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REMEDIAL DESIGN INVESTIGATION REPORT

Gratwick-Riverside Park Site
North Tonawanda, New York

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North Tonawanda, New York**

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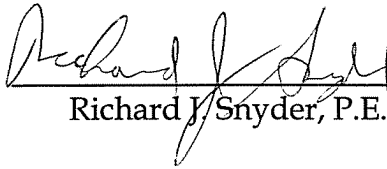
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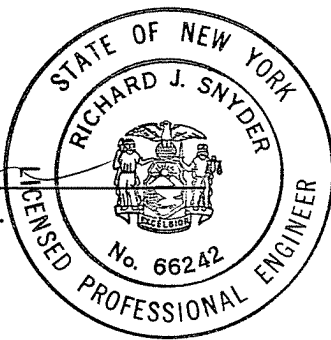
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CERTIFICATION

I, Richard J. Snyder, a Registered Professional Engineer in the State of New York do hereby certify that the document entitled "Remedial Design Investigation Report, Gratwick-Riverside Park Site, North Tonawanda, New York" has been prepared in accordance with the Order on Consent.


Richard J. Snyder, P.E.



October 24, 1996
Date.

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LIST OF ACRONYMS

BVM	-	Black Viscous Material
City	-	City of North Tonawanda
CRA	-	Conestoga-Rovers & Associates
FOP	-	Field Operations Plan
gpm	-	gallons per minute
HASP	-	Health and Safety Plan
HDPE	-	High Density Polyethylene
MHP	-	Material Handling Plan
NAPL	-	Non-Aqueous Phase Liquid
NMPC	-	Niagara Mohawk Power Corporation
NYSDEC	-	New York State Department of Environmental Conservation
POTW	-	Publicly Owned Treatment Works
PPs	-	Performing Parties
QA/QC	-	Quality Assurance/Quality Control
QAPP	-	Quality Assurance Project Plan
RA	-	Remedial Action
RD	-	Remedial Design
RD Work Plan	-	Remedial Design Work Plan
RI	-	Remedial Investigation
River	-	Niagara River
Site	-	Gratwick-Riverside Park Site
SOW	-	Scope of Work
USCS	-	United Soils Classification System
USGS	-	United States Geological Service

1.0 INTRODUCTION

In order to perform the Remedial Design (RD) for the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York, additional studies and investigations were required to supplement the data obtained by the New York State Department of Environmental Conservation (NYSDEC) during performance of the Remedial Investigation (RI). The Site location is shown on Figure 1.1. The predesign activities required to provide the additional data are described in the NYSDEC approved document entitled "Remedial Design Work Plan" June 1996, (RD Work Plan).

The predesign activities consisted of the following:

- i) generation of accurate base and topographic maps;
- ii) generation of representative cross-sections across the shoreline showing the Niagara River (River) bottom;
- iii) performance of predesign soil investigations;
- iv) installation and performance of pumping tests on a prototype groundwater withdrawal system;
- v) performance of a floodplain assessment;
- vi) performance of a Fish and Wildlife Habitat Evaluation;
- vii) performance of a Stage 1A Cultural Resources Survey;
- viii) performance of a Coastal Zone Consistency Evaluation;
- ix) performance of materials compatibility studies;
- x) performance of treatability studies for the black viscous material (BVM) in the pothole area; and
- xi) groundwater treatability studies (if required).

The above predesign activities have been completed except for item x). The analytical results from the 48-hour pumping tests will be evaluated to determine the acceptability of the groundwater for direct discharge to the City of North Tonawanda (City) Publicly Owned Treatment Works (POTW). Groundwater treatability studies will be performed if it is determined that the groundwater is not acceptable.

The purpose of this report is to present the data obtained from the predesign activities. All predesign activities were conducted in accordance with the Field Operations Plan (FOP), Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and the Materials Handling Plan (MHP) presented in Appendices A, B, C, and D, respectively, of the RD Work Plan, except for the modifications described herein.

2.0 ACCESS AGREEMENTS

All predesign activities were performed on-Site and as such no off-Site access agreements were required. The Site itself is owned by Niagara Mohawk Power Corporation (NMPC) and is leased to the City. As both are Performing Parties (PPs), on-Site access agreements were not required.

3.0 SITE SURVEY

3.1 BASE AND TOPOGRAPHIC MAPS

An accurate base map of the Site and surrounding area at a scale of 1 inch = 100 feet has been generated from aerial photographs of the Site. The aerial photographs were also used to generate a topographic map with a contour interval of one foot. The base/topographic map is presented on Plans 1 and 2.

The base/topographic map allows for:

- i) delineation of surface water drainage pathways (a component of the surface water management plan); and
- ii) accurate estimates of fill material required for Site grading and capping.

3.2 HORIZONTAL CONTROL

The base map is relatable to both the New York Transverse Mercator and the New York State Plane Grid System. This relationship has been identified on the base/topographic map.

Each of the existing monitoring wells used during predesign activities and all wells (monitoring and withdrawal) and boreholes installed as part of the predesign activities have been tied into the grid coordinate system with an accuracy of $1\pm$ foot. All survey work was performed by a professional land surveyor licensed by the State of New York.

3.3 VERTICAL CONTROL

All existing monitoring wells used during predesign activities and all wells (monitoring and withdrawal) and boreholes installed as part of predesign activities were surveyed by a professional land surveyor

licensed by the State of New York. The top of the casing of these wells were surveyed to an accuracy of $0.01\pm$ feet and the ground elevations of the wells and boreholes were surveyed to an accuracy of $0.1\pm$ feet.

3.4 PERMANENT MARKERS

The locations and elevations of permanent markers used for the survey have been identified on the base/topographic map.

3.5 NIAGARA RIVER CROSS-SECTIONS

Cross-sections across the shoreline showing the River bottom have been obtained at $1,000\pm$ foot centers along the shoreline. The cross-sections were extended into the River until an elevation equivalent to 3 feet below the average yearly minimum daily mean (USGS datum) River water surface level was reached. This elevation has been calculated to be 564.4 feet AMSL (USGS datum), using River water levels from 1968 to 1991 (see Appendix A) obtained at the U.S. Army Corps of Engineers Tonawanda Island river water level monitoring station. The average yearly daily minimum was calculated using the daily minimum water level recorded during each year of record (see Table 3.1). The River sections are presented on Plan 3.

4.0 PREDESIGN SOIL INVESTIGATIONS

Two soil investigations were conducted as part of the predesign activities to additionally characterize the Site. The two investigations included:

- i) determination of the horizontal and vertical extent of the black viscous material in the pothole area; and
- ii) delineation and characterization of the overburden materials along the areas of shoreline stabilization and barrier wall construction.

4.1 POTHOLE AREA

Prior to the remediation of the pothole area, the vertical and horizontal extent of BVM needed to be defined. The definition was achieved through the installation and logging of seven overburden boreholes (PBH14, 14A, and 14B-96, PBH15-96, and PBH16, 16A, and 16B-96). Initially, three boreholes were installed approximately 10 feet beyond the outer limit of the BVM as observed by the NYSDEC (see Figure 4.1 for locations). BVM was observed in boreholes PBH13-96 and PBH14-96 and as such, four additional boreholes were installed to delineate its extent. The additional boreholes were installed approximately 10 feet beyond the boreholes where BVM had been observed. The BVM areal extent is shown on Figure 4.1. Cross-sections A-A' and B-B' are shown in Figures 4.2 and 4.3, respectively. The pothole area borehole stratigraphic logs are included in Appendix B.

4.1.1 Treatability Study

BVM was collected from the pothole area and used in a treatability study to evaluate the effectiveness of in-place solidification of the BVM. The treatability study report is provided in Appendix C.

All seven samples passed TCLP limits and RCRA characteristics except for one semi-volatile parameter (2,4,6-trichlorophenol)

in one sample (BVM:Soil:Cement = 100:50:50 cured at 55°F). The 2,4,6-trichlorophenol concentration of 2.3 mg/L was approximately equal to the regulatory level of 2.0 mg/L. A Quality Assurance/Quality Control (QA/QC) review of the analytical results (see Appendix D) concluded the data were acceptable.

The performance testing results show that soil needs to be a significant part of the mixture to provide a stabilized material with load-bearing capacity. The BVM:S:C of 100:100:100 provided an unconfined compressive strength of 9.5 psi after 7 days of curing.

The results will be used to determine the BVM:S:C mixture necessary to achieve the objectives of generating a solid mass that passes the paint-filter test, that has an acceptable unconfined compressive strength and which has acceptable TCLP organic parameter concentrations.

It is recommended that the following mixture be used for solidification of the BVM:

BVM = 100 (maximum);
Soil = 100; and
Cement = 100 (maximum).

It is believed that mixtures containing less than 100 parts by weight of BVM (compared to soil) and equal weights of BVM and cement, will result in an acceptable solidified material based on the TCLP results for the first six samples which had BVM:C ratios ranging from 100:30 to 100:100 and based on the compressive strength results of the BVM:S:C = 100:100:100 sample. Such mixtures will have higher load-bearing capacities and will result in no TCLP exceedances. Likely BVM:S:C ratios during actual construction are expected to be in the 20:100:20 to 40:100:40 range as overlying and underlying soils are added into the mixture during the excavation process. The soils added will be in addition to the soil already mixed in with the BVM in its current insitu state.

4.2 BARRIER WALL ALIGNMENT AND SHORELINE AREAS

A predesign soil investigation was conducted to provide information necessary to design and construct the shoreline stabilization and barrier wall. The investigation was undertaken to identify the depth of the clay/till unit (confining unit) along the anticipated alignment of the barrier wall.

The soil investigation involved the installation of 25 boreholes which included BH1-96 to BH23-96 and the boreholes for prototype withdrawal wells PW-1 and PW-2. The boreholes were drilled to a minimum depth of two to four feet below the top of the clay/till unit. No bedrock was encountered during borehole advancement. The boreholes were spaced at approximately 200-foot centers along the proposed alignment of the barrier wall as shown on Figures 4.4 and 4.5. The boreholes were installed beginning on June 21, 1996 and were completed on July 12, 1996. No drums were encountered during the borehole installations.

Drilling was performed using both track-mounted and truck-mounted drilling rigs. Continuous samples were collected from the ground surface using 3-inch diameter split-spoon samplers in advance of the augering operation (8-inch outside diameter).

Soil samples were collected and examined to determine stratigraphy and were logged using the United Soils Classification System (USCS). Stratigraphic logs are included in Appendix E for boreholes BH1-96 through BH23-96 and stratigraphic and well instrumentation logs are included in Appendix F for wells PW-1 and PW-2. Geologic record samples were collected and are stored at the City wastewater treatment plant. A representative sample of the confining unit from within each borehole was submitted for moisture content and grain size analysis. Three undisturbed samples of the confining unit material were collected and submitted for permeability and Atterburg limits testing. These samples represented intervals composed primarily of clay. A fourth sample was obtained from the till unit which is composed of silts, sands, and gravel. Shelby tubes were used to collect the three undisturbed samples of the clay unit. Shelby tubes were

not able to penetrate the glacial till. Thus, a 3-inch diameter split spoon was used to obtain a core sample of the till. The till core sample was sealed inside the split spoon with wax and sent to the testing facility for permeability and Atterburg limits testing. This sample was received in a disturbed state, most likely because of the use of a split-spoon to collect the sample, by the laboratory and was not tested. The physical testing results are presented in Appendix G and are summarized in Table 4.1.

Borehole installation protocols and soil sampling protocols were performed as outlined in the RD Work Plan with the following exceptions:

- i) Four instead of the proposed six undisturbed samples of the confining unit were collected due to lack of material amenable to collection by Shelby tubes (i.e., clay). The lack of a clay layer and the very dense nature of the confining till unit in the majority of the boreholes prevented the use of Shelby tubes.
- ii) The till sample was not tested because the sample was received in a disturbed state as described above.
- iii) Five composite samples of the fill were submitted for TCLP and RCRA Characteristic analysis.

Borehole drill cuttings and excess soil from split spoon samples not used for geologic record were handled as discussed in Section 7.0.

4.3 EVALUATION OF DATA

A discussion and evaluation of the data collected during the predesign soils investigations is presented in the following subsections.

4.3.1 Site Geology

The following presents the Site geology as interpreted from the data collected during the NYSDEC RI and the predesign field activities.

The stratigraphic sequence observed at the Site is:

- i) fill material overlying;
- ii) River deposited sands and silts overlying;
- iii) native lacustrine silt and clay and till layers overlying;
- iv) bedrock.

A summary of the overburden geologic layers encountered is presented in Table 4.2.

4.3.1.1 Thickness of Fill Material

The thickness of the fill material along the River shoreline (i.e., along proposed barrier wall alignment) was determined through the compilation of the RI and predesign information. Cross-sections of the thickness of the fill materials along the River are presented on Figures 4.6 and 4.7.

The fill materials ranged in thickness from 8.0 feet to 20.2 feet with an average thickness on the order of 14± feet.

4.3.1.2 Native Materials

During performance of the RI, the thickness of the confining unit was found to range from 20 to 38.5 feet. Thus, it was not necessary to penetrate the confining unit to bedrock during the predesign activities. The depth of penetration of the native materials including the confining unit underlying the River deposited sands and silts ranged from 3±

to 12± feet during performance of the predesign activities. Select samples were collected from the confining unit for physical testing as discussed in Section 4.2.

4.3.2 Proposed Barrier Wall Alignment

The boreholes installed along the River shoreline determined the depth to the confining unit. A cross-section of the proposed barrier wall alignment is presented on Figures 4.6 and 4.7. The alignment is located as close to the River as practical to ensure maximum containment of the Site fill material and overburden groundwater and to allow construction of the Remedial Action (RA) with minimal disturbance of the River and its bed.

4.3.3 Use of Site Fill Materials for Site Grading

Existing Site fill materials will not be used for Site grading purposes, except for:

- i) soils in the area north of the marina and south of the dog walk (i.e., south of entrance opposite Ward Road);
- ii) minor surface grading particularly along River Road; and
- ii) excess materials generated during the predesign activities and/or during construction (i.e., barrier wall, groundwater collection system, conveyance system and sewer cleaning).

The soil piles located in the area north of the marina are excess soils obtained from construction of the City POTW. This area is to be a natural revegetation area with low-level gently graded hummocks to provide variety in topographic relief pursuant to the current concept plan for the Site. This will be accomplished by using to the extent practical the current topographic relief of the soil piles to minimize grading of this material.

The soils in the stockpile located in the portion of the Site north of the entrance opposite Ward Road will be used during the pregrading and capping operations. The specific use of the soils will be determined based on analytical results from samples collected pursuant to the document entitled "Soil Stockpile Sample Collection and Analysis Plan" to be submitted by October 31, 1996. Sample collection and analysis will not be performed until NYSDEC approves the plan.

4.3.4 Use of Existing Topsoil Cover

Where practical, the existing topsoil cover over the Site can be stripped, stockpiled and reused as the final cover for the Site after the regrading has been performed. Stripping of the topsoil will be allowed to a maximum depth of one half of the existing topsoil layer thickness. Stripping of the topsoil will immediately precede the placement of the grading material to minimize the amount of time exposed areas are left uncovered.

4.3.5 Shoreline Material Characterization

An activity additional to those specified in the RD Work Plan was the collection of fill samples and analysis of those samples for TCLP and RCRA characteristics to determine if the fill located between the proposed barrier wall alignment and the River requires excavation and if required, the extent of such excavation.

Samples were collected from the fill identified in the 23 barrier wall alignment boreholes and the boreholes for prototype extraction wells PW-1 and PW-2. The samples were field composited to form five samples which were submitted for analysis. The boreholes forming each composite are shown in Table 4.3 and the interval within each borehole from which sample was collected is shown in Table 4.4.

The TCLP and RCRA characteristic results (see Appendix H) were less than their associated EPA regulatory levels except for one sample from BH21-BH23 with lead at a concentration of 10 mg/L , the concentration of which was slightly above the EPA regulatory level (5 mg/L).

A QA/QC review of the results has been performed (see Appendix H). Based on the QA/QC review, the data are judged acceptable with the qualifications noted in Appendix H. These data will be used in developing procedures for handling the shoreline soils outside of the proposed barrier wall alignment. The procedures will be presented in the 30% Design Report.

5.0 PROTOTYPE GROUNDWATER WITHDRAWAL SYSTEM

Two options are available for the construction of the groundwater withdrawal system. These are:

- i) tile collection system; or
- ii) a combination of withdrawal wells.

Either of the above options will be supplemented with a physical barrier (barrier wall) to eliminate the hydraulic pathway between the groundwater withdrawal system and the River.

Three 6-inch diameter overburden groundwater withdrawal wells were installed as a prototype groundwater withdrawal system. Pumping tests at each of the withdrawal wells were performed to determine overburden characteristics and zones of capture. This information will be used to evaluate which of the two options will be implemented. Existing wells and three new 2-inch diameter overburden groundwater monitoring wells were used to monitor the groundwater levels during the pumping tests. Details of withdrawal and monitoring well installation and the pumping tests are described in the following subsections.

5.1 PROTOTYPE OVERBURDEN GROUNDWATER WITHDRAWAL WELLS

Three prototype withdrawal wells were installed in the overburden using hollow-stem auger drilling methods at the locations shown on Figures 4.4 and 4.5. The well locations were selected based on the following considerations:

- i) locations where groundwater monitoring data indicates representative ranges of concentrations and type of compounds present at the Site;
- ii) monitoring of the potential hydraulic effects on the overburden and bedrock groundwater in close proximity to the prototype withdrawal wells; and

- iii) placement adjacent to the River in close proximity to the alignment of the proposed groundwater withdrawal system.

The three prototype withdrawal wells were installed at locations approximately 20 to 50 feet from existing Site overburden/bedrock monitoring well nests (i.e., GW-5, GW-6, and GW-9) and were installed as outlined in Appendix A (FOP) of the RD Work Plan. The withdrawal well installation details are summarized in Table 5.1. Stratigraphic and instrumentation logs for the prototype withdrawal wells are included in Appendix F.

Cuttings generated during prototype withdrawal well installation were handled as described in Section 7.0.

5.2 OVERBURDEN MONITORING WELLS

Three overburden monitoring wells were installed in the overburden using hollow-stem auger drilling methods at the locations shown on Figures 4.4 and 4.5. Each monitoring well was installed approximately 10 feet from its respective prototype withdrawal well. The monitoring wells were used in conjunction with existing monitoring wells to collect hydraulic data to assess the performance of the withdrawal wells.

Each monitoring well was installed to the same depth and screened at the same interval (to the extent possible) as the corresponding prototype withdrawal well.

The monitoring wells were constructed using 2-inch diameter stainless steel pipe and a stainless steel well screen as outlined in Appendix A of the RD Work Plan. The monitoring well installation details are summarized in Table 5.1. Stratigraphic and instrumentation logs for the monitoring wells are included in Appendix I

Cuttings generated during monitoring well installation were handled as described in Section 7.0.

5.3 INSPECTION AND REPLACEMENT OF NYSDEC WELLS

Prior to conducting the pumping tests, all existing Site monitoring wells proposed to be used for monitoring groundwater levels during the pumping tests, were inspected to ensure their integrity. Two wells, GW-5S and GW-8I, were found to be unsuitable for use during monitoring. Both wells had damaged outer protective casings which prevented the installation of a pressure transducer for water level monitoring. A replacement well, MW-5SR was installed to the same depth as NYSDEC well GW-5S using the protocols described in Section 5.2. GW-8I was not replaced with concurrence from the NYSDEC due to:

- i) its distance from withdrawal well PW-2;
- ii) the well was screened in a low permeable zone; and
- iii) GW-8S, which is screened in the more permeable overlying fill, was monitored.

The combined effect of i) and ii) above made it unlikely that a response to pumping PW-2 would be observed at GW-8I.

5.4 WELL DEVELOPMENT

Well development was performed on each of the three newly installed monitoring wells prior to initiating the respective step-drawdown test at each of the prototype withdrawal wells. Development was performed until the extracted groundwater was observed to be clear. Approximately five well volumes of groundwater were removed from each monitoring well using a gasoline powered centrifugal pump. Development water was pumped into a 1,000-gallon polyethylene tank used for separation of potential non-aqueous phase liquid (NAPL) prior to being pumped to a City sanitary sewer for treatment at the City POTW.

The step-drawdown tests described in the following sections were used as well development for the prototype withdrawal wells.

5.5 PUMPING TESTS

5.5.1 Overview

The objective of the pumping tests was to provide sufficient hydraulic and water quality data for the detailed design of the groundwater withdrawal system and to determine the acceptability of groundwater for direct discharge to the City POTW. Specifically, the tests provided data for the following:

- i) determination of overburden hydraulic characteristics to assist in the design of the overburden groundwater collection system;
- ii) determination of zones of capture; and
- iii) determination of overburden groundwater quality.

The pumping tests included both step-drawdown tests and constant-rate pumping tests. Prior to the constant-rate pumping tests, groundwater levels were monitored in the prototype withdrawal and monitoring wells for a 24-hour period of time to establish static water levels.

Step-drawdown tests were conducted in advance of the 48-hour constant-rate pumping test in each of the three prototype withdrawal wells. The results of the step-drawdown tests were used to determine the pumping rate for the constant-rate tests. The step-drawdown test consisted of pumping the withdrawal wells at three different flow rates, increasing in succession for each hour over a 3-hour period, if possible. The step-drawdown and constant-rate pumping test results for withdrawal wells PW-1, PW-2, and PW-3 are discussed in Sections 5.5.2, 5.5.3, and 5.5.4, respectively.

The step-drawdown and constant-rate pumping tests were performed by pumping the groundwater out of the withdrawal wells using a

submersible pump. The flow rate was controlled with a ball valve and monitored with an in-line flow meter prior to being discharged into the NAPL separator tank. The NAPL separator tank was a 1,000-gallon polyethylene tank. No NAPL was detected in the separator tank during any of the three step-drawdown or constant-rate pumping tests. A transfer pump controlled with a float switch was used to pump the groundwater from the upper portion of the NAPL separator tank to a City sanitary sewer manhole located near the intersection of Witmer and River Roads. The water was transported using 2-inch diameter high density polyethylene pipe. The distances between this manhole and the pumping test locations ranged from 1,500 to 4,000 feet.

5.5.2 PW-1 Pumping Tests

5.5.2.1 Step-Drawdown Test

The step-drawdown test at prototype withdrawal well PW-1 was performed on August 22, 1996. PW-1 was pumped at rates of 5, 10 and 20 gallons per minute (gpm), however the 20 gpm rate could not be maintained due to drawdown of the water in the well to the pump intake. A maximum pumping rate of 16.5 gpm was obtained for the final step of the step-drawdown test. The water levels and pump rate information are presented in Table J.1 and on Figure J.1 in Appendix J. Based on the results of the step-drawdown test, a pumping rate of $16.5 \pm$ gpm was proposed for the 48-hour constant-rate test at PW-1.

5.5.2.2 Constant-Rate Test

The 48-hour constant-rate pumping test on withdrawal well PW-1 was initiated at 10:38 on August 27, 1996 following receipt of verbal approval from the NYSDEC for the proposed pumping rate. The intake of the pump was set approximately two feet above the bottom of the well.

The test was started at the approved pumping rate of 16.5 gpm, however, the water level in the well quickly drew down to the pump intake and the pumping rate had to be reduced to approximately 12 gpm to prevent pump cavitation. The pumping rate was further reduced to 10 gpm after approximately 17 hours of pumping due to decreased water levels in the well and was maintained at this rate for the duration of the test. Pumping was stopped at 10:27 on August 29, 1996. Water levels were recorded for the withdrawal well and nearby monitoring wells MW-1, GW-6S, GW-6I, 6W-6D, GW-3S and GW-3I, as well as the River, using pressure transducers and dataloggers. Manual water levels were recorded at select intervals as described in the RD Work Plan for confirmatory purposes. Following termination of pumping, water levels in the prototype withdrawal well and monitoring wells were monitored until a minimum of 80 percent recovery was achieved. The withdrawal/monitoring wells and monitoring locations for the PW-1 pumping test are presented on Figure 5.1. The pumping rate and water levels for the withdrawal well, monitoring wells and River are presented in Table J.2, and on Figures J.2 through J.7 in Appendix J.

5.5.2.3 Analytical Results

Groundwater samples were collected from PW-1 at approximately 10 minutes, 24 hours and 48 hours after initiation of the constant-rate test to evaluate the acceptability of the groundwater for direct discharge to the City POTW. The analytical parameters are listed in Table 5.2. A summary of organic compounds detected is shown in Table 5.3. The complete analytical results and QA/QC review are provided in Appendix K. The QA/QC review concluded that the data were acceptable.

5.5.2.4 Fill Hydraulic Parameters

Prototype withdrawal well PW-1 was pumped at an average rate of approximately 10.9 gpm for a 48-hour time period. During the test, groundwater levels were measured continuously in monitoring wells MW-1, GW-3S, GW-3I, GW-6S, GW-6I, and GW-6D. The water level in the

River also was measured during the test. Hydrographs for PW-1, MW-1, GW-3S, GW-3I, GW-6S, GW-6I, and GW-6D during the constant-rate pumping test are presented on Figures J.2 through J.7 of Appendix J. The River water level measurements are presented on the hydrograph for each monitoring well.

The initial pumping rate of 16.5 gpm determined for PW-1 from the step-drawdown test could not be sustained without dewatering the withdrawal well. The PW-1 pumping rate was gradually decreased to approximately 10 gpm over the first 1,000 minutes of the test after which pumping was essentially maintained at a constant rate. PW-1 was pumped at an average rate of approximately 12 gpm during the first 1,200 minutes of the test. The water level in PW-1 fluctuated significantly during this time period due to the pumping rate changes and the fact that the drawdown measured in PW-1 could not be reliably interpreted. Drawdown was observed during the first 1,000 minutes of the test in monitoring wells GW-3I, GW-6S, and GW-6D, although the magnitude of the drawdown data was insufficient to provide a reliable interpretation. No measurable response was observed in monitoring well GW-6I over the duration of the test. Figures J.5 and J.7 of Appendix J show that the groundwater levels in monitoring wells GW-6S and GW-6D increased rapidly in response to increasing River levels. Drawdown to the PW-1 pumping was observed in monitoring well MW-1 located 10.4 feet from PW-1. Due to a groundwater level increase in MW-1 corresponding to an increase in the River water level after approximately 1,200 minutes of pumping, only the MW-1 drawdown measured over the first 1,200 minutes of the test could be reliably interpreted. Correcting the increase in the MW-1 groundwater level by subtracting the River level increases would be invalid since, as is apparent on Figure J.2 of Appendix J, the magnitude of the River level increase was greater than that of the MW-1 groundwater level increase. A direct relationship between the River level and MW-1 groundwater level could not be established due to the PW-1 pumpage. At the completion of the test, the groundwater level recovery in MW-1 was influenced by increasing water levels in the River and thus the recovery data could not be reliably interpreted.

The drawdown observed in MW-1 was interpreted using the unconfined aquifer solutions developed by Neuman (1974¹) and Cooper and Jacob (1946²) as implemented in the aquifer test analysis program Aqtesolv™ (Geraghty & Miller, Inc., 1994³). Both PW-1 and MW-1 fully penetrate the saturated fill thickness. Since no delayed gravity response was apparent in the MW-1 drawdown, the specific yield for the Neuman solution was set to a low value (0.0001).

The theoretical type curve matches to the MW-1 drawdown are contained in Appendix L. Both solutions provided a transmissivity value of 1,200 feet²/day (ft²/d). Using an average of the fill saturated thickness at PW-1 and MW-1 (7 ft), the hydraulic conductivity of the fill was calculated to be 6.0×10^{-2} centimeters per second (cm/sec). A storage coefficient value of 0.2 ft/ft was determined from both solutions.

5.5.3 PW-2 Pumping Tests

5.5.3.1 Step-Drawdown Test

The step-drawdown test at prototype withdrawal well PW-2 was performed on August 29, 1996. PW-2 yielded sufficient groundwater for the initial 5 gpm step-test. Dewatering of the well occurred after 45 minutes while pumping at a rate of 10 gpm during the second step of the test. The flow rate was reduced to 8 gpm at this time to prevent pump cavitation and was used for the third step test. The water levels in PW-2 were monitored using a pressure transducer. The water levels and pump rate information are presented in Table J.3 and on Figure J.8 in Appendix J. Based on the results of the step-drawdown test, a pumping rate of 6.5 gpm was proposed for the 48-hour test at PW-2. Verbal discussions were held with the NYSDEC and a pumping rate of $8 \pm$ gpm was agreed upon cognizant of the fact

¹ Neuman, S. P., 1974, Effect of Partial Penetration on Flow in Unconfined Aquifers Considering Delayed Gravity Response, Water Resources Research, 10(2), pp. 303-312.

² Cooper, H. H., Jr., and C. E. Jacob, 1946, A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History, Trans. Amer. Geophys. Union, 27, pp. 526-534.

³ Geraghty & Miller, Inc., 1994, Aqtesolv™ Aquifer Test Solver, Version 2.0, Reston, Virginia.

that pumping rates would be reduced if groundwater drawdown caused pump cavitation.

5.5.3.2 Constant-Rate Test

The 48-hour constant-rate pumping test on withdrawal well PW-2 was initiated at 10:50 on September 4, 1996 at a pumping rate of $8\pm$ gpm. The intake of the pump was set approximately 2 feet above the bottom of the well. The pumping rate was decreased to $7\pm$ gpm after approximately 24 hours of pumping, as the well had dewatered. This flow rate was maintained for the duration of the test. Pumping was stopped at 11:10 on September 6, 1996. Water levels were recorded for the withdrawal well and nearby monitoring wells MW-2, MW-5SR, MW-5I, MW-5D, and MW-8S, as well as the River, using pressure transducers and dataloggers. Manual water levels were recorded at select intervals as described in the RD Work Plan for confirmatory purposes. Following termination of pumping, water levels in the prototype withdrawal well and monitoring wells were monitored until a minimum of 80 percent recovery was achieved. The withdrawal/monitoring wells and River monitoring locations for the PW-2 pump test are presented on Figure 5.2. The pumping rate and water levels for the withdrawal well, monitoring wells and River are presented in Table J.4 on Figures J.9 through J.13 in Appendix J.

5.5.3.3 Analytical Results

Groundwater samples were collected from PW-2 at approximately 10 minutes, 24 hours, and 48 hours after initiation of the constant-rate test to evaluate the acceptability of the groundwater for direct discharge to the City POTW. A summary of the organic compounds detected is shown in Table 5.3. The complete analytical results and QA/QC review are provided in Appendix K. The QA/QC review concluded that the data were acceptable.

5.5.3.4 Fill Hydraulic Parameters

Prototype withdrawal well PW-2 was pumped at an average rate of approximately 7.1 gpm for a 48-hour time period. During the test, groundwater levels in monitoring wells MW-2, MW-5SR, GW-5I, GW-5D, and GW-8S were measured continuously. Hydrographs for PW-2, MW-2, MW-5SR, GW-5I, GW-5D, and GW-8S during the constant-rate pumping test are presented on Figures J.9 through J.13 of Appendix J. The River water level measurements obtained during the test are presented on the hydrograph for each monitoring well.

The initial pumping rate of $8 \pm$ gpm determined for PW-2 from the step-drawdown test could not be sustained without dewatering the withdrawal well. The PW-2 pumping rate was gradually decreased to approximately 7.7 gpm over the first 400 minutes of the test where it remained essentially constant until the pumping rate was decreased further to $7 \pm$ gpm after approximately 24 hours. Fluctuations in the PW-2 water level occurred throughout the test due to the pumping rate changes and the fact that the drawdown measured in PW-2 could not be reliably interpreted. No significant drawdown was observed in monitoring wells GW-5I or GW-8S. The groundwater level in GW-5D increased and decreased throughout the test in response to changes in the River water levels. A definite drawdown to the PW-2 pumping was observed in monitoring wells MW-2 and MW-5SR located 11 ft and 30.5 ft, respectively, from PW-2. At approximately 1,000 minutes after initiating the test, the water levels in MW-2 and MW-5SR increased due to an increase in the River water level. The magnitude of the groundwater level increases were less than the River water increase and the MW-2 and MW-5SR water levels could not be corrected. As a result, only the MW-2 and MW-5SR drawdown measured over the first 1,000 minutes of the test could be reliably interpreted. The average PW-2 pumping rate was approximately 7.7 gpm over this time period. The MW-2 and MW-5SR recovery measured at the completion of the test could not be reliably interpreted due to continued influence from increases in the River water level.

The drawdown observed in MW-2 and MW-5SR was interpreted using the Neuman (1974) unconfined aquifer solution. The prototype well PW-2 and monitoring wells MW-2 and MW-5SR partially penetrate the saturated fill thickness. The Cooper and Jacob solution (1946) does not incorporate partial penetration and was not used. Since no delayed gravity response was observed in either the MW-2 or MW-5SR drawdown, the specific yield for the Neuman solution was set to a low value (0.0001).

The theoretical type curve matches to the drawdown measured in MW-2 and MW-5SR are contained in Appendix L. Both type curve matches provide comparable transmissivity values of $975 \text{ ft}^2/\text{d}$ for MW-2 and $848 \text{ ft}^2/\text{d}$ for MW-5SR. Using the average of the saturated fill thickness at PW-2, MW-2 and MW-5SR (13.6 ft), hydraulic conductivity values of $2.5 \times 10^{-2} \text{ cm/sec}$ and $2.2 \times 10^{-2} \text{ cm/sec}$ were calculated from the MW-2 and MW-5SR drawdown interpretations, respectively. Storage coefficient values of 0.1 ft/ft and 0.08 ft/ft were determined from the MW-2 and MW-5SR drawdown interpretations, respectively.

5.5.4 PW-3 Pumping Tests

5.5.4.1 Step-Drawdown Test

Pumping for the 48-hour pumping test at PW-2 was stopped at 11:10. on September 6, 1996. Relocation of the discharge line from PW-2 to PW-3 to perform the step-drawdown test at PW-3 would have required approximately 1 day. To accelerate completion of the pumping tests, the decant tank was emptied of groundwater extracted from PW-2 and relocated to PW-3. The step-drawdown test at prototype withdrawal well PW-3 was performed on September 6, 1996. Three step-tests at pumping rates of 5, 10, and 20 gpm were completed without drawdown of the groundwater level to the pump intake. A fourth step was initiated at a pumping rate of 22 gpm and performed for $18 \pm$ minutes at which time the decant tank was full. Water levels in PW-3 were monitored using a pressure transducer. The water levels and pump rate information are presented in Table J.5 and on

Figure J.14 in Appendix J. Based on the results of the step-drawdown test, a pumping rate of $22\pm$ gpm was proposed for the 48-hour test at PW-3.

5.5.4.2 Constant-Rate Test

The 48-hour pumping test on withdrawal well PW-3 was initiated at 11:25 on September 10, 1996 following receipt of verbal approval from the NYSDEC for the proposed pumping rate. The intake of the pump was set approximately 2 feet above the bottom of the well. The initial rate of $22\pm$ gpm could only be maintained for one hour before drawdown in the well caused the pump to cavitate. The flow rate was reduced to $20\pm$ gpm, and was eventually decreased to $15\pm$ gpm as the drawdown of the groundwater level in the well caused pump cavitation. The generator used for the test operated intermittently from 04:30 to 06:10 on September 22, 1996 and stopped operating at 06:10 on September 22, 1996 due to a clogged fuel filter. The filter was replaced and pumping restarted at 08:55 on September 11, 1996. Pumping for the constant rate test was extended to 16:55 on September 12, 1996 for a total time of $53.5\pm$ hours ($51\pm$ hours of pumping). The pumping rate of $15\pm$ gpm was maintained for the last 16 hours of the test. Groundwater levels were recorded for the withdrawal and nearby monitoring wells MW-3 and GW-9S, as well as the River, using pressure transducers and dataloggers. Manual water levels were recorded at select intervals as described in the RD Work Plan for confirmatory purposes. Following termination of pumping, groundwater levels in the prototype withdrawal well and monitoring wells were monitored until a minimum of 80 percent recovery was achieved. The withdrawal/monitoring wells and River monitoring locations for the PW-3 pump test are presented on Figure 5.3. The pumping rate and water levels for the withdrawal well, monitoring wells and River are presented in Table J.6 and on Figures J.15 and J.16 in Appendix J.

5.5.4.3 Analytical Results

Groundwater samples were collected from PW-3 at approximately 10 minutes, 24 hours and 53.5 hours after initiation of the

constant-rate test to evaluate the acceptability of the groundwater for direct discharge to the City POTW. A summary of the organic compounds detected is shown in Table 5.3. The complete analytical results and QA/QC review are provided in Appendix K. The QA/QC review concluded that the data were acceptable.

5.5.4.4 Fill Hydraulic Parameters

Prototype withdrawal well PW-3 was pumped at an average rate of approximately 15.3 gpm for a 48-hour time period. During the test, groundwater levels in monitoring wells MW-3 and GW-9S were measured continuously. Hydrographs for PW-3, MW-3, and GW-9S during the constant-rate pumping test are presented on Figures J.15 through J.16 of Appendix J. The River water level measurements obtained during the test are presented on the hydrograph for each monitoring well.

The initial pumping rate of $22\pm$ gpm determined for PW-3 from the step-drawdown test could not be sustained without dewatering the withdrawal well. The PW-3 pumping rate was gradually decreased to $16\pm$ gpm over the first 1,000 minutes of the test when pumping was interrupted due to operational difficulties with the on-site generator used to power the pump. The stoppage in pumping lasted approximately 150 minutes allowing groundwater levels in PW-3, MW-3, and GW-9S to recover significantly but not to pretest levels. Significant fluctuations in the PW-3 groundwater level occurred due to the pumping rate changes during the first 1,000 minutes of the test and the drawdown measured in PW-3 during this time could not be reliably interpreted. The drawdown observed in monitoring wells MW-3 and GW-9S located 8 ft and 39 ft, respectively, from PW-3 measured over the first 1,000 minutes of the test and an average pumping rate of 17.7 gpm were used to estimate the overburden hydraulic properties. The recovery observed in MW-3 and GW-9S after pumping was stopped on September 12, 1996 were also interpreted. The average pumping rate of 15.3 gpm over the entire test was used in the interpretation of the recovery data.

The drawdown and recovery observed in MW-3 and GW-9S were interpreted using unconfined aquifer solutions developed by Neuman (1974) and Cooper and Jacob (1946). The prototype well PW-3 and the monitoring wells MW-3 and GW-9S fully penetrate the saturated fill thickness. Since no delayed gravity response was observed in the drawdown measured in either the MW-3 or GW-9S, the specific yield for the Neuman (1974) solution was set to a low value (0.0001).

The theoretical type curve matches to the drawdown and recovery measured in MW-3 and GW-9S are contained in Appendix L. The Neuman (1974) and Cooper and Jacob (1946) type curve matches to the MW-3 drawdown provide comparable transmissivity values of $1,409 \text{ ft}^2/\text{d}$ and $1,550 \text{ ft}^2/\text{d}$, respectively. Using the average fill saturated thickness at PW-3, MW-3 and GW-9S (8.9 ft), hydraulic conductivity values of $5.5 \times 10^{-2} \text{ cm/sec}$ and $6.1 \times 10^{-2} \text{ cm/sec}$ were calculated from MW-3 drawdown. The Neuman (1974) and Cooper and Jacob (1946) type curve matches to the MW-3 recovery data resulted in transmissivity values of $1,225 \text{ ft}^2/\text{d}$ and $1,312 \text{ ft}^2/\text{d}$, respectively, providing hydraulic conductivity values of $4.9 \times 10^{-2} \text{ cm/s}$ and $5.2 \times 10^{-2} \text{ cm/s}$. The interpretation of the GW-9S drawdown and recovery data provided hydraulic conductivity values ranging from $4.0 \times 10^{-2} \text{ cm/s}$ to $6.1 \times 10^{-2} \text{ cm/s}$. The storage coefficient values determined from the MW-2 and GW-9S drawdown and recovery interpretations ranged from 0.02 ft/ft to 0.11 ft/ft.

5.6 DISCUSSION

5.6.1 Pumping Test Results

A summary of the hydraulic properties estimated for the fill from the pumping test interpretations is presented in Table 5.4. The transmissivity and hydraulic conductivity values determined from the three pumping tests are reasonably consistent. The geometric mean of the hydraulic conductivity values determined from all of the pumping test interpretations is $6.0 \times 10^{-2} \text{ cm/sec}$. This relatively high hydraulic conductivity corresponds to the granular nature of the slag and fill material

that forms the fill. The rapid responses observed in several of the monitoring wells to changes in the River water level are also indicative of a material with a high hydraulic conductivity.

Although the hydraulic conductivity estimates for the fill are relatively high, the transmissivity is low due to its shallow saturated thickness. The saturated thickness of the fill limits the extent of influence or capture that can be achieved by each prototype well. Of the three pumping tests that were conducted, the greatest distance from a pumped well to a well with an observed drawdown was approximately 39 ft (GW-9S located 39 ft from PW-3).

5.6.2 Groundwater Analytical Results

The groundwater analytical results shown in Table 5.3 were compared to the results presented in the NYSDEC RI for wells GW-4S, GW-5S, GW-6S, GW-7S, GW-8S, and GW-9S. RI data for these wells were used when application was made and NYSDEC approval received for direct discharge of the pumping test waters to the City POTW. The comparison showed that the maximum concentrations detected in the groundwater extracted during the pumping tests were less than the maximum RI concentrations for the above wells except for carbon disulfide, 1,4-dichlorobenzene, and 1,2-dichlorobenzene in the groundwater extracted from well PW-3, as shown in the following:

<i>Compound</i>	<i>Maximum RI Concentration for Wells Referenced Above (µg/L)</i>	<i>PW-3 Concentration (µg/L)</i>
Carbon Disulfide	4	ND10 to 20
1,4-Dichlorobenzene	7	8J to 14
1,2-Dichlorobenzene	4	9J to 12

The total organic chemical concentrations in PW-1, PW-2, and PW-3 for the 48-hour pumping test samples were:

<i>Prototype Withdrawal Well</i>	<i>Sample</i>	<i>Total Organic Chemical Concentrations (1) (µg/L)</i>
PW-1	10 minutes	14
	24 hours	10
	48 hours	6
PW-2	10 minutes	300
	24 hours	240
	48 hours	320
PW-3	10 minutes	3500
	24 hours	2600
	48 hours	2600

Note:

- (1) Compounds not detected were assigned a concentration of 0 µg/L.

Wells PW-1 and PW-2 are located closer to the River than PW-3. The results listed in Table 5.3 show the influence of pumping a larger portion of River water at PW-1 and PW-2 (lower concentration), than at PW-3 (higher concentrations).

The analytical results will be evaluated to determine acceptability of the groundwater for direct discharge to the City POTW. A groundwater treatability study will be performed if it is determined that the groundwater is not acceptable. A groundwater treatability study work plan will be prepared and submitted to NYSDEC upon such determination. The study will start upon NYSDEC approval.

6.0 ASSESSMENTS AND STUDIES

6.1 FISH AND WILDLIFE HABITAT ASSESSMENT

A biotic survey of selected areas in the vicinity of the Site was conducted during May 1996 by Fine Line Technical Services, Inc. The purpose of the survey was to provide a qualitative description of wildlife resources of the Site and near-shore aquatic resources in the Site vicinity. The survey was conducted in accordance with Step I of the NYSDEC guidance document titled "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites", dated October 1994, except as noted. The Fish and Wildlife Habitat Assessment report was submitted under separate cover to the NYSDEC on August 6, 1996.

The assessment identified that:

- i) no obvious adversely impacted areas were observed within or adjacent to the Site; and
- ii) no stressed vegetation, wildlife mortality, or other abnormal changes in biota were observed.

The United States Department of the Interior Fish and Wildlife Service (Service) was contacted requesting information on the presence of endangered or threatened species in the vicinity of the Site. The letter received from the Service, dated May 7, 1996, stated that:

- i) except for occasional transient individuals, no Federally listed or proposed endangered or threatened species were known to exist in the area of the Site; and
- ii) no biological assessment or further Section 7 consultation under the Endangered Species Act is required with the Service.

Pursuant to the Service's recommendations, the NYSDEC Wildlife Resources Center was contacted requesting information on fish and wildlife resources or state-listed species at the Site. The letter received from the NYSDEC, dated August 21, 1996, stated that:

- i) one young-of-year muskellunge was observed at the Site in 1992;
- ii) offshore beds of aquatic vegetation are used by wintering diving ducks and resident waterfowl;
- iii) other water birds such as gulls and common terns (listed as threatened in New York) use the offshore aquatic plant beds as foraging areas for fish; and
- iv) the shoreline is used by shorebirds and herons.

6.2 STATE 1A CULTURAL RESOURCES SURVEY

The Stage 1A Cultural Resource Survey was submitted to the NYSDEC on July 11, 1996. The Survey determined that:

- i) there are no properties presently on or eligible for inclusion on the National or State Register of Historic Places within or adjacent to the Site;
- ii) any archaeological sites formerly present on the Site would have been destroyed by the extensive disturbances caused by filling of the Site; and
- iii) the visual impacts resulting from remediation will range from slight to positive.

The Survey recommended no additional cultural resources work for the Site.

6.3 COASTAL ZONE CONSISTENCY EVALUATION

The Coastal Zone Consistency Evaluation was submitted under separate cover to the New York Department of State on June 21, 1996. The letter received from the Department of State, dated July 2, 1996, stated that the evaluation was complete for now and that if work was to be performed in the River, the details of any such work should be transmitted to the Department of State for review by the Department.

6.4 FLOODPLAINS ASSESSMENT

Flood insurance maps for the Site were obtained from the Federal Emergency Management Agency. The Flood Insurance Study document provided high water elevations for the 100-year and 500-year storm events. The elevation at the Site's northwest (downstream) and southwest (upstream) shorelines are 569.4 and 569.8 feet amsl for the 100-year storm event and 569.9 and 570.3 feet amsl and 500-year storm event, respectively. These elevations were plotted on the Site topographic map to develop representative current floodlines for the two storm events. The floodplain maps are presented on Figures 6.1 and 6.2 using the documented elevations.

An evaluation of RA activities on the 100-year and 500-year floodplains will be presented in the 30% Design Report.

6.5 MATERIALS COMPATIBILITY STUDIES

The RD Work Plan stated that a materials compatibility testing study would be conducted if slurry wall techniques were selected as the method of construction for the barrier wall. The RD Work Plan also presented compatibility testing results from the literature for high density polyethylene (HDPE), the preferred material for the construction of a tile collection system and associated forcemain. The compatibility testing results from the literature show that HDPE is the appropriate drain tile/forcemain material and it is believed that no compatibility study for drain tile/forcemain material is required.

6.5.1 Slurry Wall Compatibility Testing

The RD Work Plan for the Site indicated that a slurry wall materials compatibility testing study would be performed if the slurry wall technique was selected as the method of construction for the barrier wall. The

PPs have not selected the construction method of the barrier wall. The PPs have decided to perform the slurry wall compatibility testing to expedite the remedial design should the slurry wall technique be selected.

The slurry wall compatibility testing program consists of Phase III testing. This predesign activity is currently ongoing. Testing results will be forwarded to the NYSDEC upon completion under separate cover.

7.0 HANDLING OF MATERIALS GENERATED DURING PREDESIGN ACTIVITIES

7.1 SOLIDS

Borehole drill cuttings and excess soil from split-spoon samples not retained for geologic samples generated during the predesign soil investigations were replaced in the borehole in the order which they were removed pursuant to "NYSDEC Technical and Administrative Guidance Memorandum (TAGM), Disposal of Drill Cuttings", dated November 1989. The final six inches of the boreholes were either backfilled with material consistent with the surrounding surface or grouted to the ground surface. Excess materials which could not be replaced within the borehole were containerized in 55-gallon drums and stored within the fenced area of the Site decontamination facility.

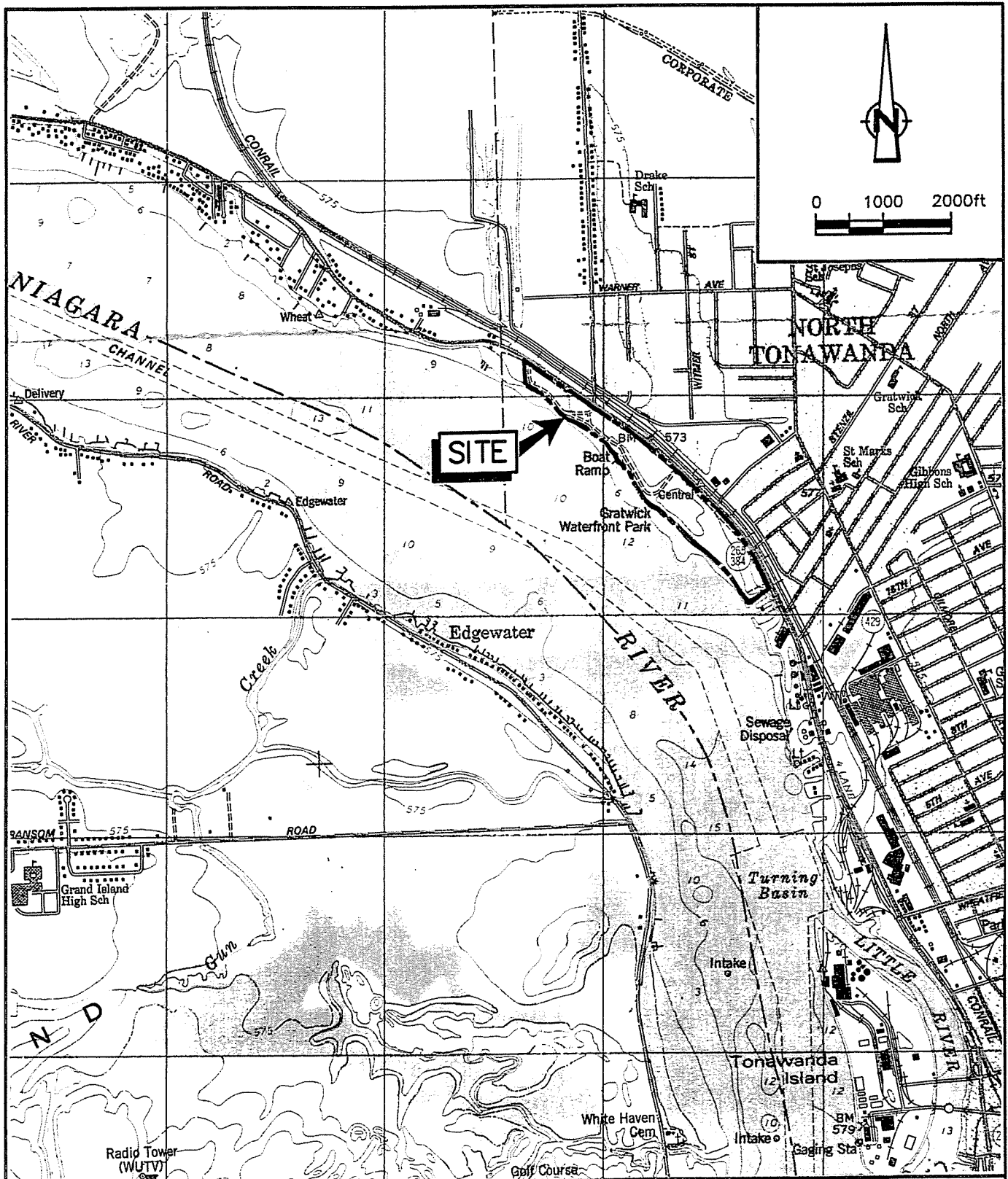
Spent personal protective equipment (PPE), disposable bailers and nylon rope generated during the predesign activities were containerized in 55-gallon drums and temporarily staged within the Site decon area.

7.2 GROUNDWATER

Groundwater collected during predesign activities was discharged to a City sanitary sewer for treatment at the City POTW. Groundwater was not drummed and stored on Site.

7.3 EQUIPMENT CLEANING

All equipment utilized during the preliminary activities was cleaned in accordance with the protocols discussed in Appendix A of the RD Work Plan. Spent cleaning fluids (20± gallons) were drummed and are currently stored in the on-Site locked fenced area.

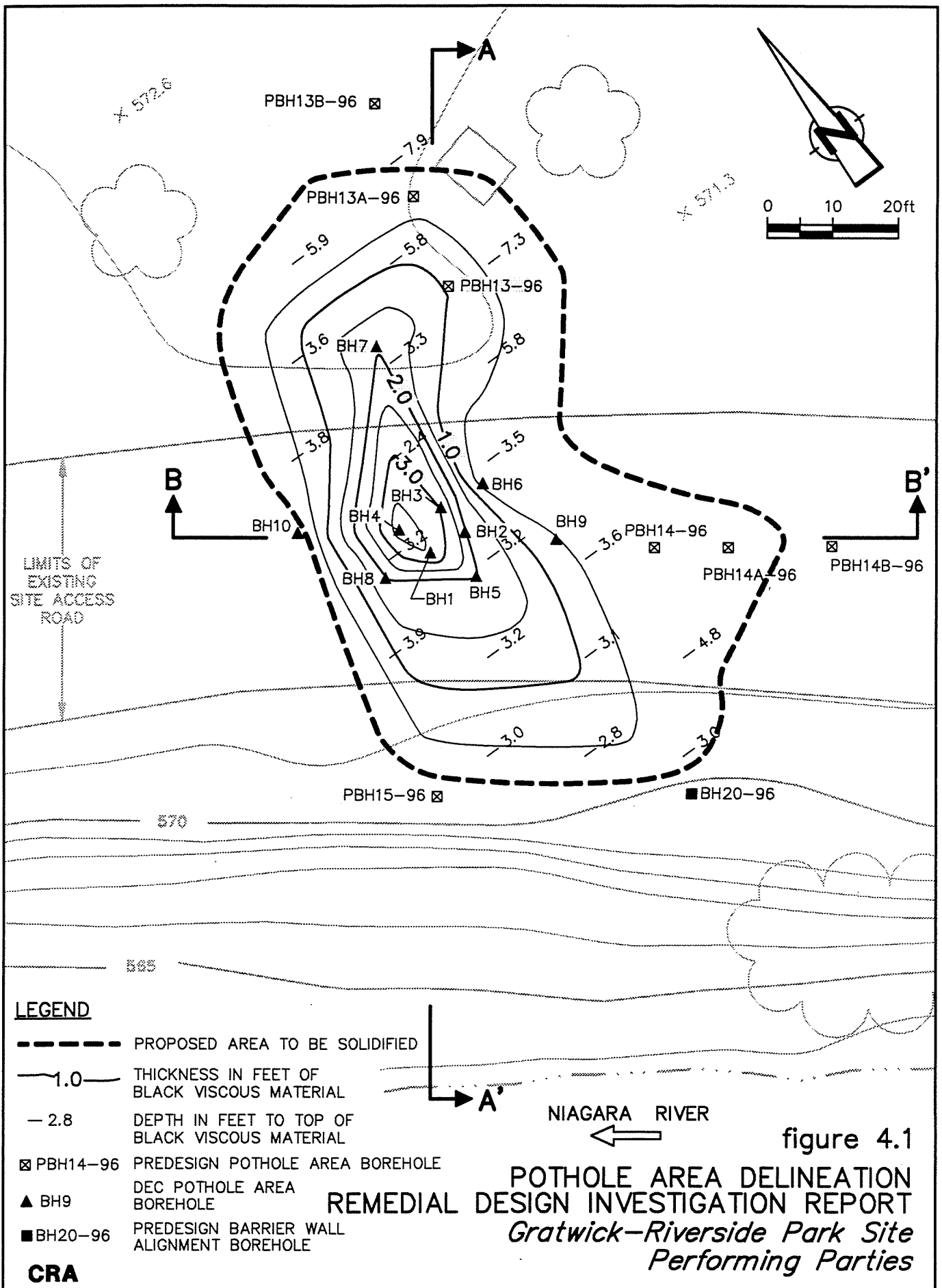


SOURCE: USGS QUADRANGLE MAP
TONAWANDA WEST, N.Y.
(1980)

figure 1.1

SITE LOCATION
REMEDIAL DESIGN INVESTIGATION REPORT
Gratwick-Riverside Park Site
North Tonawanda, New York

CRA



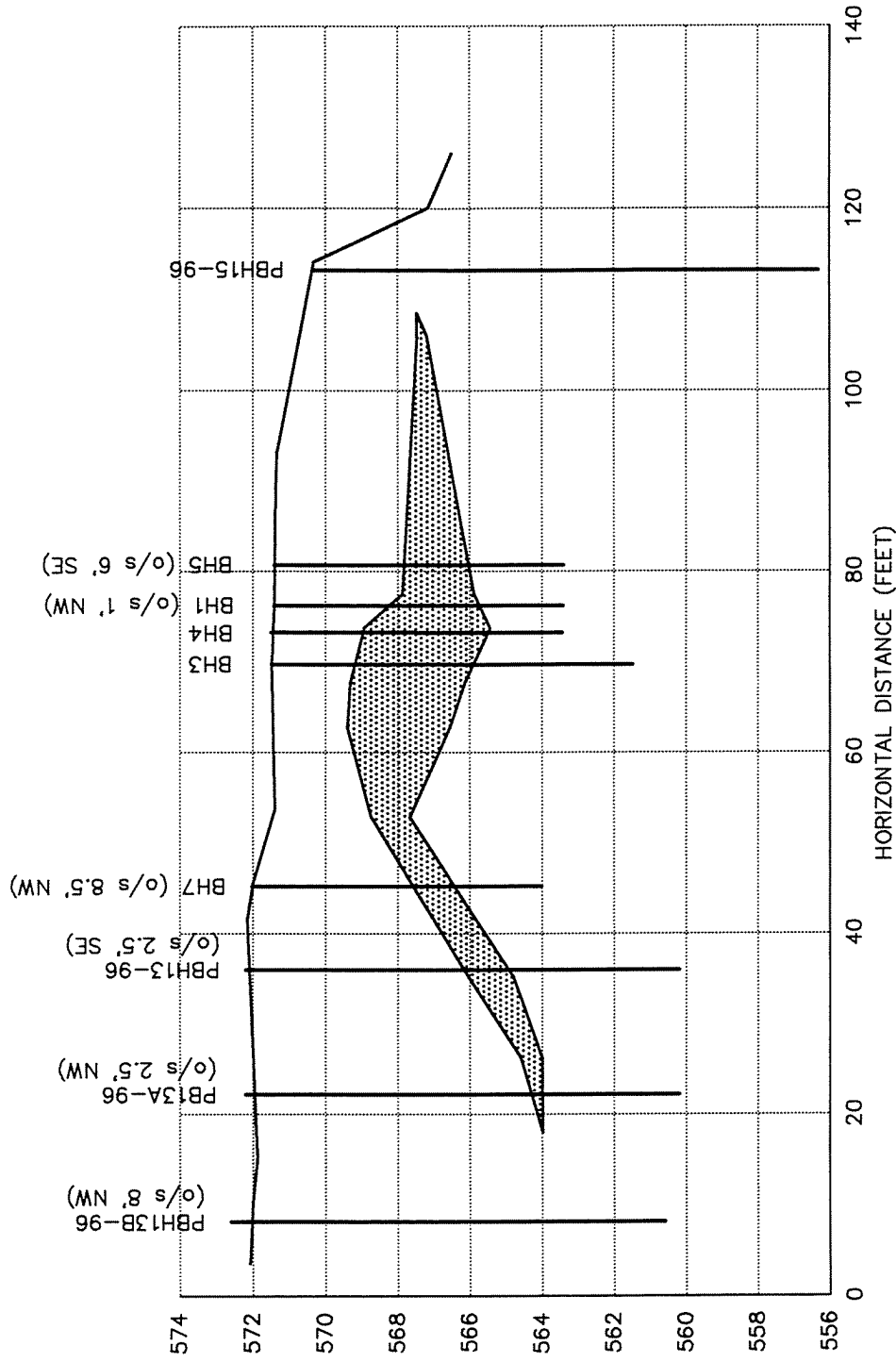


figure 4.2
 POTHOLE AREA CROSS-SECTION A-A'
 REMEDIAL DESIGN INVESTIGATION REPORT
Gratwick-Riverside Park Site
Performing Parties

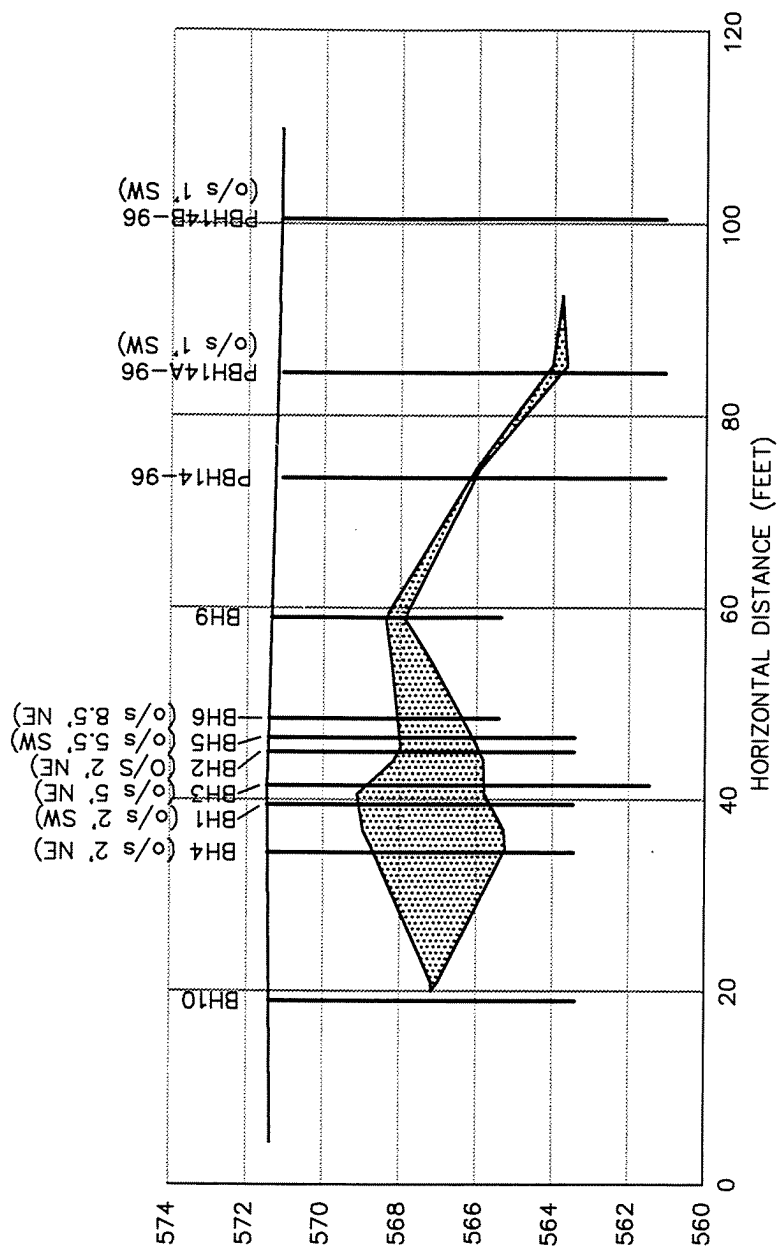
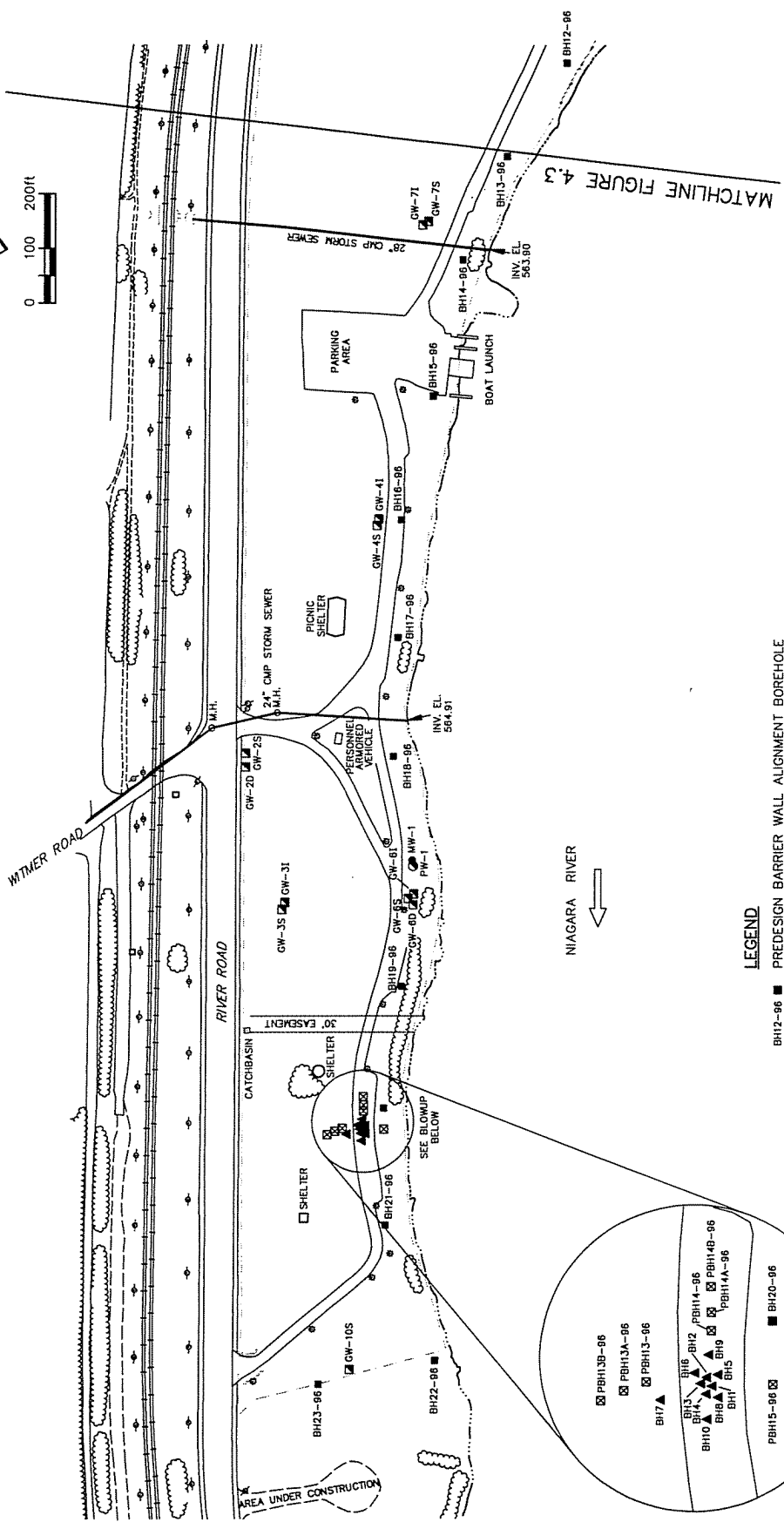
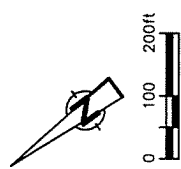


figure 4.3
 POTHOLE AREA CROSS-SECTION B-B'
 REMEDIAL DESIGN INVESTIGATION REPORT
Gratwick-Riverside Park Site
Performing Parties

CRA



- LEGEND**
- PREDESIGN BARRIER WALL ALIGNMENT BOREHOLE
 - PREDESIGN MONITORING WELL
 - DEC MONITORING WELL
 - PREDESIGN WITHDRAWAL WELL
 - PREDESIGN POT HOLE AREA BOREHOLE
 - ▲ DEC POT HOLE AREA BOREHOLE

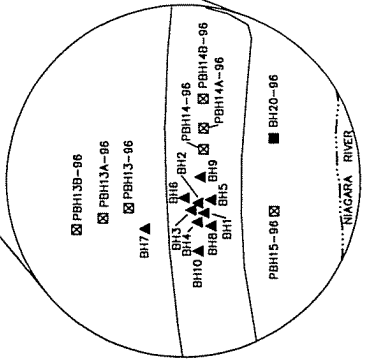
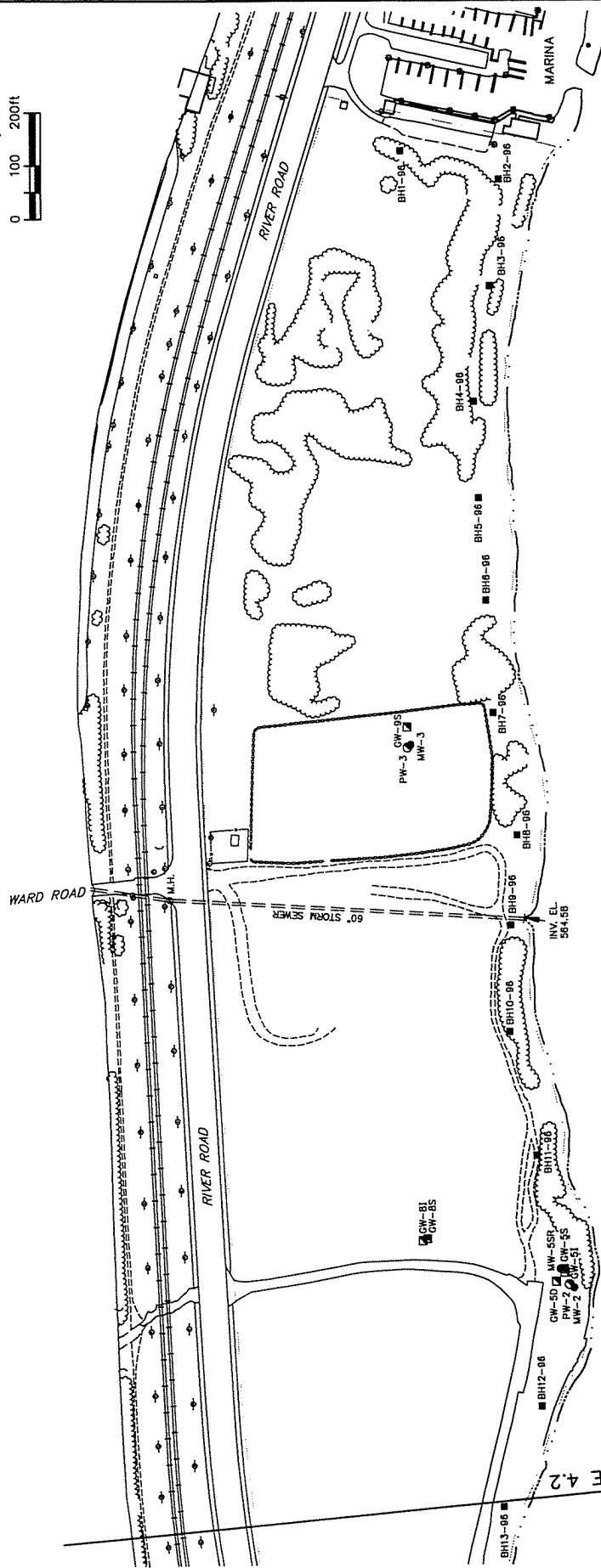


figure 4.4
WELL/BOREHOLE LOCATIONS
REMEDIAL DESIGN INVESTIGATION REPORT
Gratwick-Riverside Park Site
Performing Parties



LEGEND

- BH12-96 ■ PREDESIGN BARRIER WALL ALIGNMENT BOREHOLE
MW-1 ● PREDESIGN MONITORING WELL
GW-5D ▣ DEC MONITORING WELL
PW-3 ○ PREDESIGN WITHDRAWAL WELL

MATCHLINE FIGURE 4.2

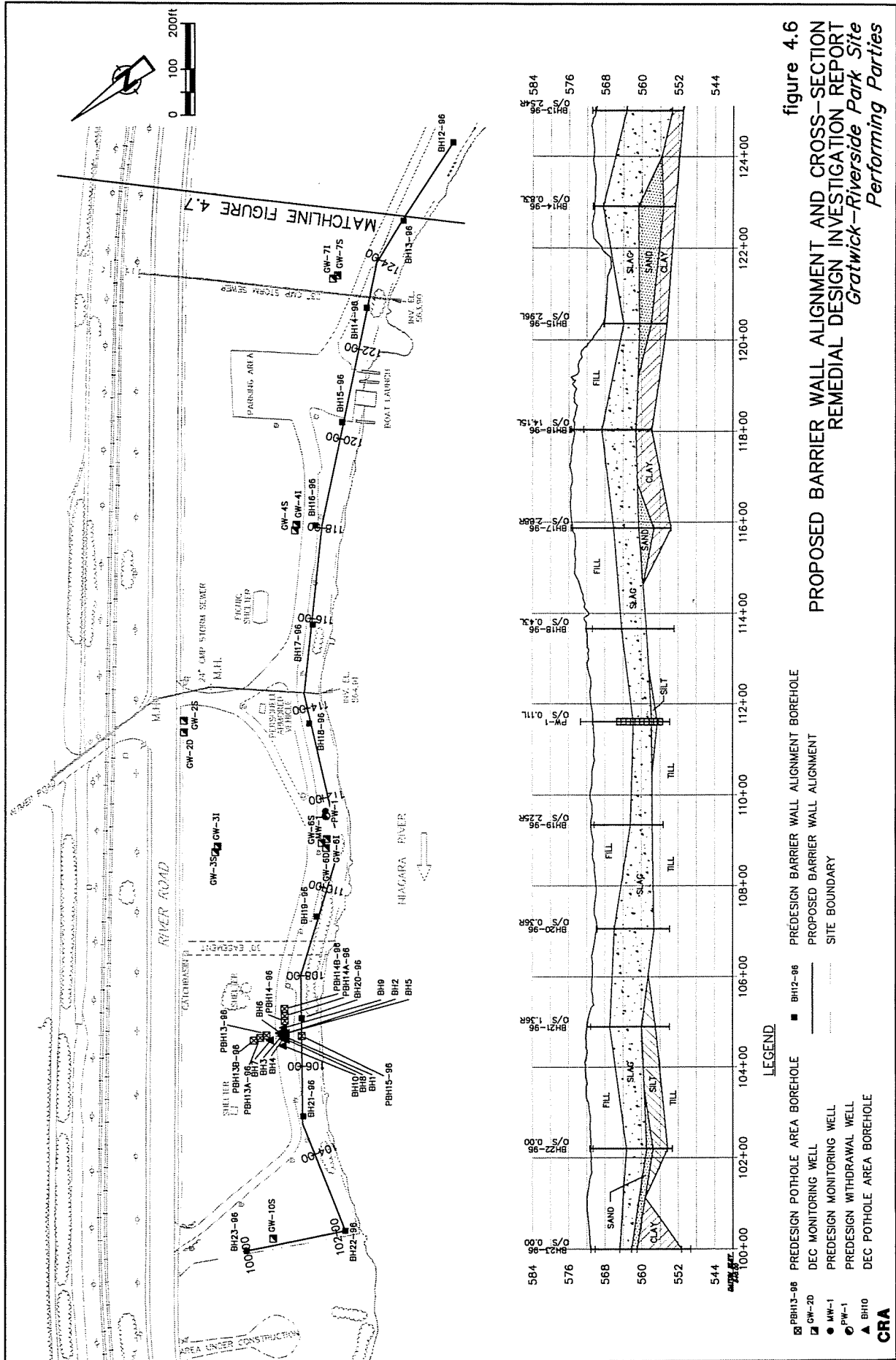
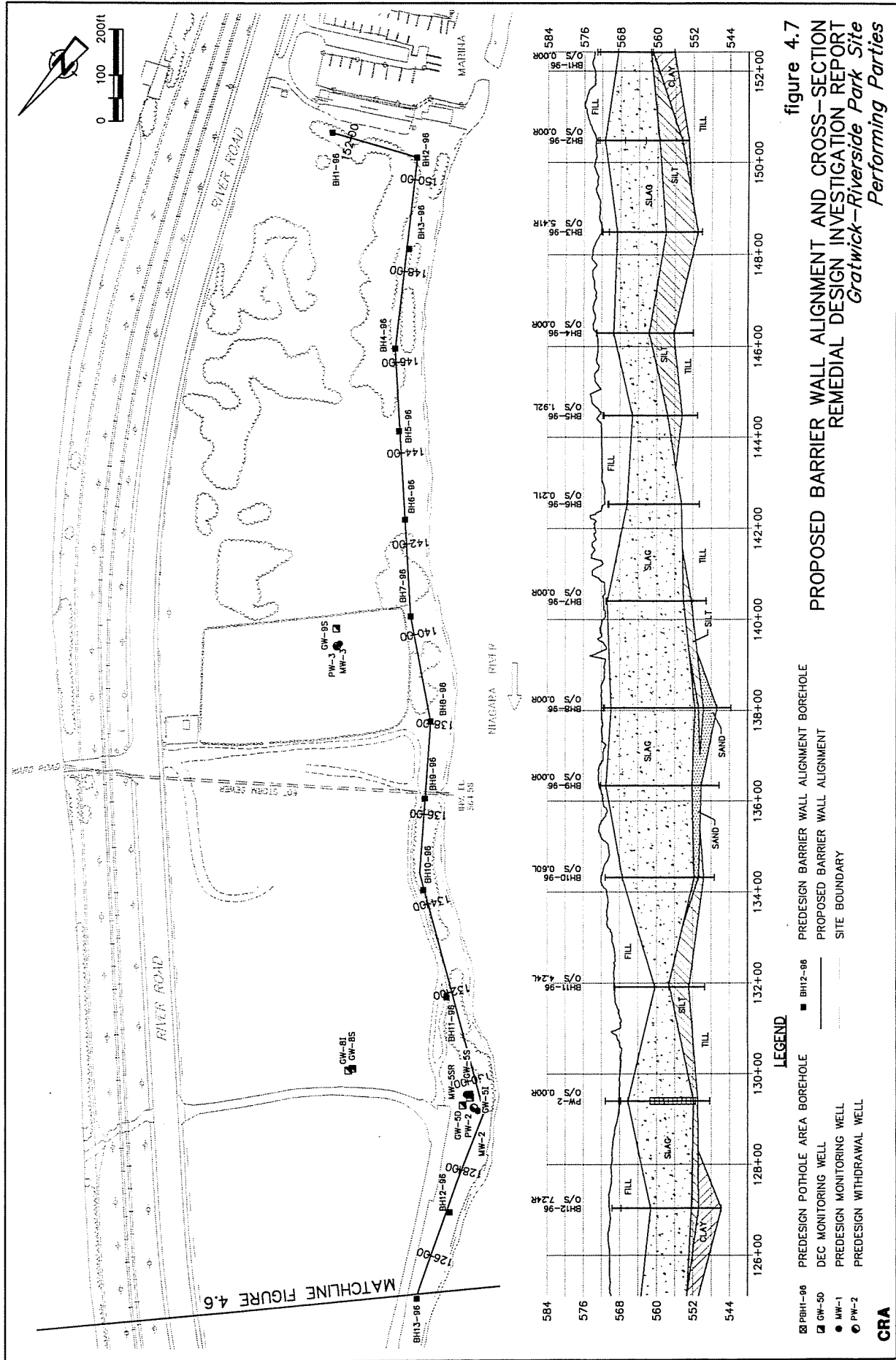


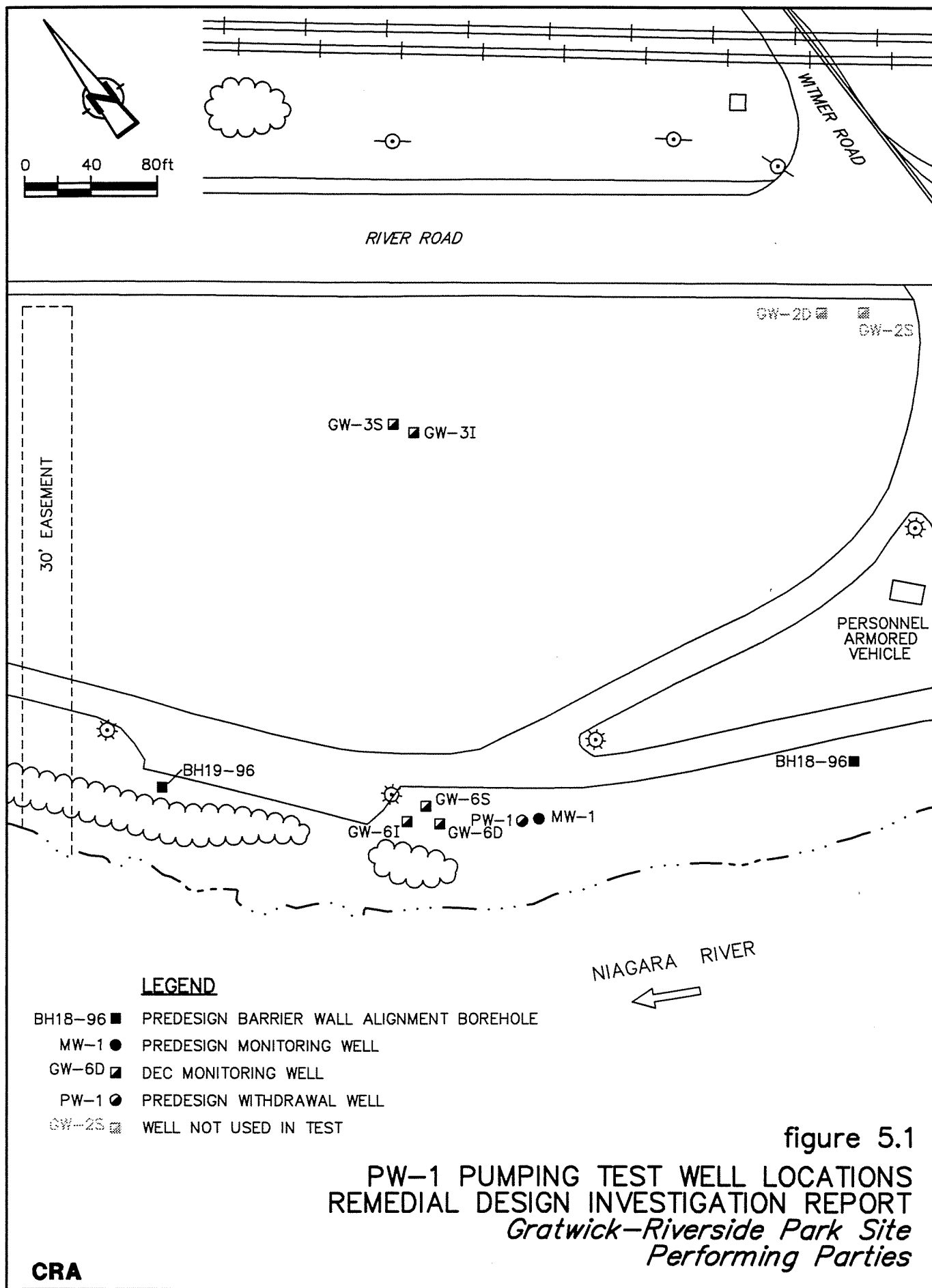
figure 4.6
PROPOSED BARRIER WALL ALIGNMENT AND CROSS-SECTION
REMEDIAL DESIGN INVESTIGATION REPORT
Gratiwick-Riverside Park Site
Performing Parties

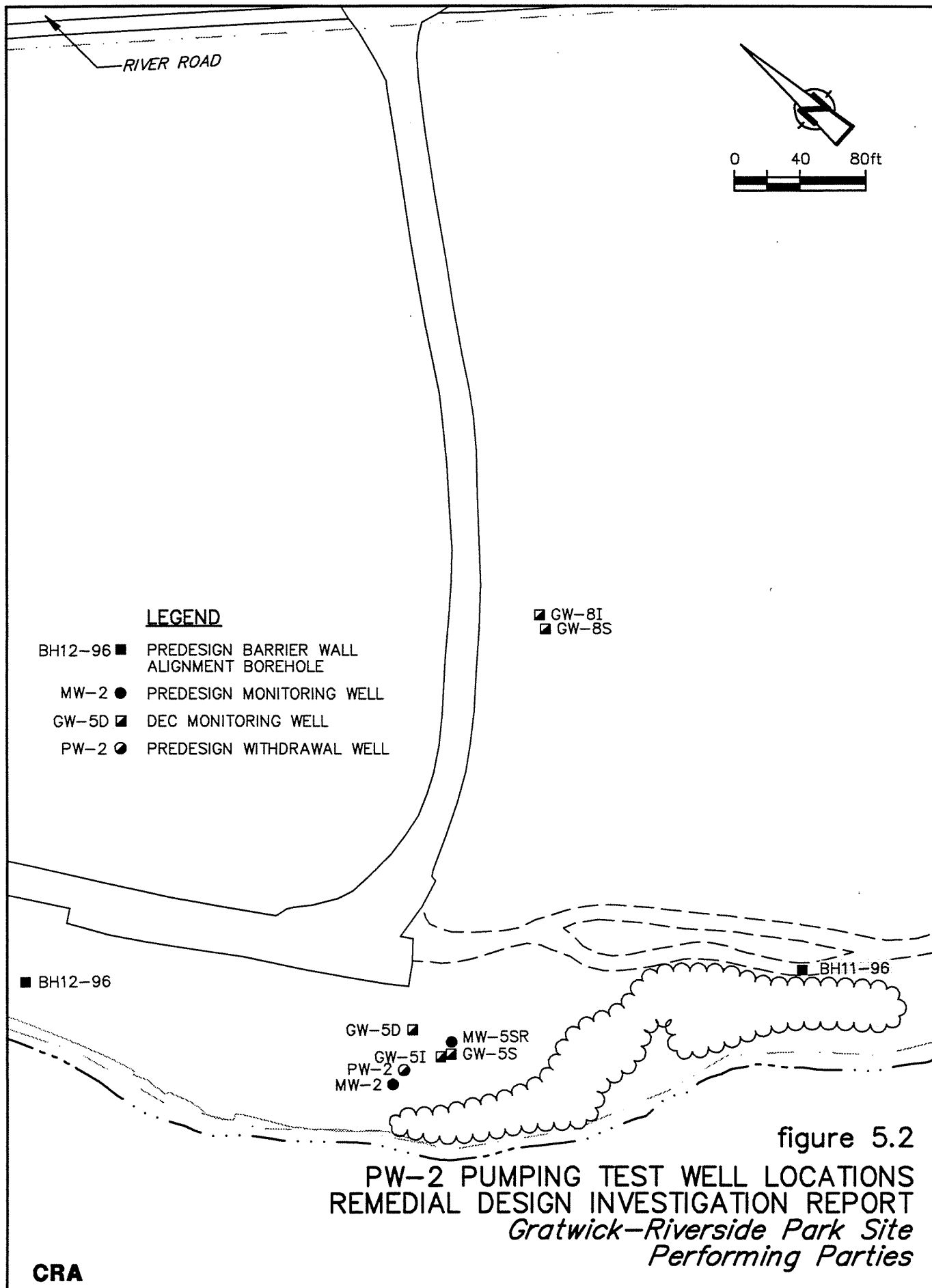
LEGEND

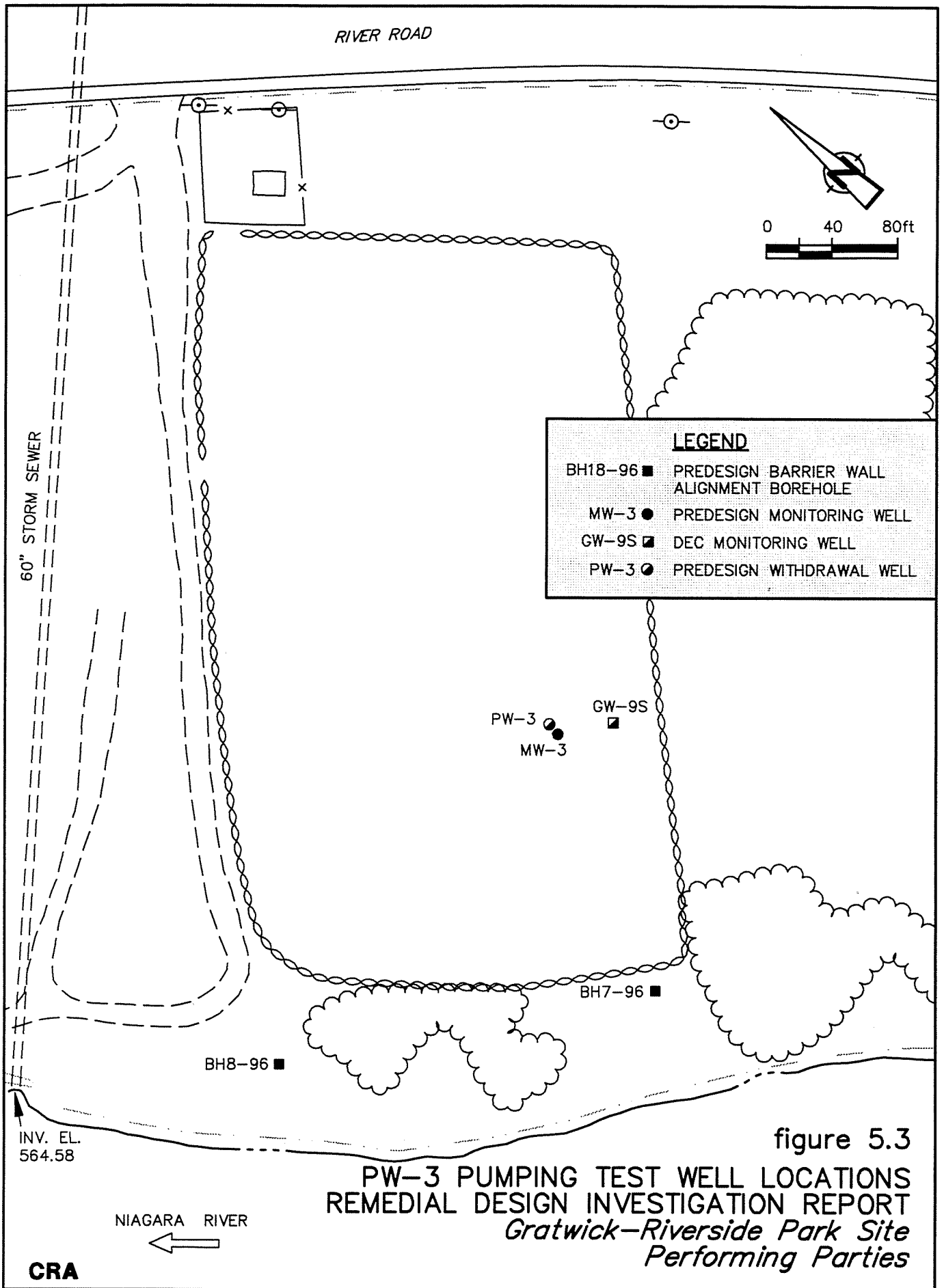
- BH12-96 PREDESIGN POTHOLE AREA BOREHOLE
- GW-20 DEC MONITORING WELL
- MW-1 PREDESIGN MONITORING WELL
- PW-1 PREDESIGN WITHDRAWAL WELL
- ▲ BH10 DEC POTHOLE AREA BOREHOLE
- PREDESIGN BARRIER WALL ALIGNMENT
- - - PROPOSED BARRIER WALL ALIGNMENT
- SITE BOUNDARY

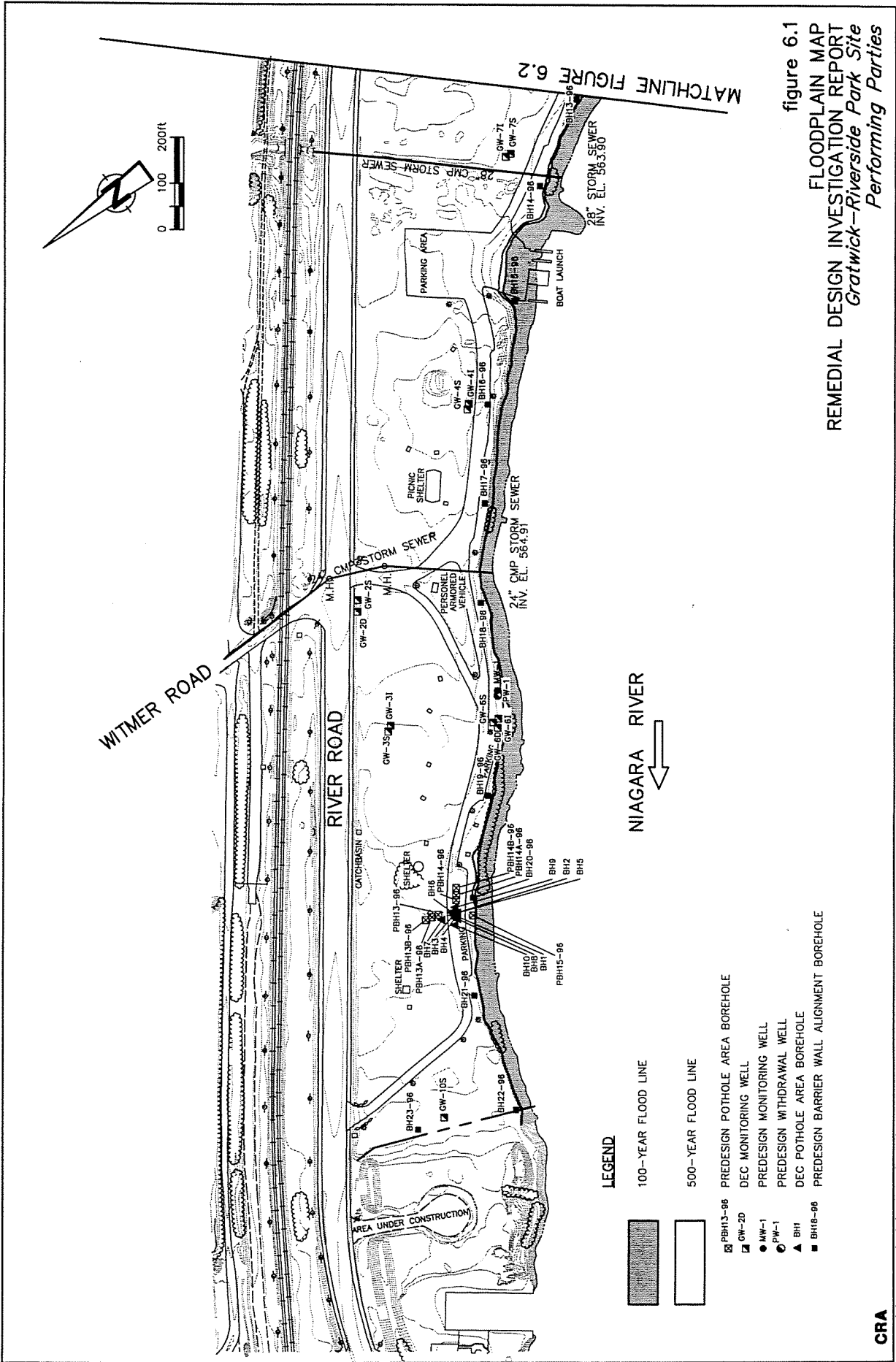
CRA
 7987 (4) OCT 08/96(W) REV.0 (P-22)











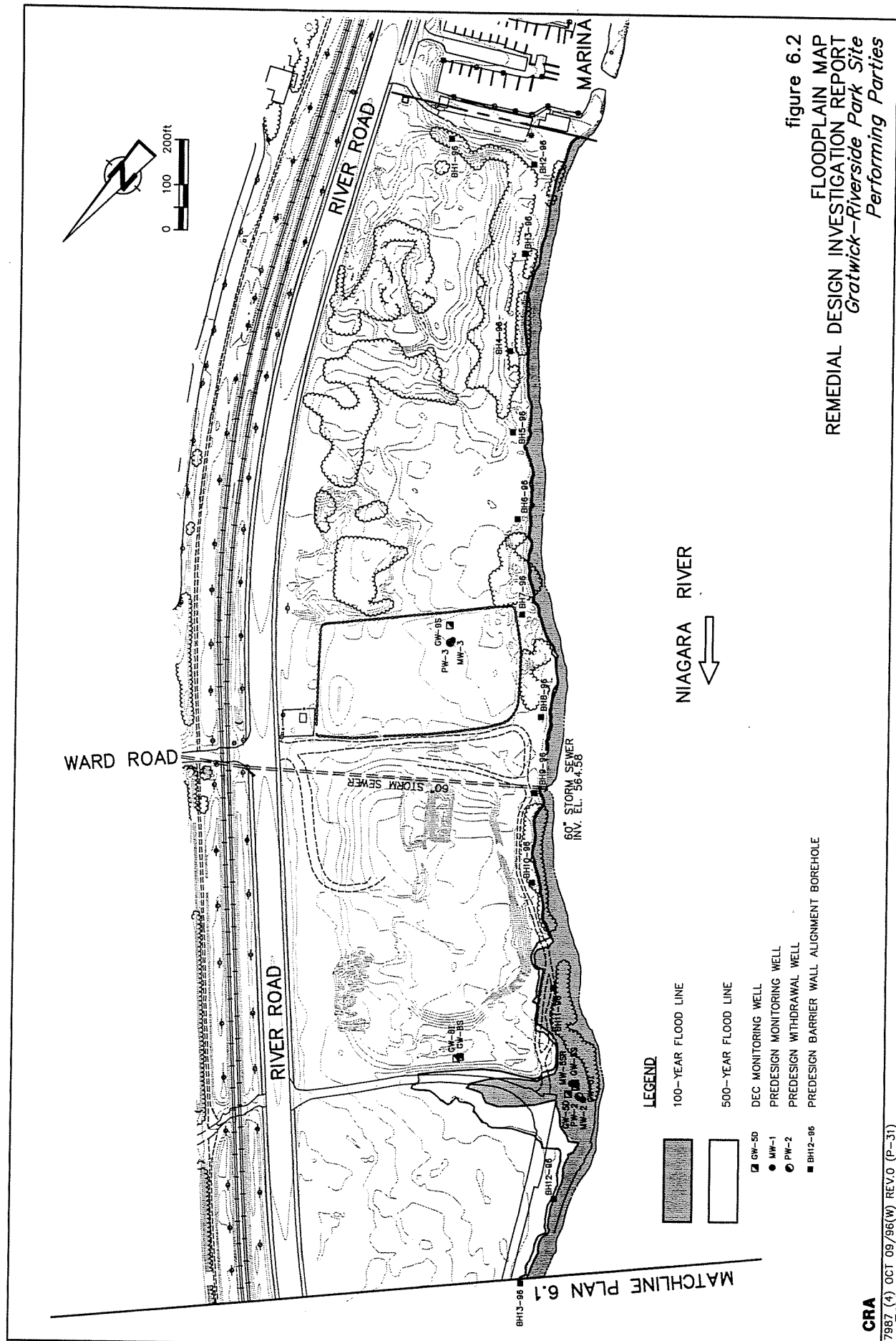


TABLE 3.1

**MAXIMUM MONTHLY AND DAILY, AND MINIMUM DAILY MEAN NIAGARA RIVER WATER LEVELS
TONAWANDA ISLAND MONITORING STATION
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK**

<i>Year</i>	<i>Maximum Monthly Mean</i>		<i>Maximum Daily Mean</i>		<i>Minimum Daily Mean</i>	
	<i>Month</i>	<i>(ft amsl)</i>	<i>Day</i>	<i>(ft amsl)</i>	<i>Day</i>	<i>(ft amsl)</i>
1968	August	565.42	December 5	567.11	November 12	564.14
1969	August	566.15	January 1	567.26	December 31	564.43
1970	July	566.08	January 9	566.99	March 3	564.15
1971	June	565.64	January 30	567.05	February 22	564.25
1972	December	566.23	January 25	567.67	November 14	564.43
1973	January	566.41	March 18	567.57	December 17	564.79
1974	April	566.27	April 15	567.39	December 1	564.66
1975	March	566.15	February 26	568.67	December 12	564.54
1976	March	566.18	March 13	567.26	November 21	564.64
1977	December	565.53	December 9	566.87	December 5	564.30
1978	June	566.12	N/A	--	NA	--
1979	August	565.70	N/A	--	NA	--
1980	August	565.79	October 26	567.07	November 27	564.65
1981	June	565.69	June 22	566.09	February 14	564.65
1982	April	565.95	April 5	566.88	November 10	564.65
1983	December	566.41	December 26	567.73	February 11	564.50
1984	November	566.06	N/A	--	December 14	564.25
1985	February	567.55	January 23	569.33	January 11	564.85
1986	January	566.75	December 2	568.55	December 1	564.75
1987	January	566.28	January 24	567.57	November 25	564.61
1988	April	565.51	February 6	566.73	December 22	564.47
1989	June	565.52	May 25	572.13	March 3	563.74
1990	December	565.42	December 4	566.66	February 15	563.89
1991	January	565.71	March 28	566.73	June 22	564.64

Notes: Notes:

- 1) Data obtained from the U.S. Army Corps of Engineers, Tonawanda Island Station
- 2) Elevations are based on USGS datum

TABLE 4.1

CONFINING UNIT PHYSICAL TESTING RESULTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK

Borehole ID	USCS	Sample Interval (ft BGS)	Percent Gravel	Percent Sand	Percent Silt	Percent Clay	Moisture Content	Permeability (cm/sec)	Liquid Limit	Plastic Limit	Plasticity Index
BH1-96	CL	15 to 17	0	2.2	26.8	71	36.8	1.10 x 10 ⁻⁷	40	20	20
BH2-96	CL	18 to 20	1	6.3	16.5	76.2	46.3				
BH3-96	ML	18 to 20	6.1	27.5	33.5	32.9	18.1				
BH4-96	ML	22 to 24	6.7	31.2	40	21.1	8.2				
BH5-96	ML	16 to 17	5.8	31.6	37.6	25	10.1	(1)	(1)	(1)	(1)
BH6-96	SC	18 to 20	15.8	45.1	15.7	23.4	9.2				
BH7-96	SM	20 to 22	28.9	43.3	19.7	8.1	7.9				
BH8-96	ML	26 to 28	8.3	34.7	37.7	19.3	9.8				
BH9-96	CL	22 to 24	2.1	8.1	24	65.8	35.1				
BH10-96	ML	22 to 24	17.5	27.6	31.3	23.6	9.7				
BH11-96	ML	18 to 20	23.4	29.7	30.4	16.5	8.3				
PW-2	GM	16 to 18	39.6	28.7	20.3	11.4	52.5				
BH12-96	CL	22 to 24	1.6	11	31.7	55.7	30.5				
BH13-96	CL	18 to 20	0	1.3	23.8	74.9	44.0				
BH14-96	CL	14 to 16	0	2.9	13.9	83.2	45.3	9.22 x 10 ⁻⁸	44	19	25
BH15-96	CL	10 to 12	0	0.2	11.2	88.6	41.5				
BH16-96	CL	16 to 18	0.6	2.2	22.8	74.4	38.3				
BH17-96	ML	18 to 20	5.5	31.7	39.6	23.2	15.0				
BH18-96	ML	18 to 19.5	8	31.7	40.3	20	11.0				
PW-1	ML	14 to 16	20.6	29.7	32.3	17.4	7.6				
BH19-96	ML	14 to 16	11.6	31	38.3	19.1	7.7				
BH20-96	ML	12 to 14	20.6	29.7	32.3	17.4	68.3	4.78 x 10 ⁻⁸	17	NP	None
BH21-96	SM	16 to 18	19.4	32.4	29.4	18.8	8.3				
BH22-96	SM	16 to 18	18.6	35.3	29.4	16.7	7.8				
BH23-96	CL	12 to 14	0.4	1.1	20.5	78	40.9				

Notes:

NP - Not Plastic

(1) Sample was disturbed and could not be tested.

TABLE 4.2

**STRATIGRAPHIC SUMMARY
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK**

BH/ Well ID	Coordinates		Ground Elevation (ft. AMSL)	Top of Native Material		Top of Confining Layer	
	Easting (ft.)	Northing (ft.)		(ft. BGS)	(ft. AMSL)	(ft. BGS)	(ft. AMSL)
BH1-96	1065911.9	1110835.0	573.1	11.8	561.3	12.1	561.0
BH2-96	1065736.7	1110752.6	572.9	13.5	559.4	18.5	554.4
BH3-96	1065617.9	1110912.3	572.0	14.0	558.0	19.3	552.7
BH4-96	1065496.2	1111094.8	575.8	14.3	561.1	19.8	556.0
BH5-96	1065368.6	1111225.1	571.7	14.2	557.5	17.5	554.2
BH6-96	1065230.1	1111361.2	570.5	16.1	554.4	16.1	554.4
BH7-96	1065079.5	1111511.6	571.0	17.0	554.0	18.8	552.2
BH8-96	1064893.0	1111654.4	571.6	20.2	551.4	25.0	546.6
BH9-96	1064788.8	1111790.2	572.1	20.1	552.0	24.0	548.1
BH10-96	1064657.5	1111943.3	571.1	19.5	551.6	21.7	549.4
BH11-96	1064463.5	1112085.3	569.2	12.0	557.2	16.5	552.7
PW-2	1064256.2	1112227.2	571.1	16.5	554.6	17.5	553.6
BH12-96	1064143.6	1112435.4	569.7	17.5	552.2	19.0	550.7
BH13-96	1064071.7	1112625.6	570.8	17.5	553.3	17.5	553.3
BH14-96	1063967.7	1112802.9	570.7	10.0	560.7	15.5	555.2
BH15-96	1063799.6	1112995.0	568.3	8.0	560.3	10.5	557.8
BH16-96	1063652.4	1113177.1	575.7	14.5	561.2	14.5	561.2
BH17-96	1063481.2	1113311.1	575.4	15.0	560.4	18.2	557.2
BH18-96	1063310.1	1113447.5	572.2	13.5	558.7	13.5	558.7
PW-1	1063125.7	1113538.7	570.7	13.0	557.7	14.3	556.4
BH19-96	1062960.6	1113687.0	571.1	13.5	557.6	13.5	557.6
BH20-96	1062799.8	1113847.1	569.9	12.5	557.4	12.5	557.4
BH21-96	1062624.2	1113973.0	571.9	12.0	559.9	12.0	559.9
BH22-96	1062367.3	1114048.5	571.2	12.5	558.7	13.8	557.4
BH23-96	1062461.6	1114247.6	571.2	9.0	559.8	10.2	561.0

TABLE 4.3

SAMPLE COLLECTION SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

<i>Sample ID</i>	<i>Sample Location</i>	<i>Interval Sampled (1)</i>	<i>Collection Date</i>	<i>Time</i>	<i>Collection Type</i>	<i>Analyses</i>
7987-008	BH1 - BH5	Fill Material	06/25/96	1300	Composite	TCLP and RCRA Characteristics
7987-013	BH6 - BH10	Fill Material	06/26/96	1400	Composite	TCLP and RCRA Characteristics
7987-021	BH11 - BH15	Fill Material	07/08/96	0900	Composite	TCLP and RCRA Characteristics
7987-030	BH16 - BH20	Fill Material	07/10/96	0900	Composite	TCLP and RCRA Characteristics
7987-033	BH21 - BH23	Fill Material	07/10/96	1600	Composite	TCLP and RCRA Characteristics

Notes:

- (1) See Table 1B for specific sample intervals.
RCRA Resource Conservation and Recovery Act.
TCLP Toxicity Characteristic Leaching Procedure.

TABLE 4.4

LOCATION AND SAMPLED INTERVAL
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

<i>Borehole Location</i>	<i>Fill Thickness (Ft.)</i>
BH1-96	0.0-11.8
BH2-96	0.0-13.5
BH3-96	0.0-14.0
BH4-96	0.0-14.3
BH5-96	0.0-14.2
BH6-96	0.0-16.1
BH7-96	0.0-17.0
BH8-96	0.0-20.2
BH9-96	0.0-20.1
BH10-96	0.0-19.5
BH11-96	0.0-12.0
PW-2	0.0-16.5
BH12-96	0.0-17.5
BH13-96	0.0-17.5
BH14-96	0.0-10.0
BH15-96	0.0-8.0
BH16-96	0.0-14.5
BH17-96	0.0-15.0
BH18-96	0.0-13.5
PW-1	0.0-13.0
BH19-96	0.0-13.5
BH20-96	0.0-12.5
BH21-96	0.0-12.0
BH22-96	0.0-12.5
BH23-96	0.0-9.0

TABLE 5.1

**WITHDRAWAL/MONITORING WELL INSTALLATION DETAILS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK**

Well ID	Ground Surface (ft AMSL)	Reference Point Top of Riser (ft AMSL)	Fill Depth (ft AMSL)	Silt/Sand Depth (ft AMSL)	Top of Sandpack (ft AMSL)	Top of Screen (ft AMSL)	Bottom of Screen (ft AMSL)	Bottom of Sandpack (ft AMSL)
<u>Monitoring Wells</u>								
MW-1	570.6	572.87	0.0 to 14.2	14.2 to EOH	565.6	564.7	554.7	554.6
MW-2	568.2	570.17	0.0 to 15.5	15.5 to EOH	563.2	561.4	551.4	550.2
MW-3	571.6	574.06	0.0 to 14.8	14.8 to EOH	567.7	566.2	556.2	555.6
MW-5SR	568.0	569.92	NA (1)	NA (1)	562.0	559.3	554.3	553.5
<u>Withdrawal Wells</u>								
PW-1	570.7	573.37	0.0 to 13.0	13.0 to EOH	566.2	565.2	555.2	553.2
PW-2	568.2	571.08	0.0 to 16.5	-16.5 to EOH	563.4	561.3	551.3	553.7
PW-3	571.2	574.16	0.0 to 14.0	14.0 to EOH	566.2	564.9	554.9	548.2

Notes:

EOH End of Hole

(1) Stratigraphy not recorded due to proximity of GW-5S

TABLE 5.2

GROUNDWATER ANALYTICAL PARAMETERS
48-HOUR PUMPING TEST
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK

TCL - volatiles
 - semi-volatiles
 - pesticides/PCBs

TAL - metals

General chemistry, including:

- Biological Oxygen Demand (BOD)
- Total Suspended Solids (TSS)
- Total Dissolved Solids (TDS)
- pH
- Ammonia (as N)
- Oil and Grease
- Total Phosphorus (as P)
- cyanide
- TKN
- Manganese
- Chloride

TABLE 5.3

SUMMARY OF DETECTED ORGANIC COMPOUNDS
48-HOUR CONSTANT RATE PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK

Pumping Well Time of Sample Collection	PW-1			PW-2			PW-3		
	10-min	24-Hour	48-Hour	10-min	24-Hour	48-Hour	10-min	24-Hour	48-Hour
TCL Volatiles (µg/L)									
Vinyl Chloride	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	38 J	50	57
Acetone	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	850	520	650
Carbon Disulfide	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	20J	ND 10
1,1-Dichloroethene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1 J	1 J
1,1-Dichloroethane	ND 10	ND 10	ND 10	10	8 J	6 J	2 J	4 J	4 J
1,2-Dichloroethene (total)	1 J	2 J	ND 10	150	120J	150	490	340	370
2-Butanone	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	7 J
Trichloroethene	ND 10	ND 10	ND 10	94	70J	120	650	490	500
Benzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	2 J	2 J
Tetrachloroethene	ND 10	ND 10	ND 10	8 J	6 J	9 J	340	250	270
Toluene	ND 10	ND 10	ND 10	3 J	2 J	4 J	20J	29	24
Chlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	13	23	18
Ethylbenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	18	25	23
Styrene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	4 J	ND 10	7 J
Xylenes (total)	ND 10	ND 10	ND 10	1 J	1 J	3 J	49	73	68
TCL Semi-Volatiles (µg/L)									
Phenol	ND 10	ND 10	0.5 J	13	14J	9 J	170	130	98
1,3-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1 J	1 J	0.7 J
1,4-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	14	11	8 J
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	12	9 J	ND 10
2-Methylphenol	ND 10	ND 10	ND 10	5 J	7 J	5 J	560	420	330
4-Methylphenol	ND 10	ND 10	ND 10	2 J	5 J	4 J	180	160	120
2,4-Dimethylphenol	ND 10	ND 10	ND 10	0.9 J	2 J	1 J	40	40	26
1,2,4-Trichlorobenzene	ND 10	ND 10	ND 10	0.6 J	0.7 J	1 J	0.8 J	0.6 J	ND 10
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1 J	1 J	0.8 J
2-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1 J	1 J	0.9 J
n-Nitrosodiphenylamine	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1 J
Di-n-butylphthalate	ND 10	ND 10	ND 10	0.7 J	ND 10	ND 10	0.5 J	ND 10	ND 10
TCL Pesticides/PCBs	None detected								

Notes:

ND - Not detected at or above associated value.

J - Estimated value.

TABLE 5.4

**SUMMARY OF HYDRAULIC PROPERTIES
CONSTANT RATE PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK**

<i>Interpreted Data / Applied Solution</i>	<i>Transmissivity (T) (ft²/day)</i>	<i>Average Saturated Thickness (b) (ft)</i>	<i>Hydraulic Conductivity (K) (ft/d)</i>	<i>Storage Coefficient, S (ft/ft)</i>	<i>Specific Storage Coefficient, Ss (1/ft)</i>
PW-1 Pumping Test Drawdown					
MW-1 / Neuman (1974)	1200	7	171.4	0.9	0.13
MW-1 / Cooper and Jacob (1946)	1200	7	171.4	0.9	0.13
PW-2 Pumping Test Drawdown					
MW-2 / Neuman (1974)	975	13.6	71.7	0.1	0.007
MW-5S / Neuman (1974)	848	13.6	62.4	0.085	0.006
PW-3 Pumping Test Drawdown					
MW-3 / Neuman (1974)	1508	8.9	169.4	0.045	0.005
MW-3 / Cooper and Jacob (1946)	1727	8.9	194.0	0.034	0.004
GW-9S / Neuman (1974)	1409	8.9	158.3	0.023	0.003
GW-9S / Cooper and Jacob (1946)	1550	8.9	174.2	0.02	0.002
PW-3 Pumping Test Recovery					
MW-3 / Neuman (1974)	1225	8.9	137.6	0.1089	0.012
MW-3 / Cooper and Jacob (1946)	1312	8.9	147.4	0.1089	0.012
GW-9S / Neuman (1974)	1000	8.9	112.4	0.05	0.006
GW-9S / Cooper and Jacob (1946)	1200	8.9	134.8	0.05	0.006
Geometric Mean:			135.0	0.085	0.005

Note:

K=T / b

Ss=S / b



APPENDIX A

NIAGARA RIVER WATER LEVELS
TONAWANDA ISLAND MONITORING STATION

MAXIMUM AND MINIMUM ELEVATIONS

NIAGARA RIVER

Tonawanda Island, Tonawanda, New York

U. S. DEPARTMENT OF COMMERCE
NOAA - National Ocean Survey
Lake Survey Center
630 Federal Building & U.S. Courthouse
Detroit, Michigan 48226

MAXIMUM STAGES

MINIMUM STAGES

YEAR	MONTHLY MEAN	DAILY MEAN	INSTANTANEOUS	MONTHLY MEAN	DAILY MEAN	INSTANTANEOUS
1980						
1981			7 Jan			
1982			18 Oct			
1983			10 Jan			
1984			20 Dec			
1985			30 Apr			
1986			02 Dec			
1987						
1988						
1989						
1990						
1991						
1992						
1993						
1994						
1995						
1996						
1997						
1998						
1999						
2000						
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2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						
2026						
2027						
2028						
2029						
2030						

Remarks: Elevations are in feet above mean water level at Father Point, Quebec, International Great Lakes Datum (1955)

Station Number: 3018

ARMY CORPS OF ENGINEERS
T DISTRICT
NIAGARA RIVER GAGES

MAXIMUM AND MINIMUM WATER LEVELS IN FEET, IGLD (1955)

TONAWANDA ISLAND, NIAGARA RIVER

MONTH	MEAN	MAXIMUM STAGES			MONTH	MEAN	MINIMUM STAGES		
		DAY	MEAN	INSTANTANEOUS			DAY	MEAN	INSTANTANEOUS
1980	AUG 564.60	OCT 26	565.88	JAN 12/0300 566.98	NOV DEC 564	NOV 27	563.46	NOV 27/11-12	563.19
1981	JUN 564.50	JUN 22	564.90	OCT 18/2100 566.40	FEB 563.80	FEB 14	563.46	NOV 20/0600	563.12
1982	APR 564.76	APR 08	565.69	JAN 11/1100 567.192	OCT 563.87	NOV 10	563.46	OCT 09/22-23	24 562.93
1983	DEC 565.22	DEC 26	566.54	DEC 26/1600 566.72	FEB 563.86	FEB 11	563.31	MAR 21/1200	562.76
1984	NOV 564.87				FEB 563.93	DEC 14	563.06	DEC 14/12-13	562.42
1985	FEB 566.36	JAN 23	568.14	DEC 02/0900 569.20 EST.	OCT 564.28	JAN 11	563.66	NOV 28/0300	563.29
1986	JAN 565.56	JAN 09	567.30	JAN 10/0300 567.55	SEP 564.55	DEC 01	563.60	DEC 01/0400	563.99
1987	JAN 565.09	JAN 24	566.38	JAN 12/0300 566.83	DEC 564.12	NOV 22	563.29	DEC 13/1000	562.73
1988	APR 564.32	APR 24	565.10	JAN 04/1900 FEB 06/1100 565.92	MAR 563.89	JAN 19	563.58	JAN 19/2200	563.08
1989	JUN 564.33	NOV 17	564.66	FEB 8/1900 566.15	MAR 563.36	MAR 3	562.55	MAR 3/2000	562.16
1990	DEC 564.73	DEC 4	565.47	NOV 6/0800 567.29	JAN 563.52	FEB 15	562.70	FEB 15/0900	562.18

766 (66) 11-12-12

915 11-12-12

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				566.45	564.89	565.58	564.59	564.31	564.38	564.55	563.78	
2				565.73	564.81	564.97	564.69	564.46	564.37	564.33	563.81	564.98
3				565.43	564.97	564.82	564.75	564.46	564.48	564.18	563.09	567.36
4				564.87	565.02	564.75	564.60	564.46	564.71	564.33	564.10	
5				564.87	565.04	564.84	564.68	564.49	564.52	565.57	563.95	
6				566.76	564.99	564.91	564.79	564.50	564.74	564.83	564.87	564.78
7				565.91	564.99	564.84	564.72	564.50	564.46	564.33	563.87	564.76
8				565.35	564.02	564.74	564.72	564.53	564.51	564.27	565.28	564.95
9				565.15	564.79	565.07	564.72	564.53	564.46	564.33	565.40	564.77
10				565.27	564.92	565.22	564.72	564.45	564.58	564.27	564.85	564.77
11				565.14	564.73	565.22	564.75	564.45	564.42	564.25	564.76	564.77
12				564.87	564.71	564.73	564.74	564.43	564.29	563.98	564.39	564.87
13				564.70	564.90	564.90	564.50	564.29	564.35	563.86	564.58	564.83
14				564.76	564.73	565.18	564.89	564.54	564.26	564.11	564.93	564.83
15				564.96	564.67	564.79	564.81	564.57	564.42	564.39	564.71	565.32
16				565.03	564.83	564.84	564.77	564.47	564.36	564.13	564.66	565.90
17				564.86	564.83	564.81	564.54	564.36	564.41	564.44	565.90	565.85
18				565.24	564.93	564.81	564.77	564.48	564.47	564.27	565.07	566.11
19				565.16	564.93	565.11	564.71	564.78	564.45	563.81	565.92	564.77
20				565.46	565.18	564.96	564.58	564.55	564.44	563.81	565.07	565.12
21				565.37	564.93	564.75	564.76	564.46	564.24	563.42	565.25	565.23
22				565.39	564.83	564.83	564.46	564.49	564.25	564.20	564.42	565.03
23				565.37	564.76	564.84	564.48	564.44	564.32	564.17	564.85	565.25
24				565.39	564.91	564.82	564.48	564.44	564.67	564.40	564.97	565.25
25				565.72	564.89	564.84	564.63	564.50	564.28	564.43	564.59	565.05
26				565.75	564.82	564.57	564.65	564.54	564.34	564.36	564.45	565.03
27				565.62	564.90	564.47	564.61	564.68	564.33	564.45	564.76	565.01
28				565.68	564.68	564.51	564.53	564.74	564.39	564.10	563.84	566.41
29					564.79	564.55	564.54	564.47	564.24	564.01	564.77	566.19
30					564.91	564.43	564.38	564.54	564.24	564.02	564.81	566.77
31				564.91	565.18	564.24	564.24	564.22	564.26	563.91	564.81	565.54
MEAN				565.35	564.88	564.86	564.64	564.49	564.42	564.28	564.72	565.40
MAX				567.87	565.76	565.95	565.43	565.11	565.30	566.47	566.86	568.66
HR/DA				1000/6	2400/31	200/1	600/14	400/19	700/24	1400/5	1000/20	800/2
MIN				564.33	564.42	564.09	563.81	563.94	563.71	563.45	563.28	564.32
HR/DA				2300/4	2100/15	2400/11	2200/31	100/1	2300/25	2000/20	900/28	2300/11
ANNUAL MEAN												564.78

1986

US ARMY CORPS OF ENG
DETROIT DISTRICT

DAILY MEAN WATER LEVELS IN FEET
INTERNATIONAL GREAT LAKES DATUM (IGLD) 1955
NIAGARA RIVER-TONAWANDA ISL

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	565.24	565.25	565.12	564.93	565.36	564.89	565.06	565.31	564.69	564.50	564.79	563.60
2	564.84	564.85	564.92	564.73	565.29	565.00	565.19	565.22	564.60	564.88	564.71	563.18
3	564.89	564.46	564.77	564.71	565.28	565.12	565.27	565.21	564.70	564.95	565.00	565.16
4	565.72	564.77	564.74	564.55	565.18	564.82	565.20	565.15	564.81	564.67	564.62	565.19
5	566.81	564.16	565.53	564.88	565.09	564.09	565.01	565.09	564.86	565.35	564.66	565.48
6	566.40	564.47	565.01	564.80	565.13	565.24	565.25	565.07	564.66	565.08	564.60	565.16
7	566.42	565.42	564.59	564.78	564.84	565.19	565.09	564.91	564.69	565.59	565.59	564.32
8	567.01	564.77	565.77	564.86	564.93	565.27	564.88	564.85	564.89	564.56	564.63	564.88
9	566.47	565.63	564.68	564.85	564.93	565.27	564.88	564.86	564.96	564.67	564.63	565.42
10	566.47	564.76	564.76	564.47	564.74	565.48	565.33	564.74	564.96	564.73	564.92	565.68
11	565.56	565.46	564.88	564.42	564.74	565.48	565.33	564.84	564.36	564.79	565.04	565.68
12	565.54	565.52	565.00	564.60	564.91	565.22	565.44	564.84	564.36	565.70	565.94	564.92
13	565.83	565.25	564.94	565.08	564.98	565.22	565.19	564.86	564.29	564.47	564.69	564.37
14	565.17	564.69	564.91	565.12	565.05	565.38	565.14	564.66	564.29	564.60	564.73	564.81
15	564.96	564.74	564.76	565.17	565.05	565.57	565.38	564.61	564.36	564.67	564.11	565.18
16	564.96	564.75	565.50	565.03	565.05	565.71	565.36	564.59	564.39	564.81	564.25	565.83
17	564.97	564.89	565.11	565.63	565.24	565.46	565.06	564.77	564.31	564.81	564.67	564.83
18	565.19	564.97	565.03	565.64	565.11	565.48	565.11	564.55	564.31	564.72	564.59	565.19
19	564.94	564.97	564.92	565.13	565.27	565.67	565.09	564.91	564.61	564.78	564.65	565.49
20	564.85	564.95	564.98	565.04	565.15	565.70	565.21	564.84	564.52	564.40	564.08	565.14
21	565.08	564.97	564.98	565.02	565.10	565.53	565.28	564.68	564.41	564.41	564.55	565.33
22	564.79	564.91	564.98	565.01	565.01	565.32	565.20	564.78	564.41	564.62	564.60	565.87
23	565.77	564.92	564.92	564.91	565.11	565.52	565.10	564.99	564.61	564.59	564.80	564.87
24	565.39	564.90	564.96	565.01	565.21	565.41	565.03	564.74	564.40	564.87	564.51	565.02
25	565.29	565.01	564.96	565.19	565.21	565.41	565.26	564.72	564.57	564.98	565.76	564.83
26	565.29	565.01	564.96	565.01	565.18	565.23	565.08	564.79	564.50	564.74	564.18	564.83
MEAN	565.56	564.95	564.96	564.90	565.09	565.33	565.16	564.88	564.55	564.81	564.72	565.04
MAX	567.55	566.02	566.61	565.98	565.54	566.15	565.80	565.93	565.63	566.23	566.62	566.69
MIN	564.27	563.40	564.38	563.79	564.47	564.58	564.50	564.39	563.93	563.96	563.48	563.39
HR/DA	300/ 3	600/ 7	1900/12	2400/12	2200/12	2200/ 5	2200/11	2100/13	1900/16	1700/10	2100/18	400/ 1
ANNUAL	MEAN 565.00											

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	564.75	564.86	564.48	564.75	564.71	564.57	564.45		564.61	564.34	563.62	564.04
2	564.72	564.82	565.38	565.47	564.61	564.31	564.42		564.24	564.07	563.67	564.44
3	564.94	565.03	565.03	563.94	564.42	564.67	564.66		564.19	564.32	564.00	563.94
4	564.81	565.39	564.65	564.52	564.58	564.45	564.54		564.24	564.35	564.08	563.74
5	564.79	565.01	564.75	564.76	564.68	564.45	564.54	564.33	564.27	564.29	564.34	563.94
6	564.82	564.77	564.80	564.93	564.69	564.67	564.77	564.62	564.28	564.40	564.59	563.80
7	565.03	565.09	564.22	564.97	564.69	564.97	564.67	564.52	564.29	564.40	564.39	563.94
8	565.01	565.06	564.88	564.98	564.72	564.62	564.77	564.52	564.25	564.34	563.93	563.80
9	564.80	565.51	563.93	564.91	564.79	564.62	564.67	564.52	564.28	564.57	563.78	563.92
10	565.31	564.93	564.66	564.82	564.66	564.44	564.69	564.52	564.28	564.04	563.48	564.18
11	565.91	564.81	564.66	564.60	564.58	564.72	564.64	564.30	564.31	563.93	563.59	563.70
12	564.98	564.89	564.67	564.90	564.46	564.60	564.64	564.36	564.37	564.09	564.19	564.06
13	564.94	564.83	564.54	564.65	564.46	564.61	564.79	564.51	564.35	564.12	563.75	563.40
14	565.01	564.75	564.22	564.67	564.67	564.47	564.57	564.51	564.32	564.09	563.55	563.25
15	564.85	564.29	564.57	564.49	564.59	564.68	564.47	564.59	564.32	564.00	563.59	564.51
16	564.81	564.77	564.51	564.60	564.47	564.36	564.68	564.61	564.33	564.29	563.73	564.03
17	564.85	564.77	564.50	564.64	564.26	564.41	564.67	564.54	564.45	564.04	564.40	564.24
18	565.28	564.62	564.64	564.66	564.54	564.35	565.03	564.44	564.42	564.07	564.02	564.24
19	565.74	564.58	564.57	564.73	564.59	564.39	564.68	564.46	564.40	564.30	563.82	565.18
20	564.90	564.56	564.56	564.61	564.59	564.62	564.67	564.65	564.42	564.24	563.90	564.24
21	566.38	564.60	564.41	564.39	564.54	564.44	564.73	564.55	564.83	564.39	563.90	564.24
22	565.66	564.53	564.37	564.54	564.44	564.58	564.73	564.45	564.54	564.19	564.02	563.96
23	565.06	564.44	564.84	564.54	564.46	564.71	564.86	564.50	564.63	564.35	563.49	563.64
24	565.32	564.19	564.61	564.91	564.54	564.70	564.52	564.15	564.24	564.13	563.29	563.75
25	564.93	564.24	564.57	564.81	564.54	564.89	564.52	564.10	564.28	564.05	563.71	563.88
26	564.73	564.46	564.46	564.81	564.55	564.64	564.51	564.38	564.36	564.04	563.93	563.78
27	564.96	564.66	564.95	564.82	564.64	564.73	564.66	564.46	564.55	564.10	564.63	563.78
28	564.93	564.66	564.95	564.82	564.64	564.73	564.66	564.46	564.55	564.10	564.63	563.78

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	565.09	563.71	563.62	563.88	564.22	564.18	563.87	564.04	563.78	563.76	563.51	563.62
2	564.54	563.67	563.79	563.95	564.15	563.96	563.92	564.03	563.80	563.68	563.63	564.13
3	563.94	563.70	563.71	564.24	564.06	563.93	563.93	564.03	563.77	563.65	563.63	564.11
4	564.79	563.99	563.84	563.96	564.10	564.16	563.86	564.11	563.90	563.81	563.71	563.71
5	565.41	563.54	563.79	564.07	564.13	564.12	563.87	564.15	563.86	563.65	563.55	563.75
6	564.86	564.47	563.87	564.02	564.17	563.91	563.83	564.06	563.74	563.59	563.46	563.60
7	563.78	564.14	563.72	564.07	564.12	563.86	563.85	564.09	563.85	563.57	563.44	563.43
8	564.84	564.17	563.89	564.07	564.18	563.93	563.96	564.05	563.81	563.57	563.44	563.43
9	564.76	564.14	563.86	564.19	564.27	564.06	563.93	564.01	563.62	563.42	563.33	563.42
10	565.02	563.43	563.83	564.14	564.20	564.17	563.93	564.03	563.62	563.41	563.33	563.42
11	564.21	563.42	563.64	564.03	564.11	564.14	563.85	564.01	563.87	563.59	563.47	563.49
12	564.77	564.96	564.26	564.25	564.24	564.14	563.87	564.03	563.87	563.80	563.73	563.59
13	563.44	563.96	564.05	564.09	564.14	564.13	563.82	564.20	563.52	563.37	563.32	563.59
14	563.37	563.82	564.03	564.58	564.20	564.07	563.87	564.02	563.77	563.60	563.55	563.48
15	564.41	563.75	563.94	564.07	564.13	564.02	563.89	564.05	563.74	563.49	563.47	563.41
16	563.62	563.65	563.92	564.04	563.95	564.01	563.89	563.83	563.74	563.58	563.47	563.41
17	563.89	563.61	563.93	564.01	563.97	564.09	563.90	563.87	563.61	563.45	563.35	563.41
18	563.69	563.39	563.94	564.04	564.18	564.11	563.81	563.88	563.04	563.33	563.22	563.28
19	564.08	564.65	563.83	564.75	564.16	563.99	563.90	563.82	563.86	563.58	563.46	563.41
20	563.81	564.05	563.86	564.33	564.14	564.12	563.91	563.78	563.63	563.36	563.24	563.30
21	563.88	564.15	563.88	564.10	564.14	563.97	563.91	563.81	563.59	563.42	563.33	563.40
22	564.03	564.23	563.86	565.10	564.15	563.90	563.91	563.12	563.59	563.28	563.14	563.40
23	563.68	564.43	563.82	564.34	564.10	564.18	564.07	564.27	563.66	563.48	563.37	563.43
24	564.03	564.20	563.86	564.15	564.14	564.00	564.03	564.17	563.59	563.28	563.14	563.40
25	563.23	564.01	564.09	564.11	564.14	563.97	564.07	564.27	563.74	563.59	563.48	563.50
26	564.08	563.72	564.47	564.21	564.12	564.02	563.95	564.17	563.40	563.16	563.04	563.30
27	564.15	563.82	563.97	564.11	564.09	563.91	563.94	563.81	563.34	563.16	563.04	563.37
28	563.95	563.77	563.75	564.27	564.06	563.91	563.94	563.81	563.40	563.1		
29	563.79	563.79	563.75	564.27	564.10	563.86	564.13	563.77	563.69	563.59	563.48	
30	563.79	563.80	563.80	564.11	564.11	563.86	564.02	563.77	563.69	563.59	563.48	
31	563.80	563.80	563.80	564.11	564.11	563.86	564.02	563.77	563.69	563.59	563.48	
MEAN	564.21	564.12	563.89	564.32	564.13	564.04	563.94	564.02	563.71	563.73	563.65	563.60
MAX	565.92	565.92	565.37	565.73	564.70	564.68	564.46	565.09	564.62	564.95	565.73	563.60
HR/DA	1900/4	1100/6	1300/3	1100/5	900/13	1100/30	2000/30	900/15	1500/20	1700/10	1400/10	1500/2
MIN	563.08	563.30	563.39	563.49	563.66	563.52	563.39	563.33	562.91	563.03	563.00	563.08
HR/DA	2200/19	1100/11	900/12	2300/2	2300/16	2600/54	2200/10	2200/22	2100/28	2100/17	1500/5	1400/24
ANNUAL MEAN	563.95											

US ARMY CORPS OF ENG
DETROIT DISTRICT

1989

DAILY MEAN WATER LEVELS IN FEET
INTERNATIONAL GREAT LAKES DATUM (IGLD) 1955

NIAGARA RIVER- TONAWANDA ISL

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	563.306	563.306	563.306	564.06	563.78	564.22	564.30	564.23	564.28	563.81	564.08	563.33
2	564.063	563.306	563.306	563.90	564.01	564.43	564.24	564.46	564.00	563.96	563.57	563.95
3	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
4	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
5	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
6	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
7	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
8	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
9	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
10	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
11	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
12	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
13	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
14	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
15	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
16	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
17	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
18	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
19	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
20	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
21	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
22	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
23	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
24	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
25	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
26	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
27	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
28	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
29	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
30	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
31	563.306	563.306	563.306	564.06	563.95	564.34	564.24	564.40	563.97	563.91	563.57	563.95
MEAN	563.63	563.62	563.36	563.89	564.24	564.33	564.23	564.17	563.96	563.76	563.81	563.57
MAX	566.05	566.15	564.76	565.09	571.26	565.01	565.02	565.09	564.87	564.44	566.00	564.88
HR/DA	1600/ 8	1900/ 8	1300/15	900/10	1100/25	600/10	1000/10	1900/ 4	1800/ 1	1100/20	2200/16	1500/ 2
MIN	562.47	562.63	562.16	563.36	563.40	563.65	563.32	563.52	563.15	563.00	563.02	562.66
HR/DA	1500/25	1200/ 2	2000/ 3	2200/ 3	2200/ 4	2200/12	2200/20	2200/18	2200/14	1400/17	1600/ 7	100/30
ANNUAL MEAN	563.88											

1990

DAILY MEAN WATER LEVELS IN FEET
INTERNATIONAL GREAT LAKES DATUM (IGLD) 1955

NIAGARA RIVER- TONAWANDA ISL

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	563.69	563.39	564.22	563.90	564.17	564.06	564.09	564.07	564.18	564.37	563.75	564.09
2	563.75	563.09	564.77	564.14	564.94	564.07	564.06	564.12	564.25	564.01		564.03
3	563.46	563.76	564.00	564.50	563.76	564.44	564.38	564.11	564.10	564.43		564.07
4	563.40	564.18	563.26	564.21	564.09	564.28	564.05	564.21	564.20	564.43	563.52	564.80
5	563.54	563.55	563.31	564.24	564.19	564.28	563.92	564.08	564.16	563.29	565.03	564.12
6	563.62	563.73	563.47	564.10	564.30	564.18	563.98	564.13	564.38	563.95	565.00	564.10
7	563.31	563.68	563.78	564.03	564.04	564.23	564.14	564.11	564.14	563.75	565.03	564.10
8	563.61	563.57	563.80	564.35	564.94	564.14	563.89	564.15	564.32	563.62	565.03	564.27
9	563.49	563.57	564.10	564.12	564.99	564.18	563.61	564.13	564.19	563.94	564.43	564.10
10	563.48	563.40	564.11	564.26	564.04	564.15	563.67	564.22	564.14	563.94	564.43	564.27
11	563.39	563.40	563.90	564.15	564.13	564.23	563.89	564.28	564.17	564.01	565.03	564.27
12	563.27	563.56	563.88	563.97	564.17	564.21	564.12	564.24	564.24	564.12	565.03	564.27
13	563.38	564.15	564.32	564.26	564.61	564.18	564.15	564.21	564.16	564.06	565.03	564.27
14	563.61	563.16	564.01	564.12	564.36	564.25	564.12	564.20	564.15	564.06	565.03	564.27
15	563.32	563.84	563.96	564.18	564.04	564.27	564.08	563.89	564.16	564.95	565.03	564.27
16	563.59	563.77	563.92	564.12	564.05	564.13	563.99	563.89	564.21	563.83	565.03	564.27
17	563.69	563.86	564.19	564.06	564.10	564.05	563.84	564.05	564.09	564.00	565.03	564.27
18	563.41	563.68	564.12	564.11	564.22	564.33	564.07	564.08	564.55	563.85	565.03	564.27
19	563.58	564.31	564.00	564.11	564.11	564.20	564.09	564.39	564.39	563.98	565.03	564.27
20	563.70	563.89	564.05	564.09	564.09	564.10	564.07	564.55	564.18	564.08	565.03	564.27
21	563.48	563.13	563.82	563.99	564.17	564.10	563.99	563.17	563.12	563.78	565.03	564.27
22	563.69	563.98	563.54	564.00	563.92	563.87	564.06	563.17	563.01	564.12	565.03	564.27
23	563.48	563.09	563.66	563.98	564.17	564.06	564.09	563.17	563.97	564.55	564.34	564.24
24	563.58	563.71	563.71	564.01	564.20	564.33	564.08	564.15	564.22	563.99	564.26	564.44
25	563.48	563.68	564.12	564.11	564.22	564.33	564.07	564.08	564.22	563.85	564.26	564.91
26	563.54	563.81	564.00	564.09	564.11	564.20	564.09	564.39	564.39	563.98	564.18	564.98
27	563.70	563.70	564.05	564.09	564.09	564.10	564.07	564.55	564.18	564.08	564.15	564.83
28	563.48	563.98	563.82	563.99	564.17	564.10	563.99	563.17	563.12	563.78	565.03	564.82
29	563.09	563.54	563.54	564.00	563.92	563.87	564.06	563.17	563.01	564.12	564.38	563.89
30	563.21	563.54	563.66	563.98	564.17	564.06	564.09	563.17	563.97	564.55	564.34	564.24
31	563.33	563.71	563.71	564.01	564.20	564.33	564.12	564.14	564.22	563.99	564.26	564.91
MEAN	563.52	563.71	563.86	564.13	564.18	564.20	564.03	564.12	564.21	564.10	564.02	564.23
MAX	565.40	564.98	564.70	564.98	565.72	565.16	564.71	564.59	565.24	566.27	567.29	565.90
HR/DA	302/26	200/17	1200/18	800/5	700/11	200/4	900/4	1100/17	1700/24	1700/18	300/6	1300/4
MIN	562.97	562.18	563.14	563.50	563.16	563.64	563.22	563.17	563.55	563.26	562.94	563.38
HR/DA	900/25	900/15	1500/6	2400/2	2100/4	2400/28	2200/22	2200/19	2000/29	100/10	1000/5	1600/14
ANNUAL	MEAN	564.02										

477 MICHIGAN AVE
DETROIT MI 48226

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	564.80	564.53	563.86	564.23	564.74	564.20	563.89	564.03				
2	564.80	564.44	564.04	564.24	564.74	564.19	563.89	563.91				
3	565.08	564.28	563.85	563.99	564.56	564.20	563.90	563.84				
4	564.57	564.12	564.11	563.98	564.17	564.05	563.97	563.99				
5	564.57	564.13	564.21	564.10	564.02	564.22	564.08	563.88				
6	564.06	564.02	564.09	564.17	564.45	564.19	563.97	563.77				
7	564.94	564.28	564.68	564.10	564.93	564.19	564.11	563.79				
8	563.94	564.41	564.30	564.10	564.35	564.22		563.73				
9	564.32	564.41	564.17	564.08	564.16	564.16		563.74				
10	563.70	564.51	564.01	564.14	564.14	564.20		563.98				
11	564.61	564.14	564.13	563.85	564.21	564.26		564.11				
12	563.87	563.87	563.63	563.77	564.24	564.25		563.87				
13	564.38	564.11	563.73	563.77	564.19	564.03		563.86				
14	564.15	564.90	563.03	563.85	564.27	564.05		563.88				
15	564.59	564.75	564.15	564.46	564.15	564.11		563.90				
16	564.16	564.41	564.14	564.14	564.14	564.31		563.90				
17	565.25	563.91	563.06	564.11	564.21	564.12		563.97				
18	565.25	563.91	564.12	564.04	564.04	564.12		563.96				
19	564.91	564.09	564.50	563.82	563.97	564.06		563.97				
20	564.31	564.46	564.26	563.99	563.97	564.05		563.97				
21	564.09	564.33	564.09	564.24	564.11	564.05	564.04	563.97				
22	564.19	564.33	564.09	564.24	564.13	563.93	563.97	563.97				
23	564.80	563.89	563.69	564.83	564.14	563.45	563.96	564.01				
24	564.54	563.89	564.64	564.82	564.18	563.60	563.98	564.01				
25	564.23	563.90	564.53	564.72	564.15	563.90	564.15	563.80				
26	564.70	563.90	564.53	564.63	564.18	563.90	564.01	563.58				
27	565.08	564.02	564.19	564.46	564.16	563.93	564.00	563.71				
28	564.46	564.22	564.29	564.22	564.25	563.95	563.85	563.85				
29	565.08	564.46	565.54	564.20	564.25	564.01	563.87	563.84				
30	564.27	564.19	564.44	564.19	564.23	564.14	563.79	563.83				
31	563.91	564.23	564.23	564.19	564.28	564.00	563.67	563.83				
MEAN	564.52	564.25	564.22	564.25	564.42	564.07	563.93	563.76				
MAX	566.07	565.61	566.80	565.63	564.25	564.07	563.95	563.85				
HR/DA	1000/31	200/1	900/28	1900/15	1100/7	800/16	800/5	900/11				
MIN	563.19	563.67	563.30	563.26	563.36	563.17	563.29	563.20				
HR/DA	400/11	2000/13		2200/12	100/18	2300/22	2300/28	2300/19				
ANNUAL MEAN	564.18											

APPENDIX B

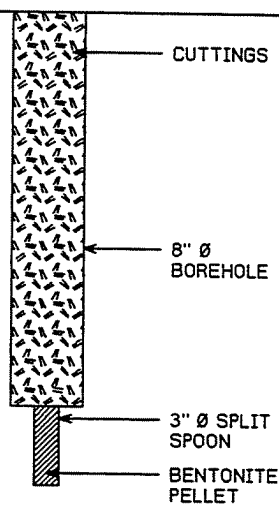
POTHOLE AREA BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-34)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113931.52
EAST: 1062815.80

HOLE DESIGNATION: PBH13-96
DATE COMPLETED: JULY 12, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	N' VALUE	PID (ppm)
	GROUND SURFACE	572.2					
2.5	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	571.5		1SS	X	25	0
	ML-SILT and ASH (FILL), glass, slag and wood, brown and red brown			2SS	X	41	0
5.0				3SS	X	4	0
7.5	SLAG, vesicular, gray - black viscous material (7.0 to 8.0ft BGS) - granular, dark green	566.2		4SS	X	54	0
10.0				5SS	X	61	0
12.5	CL-CLAY (NATIVE), and some silt, firm, red brown, moist	561.2		6SS	X	32	0
	END OF HOLE @ 12.0ft BGS	560.2					
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

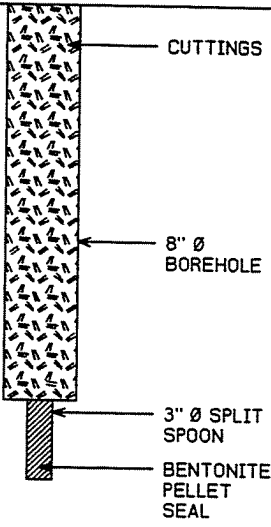
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-35)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113945.57
EAST: 1062819.53

HOLE DESIGNATION: PBH13A-96
DATE COMPLETED: JULY 12, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	572.2					
	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	571.7		1SS		17	0
-2.5	ML-SILT (FILL), glass, foundry sand, brown and black			2SS		9	0
-5.0				3SS		2	0
-7.5	SLAG, vesicular, gray - black viscous material (7.8 to 8.0ft BGS) - granular, dark green	565.2		4SS		33	0
-10.0	SP-SAND (NATIVE), little gravel, trace vegetative matter, fine grained, dark gray, wet	561.7		5SS		26	0
-12.5	END OF HOLE @ 12.0ft BGS	560.2		6SS		10	0
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

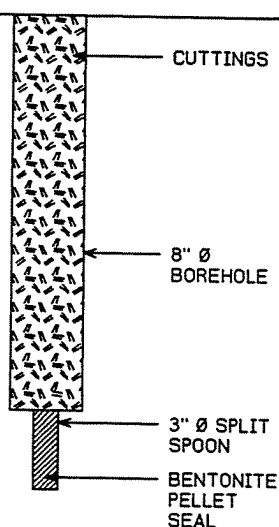
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-36)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113960.38
EAST: 1062823.10

HOLE DESIGNATION: PBH13B-96
DATE COMPLETED: JULY 12, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	572.6					
	ML-SILT (TOPSOIL), dark brown, moist	572.1		1SS	X	20	0
-2.5	SM-SAND (FILL), little silt, occasional glass fragment, fine grained, brown	570.6		2SS	X	4	0
	ASH, glass and slag, black and off white			3SS	X	14	0
-5.0				4SS	X	60	0
-7.5	SLAG, granular, gray, white, light green	566.6		5SS	X	3	0
	- wet			6SS	X	3	0
-10.0							
-12.5	SM-SAND (NATIVE), little silt, little gravel, fine to medium grained, dark gray, wet	561.5					
	END OF HOLE @ 12.0ft BGS	560.6					
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

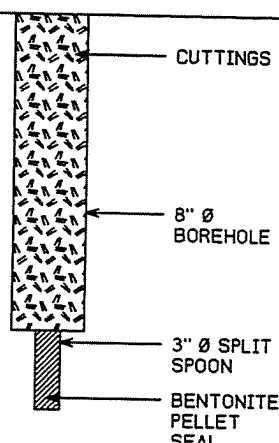
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-30)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113880.65
EAST: 1062817.47

HOLE DESIGNATION: PBH14-96
DATE COMPLETED: JULY 11, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
	ASPHALT PAVEMENT	570.9		1SS	X	7	0
	CRUSHED LIMESTONE SUBBASE	570.4		2SS	X	2	0
-2.5	ASH (FILL), glass, slag, brick and wood, black and brown			3SS	X	51	0
-5.0	SLAG, vesicular and granular, hard, gray and dark green - black viscous material (5.2 to 5.3ft BGS)	567.1		4SS	X	148	0
-7.5				5SS	X	57	0
-10.0	SP-SAND (NATIVE), trace silt, trace clay, fine grained, dark gray, wet END OF HOLE @ 10.0ft BGS	561.6 561.1					
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

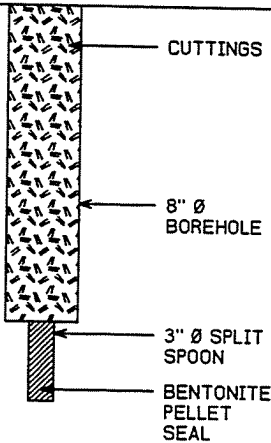
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-31)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113873.94
EAST: 1062826.47

HOLE DESIGNATION: PBH14A-96
DATE COMPLETED: JULY 11, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
	ASPHALT PAVEMENT	571.0					
	CRUSHED LIMESTONE SUBBASE	570.8					
-2.5	ASH (FILL), slag, silt, glass, sand and wood, loose, gray, black and brown			1SS	X	24	0
				2SS	X	2	0
-5.0	SLAG, dense, gray and brown - wet	566.9		3SS	X	33	0
-7.5	- black viscous material (7.2 to 7.6ft BGS)			4SS	X	73	0
-10.0	SP-SAND (NATIVE), trace silt, trace clay, fine to medium grained, dark gray, wet	561.3 561.1		5SS	X	23	0
	END OF HOLE @ 10.0ft BGS						
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

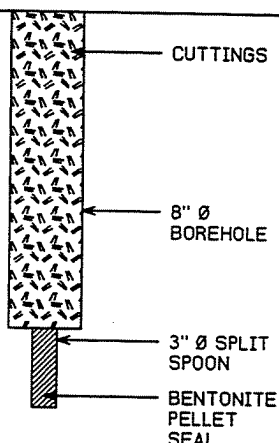
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-32)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113864.73
EAST: 1062839.29

HOLE DESIGNATION: PBH14B-96
DATE COMPLETED: JULY 11, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
	ASPHALT PAVEMENT	571.0					
	CRUSHED LIMESTONE SUBBASE	570.8					
-2.5	SP-SAND (FILL), slag, glass and brick, loose, fine to medium grained, rust brown			1SS	X	7	0
				2SS	X	2	0
-5.0	- wet			3SS	X	2	0
-7.5	SLAG, brown - dark green	565.6		4SS	X	42	0
-10.0	SP-SAND (NATIVE), trace silt, trace clay, fine grained, dark gray, wet	561.5		5SS	X	31	0
	END OF HOLE @ 10.0ft BGS	561.1					
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

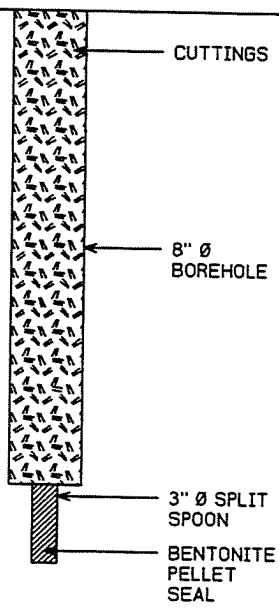
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-33)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113870.01
EAST: 1062768.22

HOLE DESIGNATION: PBH15-96
DATE COMPLETED: JULY 12, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	570.3					
2.5	ML-SILT (TOPSOIL), little sand, dark brown, moist SP-SAND (FILL), brick, glass, ash, wood and slag, fine to medium grained	570.1		1SS	X	5	0
				2SS	X	>70	0
5.0	SLAG, gray	566.8		3SS	X	>137	0
	- wet			4SS	X	4	0
7.5	- white and dark green			5SS	X	67	0
10.0				6SS	X	7	0
12.5	SM-SAND (NATIVE), little silt, little gravel, fine to medium grained, dark gray, wet	558.8 558.1		7SS	X	57	0
	ML-SILT (TILL), little to some fine sand, little gravel, dense, red brown, moist	556.3					
15.0	END OF HOLE @ 14.0ft BGS						
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

APPENDIX C

POTHOLE AREA IN-PLACE SOLIDIFICATION TREATABILITY STUDY REPORT

**TECHNICAL MEMORANDUM
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK**

1.0 INTRODUCTION

A treatability study for in-place solidification was performed by TreaTek-CRA Company (TreaTek-CRA) for a black viscous material (BVM) from the Gratwick-Riverside Park Site (Site) which is located along the Niagara River in the City of North Tonawanda, New York. A 5-gallon bucket of the BVM was received from the Site on July 12, 1996. The BVM had a pungent odor and its physical characteristic was temperature dependent. At room temperature (70-72°F), it was viscous but flowable. At temperatures below 55°F, it was hard and immobile. A bucket of soil from the Site was also obtained. The soil was clay-like and had a moisture content of about 15 percent. The objective of the treatability study is to evaluate the effectiveness of the solidification process, using cement, cement and soil, or cement grout, in generating a solid mass that passes the paint-filter test and which has acceptable TCLP organic parameter concentrations.

2.0 SCOPE OF WORK/DISCUSSION OF RESULTS

The solidification study was conducted in two phases, preliminary screening and performance testing.

1. Preliminary Screening

The screening was conducted at room temperature (70-72°F) with 200 gm of BVM in 16 oz. glass jars. Various amounts of portland cement (type I) and soil were added to the BVM. The BVM, cement, and/or soil mixtures were homogenized with the combination of mechanical mixing using a hand mixer and manual mixing with a stainless steel spoon. Cement grout and soil/cement grout were also used in the preliminary screening. The mixtures were cured for three days at room temperature (approximately 70-72°F).

The following weight ratios of the BVM and solidification agents were screened:

BVM: Cement = 100:20; 100:30; 100:40; 100:50

BVM: Soil:Cement = 100:50:50; 100:100:100; 100:100:150; 100:150:100

BVM: Cement grout = 100:45

BVM: Soil:Cement grout = 100:100:50

The results from the preliminary screening phase are presented in Table C.1. The screening strategy focused primarily on the texture and appearance of the "solidified" mixtures after three days of curing. The screening results can be summarized with the following:

- a) Adding cement only (up to 50 parts) to the BVM did not result in a firm or hard material after three days of curing.
- b) An equal amount (by weight) of soil and cement must be added in order to obtain a firm to hard solidified mixture.
- c) The use of cement grout resulted in the formation of free liquid even after three days of curing.

Based on the screening results the following mixture recipes were retained for further evaluation in the performance testing phase:

Mix 1	BVM: Cement = 100:30
Mix 2	BVM: Cement = 100:60
Mix 3	BVM: Soil:Cement = 100:50:50
Mix 4	BVM: Soil:Cement = 100:100:100

Three of the four mixtures were prepared and cured in two different temperatures (70°F and 55°F) to assess potential performance differences. A total of seven samples were prepared and were cured for seven days prior to performance testing. A summary of the performance sample mixtures is shown in Table C.2.

2. Performance Testing

The performance testing phase involved preparing sufficient quantities of these different mixtures so that they can be tested for RCRA hazardous waste parameters (TCLP and the RCRA characteristic list) (see Table C.3), and unconfined compressive strength (ASTM Method D2166).

Approximately two kilograms of solidified material was required for these performance tests for each of the mixtures recipes. These mixtures were prepared in a 5-quart stainless steel mixing bowl using a combination of manual and mechanical mixers.

Table C.4 is a summary of the TCLP and RCRA characteristic testing results for the seven samples. The results showed the following:

- a) All seven samples passed TCLP limits for volatiles, pesticides and herbicides, and metals. They also passed the RCRA characteristic parameters.

- b) Only one semi-volatile parameter (2,4,6-trichlorophenol) in one sample (BVM:S:C = 100:50:50 cured at 55°F) exceeded the TCLP regulatory level (2.0 mg/L) with a concentration of 2.3 mg/L.

A QA/QC review of the analytical results (see Appendix D, Remedial Design Investigation Report) concluded that the data were acceptable.

The physical testing results are presented in Table C.5. The laboratory report is included in Attachment C.1. The unconfined compressive strength after 7 days of curing ranged from 0 to 9.5 psi. Consistent with the prescreening results, the mixture with the highest soil content resulted in the highest unconfined compressive strength. Mixtures prepared and cured at a lower temperature (55°F versus 70°F) also showed some minor improvement in material strength.

3.0 CONCLUSIONS

All seven samples passed TCLP limits and RCRA characteristics except for one semi-volatile parameter (2,4,6-trichlorophenol) in one sample (BVM:S:C = 100:50:50 cured at 55°F). The 2,4,6-trichlorophenol concentration of 2.3 mg/L was only slightly above the regulatory level of 2.0 mg/L.

The performance testing results show that soil needs to be a significant part of the mixture to provide a stabilized material with load-bearing capacity. The BVM:Soil:Cement mixture of 100:100:100 provided an unconfined compressive strength of 9.5 psi after 7 days of curing.

TABLE C.1
PRELIMINARY SCREENING RESULTS
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

BVM	Mixtures		Cement Grout	Observations After Three Days Curing		Selected for Performance Testing (1)
	Cement	Soil		Texture	Free Liquid	
100	20	-	-	Very Soft	No	No
100	30	-	-	Soft	No	Yes
100	40	-	-	Soft	No	No
100	50	-	-	Soft	No	No
100	50	50	-	Firm	No	Yes
100	100	100	-	Firm	No	Yes
100	100	150	-	Firm	No	No
100	150	100	-	Firm	No	No
100	-	-	45	Soft	Yes	No
100	-	100	50	Soft	Yes	No

Notes:

- (1) A BVM:Cement mixture of 100:60 was also selected for Performance Testing.
BVM Black Viscous Material

TABLE C.2
SAMPLE TREATMENT SUMMARY
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

<i>Sample ID</i>	<i>Sample Ratio</i>	<i>Collection Date</i>	<i>Time</i>	<i>Analyses</i>
100/30 70 °F	BVM100/C30 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/60 70 °F	BVM100/C60 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/50/50 70 °F	BVM100/S50/C50 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/100/100 70 °F	BVM100/S100/C100 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/30 55 °F	BVM100/C30 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics
100/60 55 °F	BVM100/C60 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics
100/50/50 55 °F	BVM100/S50/C50 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics

Notes:
 BVM Black Viscous Material.
 C Cement.
 RCRA Resource Conservation and Recovery Act.
 S Soil.
 TCLP Toxicity Characteristic Leaching Procedure.

TABLE C.3
ANALYTICAL METHODS SUMMARY
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

<i>Analytical Parameter</i>	<i>Method(1)</i>
TCLP Volatiles	1311/8260
TCLP Semi-Volatiles	1311/8270
TCLP Pesticides	1311/8080
TCLP Herbicides	1311/8150
TCLP Metals	1311/6010/7000
Ignitability	1010
Corrosivity	1110
Sulfide Reactivity	7.3.4.2
Cyanide Reactivity	7.3.4.2
Paint Filter Test	9095

Notes:

- (1) Methods referenced form "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Third Edition, August 1994, USEPA Office of Solid Waste.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE C.4

ANALYTICAL RESULTS SUMMARY
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

		Sample Location: Collection Date:		100/30 70 °F 07/29/96		100/60 70 °F 07/29/96		100/50/50 70 °F 07/29/96		100/100/100 70 °F 07/29/96		100/50 55 °F 07/30/96		100/60 55 °F 07/30/96		100/50/50 55 °F 07/30/96	
		Units	Regulatory Limits														
TCLP Volatiles																	
Vinyl chloride		mg/L	0.2	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
1,1-Dichloroethene		mg/L	0.7	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Chloroform		mg/L	6.0	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
1,2-Dichloroethane		mg/L	0.5	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
2-Butanone		mg/L	200	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
Carbon tetrachloride		mg/L	0.5	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Trichloroethene		mg/L	0.5	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Benzene		mg/L	0.5	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Tetrachloroethene		mg/L	0.7	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Chlorobenzene		mg/L	100	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
TCLP Semi-Volatiles																	
Pyridine		mg/L	5.0	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
1,4-Dichlorobenzene		mg/L	7.5	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
2-Methylphenol		mg/L	200	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
3- and/or 4-Methylphenol		mg/L	200	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
Hexachloroethane		mg/L	3.0	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
Nitrobenzene		mg/L	2.0	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
Hexachlorobutadiene		mg/L	0.5	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
2,4,6-Trichlorophenol		mg/L	2.0	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
2,4,5-Trichlorophenol		mg/L	400	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20
2,4-Dinitrotoluene		mg/L	0.13	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
Hexachlorobenzene		mg/L	0.13	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040	ND 0.040
Pentachlorophenol		mg/L	100	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20	ND 0.20
TCLP Pesticides																	
Heptachlor		mg/L	0.008	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005
alpha-Chlordane		mg/L	0.03	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005
gamma-Chlordane		mg/L	0.03	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005
gamma-BHC (Lindane)		mg/L	0.4	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005
Endrin		mg/L	0.02	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001
Methoxychlor		mg/L	10	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
Toxaphene		mg/L	0.5	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Heptachlor epoxide		mg/L	0.008	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005	ND 0.00005
TCLP Herbicides																	
2,4-D		mg/L	10	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001
2,4,5-TP		mg/L	1.0	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005

TABLE C.4

ANALYTICAL RESULTS SUMMARY
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

Sample Location: Collection Date:		Regulatory Limits	Units	100/30 70 °F 07/29/96					100/50/50 70 °F 07/29/96					100/100/100 70 °F 07/29/96					100/30 55 °F 07/30/96					100/60 55 °F 07/30/96					100/50/50 55 °F 07/30/96																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Silver		mg/L	5.0	ND 0.007	ND 0.038	ND 0.036	ND 0.0032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038	ND 0.032	ND 0.007	ND 0.007	ND 0.038

Notes:

- Not applicable.
- J Estimated.
- mm/yr Millimeters per year.
- NDx Not detected at or above x.
- neg Negative.
- RCRA Resource Conservation and Recovery Act.
- s.u. Standard Unit.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE C.5
PHYSICAL TESTING RESULTS
SOLIDIFICATION STUDY - BLACK VISCOUS MATERIAL
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

<i>Ratio/ Parameter</i>	<i>Curing Temperature (°F)</i>	<i>Volume Increase (%)</i>	<i>Unconfined Compressive Strength (psi)</i>
Sample: BVM:Cement=100:30	70	10	0
Sample: BVM:Cement=100:60	70	20	0
Sample: BVM:Soil:Cement=100:50:50	70	25	0
Sample: BVM:Soil:Cement=100:100:100	70	40	9.5
Sample: BVM:Cement=100:30	55	10	0
Sample: BVM:Cement=100:60	55	20	0.5
Sample: BVM:Soil:Cement=100:50:50	55	25	2.0

NOTES:

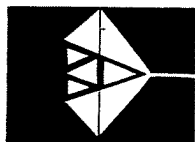
BVM Black Viscous Material

ATTACHMENT C.1

PHYSICAL TESTING RESULTS
BVM SOLIDIFICATION STUDY

7987

BUFFALO DRILLING COMPANY



INC.

10440 MAIN STREET
CLARENCE, NEW YORK
14031
(716) 759-7821
FAX (716) 759-7823

August 12, 1996

Job No.: 96-1263B

TreaTek-CRA Company
2055 Niagara Falls Boulevard, Suite Three
Niagara Falls, New York 14304

ATTN: Dr. Cindy Lin

RE: Unconfined Compressive Strength Testing of
Reconstituted Soil Samples
Unspecified Site
(CRA Project Ref. No. 7987)
(P.O. No. P0tt0004863)

Ladies/Gentlemen:

Barron & Associates, P.C. and Buffalo Drilling Company, Inc. (BDC) are enclosing the individual unconfined compressive strength analysis graphs for the above referenced project. The samples were tested in accordance with the following methods:

- ASTM D2216 Moisture Content Determination
- ASTM D2166 Unconfined Compressive Strength of Cohesive Soils

This data represents the laboratory testing results for the seven samples that were provided by TreaTek-CRA on July 30, 1996. All samples were tested on Wednesday, July 31, 1996. A copy of the sample chain-of-custody record is also enclosed.

Please call either James S. Barron, P.E. or the undersigned at your earliest convenience, if questions should arise.

Very truly yours,
BARRON & ASSOCIATES, P.C.

&

BUFFALO DRILLING COMPANY, INC.

Carmen M. Panuccio
Geotechnical Engineer

Encls.

BUFFALO DRILLING COMPANY, INC.



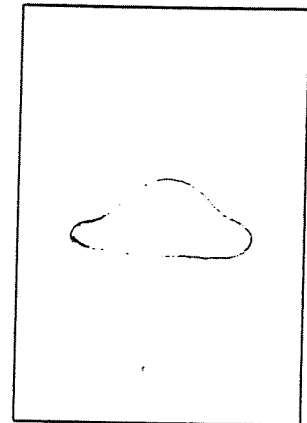
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

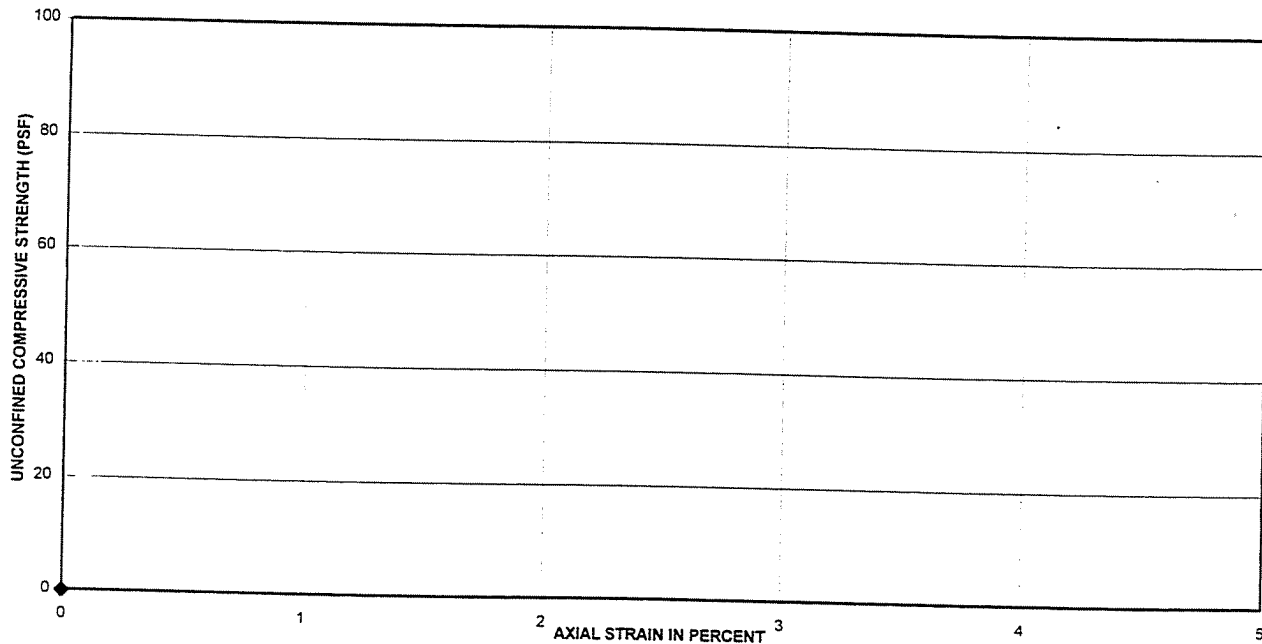
Client: TreTek-CRA
Project: Not Specified
File No: 96-12633
Boring No: -
Sample No: 7987-100/30-1
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96
Soil Classification: Silt-like (Uniform, black, strong odor)
Sample Height (in.): 4.0
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.00
Initial Water Content (%): -
Initial Wet Density (pcf): 91.7
Initial Dry Density (pcf): -
Maximum Strength (psf): 0

SKETCH AT FAILURE



Note: Sample slumps under its own weight,
therefore, cannot be tested.



BUFFALO DRILLING COMPANY, INC.



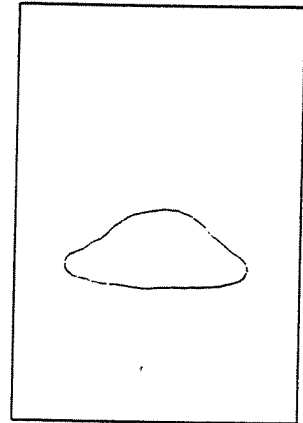
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

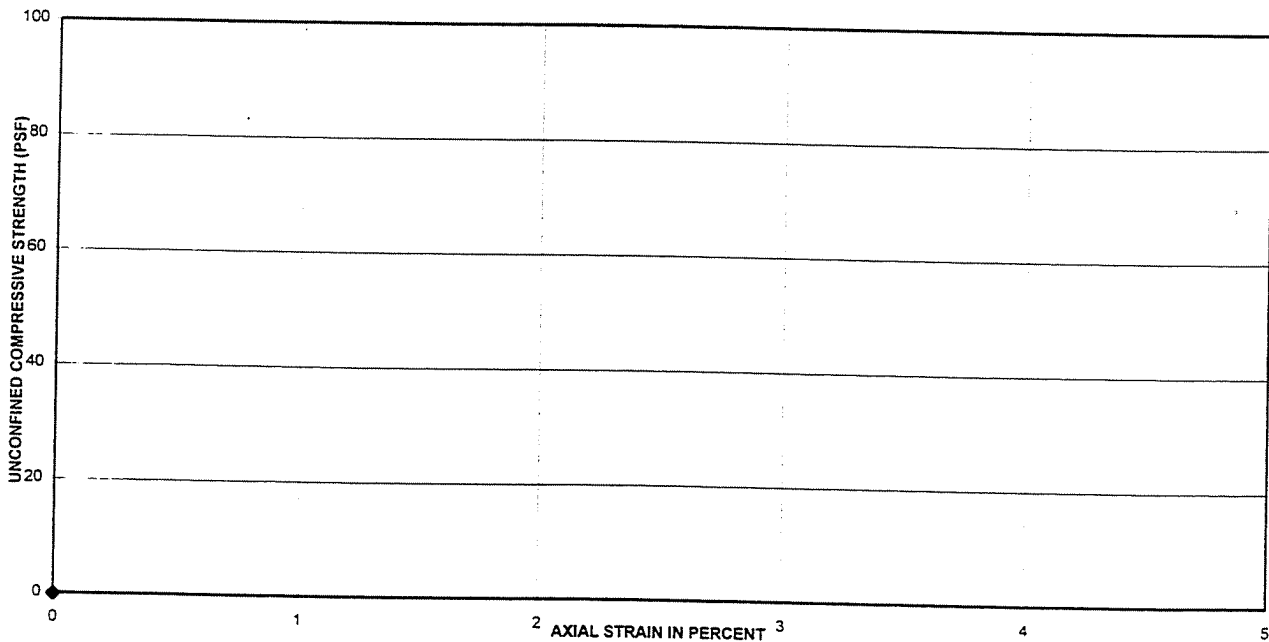
Client: TreaTek-CRA
Project: Not Specified
File No: 96-1263 B
Boring No: -
Sample No: 7987-100/60-2
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96
Soil Classification: Silt-like (Uniform, black, strong odor)
Sample Height (in.): 4.0
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.00
Initial Water Content (%): -
Initial Wet Density (pcf): 96.9
Initial Dry Density (pcf): 0.0
Maximum Strength (psf): 0

SKETCH AT FAILURE



Note: Sample slumps under its own weight,
therefore, cannot be tested.



BUFFALO DRILLING COMPANY, INC.



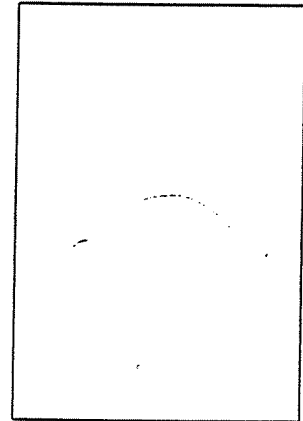
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

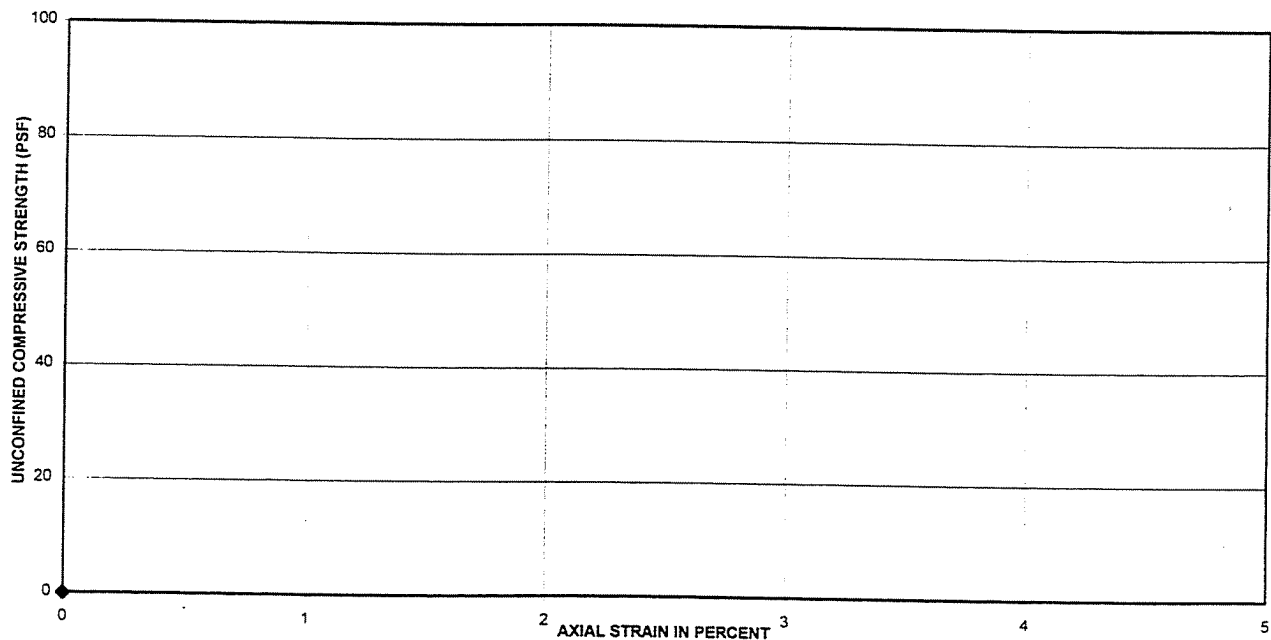
Client: TreaTek-CRA
Project: Not Specified
File No: 96-1263B
Boring No: -
Sample No: 7987-100/50/50-3
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96 at 4:43 P.M.
Soil Classification: Silt-like (Uniform, black, strong odor)
Sample Height (in.): 4.0
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.00
Initial Water Content (%): 10.9%
Initial Wet Density (pcf): 102.0
Initial Dry Density (pcf): 91.9
Maximum Strength (psf): 0

SKETCH AT FAILURE



Note: Sample slumps under its own weight,
therefore, cannot be tested.



BUFFALO DRILLING COMPANY, INC.

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CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

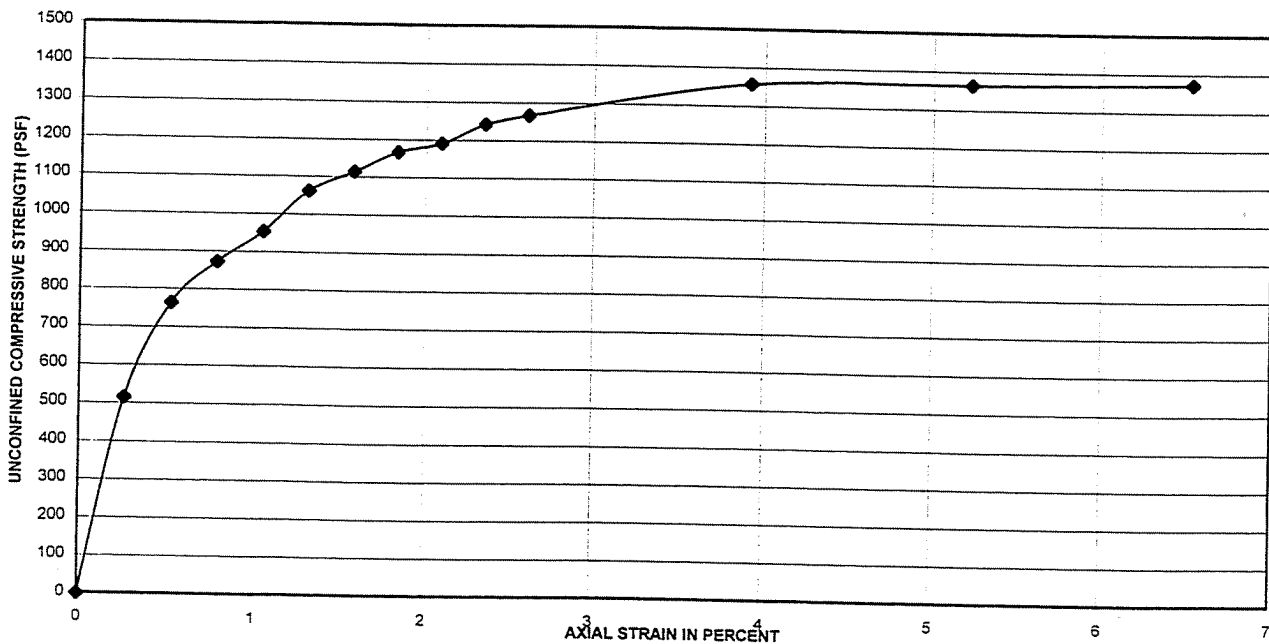
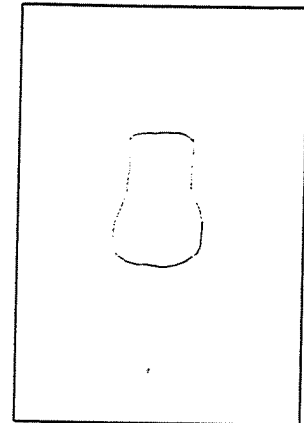
UNCONFINED COMPRESSIVE STRENGTH TEST

ASTM D2166

Client: TreaTek-CRA
Project: Not Specified
File No: 96-1263B
Boring No: -
Sample No: 7987-100/100/100-4
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96 at 2:00 P.M.
Soil Classification: Silt-like (brn & blk granules, strong odor)
Sample Height (in.): 3.8
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.77
Initial Water Content (%): 10.1
Initial Wet Density (pcf): 95.8
Initial Dry Density (pcf): 87.0
Maximum Strength (psf): 1,373

SKETCH AT FAILURE



BUFFALO DRILLING COMPANY, INC.



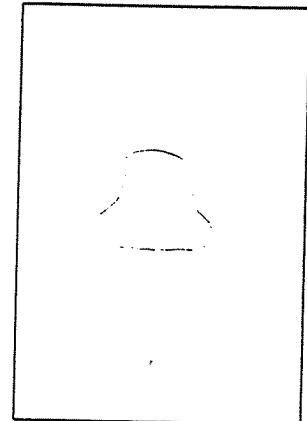
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

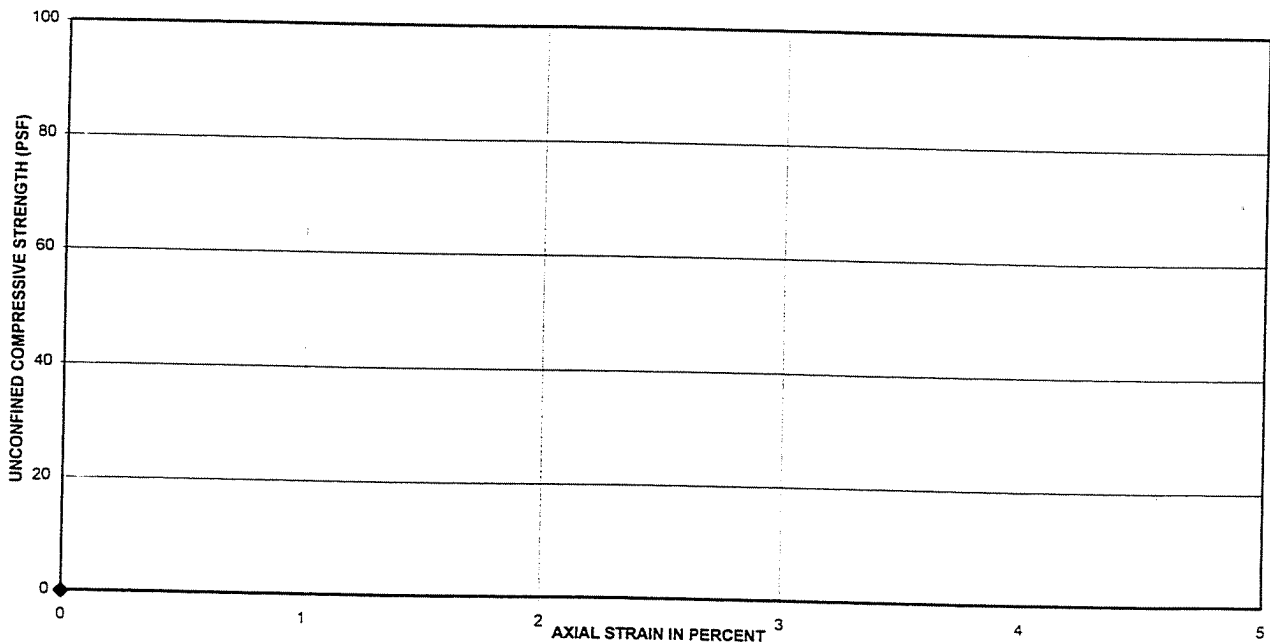
Client: TreaTek-CRA
Project: Not Specified
File No: 96-1263 B
Boring No: -
Sample No: 7987-100/30-5
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96
Soil Classification: Silt-like (Uniform, black, strong odor)
Sample Height (in.): 4.0
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.00
Initial Water Content (%): -
Initial Wet Density (pcf): 90.2
Initial Dry Density (pcf): -
Maximum Strength (psf): 0

SKETCH AT FAILURE



Note: Sample intact, however no load measurement as strain applied to sample.



BUFFALO DRILLING COMPANY, INC.



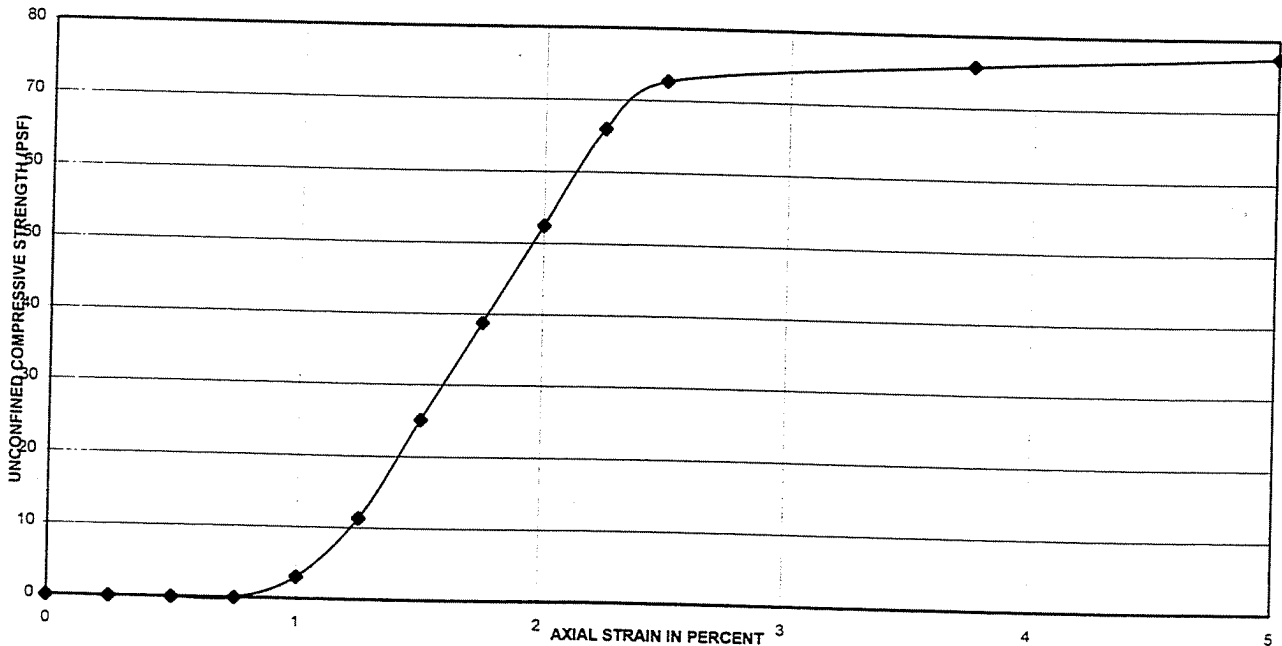
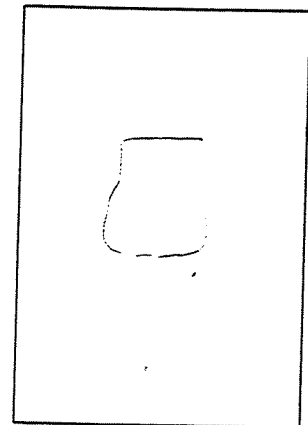
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

Client: Trea-Tek
Project: Not Specified
File No: 96-1263B
Boring No: -
Sample No: 7987-100/60-6
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96 @ 4:34 pm
Soil Classification: Silt-like (uniform, black, strong odor)
Sample Height (in.): 4.0
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.80
Initial Water Content (%): 9.5
Initial Wet Density (pcf): 105.4
Initial Dry Density (pcf): 96.2
Maximum Strength (psf): 77

SKETCH AT FAILURE



BUFFALO DRILLING COMPANY, INC.



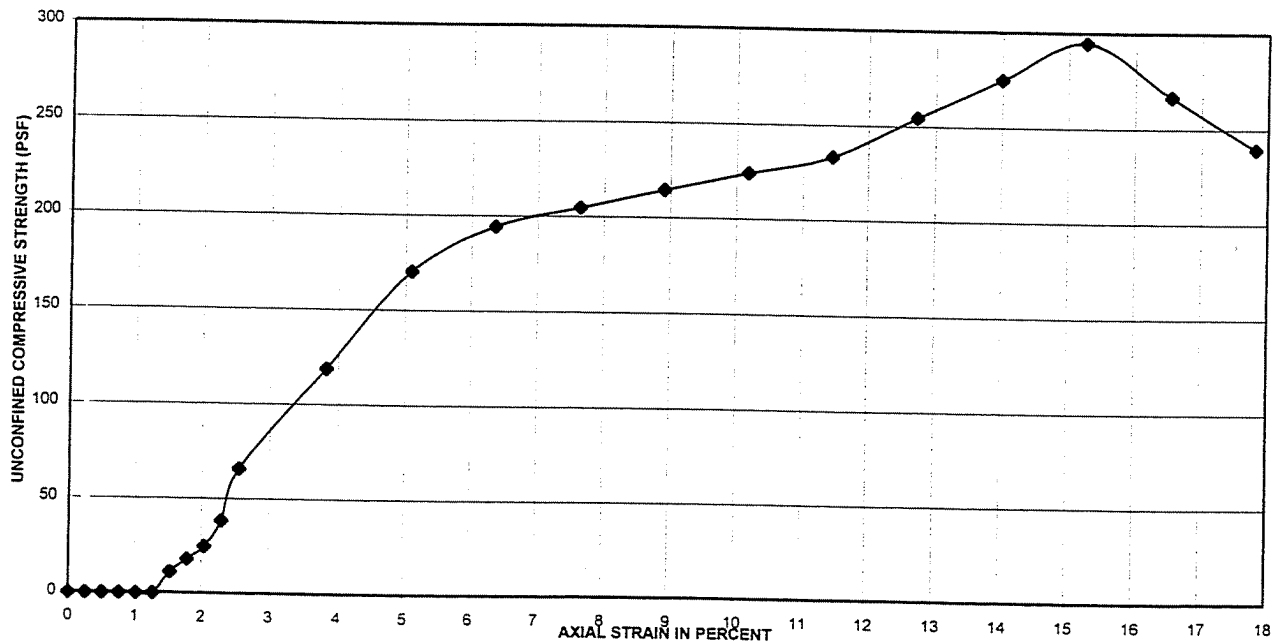
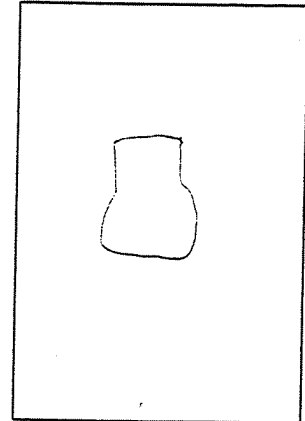
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

UNCONFINED COMPRESSIVE STRENGTH TEST
ASTM D2166

Client: Trea-Tek
Project: Not Specified
File No: 96-1263 B
Boring No: -
Sample No: 7987-100/50/50-7
Depth: -
Sample Method: Prepared by Client

Test Date: 7/31/96 at 2:21 PM
Soil Classification: Silt-like (uniform, black, strong odor)
Sample Height (in.): 3.9
Sample Diameter (in.): 2.0
Rate of Strain (%/min.): 0.79
Initial Water Content (%): 2.4
Initial Wet Density (pcf): 110.1
Initial Dry Density (pcf): 107.5
Maximum Strength (psf): 295

SKETCH AT FAILURE



CHAIN OF CUSTODY RECORD

TreatTek - CRA™ COMPANY

2055 Niagara Falls Blvd, Suite Three
Niagara Falls, N.Y. 14304 (716) 297-2160

SHIPPED TO (Laboratory Name):

Buffalo Drilling

REFERENCE NUMBER:

7987

SAMPLER'S
SIGNATURE:

Cynthia Lane

PRINTED
NAME:

Cynthia Lin

PARAMETERS

CONTAINERS

NO. OF

SAMPLE
TYPE

SAMPLE No.

DATE

TIME

REMARKS

7/30/96

1 PM

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

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7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

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7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

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7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

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7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987-100/30-5

7987-100/60-6

7987-100/50/50-7

7987-100/30-1

7987-100/60-2

7987-100/50/50-3

7987-100/100/100-4

7987

APPENDIX D

ANALYTICAL RESULTS AND QA/QC REVIEW BLACK VISCOUS MATERIAL TREATABILITY STUDY

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1.0 EXECUTIVE SUMMARY

A sample of black viscous material was collected and treated with cement and soil in support of the Remedial Design Program at the Gratwick-Riverside Park Site in North Tonawanda, New York (Site). Treated samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analytes, corrositivity, ignitability, reactivity, and paint filter liquid.

All data were acceptable. All results were less than the associated EPA regulatory levels except for the 2,4,6-trichlorophenol concentration in sample 100/50/50 55°F.

2.0 INTRODUCTION

A sample of black viscous material was collected and treated with cement and soil in support of the treatability study at the Gratwick-Riverside Park Site in North Tonawanda, New York.

The treated samples were analyzed by Roy F. Weston, Inc. in Lionville, Pennsylvania. A summary of the sample treatment and analysis program is presented in Table 1.

Samples were analyzed in accordance with the methods referenced in Table 2. A summary of the analytical data is presented in Table 3. The Quality Assurance/Quality Control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the "Quality Assurance Project Plan (QAPP) for the Remedial Design Work Plan at the Gratwick-Riverside Park Site, North Tonawanda, New York, March 1996". Additional validation guidance was referenced from the following documents:

- i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" EPA 540/R-94/012, February 1994; and
- ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-5400/R-94-013, February 1994.

All raw data including calibration, spike, duplicate and blank results for TCLP analyses were assessed.

Due to the nature of the tests, a limited evaluation of the reactivity analyses was performed and no validation of the ignitability, corrosivity and paint filter liquid test was performed.

3.0 QA/QC REVIEW

3.1 HOLDING TIMES

Sample holding time data are presented in Table 4. Holding time criteria, as specified in the QAPP and the associated methods, were originally met for all sample preparation and analyses. Reported detection limits exceeded the EPA regulatory limits for hexachlorobutadiene, hexachlorobenzene and 2,4-dinitrotoluene. Five of the samples were re-analyzed, out of the specified holding times, for these compounds. Since the holding times were not grossly exceeded and the results were non-detect, the data were not qualified.

3.2 INSTRUMENT CALIBRATION

Gas Chromatograph/Mass Spectrometer (GC/MS) - Volatiles, Semi-Volatiles

The GC/MS instrumentation was properly tuned prior to sample analyses. Calibration data showed adequate instrument sensitivity, and calibration curves showed acceptable linearity and stability throughout the analysis period.

Gas Chromatograph (GC) - Pesticides/Herbicides

Initial and continuing calibration data showed adequate instrument sensitivity and linearity.

Metals

Calibration curves and initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the proper frequency. The calibration curves were acceptable and all ICV and CCV recoveries were within the required control limits.

Interference check standards were analyzed at the proper frequency; all recoveries were acceptable.

Contract Required Detection Limit (CRDL) standards were analyzed at the proper frequency. All recoveries were acceptable with the exception of a slightly low silver recovery. All sample results for silver were non-detect. Since the exceedance was marginal, the results were judged to be acceptable without qualification.

Wet Chemistry - Cyanide/Sulfide Reactivity

All calibrations were performed as required by the methods. Initial and continuing calibration verification standards were analyzed at the proper frequency and the results were acceptable.

3.3 INTERNAL STANDARD ANALYSES - GC/MS ANALYSES

The proper internal standard (IS) compounds were added to all samples, blanks, standards and spiked samples prior to volatile and semi-volatile analyses. All applicable internal standard recoveries were acceptable.

3.4 SURROGATE COMPOUND ANALYSES - ORGANICS

Surrogates were added to all samples, blanks and QC samples prior to extraction and/or analysis. A summary of surrogate recoveries is presented in Table 5. Surrogate recoveries met the method acceptance criteria with the following exceptions:

- i) Surrogate recoveries could not be reported for some samples due to necessary dilutions. Analytical accuracy for these samples was assessed based on blank spike recoveries (see Section 3.8).
- ii) Low 2,4-dichlorophenylacetic acid recoveries were reported for some of the herbicide analyses. All associated sample results were non-detect and although the surrogate recoveries were low, they were adequate to demonstrate sufficient method efficiency. These data were judged to be acceptable without qualifications.

3.5 BLANK ANALYSES

Method blanks and leachate blanks were analyzed and/or extracted at the proper frequency for all parameters, and the results are summarized in Table 6. Low level barium and volatile organics concentrations were detected in some of the blanks. All associated positive sample results up to five times the concentrations detected in the blanks were qualified non-detect.

3.6 MATRIX SPIKE AND DUPLICATE ANALYSES - VOLATILES AND METALS

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed with the batch of samples for TCLP volatile organics. A summary of the MS/MSD results is presented in Table 7. All recoveries were acceptable indicating good analytical accuracy and precision.

A matrix spike was analyzed with the batch of samples. Slightly low recoveries were reported for selenium and silver. Results for these analytes were non-detect and based on sufficient analyte recoveries, the results were judged acceptable without qualification (see Table 7).

3.7 DUPLICATE ANALYSES - CYANIDE/SULFIDE REACTIVITY AND CORROSIVITY

Duplicate samples were analyzed for cyanide/sulfide reactivity with each batch of samples; a duplicate analysis was also reported for corrosivity. A summary of duplicate results are provided in Table 8. These data showed acceptable analytical accuracy and precision.

3.8 BLANK SPIKE SAMPLE ANALYSES - ORGANICS

Blank spike (BS) samples were prepared and analyzed on a regular basis. The results are summarized in Table 9A. The BS contained all analytes of interest, and recoveries indicated acceptable overall analytical accuracy.

3.9 LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD) - METALS AND CYANIDE/SULFIDE REACTIVITY

LCSs were prepared and analyzed for all metals of interest. The results are summarized in Table 9B. The recoveries indicated acceptable overall accuracy.

LCS/LCSDs were prepared and analyzed for cyanide/sulfide reactivity (see Table 9B). The cyanide reactivity recoveries showed acceptable analytical accuracy but slight variability between results. Analytical precision was judged to be acceptable based on laboratory duplicate results (see Section 3.7). The sulfide reactivity recoveries were low, and showed some variability. Sample results for sulfide reactivity were

non-detect. Although the LCS/LCSD results were low, the recoveries were sufficient to demonstrate analyte recovery, and the non-detect data were judged to be acceptable.

3.10 ICP SERIAL DILUTION - METALS

A serial dilution was performed on one sample and the results showed acceptable correlation.

4.0 CONCLUSION

Based on the preceding assessment, the data were acceptable with the qualifications noted. All results were less than the associated EPA regulatory limits except for the 2,4,6-trichlorophenol concentration in sample 100/50/50 55°F.

TABLES

TABLE 1

SAMPLE TREATMENT SUMMARY
 BLACK VISCOUS MATERIAL TREATABILITY STUDY
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

<i>Sample ID</i>	<i>Sample Ratio</i>	<i>Collection Date</i>	<i>Time</i>	<i>Analyses</i>
100/30 70 °F	BVM100/C30 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/60 70 °F	BVM100/C60 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/50/50 70 °F	BVM100/S50/C50 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/100/100 70 °F	BVM100/S100/C100 at 70 °F	07/29/96	1500	TCLP and RCRA Characteristics
100/30 55 °F	BVM100/C30 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics
100/60 55 °F	BVM100/C60 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics
100/50/50 55 °F	BVM100/S50/C50 at 55 °F	07/30/96	1300	TCLP and RCRA Characteristics

Notes:

BVM Black Viscous Material.

C Cement.

RCRA Resource Conservation and Recovery Act.

S Soil.

TCLP Toxicity Characteristic Leaching Procedure.

TABLE 2

ANALYTICAL METHODS SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

<i>Analytical Parameter</i>	<i>Method(1)</i>
TCLP Volatiles	1311/8260
TCLP Semi-Volatiles	1311/8270
TCLP Pesticides	1311/8080
TCLP Herbicides	1311/8150
TCLP Metals	1311/6010/7000
Ignitability	1010
Corrosivity	1110
Sulfide Reactivity	7.3.4.2
Cyanide Reactivity	7.3.4.2
Paint Filter Test	9095

Notes:

- (1) Methods referenced from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Third Edition, August 1994, USEPA Office of Solid Waste.

TCLP Toxicity Characteristic Leaching Procedure.

TABLE 3
ANALYTICAL RESULTS SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

	Units	Sample Location: Collection Date:					
		Regulatory Limits					
		100/30 70 °F 07/29/96	100/60 70 °F 07/29/96	100/50/50 70 °F 07/29/96	100/100/100 70 °F 07/29/96	100/60 55 °F 07/30/96	100/50/50 55 °F 07/30/96
TCLP Volatiles							
Vinyl chloride	mg/L	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
1,1-Dichloroethene	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Chloroform	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
1,2-Dichloroethane	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
2-Butanone	mg/L	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
Carbon tetrachloride	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Trichloroethene	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Benzene	mg/L	0.007	0.008	0.008	0.002	0.005	0.003
Tetrachloroethene	mg/L	ND 0.005	ND 0.005	ND 0.010	ND 0.010	ND 0.005	ND 0.005
Chlorobenzene	mg/L	0.005	0.005	0.005	0.003	0.003	0.003
TCLP Semi-Volatiles							
Pyridine	mg/L	ND 0.040	ND 0.040	ND 2.0	ND 2.0	ND 2.0	ND 2.0
1,4-Dichlorobenzene	mg/L	0.007	0.008	ND 2.0	ND 2.0	ND 2.0	ND 2.0
2-Methylphenol	mg/L	0.014	0.052	ND 2.0	ND 2.0	ND 2.0	ND 2.0
3- and/or 4-Methylphenol	mg/L	0.094	0.34	0.35	0.21	0.77	0.51
Hexachloroethane	mg/L	ND 0.040	ND 0.040	ND 2.0	ND 2.0	ND 2.0	ND 2.0
Nitrobenzene	mg/L	ND 0.040	ND 0.040	ND 2.0	ND 2.0	ND 2.0	ND 2.0
Hexachlorobutadiene	mg/L	ND 0.040	ND 0.040	ND 0.10	ND 0.10	ND 0.10	ND 0.10
2,4,6-Trichlorophenol	mg/L	0.014	0.078	0.97	1.5	1.8	2.3
2,4,5-Trichlorophenol	mg/L	ND 0.20	ND 0.20	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrotoluene	mg/L	ND 0.040	ND 0.040	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Hexachlorobenzene	mg/L	ND 0.040	ND 0.040	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Pentachlorophenol	mg/L	ND 0.20	ND 0.20	ND 10	ND 10	ND 10	ND 10
TCLP Pesticides							
Heptachlor	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
alpha-Chlordane	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
gamma-Chlordane	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
gamma-BHC (Lindane)	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
Endrin	mg/L	ND 0.0001	ND 0.0001	ND 0.001	ND 0.001	ND 0.001	ND 0.001
Methoxychlor	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
Toxaphene	mg/L	ND 0.005	ND 0.005	ND 0.05	ND 0.05	ND 0.05	ND 0.05
Heptachlor epoxide	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
TCLP Herbicides							
2,4-D	mg/L	ND 0.001	ND 0.001	ND 0.002	ND 0.002	ND 0.002	ND 0.002
2,4,5-TP	mg/L	ND 0.0005	ND 0.0005	ND 0.001	ND 0.001	ND 0.001	ND 0.001

TABLE 3

**ANALYTICAL RESULTS SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996**

		Sample Location: Collection Date:						
		100/30 70 °F 07/29/96	100/60 70 °F 07/29/96	100/50/50 70 °F 07/29/96	100/100/100 70 °F 07/29/96	100/30 55 °F 07/30/96	100/60 55 °F 07/30/96	100/50/50 55 °F 07/30/96
Regulatory Limits								
Units								
TCLP Metals								
Silver	mg/L	ND 0.007	ND 0.007	ND 0.007	ND 0.007	ND 0.007	ND 0.007	ND 0.007
Arsenic	mg/L	ND 0.038	ND 0.038	ND 0.038	ND 0.038	ND 0.038	ND 0.038	ND 0.038
Barium	mg/L	ND 0.36	0.92	0.70	0.92	0.84	1.0	0.84
Cadmium	mg/L	ND 0.0032	ND 0.0032	ND 0.0032	ND 0.0032	ND 0.0032	ND 0.0032	ND 0.0032
Chromium	mg/L	0.0097	0.021	0.023	0.074	ND 0.0091	0.049	0.030
Lead	mg/L	ND 0.055	ND 0.055	ND 0.055	ND 0.055	ND 0.055	ND 0.055	ND 0.055
Mercury	mg/L	ND 0.0001	ND 0.0001	0.00011	ND 0.0001	ND 0.0001	0.00016	ND 0.0001
Selenium	mg/L	ND 0.080	ND 0.080	ND 0.080	ND 0.080	ND 0.080	ND 0.080	ND 0.080
RCRA Characteristics								
Ignitability	°F	neg	neg	neg	neg	neg	neg	neg
Cyanide, Reactive	mg/Kg	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25	ND 0.25
Corrosivity by pH	s.u.	9.3	9.9	10	10	9.9	9.4	9.7
Corrosivity by Coupon	mm/yr	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulfide, Reactive	mg/Kg	ND 26	ND 25	ND 25	ND 25	ND 25	ND 25	ND 25
Paint Filter Test	-	neg	neg	neg	neg	neg	neg	neg

Notes:

- Not applicable.
- J Estimated.
- mm/yr Millimeters per year.
- NDx Not detected at or above x.
- neg Negative.
- RCRA Resource Conservation and Recovery Act.
- s.u. Standard Unit.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE 4
HOLDING TIME SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)		
					to TCLP Extraction	to Sample Extraction	to Sample Analysis
TCLP Volatiles							
100/30 70 °F	07/29/96	08/06/96	-	08/09/96	0	-	0
100/60 70 °F	07/29/96	08/06/96	-	08/09/96	0	-	0
100/50/50 70 °F	07/29/96	08/06/96	-	08/10/96	0	-	0
100/100/100 70 °F	07/29/96	08/06/96	-	08/10/96	0	-	0
100/30 55 °F	07/30/96	08/06/96	-	08/10/96	0	-	0
100/60 55 °F	07/30/96	08/06/96	-	08/10/96	0	-	0
100/50/50 55 °F	07/30/96	08/06/96	-	08/11/96	0	-	0
TCLP Semi-Volatiles							
100/30 70 °F	07/29/96	08/07/96	08/08/96	08/12/96	0	0	0
100/60 70 °F	07/29/96	08/07/96	08/08/96	08/12/96	0	0	0
100/50/50 70 °F	07/29/96	08/07/96	08/08/96	08/19/96	0	0	0
100/50/50 70 °F RE	07/29/96	08/07/96	08/08/96	10/02/96	0	0	17
100/100/100 70 °F	07/29/96	08/07/96	08/08/96	08/20/96	0	0	0
100/100/100 70 °F RE	07/29/96	08/07/96	08/08/96	10/02/96	0	0	17
100/30 55 °F	07/30/96	08/07/96	08/08/96	08/19/96	0	0	0
100/30 55 °F RE	07/30/96	08/07/96	08/08/96	10/02/96	0	0	17
100/60 55 °F	07/30/96	08/07/96	08/08/96	08/20/96	0	0	0
100/60 55 °F RE	07/30/96	08/07/96	08/08/96	10/02/96	0	0	17
100/50/50 55 °F	07/30/96	08/07/96	08/08/96	08/19/96	0	0	0
100/50/50 55 °F RE	07/30/96	08/07/96	08/08/96	10/03/96	0	0	18
TCLP Pesticides							
100/30 70 °F	07/29/96	08/07/96	08/08/96	08/11/96	0	0	0
100/60 70 °F	07/29/96	08/07/96	08/08/96	08/11/96	0	0	0
100/50/50 70 °F	07/29/96	08/07/96	08/08/96	08/12/96	0	0	0
100/100/100 70 °F	07/29/96	08/07/96	08/08/96	08/12/96	0	0	0
100/30 55 °F	07/30/96	08/07/96	08/08/96	08/11/96	0	0	0
100/60 55 °F	07/30/96	08/07/96	08/08/96	08/12/96	0	0	0
100/50/50 55 °F	07/30/96	08/07/96	08/08/96	08/12/96	0	0	0

TABLE 4
HOLDING TIME SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)		
					to TCLP Extraction	to Sample Extraction	to Sample Analysis
TCLP Herbicides							
100/30 70 °F	07/29/96	08/07/96	08/08/96	08/15/96	0	0	0
100/60 70 °F	07/29/96	08/07/96	08/08/96	08/15/96	0	0	0
100/50/50 70 °F	07/29/96	08/07/96	08/08/96	08/15/96	0	0	0
100/100/100 70 °F	07/29/96	08/07/96	08/08/96	08/15/96	0	0	0
100/30 55 °F	07/30/96	08/07/96	08/08/96	08/15/96	0	0	0
100/60 55 °F	07/30/96	08/07/96	08/08/96	08/15/96	0	0	0
100/50/50 55 °F	07/30/96	08/07/96	08/08/96	08/15/96	0	0	0
TCLP Metals (except mercury)							
100/30 70 °F	07/29/96	8/96	-	8/96	0	-	0
100/60 70 °F	07/29/96	8/96	-	8/96	0	-	0
100/50/50 70 °F	07/29/96	8/96	-	8/96	0	-	0
100/100/100 70 °F	07/29/96	8/96	-	8/96	0	-	0
100/30 55 °F	07/30/96	8/96	-	8/96	0	-	0
100/60 55 °F	07/30/96	8/96	-	8/96	0	-	0
100/50/50 55 °F	07/30/96	8/96	-	8/96	0	-	0
TCLP Mercury							
100/30 70 °F	07/29/96	08/06/96	-	08/13/96	0	-	0
100/60 70 °F	07/29/96	08/06/96	-	08/13/96	0	-	0
100/50/50 70 °F	07/29/96	08/06/96	-	08/13/96	0	-	0
100/100/100 70 °F	07/29/96	08/06/96	-	08/13/96	0	-	0
100/30 55 °F	07/30/96	08/06/96	-	08/13/96	0	-	0
100/60 55 °F	07/30/96	08/06/96	-	08/13/96	0	-	0
100/50/50 55 °F	07/30/96	08/06/96	-	08/13/96	0	-	0

TABLE 4
HOLDING TIME SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)	
					to TCLP Extraction	to Sample Analysis
RCRA Characteristics						
Cyanide, Reactive						
100/30 70 °F	07/29/96	-	-	08/12/96	-	0
100/60 70 °F	07/29/96	-	-	08/12/96	-	0
100/50/50 70 °F	07/29/96	-	-	08/12/96	-	0
100/100/100 70 °F	07/29/96	-	-	08/12/96	-	0
100/30 55 °F	07/30/96	-	-	08/12/96	-	0
100/60 55 °F	07/30/96	-	-	08/12/96	-	0
100/50/50 55 °F	07/30/96	-	-	08/12/96	-	0
Sulfide, Reactive						
100/30 70 °F	07/29/96	-	-	08/12/96	-	0
100/60 70 °F	07/29/96	-	-	08/12/96	-	0
100/50/50 70 °F	07/29/96	-	-	08/12/96	-	0
100/100/100 70 °F	07/29/96	-	-	08/12/96	-	0
100/30 55 °F	07/30/96	-	-	08/12/96	-	0
100/60 55 °F	07/30/96	-	-	08/12/96	-	0
100/50/50 55 °F	07/30/96	-	-	08/12/96	-	0

Notes:

- Not applicable.
- RCRA Resource Conservation and Recovery Act.
- RE Reanalysis.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE 5
 SURROGATE SPIKE RECOVERIES (PERCENT)
 BLACK VISCOUS MATERIAL TREATABILITY STUDY
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

<i>Surrogate:</i>	<i>DCE</i>	<i>TOL</i>	<i>BFB</i>
<i>Recovery Limits:</i>	<i>(76-114)</i>	<i>(88-110)</i>	<i>(86-115)</i>
<i>TCLP Volatiles</i>			
100/30 70 °F	103	103	107
100/60 70 °F	107	104	108
100/50/50 70 °F	108	106	106
100/100/100 70 °F	106	104	108
100/30 55 °F	113	107	109
100/60 55 °F	112	102	105
100/50/50 55 °F	103	103	104

<i>Surrogate:</i>	<i>NBZ</i>	<i>FBP</i>	<i>TPH</i>	<i>PHL</i>	<i>2FP</i>	<i>TBP</i>
<i>Recovery Limits:</i>	<i>(35-114)</i>	<i>(43-116)</i>	<i>(33-141)</i>	<i>(10-94)</i>	<i>(21-100)</i>	<i>(10-123)</i>
<i>TCLP Semi-Volatiles</i>						
100/30 70 °F	68	67	81	68	73	78
100/60 70 °F	76	65	45	45	73	73
100/50/50 70 °F	D	D	D	D	D	D
100/50/50 70 °F RE	68	68	103	108*	72	80
100/100/100 70 °F	D	D	D	D	D	D
100/100/100 70 °F RE	70	75	94	116*	81	81
100/30 55 °F	D	D	D	D	D	D
100/30 55 °F RE	69	74	78	99*	66	90
100/60 55 °F	D	D	D	D	D	D
100/60 55 °F RE	69	80	76	117*	81	89
100/50/50 55 °F	D	D	D	D	D	D
100/50/50 55 °F RE	72	80	93	123*	86	84

<i>Surrogate:</i>	<i>DCB</i>	<i>TCX</i>
<i>Recovery Limits:</i>	<i>(22-126)</i>	<i>(27-129)</i>
<i>TCLP Pesticides</i>		
100/30 70 °F	106	62
100/60 70 °F	87	55
100/50/50 70 °F	D	D
100/100/100 70 °F	D	D
100/30 55 °F	55	50
100/60 55 °F	D	D
100/50/50 55 °F	D	D

TABLE 5
 SURROGATE SPIKE RECOVERIES (PERCENT)
 BLACK VISCOUS MATERIAL TREATABILITY STUDY
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

<i>Surrogate:</i> DCAA	
<i>Recovery Limits:</i> (40-150)	
<i>TCLP Herbicides</i>	
100/30 70 °F	59
100/60 70 °F	50
100/50/50 70 °F	43
100/100/100 70 °F	32 *
100/30 50 °F	34 *
100/60 50 °F	28*
100/50/50 50 °F	29*

Notes:

- * Value outside the control limits.
- D Compound diluted out.
- TCLP Toxicity Characteristic Leaching Procedure.

Surrogates:

2FP	2-Fluorophenol	NBZ	Nitrobenzene-d5
BFB	Bromofluorobenzene	PHL	Phenol-d5
DCAA	2,4-Dichlorophenylacetic acid	TBP	2,4,6-Tribromophenol
DCB	Decachlorobiphenyl	TCX	Tetrachloro-m-xylene
DCE	1,2-Dichloroethane-d4	TOL	Toluene-d8
FBP	2-Fluorobiphenyl	TPH	p-Terphenyl-d14

TABLE 6
METHOD BLANK RESULTS SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

<i>Analysis Date:</i> <i>Units:</i>	<i>TCLP Blank</i> <i>08/09/96</i> <i>(mg/L)</i>	<i>Method Blank</i> <i>08/09/96</i> <i>(mg/L)</i>	<i>Method Blank</i> <i>08/10/96</i> <i>(mg/L)</i>	<i>Method Blank</i> <i>08/11/96</i> <i>(mg/L)</i>
<i>TCLP Volatiles</i>				
Vinyl chloride	ND 0.010	ND 0.010	ND 0.010	ND 0.010
1,1-Dichloroethene	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Chloroform	0.001J	ND 0.005	ND 0.005	ND 0.005
1,2-Dichloroethane	ND 0.005	ND 0.005	ND 0.005	ND 0.005
2-Butanone	ND 0.010	ND 0.010	ND 0.010	ND 0.010
Carbon tetrachloride	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Trichloroethene	0.002J	ND 0.005	ND 0.005	ND 0.005
Benzene	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Tetrachloroethene	0.006	ND 0.005	ND 0.005	ND 0.005
Chlorobenzene	ND 0.005	ND 0.005	ND 0.005	ND 0.005
<i>Sample Extraction Date:</i> <i>Units:</i>	<i>Method Blank</i> <i>08/08/96</i> <i>(mg/L)</i>	<i>TCLP Blank</i> <i>08/08/96</i> <i>(mg/L)</i>		
<i>TCLP Semi-Volatiles</i>				
Pyridine	ND 0.040	ND 0.040		
1,4-Dichlorobenzene	ND 0.040	ND 0.040		
2-Methylphenol	ND 0.040	ND 0.040		
3- and /or 4-Methylphenol	ND 0.040	ND 0.040		
Hexachloroethane	ND 0.040	ND 0.040		
Nitrobenzene	ND 0.040	ND 0.040		
Hexachlorobutadiene	ND 0.040	ND 0.040		
2,4,6-Trichlorophenol	ND 0.040	ND 0.040		
2,4,5-Trichlorophenol	ND 0.20	ND 0.20		
2,4-Dinitrotoluene	ND 0.040	ND 0.040		
Hexachlorobenzene	ND 0.040	ND 0.040		
Pentachlorophenol	ND 0.20	ND 0.20		
<i>Sample Extraction Date:</i> <i>Units:</i>	<i>Method Blank</i> <i>08/08/96</i> <i>(mg/L)</i>	<i>TCLP Blank</i> <i>08/08/96</i> <i>(mg/L)</i>		
<i>TCLP Pesticides</i>				
Heptachlor	ND 0.00005	ND 0.00005		
alpha-Chlordane	ND 0.00005	ND 0.00005		
gamma-Chlordane	ND 0.00005	ND 0.00005		
gamma-BHC (Lindane)	ND 0.00005	ND 0.00005		
Endrin	ND 0.0001	ND 0.0001		
Methoxychlor	ND 0.0005	ND 0.0005		
Toxaphene	ND 0.005	ND 0.005		
Heptachlor epoxide	ND 0.00005	ND 0.00005		

TABLE 6
 METHOD BLANK RESULTS SUMMARY
 BLACK VISCOUS MATERIAL TREATABILITY STUDY
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

<i>Sample Extraction Date:</i>	<i>Method Blank</i>	<i>TCLP Blank</i>
	08/08/96	08/08/96
<i>Units:</i>	(mg/L)	(mg/L)
<i>TCLP Herbicides</i>		
2,4-D	ND 0.001	ND 0.001
2,4,5-TP (Silvex)	ND 0.0005	ND 0.0005
<i>Analysis Date:</i>	<i>Method Blank</i>	<i>TCLP Blank</i>
	08/19/96	08/19/96
<i>Units:</i>	(mg/L)	(mg/L)
<i>TCLP Metals</i>		
Silver	ND 0.007	ND 0.007
Arsenic	ND 0.038	ND 0.038
Barium	ND 0.0025	0.11
Cadmium	ND 0.0032	ND 0.0032
Chromium	ND 0.0091	ND 0.0091
Lead	ND 0.055	ND 0.055
Selenium	ND 0.080	ND 0.080
<i>Analysis Date:</i>	<i>Method Blank</i>	<i>TCLP Blank</i>
	8/12/96	8/13/96
<i>Units:</i>	(mg/L)	(mg/L)
Mercury	ND 0.0001	ND 0.0001
<i>Analysis Date:</i>	<i>08/12/96</i>	
<i>Units:</i>	(mg/Kg)	
<i>RCRA Characteristics</i>		
Cyanide Reactive	ND 0.25	
Sulfide, Reactive	42	

Notes:

J Estimated.

NDx Not detected at or above x.

RCRA Resource Conservation and Recovery Act.

TCLP Toxicity Characteristic Leaching Procedure.

TABLE 7
 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY (PERCENT)
 BLACK VISCOUS MATERIAL TREATABILITY STUDY
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

	<i>MS/MSD</i>	<i>RPD</i>	<i>100/30 70°F</i>		
	<i>Control</i>	<i>Control</i>			
	<i>Limits</i>	<i>Limits</i>	<i>MS</i>	<i>MSD</i>	<i>RPD</i>
<i>TCLP Volatiles</i>					
Vinyl chloride	50-150	20	108	110	2
1,1-Dichloroethene	61-145	14	102	104	2
Chloroform	50-150	20	101	104	3
1,2-Dichloroethane	50-150	20	100	102	2
2-Butanone	50-150	20	81	84	4
Carbon tetrachloride	50-150	20	108	111	3
Trichloroethene	71-120	14	97	98	1
Benzene	76-127	11	96	97	1
Tetrachloroethene	50-150	20	99	102	3
Chlorobenzene	75-130	13	94	98	4
<i>TCLP Metals</i>					
Silver	80-120	-	76*	-	-
Arsenic	80-120	-	105	-	-
Barium	80-120	-	103	-	-
Cadmium	80-120	-	92	-	-
Chromium	80-120	-	92	-	-
Lead	80-120	-	93	-	-
Mercury	80-120	-	110	-	-
Selenium	80-120	-	73*	-	-

Notes:

- Not applicable.
- * Value outside Control Limits.
- MS Matrix Spike.
- MSD Matrix Spike Duplicate.
- RPD Relative Percent Difference.

TABLE 8
LABORATORY DUPLICATE SUMMARY
BLACK VISCOUS MATERIAL TREATABILITY STUDY
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

RCRA Characteristics	100/30 70 °F (mg/Kg)			100/60 70 °F (mg/Kg)			100/50/50 55 °F (mg/Kg)		
	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD
Cyanide, Reactive	ND 0.25	ND 0.25	*	ND 0.25	ND 0.25	*	-	-	-
Sulfide, Reactive	ND 26	ND 95	*	ND 25	ND 25	*	-	-	-
Corrosivity by Coupon	-	-	-	-	-	-	ND 1.0	ND 1.0	*

Notes:

- * Value could not be calculated due to one or more non-detect results.
- NDx Not detected at or above x.
- RCRA Resource Conservation and Recovery Act.
- RPD Relative Percent Difference.

TABLE 9A
BLANK SPIKE (PERCENT)
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JULY 1996

	Sample Extraction Date:		
	08/09/96		08/10/96
	BS	BS	BS
	Control		
	Limits		
<i>TCLP Volatiles</i>			
Vinyl chloride	50-150	114	113
1,1-Dichloroethene	61-145	99	99
Chloroform	50-150	96	97
1,2-Dichloroethane	50-150	93	94
2-Butanone	50-150	74	88
Carbon tetrachloride	50-150	99	101
Trichloroethene	71-120	90	92
Benzene	76-127	92	92
Tetrachloroethene	50-150	94	96
Chlorobenzene	75-130	91	93
	Sample Extraction Date:		
	08/08/96		
	BS	BS	
	Control		
	Limits		
<i>TCLP Semi-Volatiles</i>			
Pyridine	6-94	66	
1,4-Dichlorobenzene	19-103	46	
2-Methylphenol	28-111	74	
3- and /or 4-Methylphenol	18-117	81	
Hexachloroethane	15-100	40	
Nitrobenzene	41-120	83	
Hexachlorobutadiene	7-117	42	
2,4,6-Trichlorophenol	41-125	76	
2,4,5-Trichlorophenol	42-122	80	
2,4-Dinitrotoluene	32-113	73	
Hexachlorobenzene	47-127	84	
Pentachlorophenol	41-147	80	

TABLE 9A
 BLANK SPIKE (PERCENT)
 GRATWICK-RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

	<i>Sample Extraction Date:</i>	<u>08/08/96</u>
	BS	BS
	<i>Control</i>	
	<i>Limits</i>	
<i>TCLP Pesticides</i>		
Heptachlor	34-111	50
alpha-Chlordane	45-119	70
gamma-Chlordane	45-119	70
gamma-BHC (Lindane)	19-140	90
Endrin	30-147	95
Methoxychlor	30-147	103
Heptachlor epoxide	37-142	95

	<i>Sample Extraction Date:</i>	<u>08/08/96</u>
	BS	BS
	<i>Control</i>	
	<i>Limits</i>	
<i>TCLP Herbicides</i>		
2,4-D	28-154	60
2,4,5-TP (Silvex)	30-150	58

Notes:

BS Blank Spike.

TABLE 9B
 LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE (PERCENT)
 GRATWICK-RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JULY 1996

		Sample Analysis Date:	08/19/96			
		LCS	LCS			
		Control				
		Limits				
TCLP Metals (except mercury)						
Silver	80-120		105			
Arsenic	80-120		104			
Barium	80-120		106			
Cadmium	80-120		94			
Chromium	80-120		98			
Lead	80-120		101			
Selenium	80-120		104			
		Sample Analysis Date:	08/12/96			
		LCS	LCS			
		Control				
		Limits				
Mercury	80-120		113			
		Sample Analysis Date:	08/12/96			
		LCS	RPD	LCS	LCSD	RPD
		Control	Control			
		Limits	Limits			
RCRA Characteristics						
Cyanide, Reactive	0-22.1	35	19	15	24*	
Sulfide, Reactive	80-120	20	74*	49*	41*	

Notes:

- * - Not applicable.
- LCS Laboratory Control Sample.
- LCSD Laboratory Control Sample Duplicate.
- RPD Relative Percent Difference.

APPENDIX D.1

CHAIN OF CUSTODY FORMS

TECHNICAL COMPANY
 2055 Niagara Falls Blvd. Suite Three
 Niagara Falls, N.Y. 14304 (716) 297-2160

SHIP TO: Roy F. Watson, Inc.
 208 Welsh Pool Rd.
 Lionville, PA 19361-1225

REFERENCE NUMBER: 7987

SAMPLER'S SIGNATURE: Cynthia Lin
 PRINTED NAME: Cynthia Lin

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	CONTAINER NO.	PARAMETERS	REMARKS
	7/29/96	3 PM	7987-100/30-1A	Solid	1	✓	910074 4076-001
			-1B		1	✓	-002
			-1C		1	✓	-003
			-1D		1	✓	-004
			7987-100/60-2A		1	✓	-005
			-2B		1	✓	-006
			-2C		1	✓	-007
			-2D		1	✓	-008
			7987-100/50/50-3A		1	✓	-009
			-3B		1	✓	-010
			-3C		1	✓	-011
			-3D		1	✓	-012
			7987-100/100/100-4A		1	✓	-013
			-4B		1	✓	-014
			-4C		1	✓	-015
			-4D		1	✓	-016

TOTAL NUMBER OF CONTAINERS: 16

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① Cynthia Lin	7/30/96	2:50 PM	② [Signature]	7/30/96	3:50 PM
② [Signature]			③ [Signature]	7/31/96	9:00
③ [Signature]			④ [Signature]		

METHOD OF SHIPMENT: WAY BILL No.

White	Yellow	Pink	Goldenrod	Sample Team	Received for Laboratory By:	No. NF-0099
Fully Executed Copy	Receiving Laboratory Copy	Shipper Copy	Sampler Copy	[Signature]	[Signature]	

E

APPENDIX E

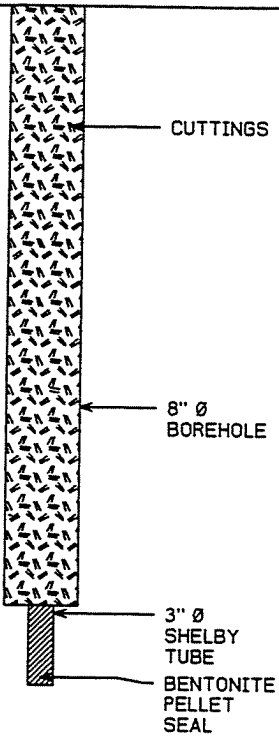
BARRIER WALL ALIGNMENT BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-01)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1110834.95
EAST: 1065911.87

HOLE DESIGNATION: BH1-96
DATE COMPLETED: JUNE 24, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	573.1					
-2.5	ML-SILT (TOPSOIL), little clay, brown, moist	572.5		1SS	X	7	0
	SM-SAND (FILL), little silt, occasional wood fragments, fine grained, black, moist			2SS	X	>50	0
-5.0	SLAG (FILL), granular and vesicular, gray and dark green, moist	568.6		3SS	X	>107	0
-7.5	- wet			4SS	X	>50	0
-10.0				5SS	X	14	0
-12.5	ML-SILT (NATIVE), little rotted vegetative matter, trace clay, black, wet	561.3		6SS	X	8	0
-15.0	ML/CL-SILT and CLAY, trace fine sand, gray, wet - red brown	561.0		7SS	X	WH	0
				8SS	X	WH	0
-17.5	END OF HOLE @ 17.0ft BGS	556.1		9ST		-	0
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS

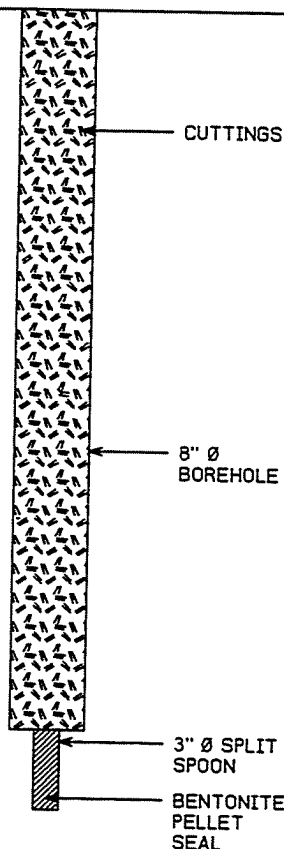
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-02)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1110752.59
EAST: 1065736.67

HOLE DESIGNATION: BH2-96
DATE COMPLETED: JUNE 24, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	572.9					
	ML-SILT (TOPSOIL), brown, moist	572.6					
	SM-SAND (FILL), some silt, little gravel, brown, moist	571.4					
-2.5	SLAG, vesicular, hard, gray, moist			1SS	X	22	0
				2SS	X	42	0
-5.0				3SS	X	>100	0
	WOOD, little slag, moist	566.9		4SS	X	25	0
-7.5	- wet			5SS	X	23	0
-10.0				6SS	X	16	0
	SLAG, hard, gray and dark green, stained black, wet	562.4		7SS	X	11	0
-12.5				8SS	X	WH	0
-15.0	ML-SILT (NATIVE), trace clay, layers of rotted vegetative matter, black, wet	559.4		9SS	X	WH	0
-17.5	- little clay, little fine sand, red brown			10SS	X	3	0
-20.0	ML/CL-SILT and CLAY, soft, red brown, wet	554.4					
	END OF HOLE @ 20.0ft BGS	552.9					
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☐ STATIC WATER LEVEL ☐
GRAIN SIZE ANALYSIS ☐

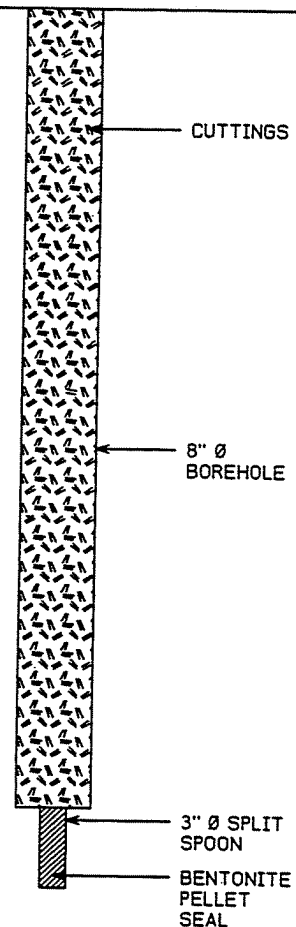
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-03)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1110912.27
EAST: 1065617.86

HOLE DESIGNATION: BH3-96
DATE COMPLETED: JUNE 24, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	571.9					
	ML-SILT (TOPSOIL), little fine sand, brown, moist	571.7					
-2.5	SW-SAND (FILL), some gravel, medium to coarse grained, gray, moist	570.4		1SS	X	29	0
	SP-SAND, little gravel, medium grained, black, moist	568.7		2SS	X	12	0
-5.0	SLAG, white granules, loose becoming compact, gray and dark green, moist			3SS	X	6	0
-7.5				4SS	X	16	0
-10.0	- wet			5SS	X	21	0
-12.5				6SS	X	12	0
-15.0	ML-SILT (NATIVE), little clay, rotted vegetative matter, black, wet	557.9		7SS	X	7	0
-17.5				8SS	X	WH	0
-20.0	- little to some clay, red brown			9SS	X	WR	0
-22.5	ML-SILT (TILL), some fine sand, little gravel, dense, red brown, moist	550.9		10SS	X	4	0
	END OF HOLE @ 22.0ft BGS	549.9		11SS	X	27	0
-25.0							
-27.5							
-30.0							
-32.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-04)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111094.80
EAST: 1065496.22

HOLE DESIGNATION: BH4-96
DATE COMPLETED: JUNE 24, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	575.8					
-2.5	ML-SILT (TOPSOIL), little fine sand, dark brown, moist ML-SILT (FILL), little to some sand, little brick and gravel fragments, brown, wet	575.6	 CUTTINGS 8" Ø BOREHOLE	1SS	X	11	0
-5.0				2SS	X	14	0
-7.5	SLAG, white granules, gray and dark green, moist - wet	569.3		3SS	X	5	0
-10.0				4SS	X	>50	0
-12.5				5SS	X	47	0
-15.0	ML-SILT (NATIVE), trace to little clay, rotted vegetative matter, black, wet - dark gray	561.5		6SS	X	23	0
-17.5				7SS	X	8	0
-20.0	ML-SILT (TILL), little to some fine sand, little gravel, red brown, moist	556.0		8SS	X	WH	0
-22.5				9SS	X	WH	0
-25.0	END OF HOLE @ 24.0ft BGS	551.8		10SS	X	WH	0
-27.5				11SS	X	23	0
-30.0				12SS	X	128	0
-32.5			 3" Ø SPLIT SPOON BENTONITE PELLET SEAL				

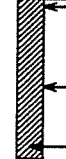
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111225.11
EAST: 1065368.64

HOLE DESIGNATION: BH5-96
DATE COMPLETED: JUNE 25, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.7					
-2.5	ML-SILT (TOPSOIL), little clay, brown, moist ML-SILT (FILL), and to some fine to medium sand, glass, brick fragments and tires, brown and black	571.4	 CUTTINGS 8" Ø BOREHOLE	1SS	X	17	0
-5.0				2SS	X	7	0
				3SS	X	>100	0
-7.5	SLAG, white granules, dense, gray and dark green, moist - wet	565.2		4SS	X	51	0
-10.0				5SS	X	24	0
-12.5				6SS	X	26	0
				7SS	X	45	0
-15.0	ML-SILT (NATIVE), little clay, rotted vegetative matter, dark gray and black, wet	557.5		8SS	X	4	0
-17.5				9SS	X	-	0
-20.0	ML-SILT (TILL), little to some fine sand, little gravel, compact to dense, red brown, moist	554.2		10ST	X	-	0
			 3" Ø SHELBY TUBE 3" Ø SPLIT SPOON	11SS	X	17	0
-22.5	Refusal on limestone cobble END OF HOLE @ 20.8ft BGS	550.9					
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

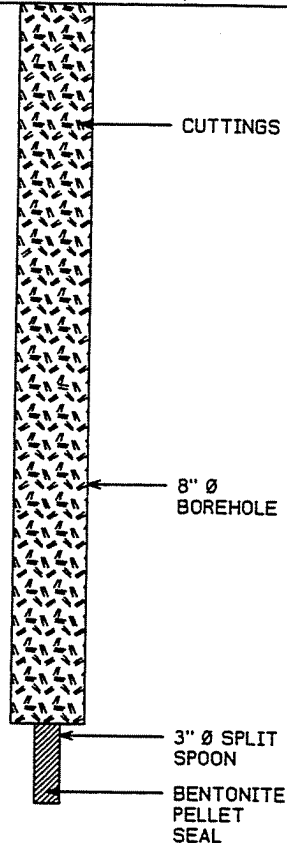
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-06)
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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111361.21
EAST: 1065230.13

HOLE DESIGNATION: BH6-96
DATE COMPLETED: JUNE 25, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	570.5					
	ML-SILT (TOPSOIL), little clay, dark brown, moist	570.3		1SS	X	12	0
-2.5	SP-SAND (FILL), little to some gravel, fine to medium grained, black, moist			2SS	X	5	0
				3SS	X	>50	0
-5.0	SLAG, white granules, slightly pastey, gray and dark green, moist	566.4					
-7.5	Augered without sampling from 5.5 to 8.0ft BGS due to apparent concrete			4SS	X	34	0
-10.0				5SS	X	9	0
-12.5				6SS	X	14	0
-15.0				7SS	X	57	0
-17.5	ML-SILT (TILL), little to some fine sand, little gravel, compact to dense, red brown, moist	554.4		8SS	X	21	0
-20.0	END OF HOLE @ 20.0ft BGS	550.5		9SS	X	31	0
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111511.57
EAST: 1065079.48

HOLE DESIGNATION: BH7-96
DATE COMPLETED: JUNE 25, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.0					
	ML-SILT (TOPSOIL), little clay, dark brown, moist	570.7		1SS	X	4	0
-2.5	SLAG (FILL), wood, brick fragments and black sand		CUTTINGS	2SS	X	4	0
-5.0	- granular, paste like consistency, gray and dark green			3SS	X	>100	0
-7.5	- wet			4SS	X	>50	0
-10.0				5SS	X	8	0
-12.5				6SS	X	60	0
-15.0				7SS	X	11	0
-17.5	ML-SILT (NATIVE), little fine sand, trace clay, red brown, moist	554.0		8SS	X	21	0
-20.0	ML-SILT (TILL), little to some fine sand, little gravel, red brown and gray, moist	552.2		9SS	X	33	0
-22.5	END OF HOLE @ 22.0ft BGS	549.0		10SS	X	12	0
-25.0				11SS	X	58	0
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111654.42
EAST: 1064892.97

HOLE DESIGNATION: BH8-96
DATE COMPLETED: JUNE 25, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.6					
	ML-SILT (TOPSOIL), little clay, dark brown, moist	571.3		1SS	X	9	0
-2.5	SP-SAND (FILL), little gravel, coke fragments, medium grained SLAG, granular to pastey, gray	569.9		2SS	X	2	0
-5.0				3SS	X	69	0
-7.5	- wet			4SS	X	>50	0
-10.0				5SS	X	5	0
-12.5				6SS	X	12	0
-15.0	- dark green			7SS	X	18	0
-17.5				8SS	X	63	0
-20.0				9SS	X	42	0
				10SS	X	49	0
	SM-SAND (NATIVE), some fine gravel, little silt, trace rotted vegetative matter, fine to medium grained, black, wet	551.4 550.6		11SS	X	3	0
-22.5	ML-SILT, little to some fine gravel, little fine sand, red brown, wet SP-SAND, trace silt, fine grained, brown, wet	549.6		12SS	X	3	0
-25.0	ML-SILT (TILL), little fine sand, little gravel, red brown, moist	546.6		13SS	X	43	0
-27.5				14SS	X	61	0
	END OF HOLE @ 28.0ft BGS	543.6					

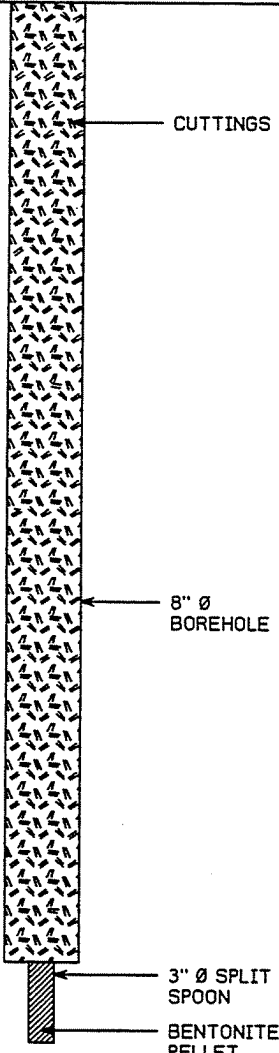
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111790.18
EAST: 1064788.82

HOLE DESIGNATION: BH9-96
DATE COMPLETED: JUNE 26, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	N' VALUE	PID (ppm)
	GROUND SURFACE	572.1					
-2.5	SP-SAND (FILL), little to some gravel, fine to medium grained, black, moist SLAG, some medium sand, black and brown, moist - granular to pastey, gray	571.0		1SS	X	26	0
-5.0				2SS	X	15	0
-7.5				3SS	X	37	0
-10.0	- wet			4SS	X	20	0
-12.5	- dark green			5SS	X	>100	0
-15.0				6SS	X	68	0
-17.5				7SS	X	35	0
-20.0				8SS	X	>100	0
-22.5				9SS	X	>100	0
-25.0				10SS	X	64	0
-27.5				11SS	X	35	0
-30.0				12SS	X	WH	0
-32.5				13SS	X	41	0
	SM-SAND (NATIVE), little to some silt, some fine gravel, vegetative matter, fine to medium grained, black, wet	552.0					
	ML-SILT (TILL), little fine sand, little gravel, soft, red brown, wet - dense	550.1					
	END OF HOLE @ 26.0ft BGS	546.1					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111943.25
EAST: 1064657.50

HOLE DESIGNATION: BH10-96
DATE COMPLETED: JUNE 26, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
-2.5	SM-SAND (FILL), little silt, fine to medium grained, black, moist	567.4	 CUTTINGS	1SS	X	3	0
-5.0	SLAG, vesicular and granular, hard, gray			2SS	X	1	0
-7.5	- white granules, dark green - wet			3SS	X	>100	0
-10.0				4SS	X	>50	0
-12.5				5SS	X	>100	0
-15.0				6SS	X	51	0
-17.5				7SS	X	49	0
-20.0				8SS	X	>50	0
-22.5				9SS	X	67	0
-25.0				10SS	X	54	0
-27.5	SM-SAND (NATIVE), little to some fine gravel, little silt, rotted vegetative matter, fine to medium grained, black, wet	551.6	 3" Ø SPLIT SPOON BENTONITE PELLET SEAL	11SS	X	2	0
-30.0	ML-SILT, little clay, soft, red brown, wet	550.6		12SS	X	47	0
-32.5	ML-SILT (TILL), little to some fine sand, little gravel, compact, red brown, moist	549.4					
	END OF HOLE @ 24.0ft BGS	547.1					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-11)
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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112085.31
EAST: 1064463.54

HOLE DESIGNATION: BH11-96
DATE COMPLETED: JULY 3, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	569.2					
-2.5	SP-SAND (FILL), little gravel, slag, glass and wood fragments, fine to medium grained, black	560.2		1SS	X	2	0
-5.0	- wet			2SS	X	11	0
-7.5				3SS	X	5	0
-10.0	SLAG, granular and vesicular, gray, stained black, slight sheen on water			4SS	X	11	0
-12.5	ML-SILT (FILL), thin silver metallic flakes, soft, black, wet	557.2		5SS	X	13	0
-15.0		552.7		6SS	X	9	0
-17.5	ML-SILT (TILL), little fine sand, little clay, little gravel, dense, red brown, moist			7SS	X	1	0
-20.0	END OF HOLE @ 20.0ft BGS			549.2	8SS	X	2
-22.5				9SS	X	22	0
-25.0				10SS	X	64	0
-27.5							
-30.0							
-32.5							

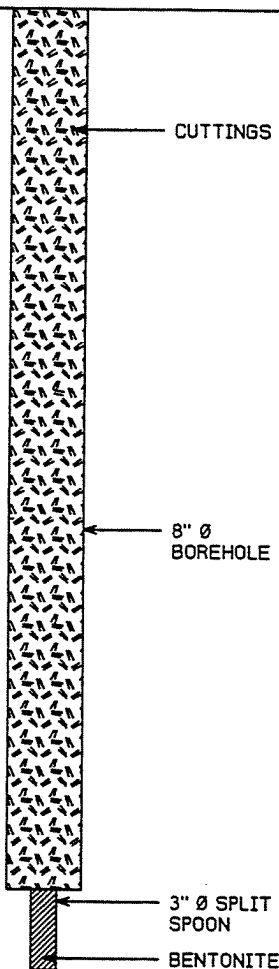
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112435.37
EAST: 1064143.59

HOLE DESIGNATION: BH12-96
DATE COMPLETED: JULY 4, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	569.7					
	ML-SILT (TOPSOIL), some fine sand, occasional gravel fragment, dark brown, moist			1SS	X	20	0
-2.5	SP-SAND (FILL), some gravel, slag, glass and wood, fine to medium grained, brown and black	567.7		2SS	X	>50	0
-5.0				3SS	X	>50	0
-7.5	- wet			4SS	X	8	0
	SLAG, granular, hard, gray and dark green wet	561.2		5SS	X	11	0
-10.0				6SS	X	20	0
-12.5				7SS	X	27	0
-15.0				8SS	X	25	0
-17.5	ML-SILT (NATIVE), little clay, vegetative matter, soft, black, wet	552.2		9SS	X	11	0
-20.0	CL-CLAY, and to some silt, firm, red brown, wet	550.7		10SS	X	13	0
-22.5				11SS	X	16	0
-25.0	END OF HOLE @ 24.0ft BGS	545.7		12SS	X	3	0
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-13)
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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112625.64
EAST: 1064071.74

HOLE DESIGNATION: BH13-96
DATE COMPLETED: JULY 4, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	570.8					
	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	570.1		1SS	X	15	0
-2.5	SM-SAND (FILL), some silt, gravel, slag, glass and wood fragments, fine to medium grained			2SS	X	30	0
-5.0				3SS	X	>50	0
-7.5	- wet	563.3		4SS	X	>50	0
-10.0	SLAG, hard, gray, greenish, blue and stained black			5SS	X	>50	0
-12.5				6SS	X	10	0
-15.0				7SS	X	47	0
-17.5		553.3		8SS	X	>50	0
-20.0	CL-CLAY (NATIVE), some silt, soft, red brown, wet	550.8		9SS	X	>50	0
-22.5	END OF HOLE @ 20.0ft BGS			10SS	X	2	0
-25.0							
-27.5							
-30.0							
-32.5							

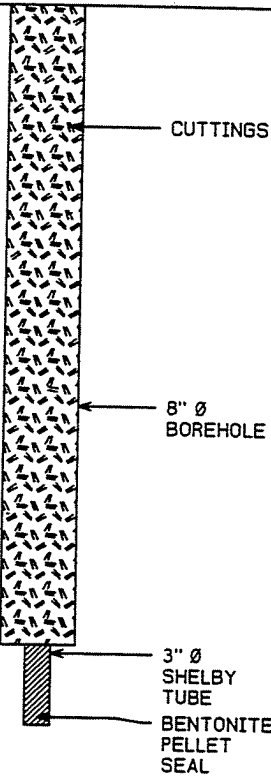
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-14)
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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112802.85
EAST: 1063967.74

HOLE DESIGNATION: BH14-96
DATE COMPLETED: JULY 9, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	570.7					
	ML-SILT (TOPSOIL), little sand, dark brown, moist	570.5		1SS	X	34	0
-2.5	SP-SAND (FILL), some glass, brick and slag fragments, fine to medium grained	568.4		2SS	X	>80	0
	SLAG, vesicular, brown and gray			3SS	X	16	0
-5.0				4SS	X	>72	0
-7.5	- wet			5SS	X	23	0
-10.0	SM-SAND (NATIVE), some silt, trace clay, fine to medium grained, gray, wet	560.7		6SS	X	8	0
-12.5				7SS	X	4	0
-15.0				8SS	X	21	0
-17.5	CL-CLAY, some silt, soft, red brown, wet	555.2		9ST	█	-	0
	END OF HOLE @ 18.0ft BGS	552.7					
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

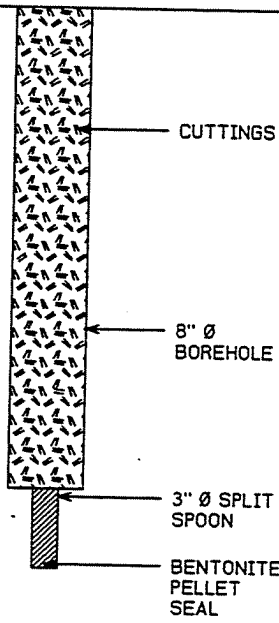
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-15)
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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112995.03
EAST: 1063799.64

HOLE DESIGNATION: BH15-96
DATE COMPLETED: JULY 4, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	568.3					
	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	568.1		1SS	X	19	0
-2.5	SP-SAND (FILL), glass, wood, brick fragments, slag, medium grained, brown			2SS	X	>50	0
-5.0	SLAG, granular, hard, gray and dark green - wet	563.8		3SS	X	108	0
-7.5				4SS	X	>50	0
-10.0	SP-SAND (NATIVE), occasional gravel fragments, fine grained, black, wet	560.3		5SS	X	12	0
-12.5	CL-CLAY, some silt, soft, red brown, wet	557.8		6SS	X	2	0
-15.0	- gray			7SS	X	2	0
-15.0	END OF HOLE @ 14.0ft BGS	554.3					
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

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PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113177.06
EAST: 1063652.35

HOLE DESIGNATION: BH16-96
DATE COMPLETED: JULY 9, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	575.7					
	ML-SILT (TOPSOIL), little clay, dark brown, moist	575.4	 CUTTINGS 8" Ø BOREHOLE 3" Ø SPLIT SPOON BENTONITE PELLET SEAL	1SS	X	16	0
-2.5	SP-SAND (FILL), brick and slag fragments, fine to medium grained, brown, moist			2SS	X	10	0
	ML-SILT, black foundry sand, moist	572.7		3SS	X	6	0
-5.0				4SS	X	>60	0
-7.5	SLAG, vesicular, gray	568.7		5SS	X	>50	0
-10.0	- wet			6SS	X	>50	0
-12.5	- granular, dark green			7SS	X	10	0
-15.0	CL-CLAY (NATIVE), some silt, soft, red brown, wet	561.2		8SS	X	5	0
-17.5	END OF HOLE @ 18.0ft BGS	557.7		9SS	X	2	0
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-17)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113311.10
EAST: 1063481.16

HOLE DESIGNATION: BH17-96
DATE COMPLETED: JULY 9, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	575.5					
-2.5	ML-SILT (TOPSOIL), trace fine sand, dark brown, moist SP-SAND (FILL), slag, coke and apparent tires, fine to medium grained	575.1	 CUTTINGS 8" Ø BOREHOLE	1SS	X	18	0
-5.0				2SS	X	25	0
-7.5				3SS	X	8	0
-10.0	SLAG, vesicular, hard, gray	566.0		4SS	X	9	0
-12.5				5SS	X	10	0
-15.0	- granular, dark green			6SS	X	42	0
-17.5	SP-SAND (NATIVE), trace silt, trace clay, rotted vegetative matter, fine to medium grained, black, wet	560.5		7SS	X	>50	0
-20.0	CL-CLAY, some silt, soft, red brown, wet	557.3		8SS	X	16	0
-22.5	END OF HOLE @ 22.0ft BGS	553.5		9SS	X	4	0
-25.0				10SS	X	2	0
-27.5				11SS	X	1	0
-30.0			 3" Ø SPLIT SPOON BENTONITE PELLET SEAL				
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

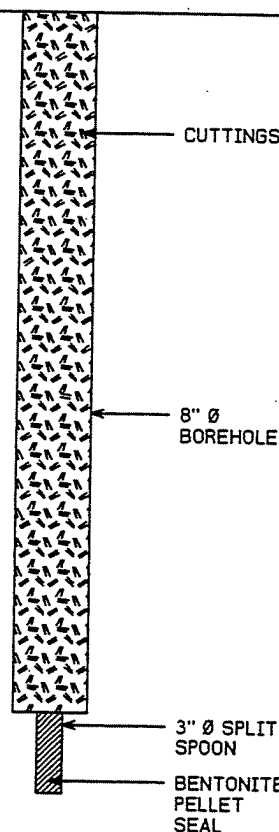
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-18)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113447.54
EAST: 1063310.09

HOLE DESIGNATION: BH18-96
DATE COMPLETED: JULY 9, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	572.2					
	ML-SILT (TOPSOIL), trace clay, dark brown, moist			1SS	X	17	0
-2.5	SP-SAND (FILL), slag, brick, glass, very loose, fine to medium grained, brown	570.7		2SS	X	7	0
-5.0				3SS	X	2	0
-7.5	- wet			4SS	X	3	0
-10.0	SLAG, vesicular, hard, gray	564.2		5SS	X	>50	0
-12.5	- granular, dark green			6SS	X	53	0
-15.0	ML-SILT (TILL), little to some gravel, little fine sand, dense, red brown	558.7		7SS	X	>50	0
-17.5				8SS	X	>50	0
-20.0	END OF HOLE @ 19.5ft BGS	552.7		9SS	X	>100	0
-22.5				10SS	X	>172	0



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-19)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113687.01
EAST: 1062960.58

HOLE DESIGNATION: BH19-96
DATE COMPLETED: JULY 9, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
2.5	ML-SILT (TOPSOIL), little fine sand, dark brown, moist SP-SAND (FILL), glass, brick, ash, slag, very loose, fine to medium grained, brown	570.3	 CUTTINGS 8" Ø BOREHOLE	1SS	X	21	0
5.0				2SS	X	3	0
7.5				3SS	X	6	0
				4SS	X	4	0
10.0	- wet SLAG, hard, gray, stained black, sheen on water, slight chemical odor	562.4		5SS	X	42	0
12.5				6SS	X	>50	0
15.0	ML-SILT (TILL), little to some fine sand, little gravel, dense, red brown	557.6		7SS	X	10	0
17.5	END OF HOLE @ 16.0ft BGS	555.1	 3" Ø SPLIT SPOON BENTONITE PELLET SEAL	8SS	X	127	0
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

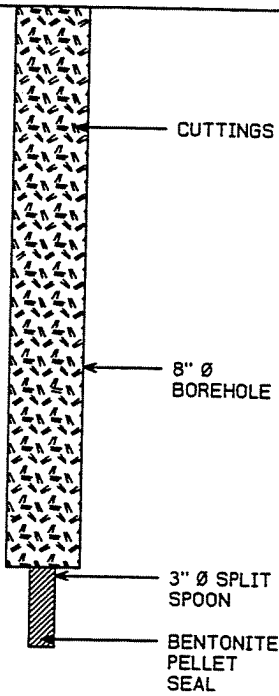
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-20)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113847.10
EAST: 1062799.77

HOLE DESIGNATION: BH20-96
DATE COMPLETED: JULY 10, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	569.9					
	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	569.6		1SS	X	18	0
-2.5	SP-SAND (FILL), slag, ash, brick and glass, very loose, fine to medium grained, brown, moist			2SS	X	10	0
-5.0	SLAG, vesicular, hard, blue gray	565.9		3SS	X	>50	0
-7.5	- wet			4SS	X	>50	0
-10.0				5SS	X	53	0
-12.5				6SS	X	7	0
-15.0	ML-SILT (TILL), little to some fine sand, little to some gravel, dense, red brown	557.4		7SS	X	84	0
-17.5	END OF HOLE @ 16.0ft BGS	553.9		8SS	X	101	0
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

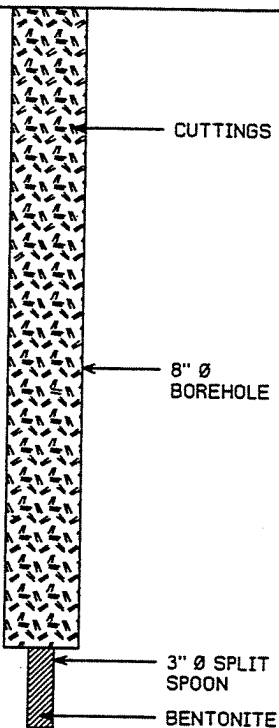
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-21)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113973.02
EAST: 1062624.24

HOLE DESIGNATION: BH21-96
DATE COMPLETED: JULY 10, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.9					
	ML-SILT (TOPSOIL), trace fine sand, dark brown, moist	571.2		1SS	X	17	0
-2.5	SP-SAND (FILL), slag, glass, brick and ash, loose, fine to medium grained, moist			2SS	X	4	0
-5.0	SLAG, vesicular, hard, gray	566.9		3SS	X	27	0
-7.5				4SS	X	>50	0
-10.0				5SS	X	>50	0
-12.5	ML-SILT (NATIVE), and to some clay, soft, red brown, wet	559.9		6SS	X	17	0
-15.0	ML-SILT (TILL), little to some fine sand, little gravel, dense, red brown, moist	556.9		7SS	X	2	0
-17.5				8SS	X	9	0
-20.0	END OF HOLE @ 18.0ft BGS	553.9		9SS	X	51	0
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

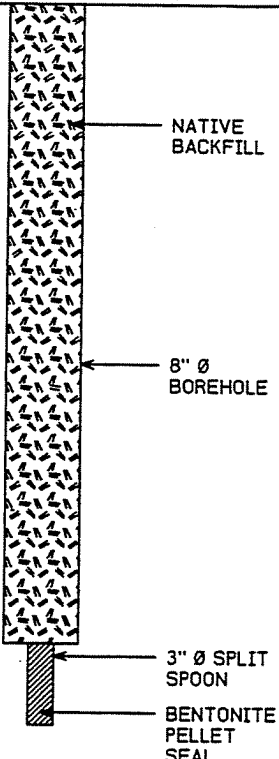
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-22)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1114048.52
EAST: 1062367.33

HOLE DESIGNATION: BH22-96
DATE COMPLETED: JULY 10, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.2					
	ML-SILT (TOPSOIL), trace fine sand, red brown, moist	570.5	 NATIVE BACKFILL 8" Ø BOREHOLE 3" Ø SPLIT SPOON BENTONITE PELLET SEAL	1SS		9	0
-2.5	SP-SAND (FILL), slag, ash, glass, brick, loose, fine to medium grained, brown, moist			2SS		10	0
-5.0				3SS		8	0
-7.5				4SS		14	0
-10.0	SLAG, ash, glass, gray - wet - stained black (8.0 to 12.5ft BGS)	563.2		5SS		>50	0
-12.5				6SS		3	0
-15.0	SM-SAND (NATIVE), some silt, rotted wood fragments, fine to medium grained, sheen and slight chemical odor	558.7		7SS		29	0
	ML-SILT, and to some clay, soft, red brown, wet	557.4		8SS		4	0
-17.5	ML-SILT (TILL), little to some fine sand, little gravel, dense, moist	554.2		9SS		13	0
	END OF HOLE @ 18.0ft BGS	553.2					
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-23)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1114247.58
EAST: 1062461.64

HOLE DESIGNATION: BH23-96
DATE COMPLETED: JULY 10, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	571.1					
2.5	ML-SILT (TOPSOIL), little fine sand, dark brown, moist ASH (FILL), sand, slag and glass, brown and black	570.1	 CUTTINGS 8" Ø BOREHOLE 3" Ø SPLIT SPOON BENTONITE PELLET SEAL	1SS	X	7	0
5.0				2SS	X	15	0
				3SS	X	2	0
7.5	SLAG, vesicular and granular, gray and dark green	564.6		4SS	X	9	0
	- wet	562.1		5SS	X	9	0
10.0	SM-SAND (NATIVE), little silt, trace clay, fine to medium grained, dark gray, wet	561.0		6SS	X	2	0
12.5	CL-CLAY, and to some silt, soft, gray			7SS	X	2	0
	- red brown			8SS	X	1	0
15.0				9SS	X	1	0
17.5				10SS	X	2	0
20.0	ML-SILT (TILL), little to some sand, little gravel, dense, red brown	551.1		11SS	X	48	0
22.5	END OF HOLE @ 22.0ft BGS	549.1					
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

APPENDIX F

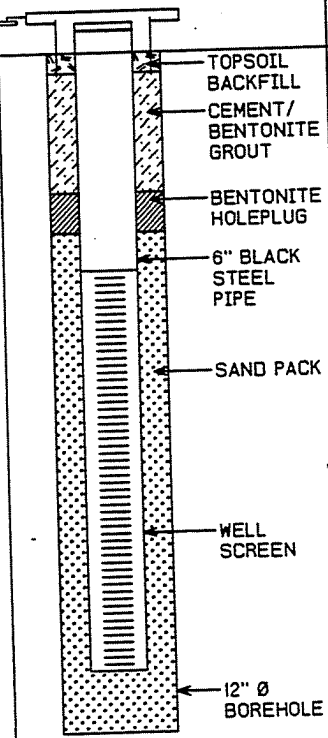
PROTOTYPE WITHDRAWAL WELL STRATIGRAPHIC AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-27)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113538.72
EAST: 1063125.65

HOLE DESIGNATION: PW-1
DATE COMPLETED: JULY 2, 1996
DRILLING METHOD: 8 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	573.37 570.7					
	ML-SILT (TOPSOIL), trace fine sand, dark brown, moist	570.5		1SS	X	9	0
-2.5	SP-SAND (FILL), slag, glass and wood, loose, fine to medium grained, brown			2SS	X	2	0
-5.0	- wet			3SS	X	4	0
-7.5				4SS	X	2	0
-10.0	SLAG, granular and vesicular, gray, stained black, moderate sheen on water, slight chemical odor	561.7		5SS	X	>50	0
-12.5				6SS	X	>50	0
-15.0	ML-SILT (NATIVE), little clay, occasional gravel, red brown, wet	557.7		7SS	X	>50	0
-17.5	ML-SILT (TILL), little fine sand, little to some gravel, red brown, moist	556.4		8SS	X	>50	0
-20.0	END OF HOLE @ 17.0ft BGS	553.7		9SS	X	>50	0

SCREEN DETAILS
Screened interval:
5.5 to 15.5ft BGS
Length: 10.0ft
Diameter: 6"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
4.5 to 17.0ft BGS
Material: #4 Quartzite Sand

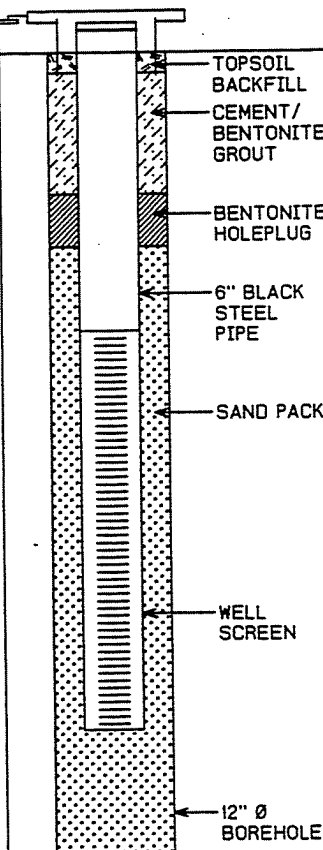
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-28)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112227.23
EAST: 1064256.16

HOLE DESIGNATION: PW-2
DATE COMPLETED: JULY 2, 1996
DRILLING METHOD: 8 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	571.08 568.2					
	ML-SILT (TOPSOIL), little clay, brick fragments	567.7		1SS	X	4	0
	SP-SAND (FILL), slag, fine to medium grained, black, moist	566.2		2SS	X	>80	0
-2.5	SLAG, hard, gray - wet			3SS	X	>50	0
-5.0				4SS	X	>50	0
-7.5				5SS	X	>57	0
-10.0				6SS	X	>50	0
-12.5	- blueish green			7SS	X	62	0
-15.0				8SS	X	>79	0
-17.5	ML-SILT (NATIVE), little clay, trace fine sand, black, wet	551.7 550.7		9SS	X	4	0
-20.0	ML-SILT (TILL), little to some gravel, little fine sand, dense, red brown	548.2		10SS	X	18	0
-20.0	END OF HOLE @ 20.0ft BGS						
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

SCREEN DETAILS
Screened Interval:
6.9 to 16.9ft BGS
Length: 10.0ft
Diameter: 6"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
4.8 to 20.0ft BGS
Material: #4 Quartzite Sand

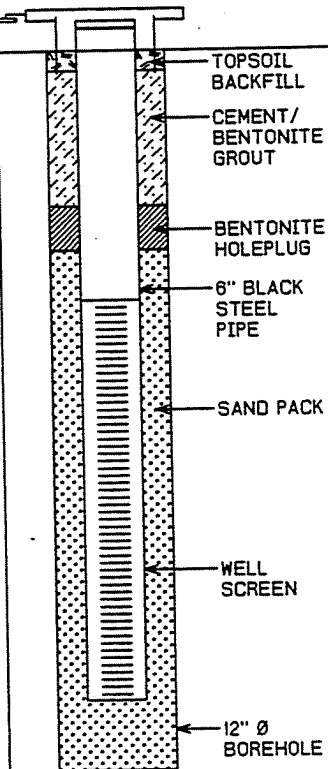
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-29)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111667.92
EAST: 1065157.72

HOLE DESIGNATION: PW-3
DATE COMPLETED: JUNE 28, 1996
DRILLING METHOD: 8 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	574.16 571.2					
	SM-SAND (TOPSOIL), some silt, dark brown, moist	571.0		1SS	X	16	0
2.5	SM-SAND (FILL), little silt, little gravel, brick and glass fragments, fine to medium grained, black, moist			2SS	X	16	0
5.0	SLAG, granular and vesicular, gray - dark green - wet	566.7		3SS	X	>50	0
7.5				4SS	X	>50	0
10.0				5SS	X	25	0
12.5				6SS	X	15	0
15.0	ML-SILT (NATIVE), little clay, little fine sand, black, wet - little to some clay, soft, red brown	557.2		7SS	X	25	0
17.5				8SS	X	9	0
20.0	END OF HOLE @ 18.0ft BGS	553.2		9SS	X	2	0
22.5							
25.0							
27.5							
30.0							
32.5							

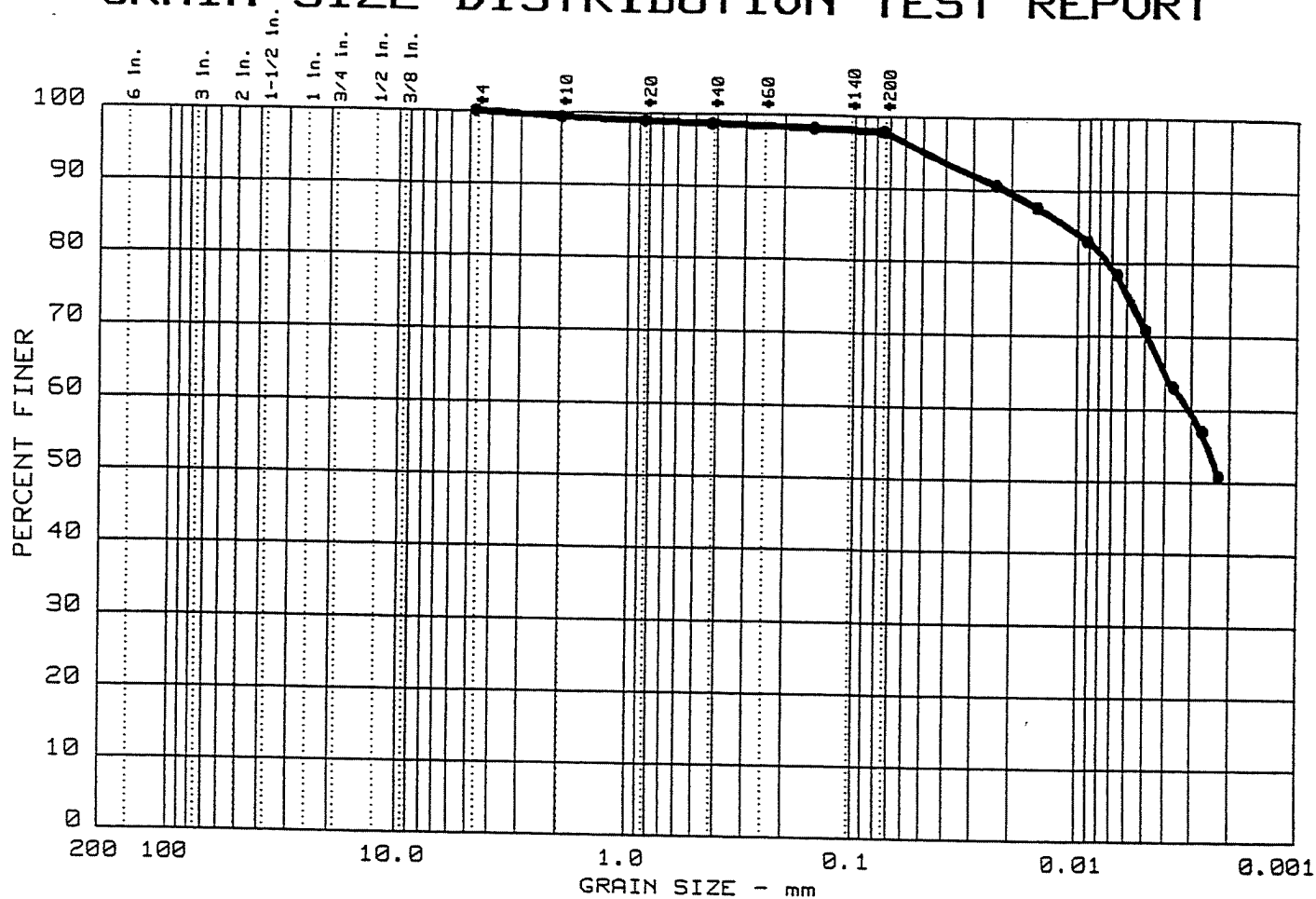
SCREEN DETAILS
Screened Interval:
6.3 to 16.3ft BGS
Length: 10.0ft
Diameter: 6"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
5.0 to 18.0ft BGS
Material: #4 Quartzite Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

APPENDIX G

CONFINING UNIT PHYSICAL TESTING RESULTS

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
1	0.0	0.0	2.2	26.8	71.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u

MATERIAL DESCRIPTION	USCS	AASHTO
CLAY, Some Silt, trace sand	ML	

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH1-96 7987-001

Date: 7/19/96

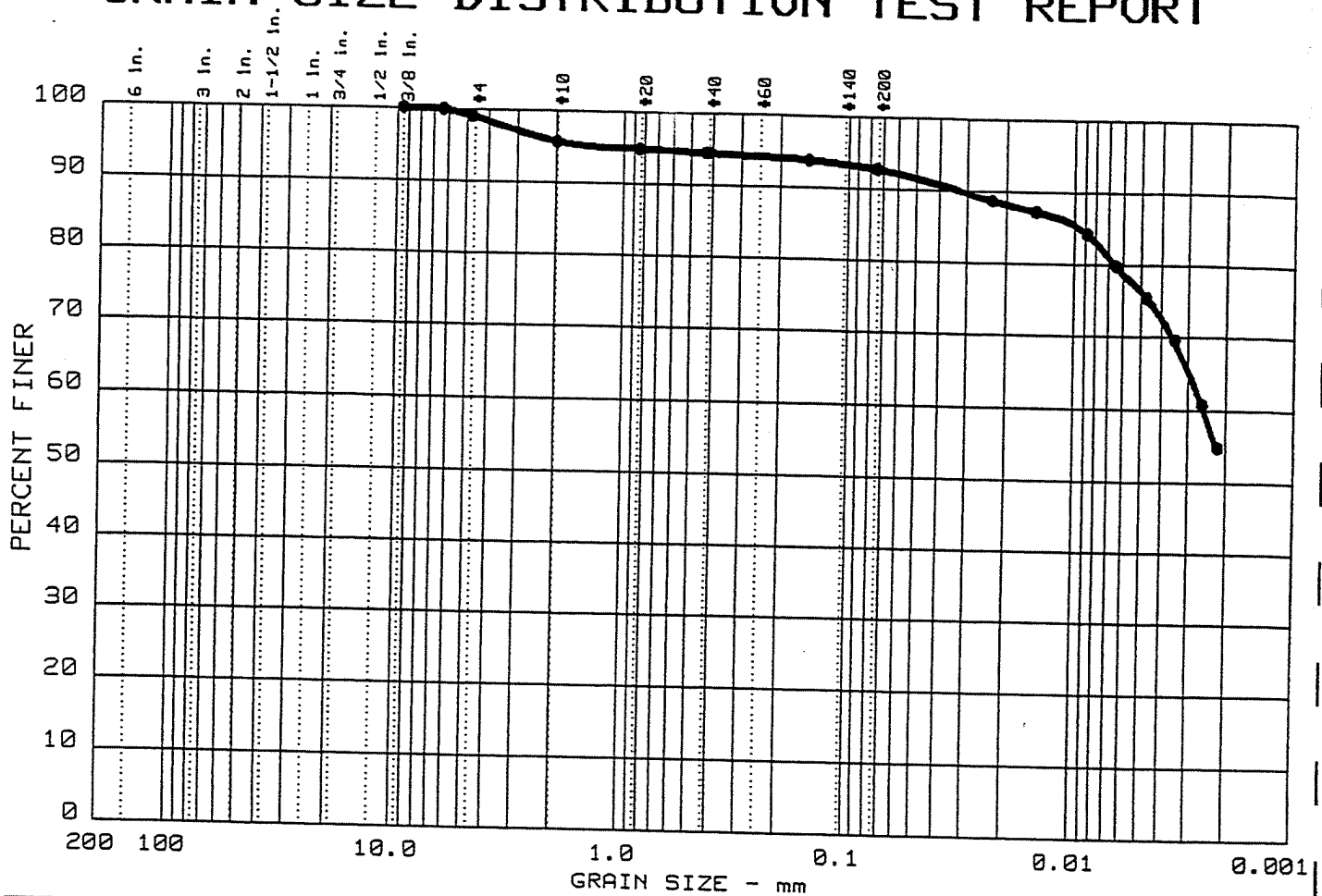
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample collected by
 split spoon

Sampled on 7/12/96

Figure No. 7987-001

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 3	0.0	1.0	6.3	16.5	76.2

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•									

MATERIAL DESCRIPTION	USCS	AASHTO
• CLAY, little Silt, trace sand and gravel	ML	

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH2-96 7987-003

Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

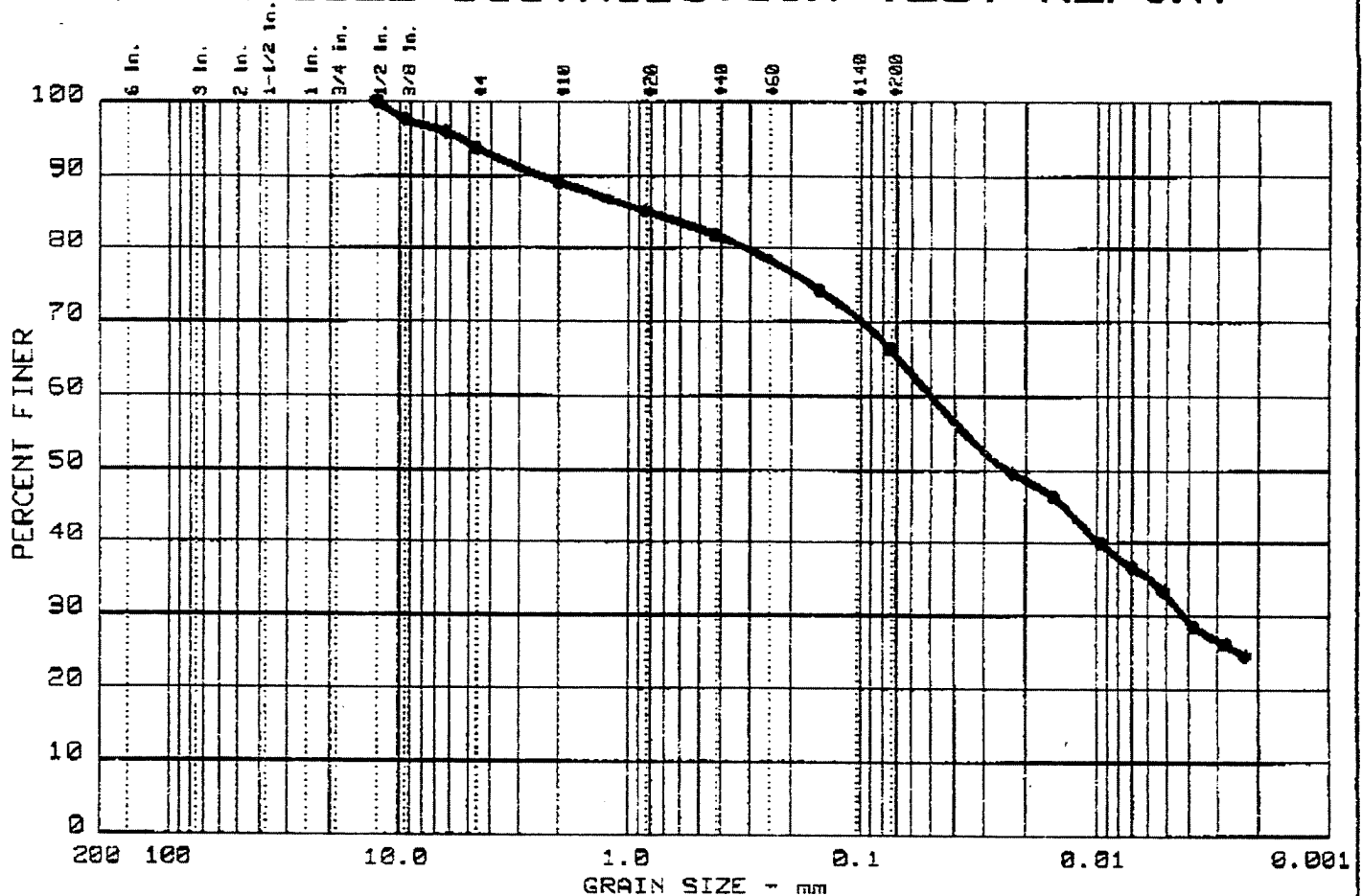
Remarks:

Sample obtained by
 split spoon

Sampled on 6/25/96

Figure No. 7987-003

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 18	0.0	6.1	27.5	33.5	32.9

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		0.822		0.0240	0.0042				

MATERIAL DESCRIPTION	USCS	AASHTO
• Clayey SILT, Some Sand, trace gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: Boring BH3-96 7987-004
 * Moisture Content = 18.1 %
 Date: 7/11/96

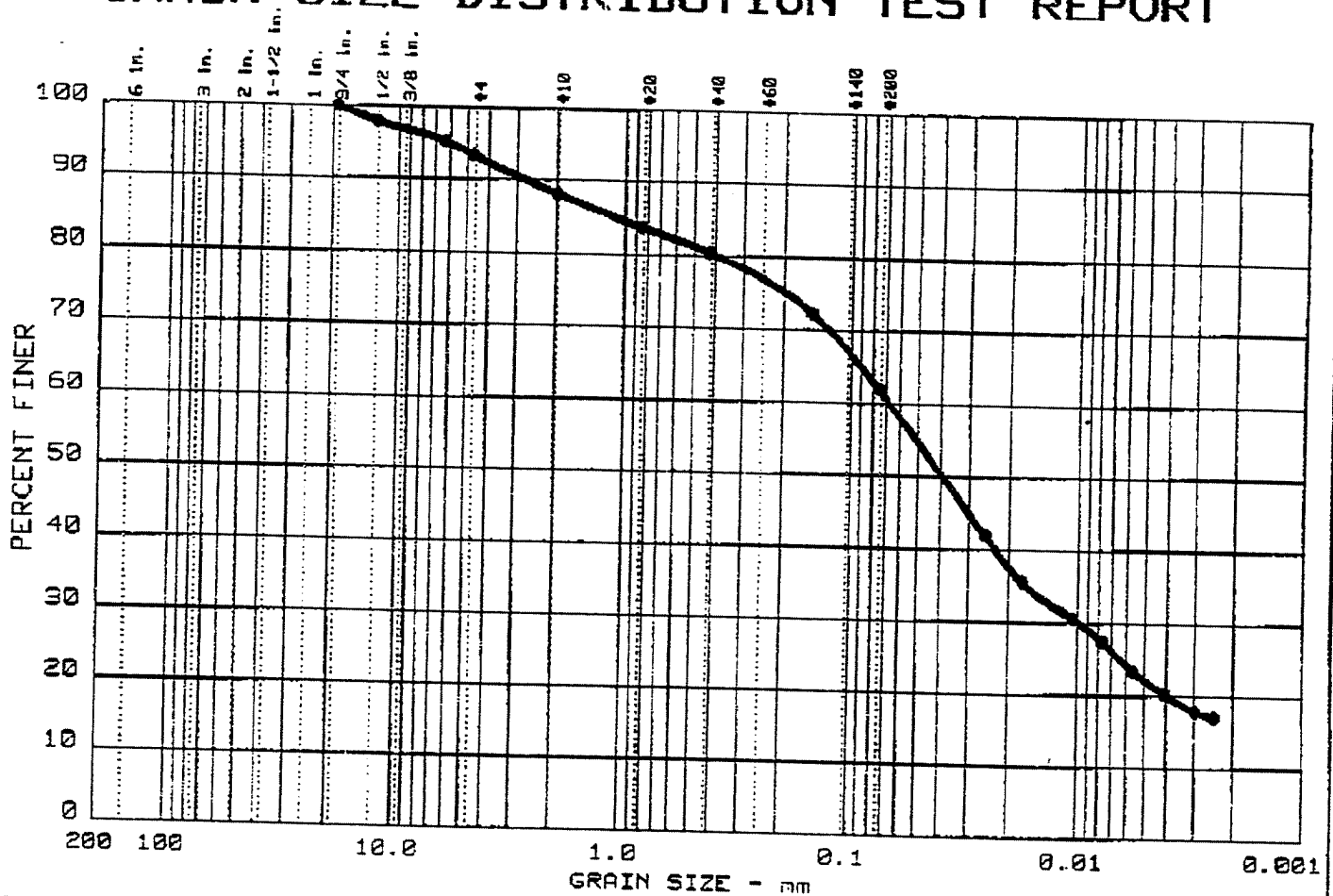
Remarks:
 Sample obtained by
 split spoon

Sampled on 6/25/96

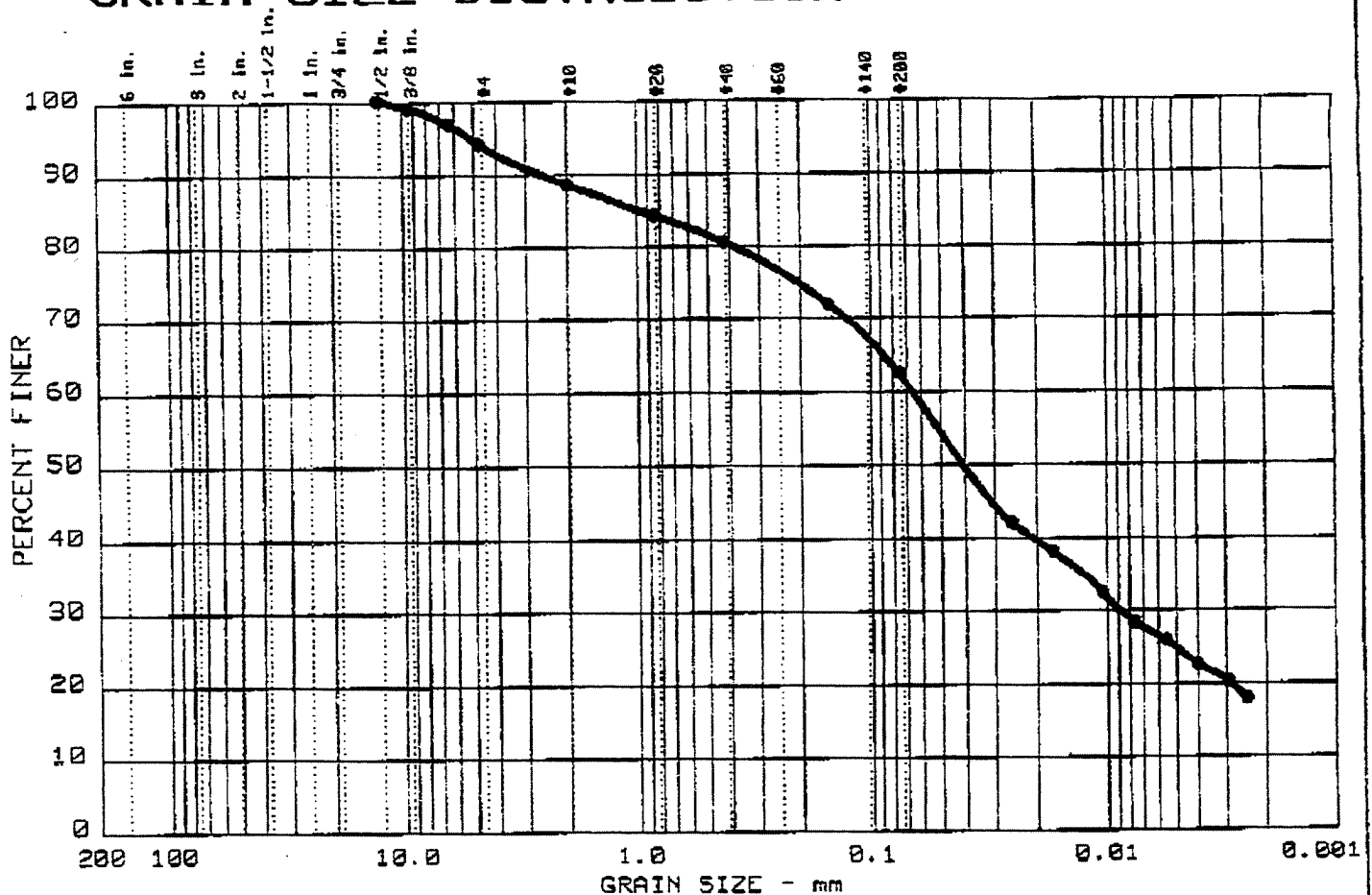
Figure No. 7987-004

GRAIN SIZE DISTRIBUTION TEST REPORT
 MAXIM TECHNOLOGIES

GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 17	0.0	5.8	31.6	37.6	25.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		0.977		0.0402	0.0087				

MATERIAL DESCRIPTION	USCS	AASHTO
• Clayey SILT, Some Sand, trace gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: Boring BHS-96 7987-007
 * Moisture Content = 10.1 %
 Date: 7/11/96

Remarks:
 Sample collected by
 split spoon

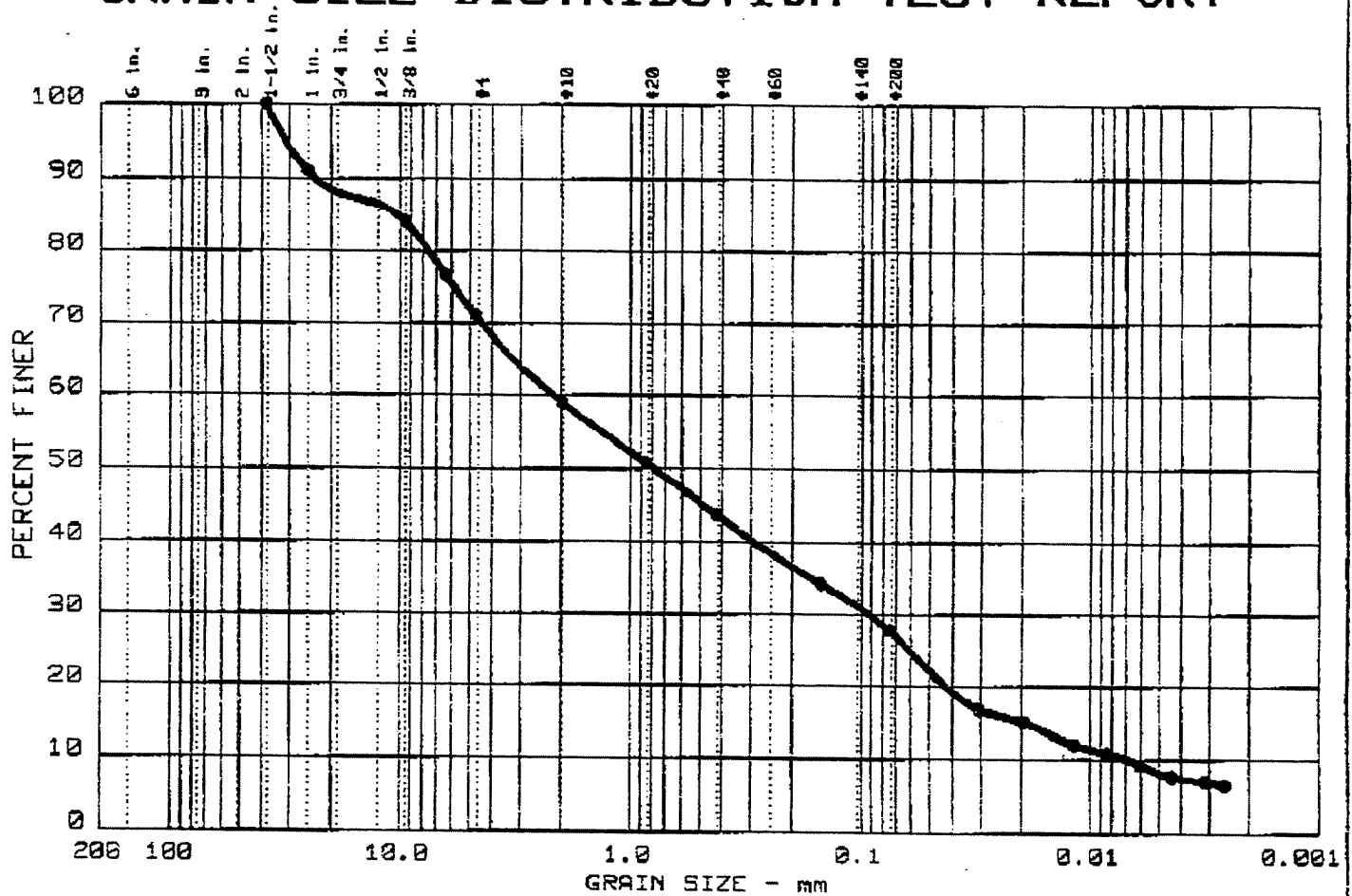
Sampled on 6/25/96

Figure No. 7987-007

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

MAXIM TECHNOLOGIES

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 14	0.0	28.9	48.3	19.7	8.1

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		10.4	2.19	0.785	0.0912	0.0191	0.0068	0.56	323.6

MATERIAL DESCRIPTION	USCS	AASHTO
• Silty SAND, Some Gravel, trace clay		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: Boring BH7-96 7987-010
 * Moisture Content = 7.9 %

Date: 7/11/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

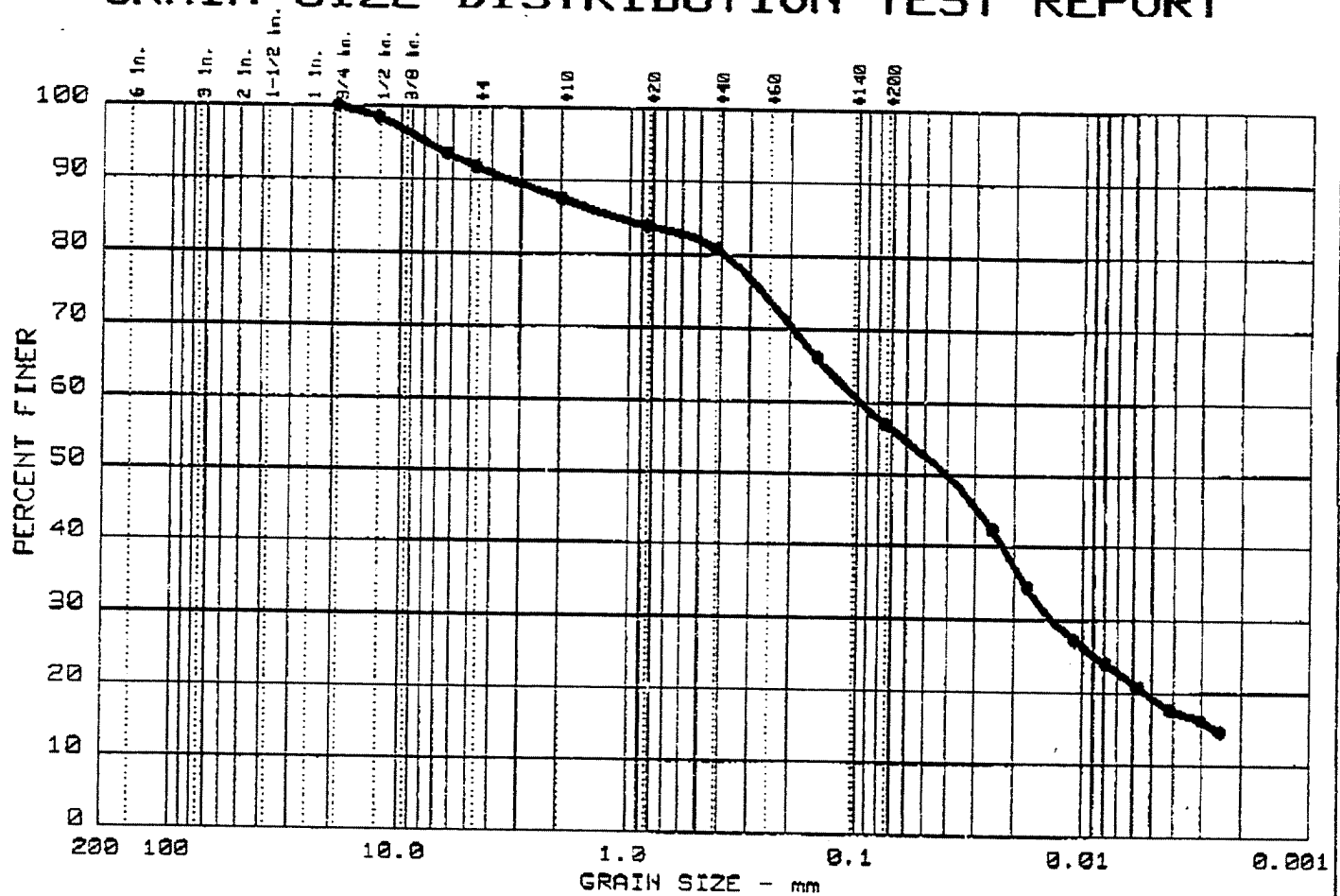
Remarks:

Sample obtained by
 split spoon

Sampled on 6/25/96

Figure No. 7987-010

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 11	0.0	8.3	34.7	37.7	19.3

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		1.17	0.0955	0.0403	0.0135	0.0026			

MATERIAL DESCRIPTION	USCS	AASHTO
• Clayey SILT, Some Sand, trace gravel		

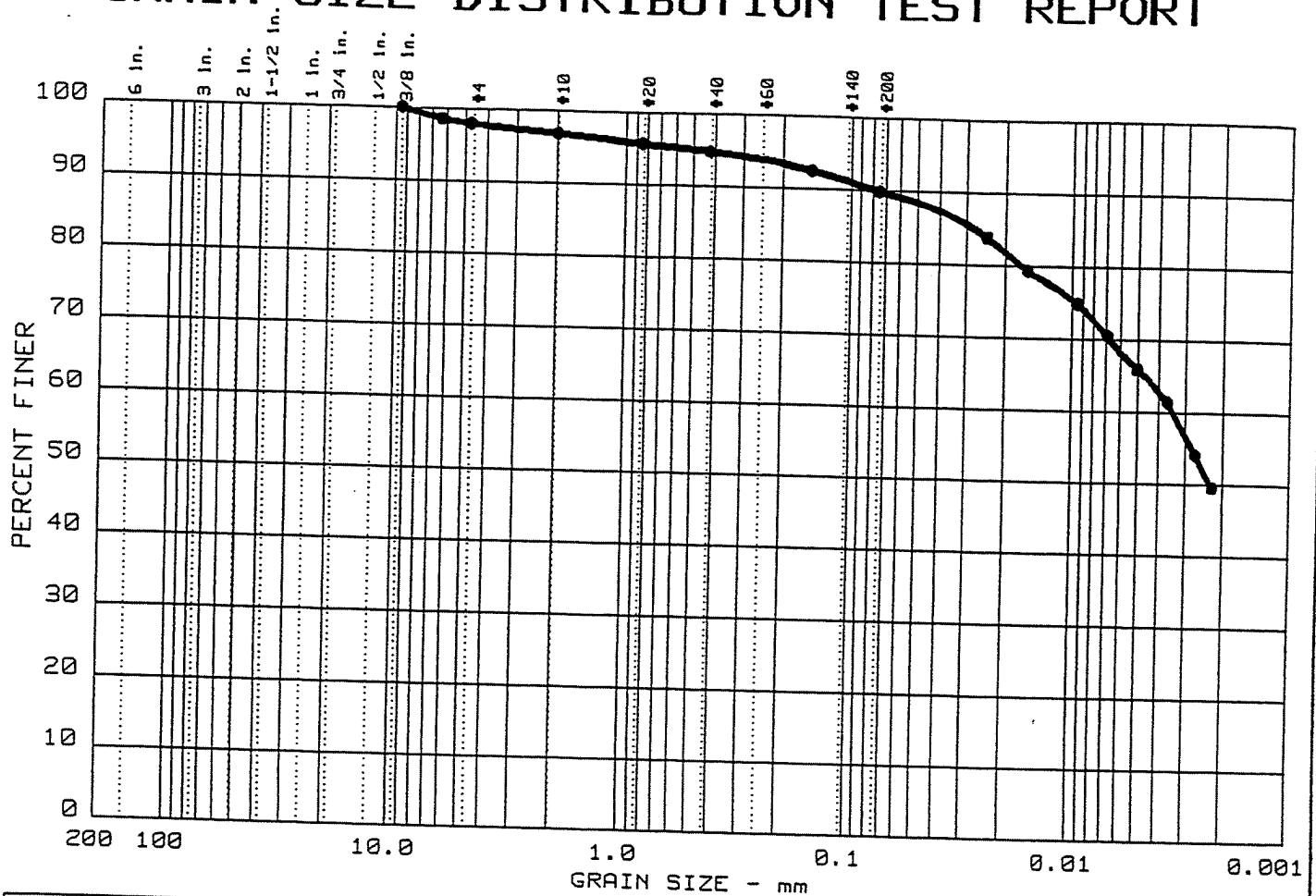
Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: Boring BHB-96 7987-011
 * Moisture Content = 9.8 %
 Date: 07/11/96
 GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 6/25/96

Figure No. 7987-011

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 2	0.0	2.1	8.1	24.0	65.8

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•				0.0023					

MATERIAL DESCRIPTION	USCS	AASHTO
• CLAY, Some Silt, trace sand and gravel	ML	

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH9-96 7987-012

Date: 7/19/96

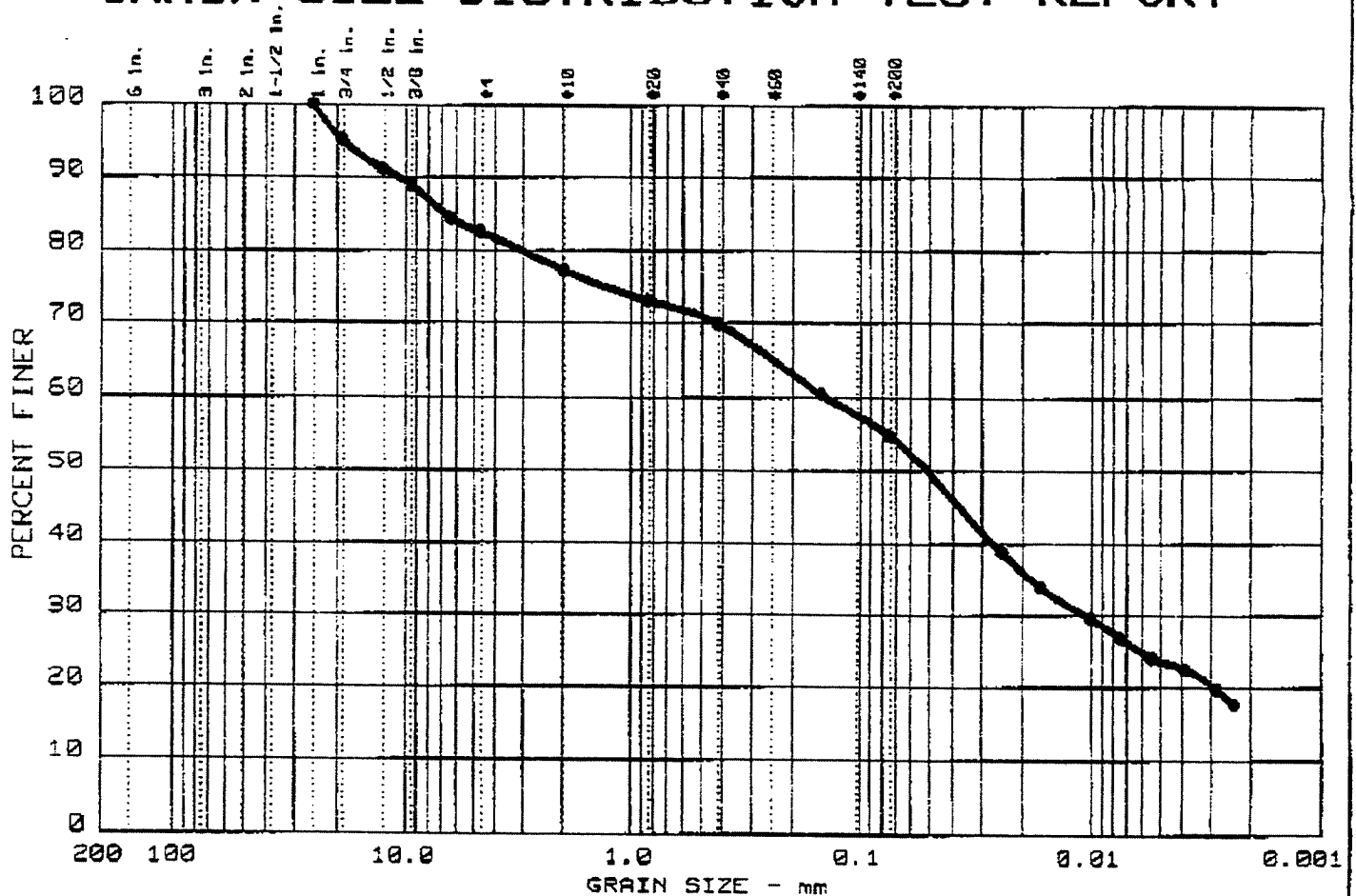
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon.

Sampled on 6/25/96

Figure No. 7987-012

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 12	0.0	17.5	27.6	31.3	23.6

[illegible]

MATERIAL DESCRIPTION	USCS	AASHTO
• Sandy SILT, Some Clay, little gravel		

Project No.: 6023-6-00137
Project: Gratwick Park Site
● Location: Boring BH10-96 7987-0014
* moisture Content = 9.7 %
Date: 7/11/96

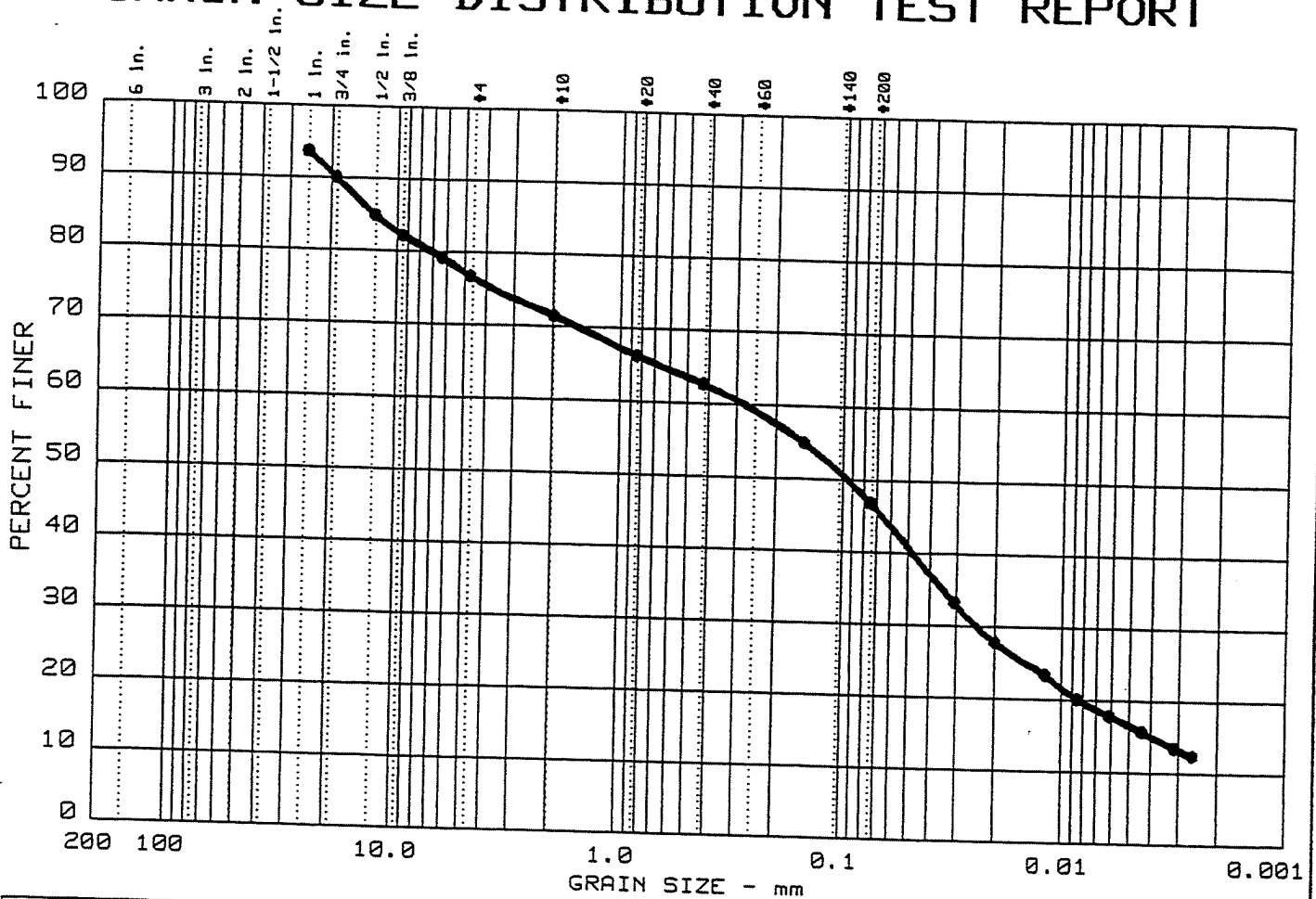
Remarks:
Sample obtained by
split spoon

Sampled on 6/25/96

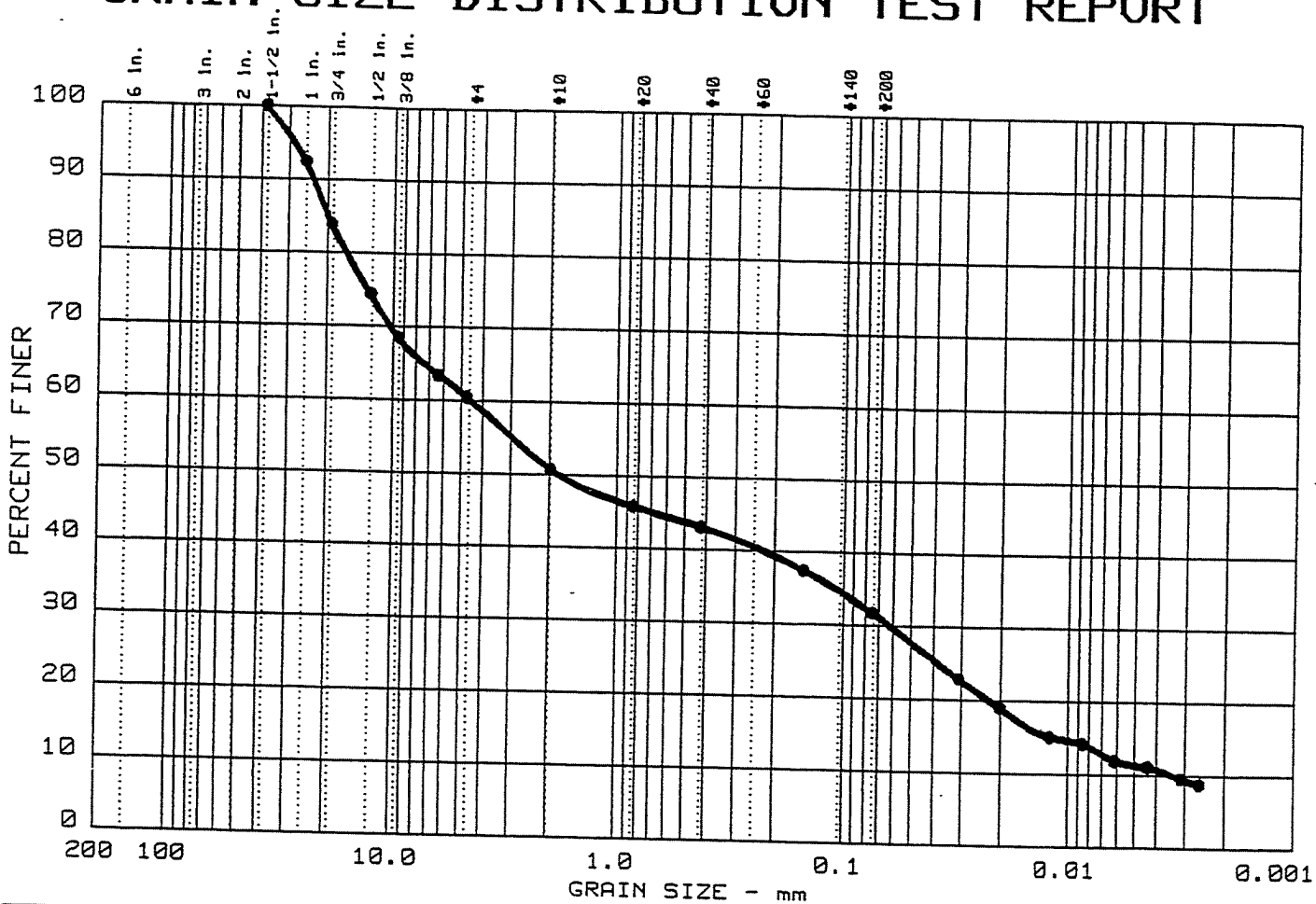
Figure No. 7987-014

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 10	0.0	39.6	28.7	20.3	11.4

[illegible]

MATERIAL DESCRIPTION	USCS	AASHTO
● GRAVEL, Some Sand and Silt, little clay		

Project No.: 6003-6-00137
Project: Gratwick Park Site
● Location: PW-2 7987-016

Date: 7/19/96

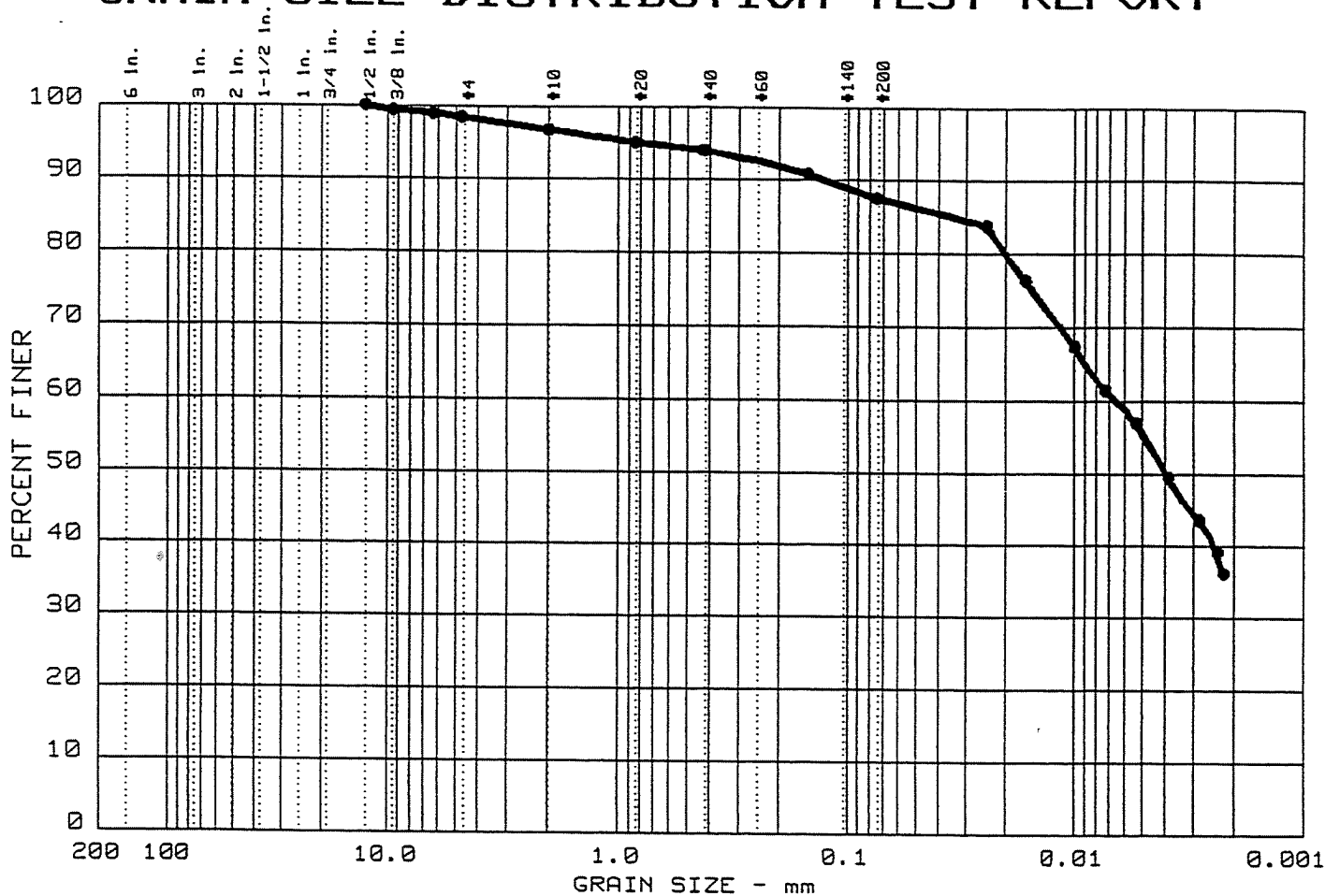
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
Sample obtained by
split spoon

Sampled on 7/12/96

Figure No. 7987-016

GRAIN SIZE DISTRIBUTION TEST REPORT



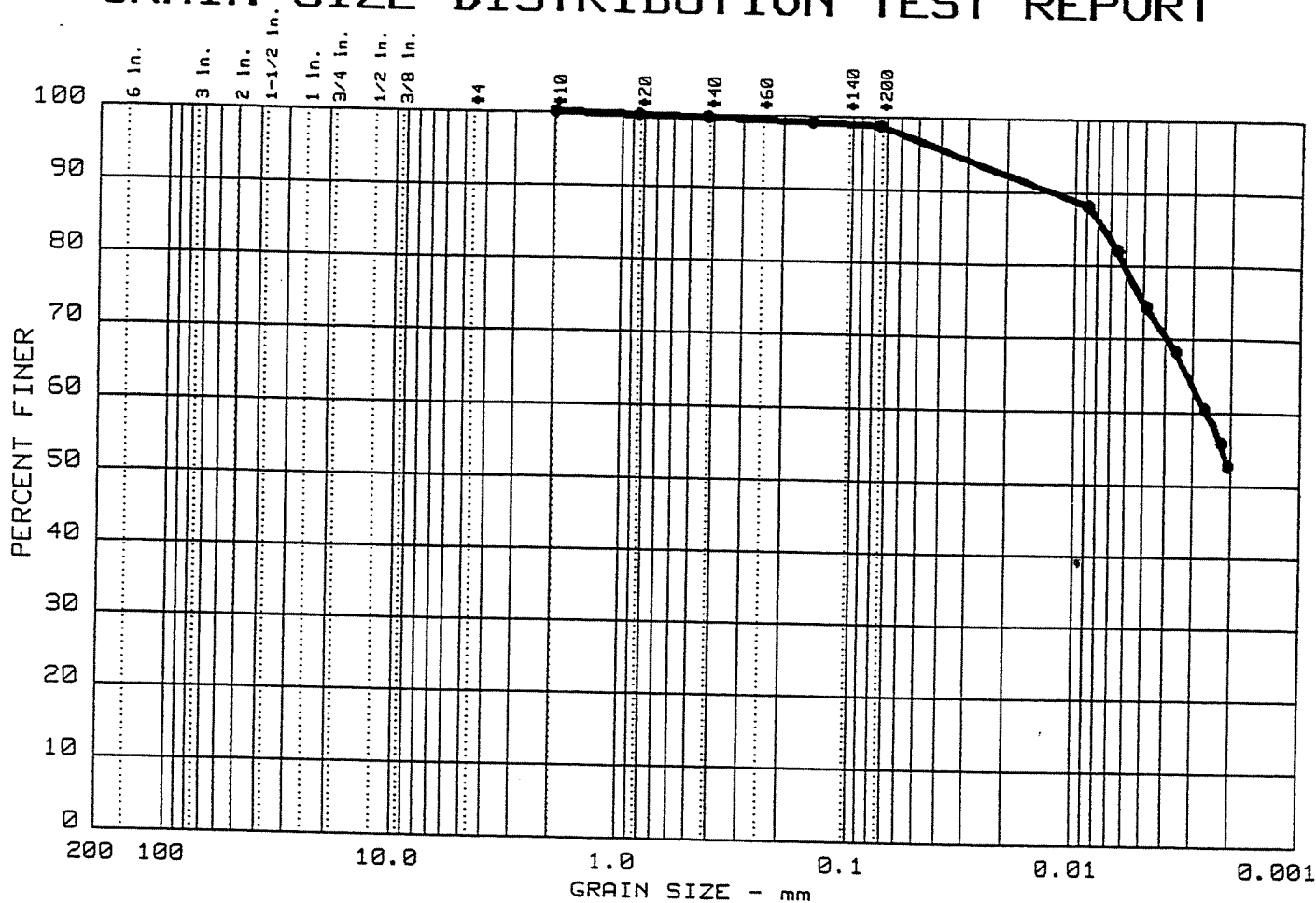
Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
6	0.0	1.6	11.0	31.7	55.7

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
				0.0040					

MATERIAL DESCRIPTION	USCS	AASHTO
CLAY, Some Silt, little sand, trace gravel		

Project No.: 6003-6-00137 Project: Gratwick Park Site Location: BH-12 7987-017 Date: 7/19/96	Remarks: Sample obtained by split spoon Sampled on 7/12/96 Figure No. 7987-017
GRAIN SIZE DISTRIBUTION TEST REPORT MAXIM TECHNOLOGIES	

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 2	0.0	0.0	1.3	23.8	74.9

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•									

MATERIAL DESCRIPTION	USCS	AASHTO
• CLAY, Some Silt, trace sand		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-13 7987-018

Date: 7/19/96

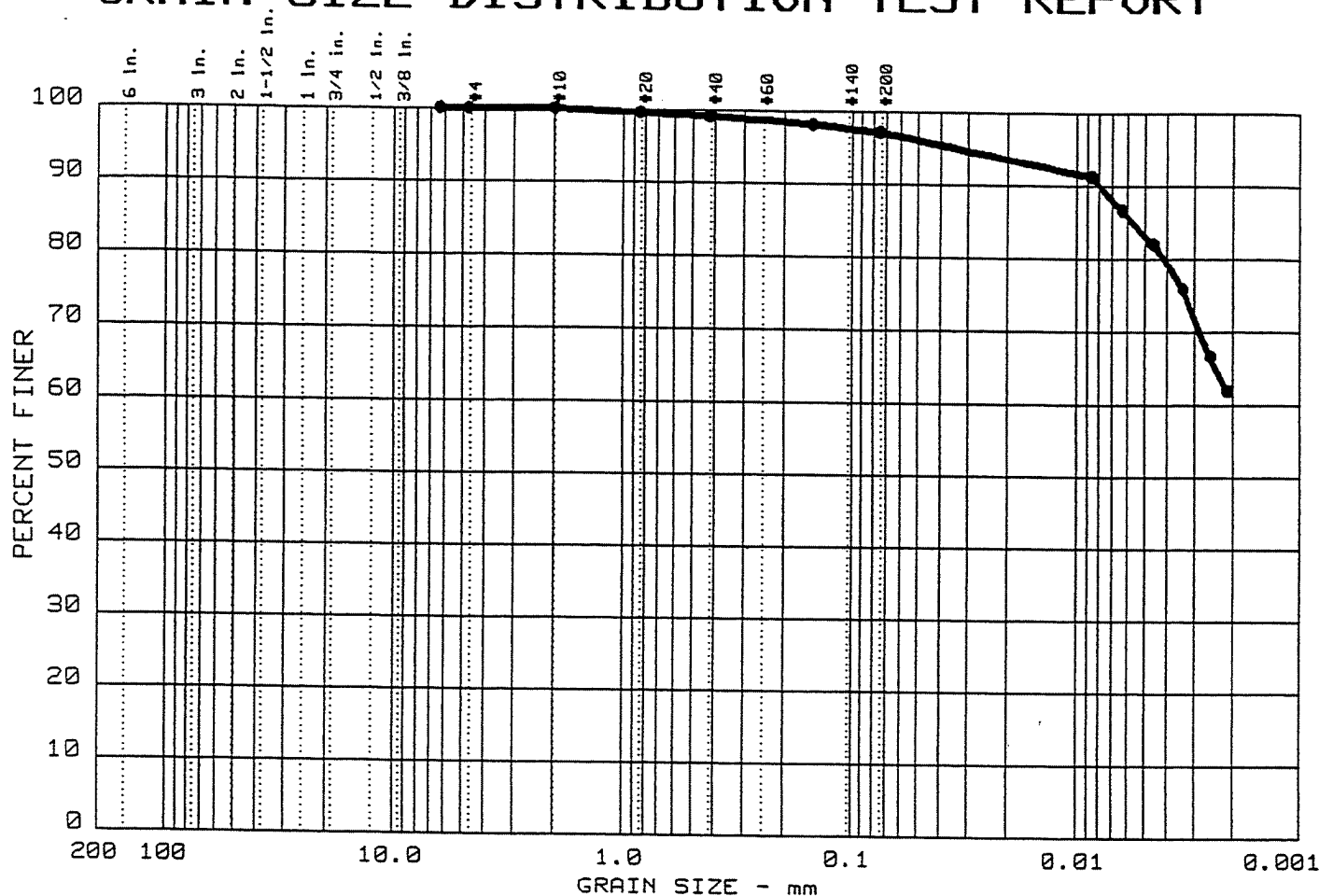
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-018

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 5	0.0	0.0	2.9	13.9	83.2

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•									

MATERIAL DESCRIPTION	USCS	AASHTO
• CLAY, little silt, trace sand		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-14 7987-020

Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-020

Grain size distribution curve for a soil sample. The graph plots Percent Finer (0 to 100) against Grain Size in mm (logarithmic scale from 200 to 0.001). The curve shows a sharp drop in percent finer between 0.075 mm and 0.06 mm, indicating a fine-grained soil with a significant amount of material passing through the No. 20 sieve.

Grain Size (mm)	Percent Finer (%)
200	100
100	100
60	100
40	100
20	100
10	100
7.5	100
6	100
4.75	100
3.75	100
3	100
2.5	100
2	100
1.5	100
1.18	100
0.85	100
0.75	100
0.6	100
0.425	100
0.3	100
0.25	100
0.2	100
0.15	100
0.106	100
0.075	100
0.06	85
0.0475	75
0.0375	65
0.03	55
0.025	50
0.02	45
0.015	40
0.0106	35
0.0075	30
0.006	25
0.00475	20
0.00375	15
0.003	10
0.0025	5
0.002	0
0.0015	0
0.00106	0
0.00075	0
0.0006	0
0.000475	0
0.000375	0
0.0003	0
0.00025	0
0.0002	0
0.00015	0
0.000106	0
0.000075	0
0.00006	0
0.0000475	0
0.0000375	0
0.00003	0
0.000025	0
0.00002	0
0.000015	0
0.0000106	0
0.0000075	0
0.000006	0
0.00000475	0
0.00000375	0
0.000003	0
0.0000025	0
0.000002	0
0.0000015	0
0.00000106	0
0.00000075	0
0.0000006	0
0.000000475	0
0.000000375	0
0.0000003	0
0.00000025	0
0.0000002	0
0.00000015	0
0.000000106	0
0.000000075	0
0.00000006	0
0.0000000475	0
0.0000000375	0
0.00000003	0
0.000000025	0
0.00000002	0
0.000000015	0
0.0000000106	0
0.0000000075	0
0.000000006	0
0.00000000475	0
0.00000000375	0
0.000000003	0
0.0000000025	0
0.000000002	0
0.0000000015	0
0.00000000106	0
0.00000000075	0
0.0000000006	0
0.000000000475	0
0.000000000375	0
0.0000000003	0
0.00000000025	0
0.0000000002	0
0.00000000015	0
0.000000000106	0
0.000000000075	0
0.00000000006	0
0.0000000000475	0
0.0000000000375	0
0.00000000003	0
0.000000000025	0
0.00000000002	0
0.000000000015	0
0.0000000000106	0
0.0000000000075	0
0.000000000006	0
0.00000000000475	0
0.00000000000375	0
0.000000000003	0
0.0000000000025	0
0.000000000002	0
0.0000000000015	0
0.00000000000106	0
0.00000000000075	0
0.0000000000006	0
0.000000000000475	0
0.000000000000375	0
0.0000000000003	0
0.00000000000025	0
0.0000000000002	0
0.0000000000	

[illegible]

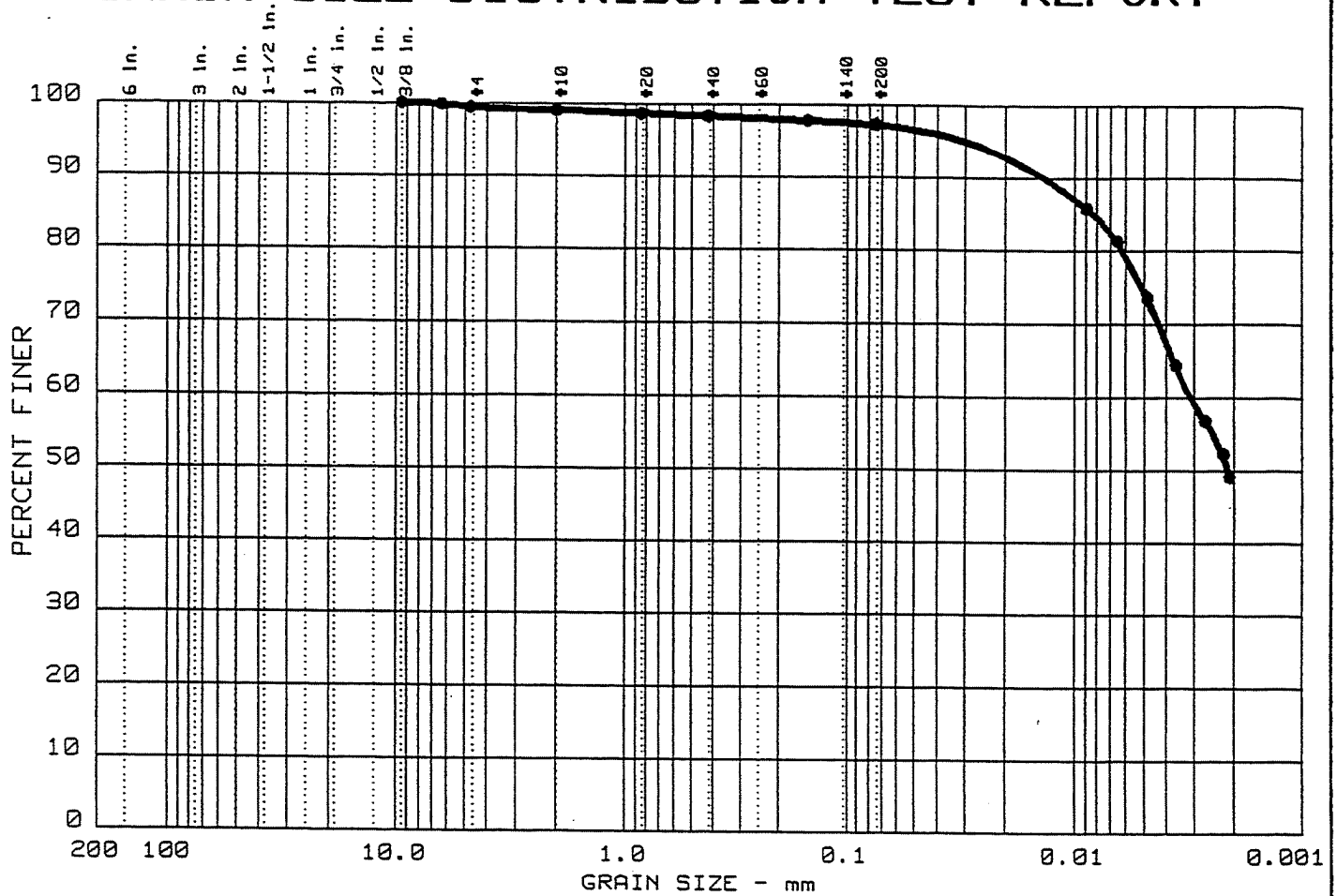
Project No.: 6003-6-00137
Project: Gratwick Park Site
● Location: BH-15 7987-019

Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Figure No. 7987-019

GRAIN SIZE DISTRIBUTION TEST REPORT



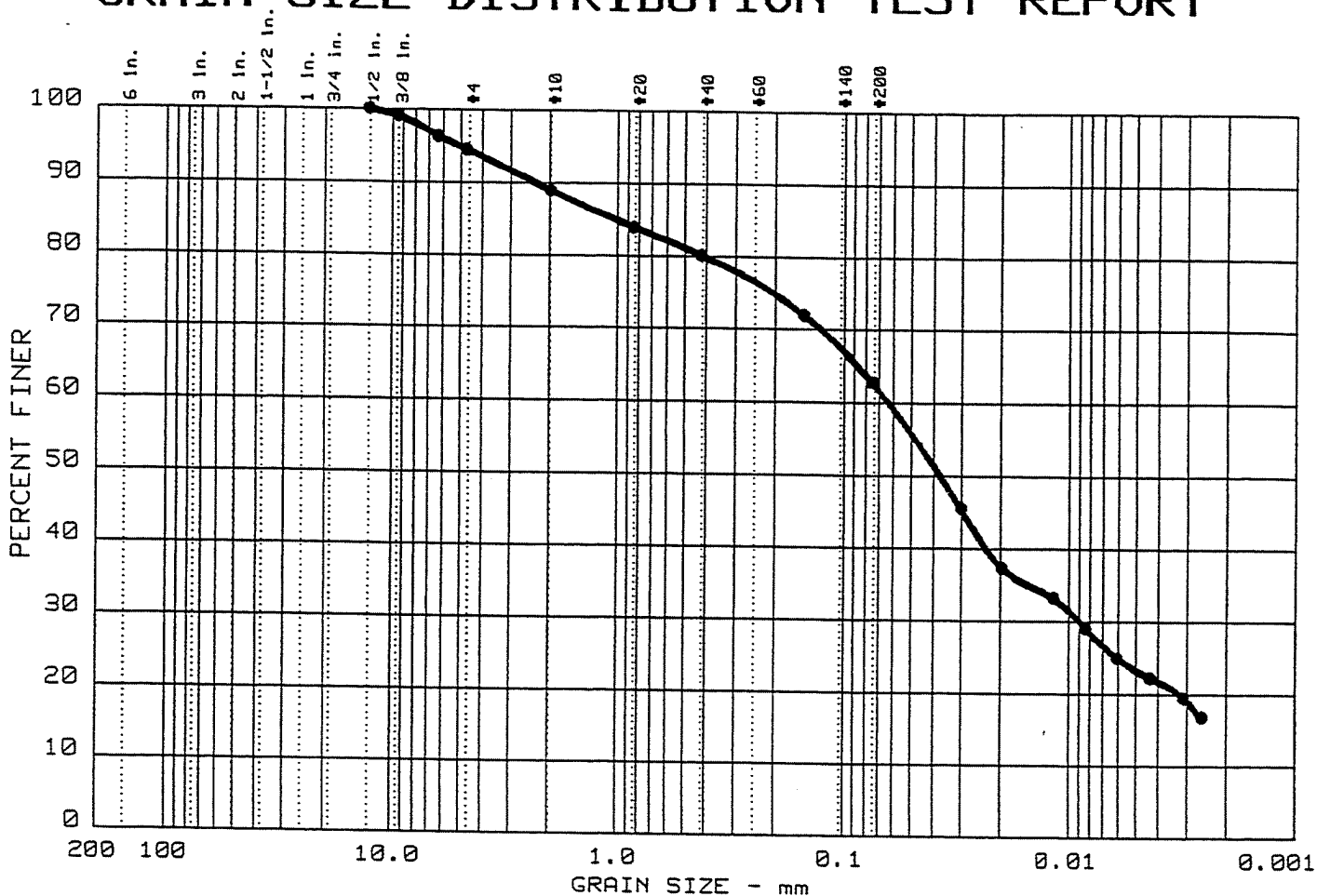
Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 8	0.0	0.6	2.2	22.8	74.4

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
●				0.0021					

MATERIAL DESCRIPTION	USCS	AASHTO
● CLAY, Some Silt, trace sand and gravel		

Project No.: 6003-6-00137 Project: Gratwick Park Site ● Location: BH-16 7987-023 Date: 7/19/96	Remarks: Sample obtained by split spoon Sampled on 7/12/96 Figure No. 7987-023
GRAIN SIZE DISTRIBUTION TEST REPORT MAXIM TECHNOLOGIES	

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 9	0.0	5.5	31.7	39.6	23.2

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
●		1.04		0.0372	0.0089				

MATERIAL DESCRIPTION	USCS	AASHTO
● SILT, Some Sand and Clay, trace gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 ● Location: BH-17 7987-024

Date: 7/19/96

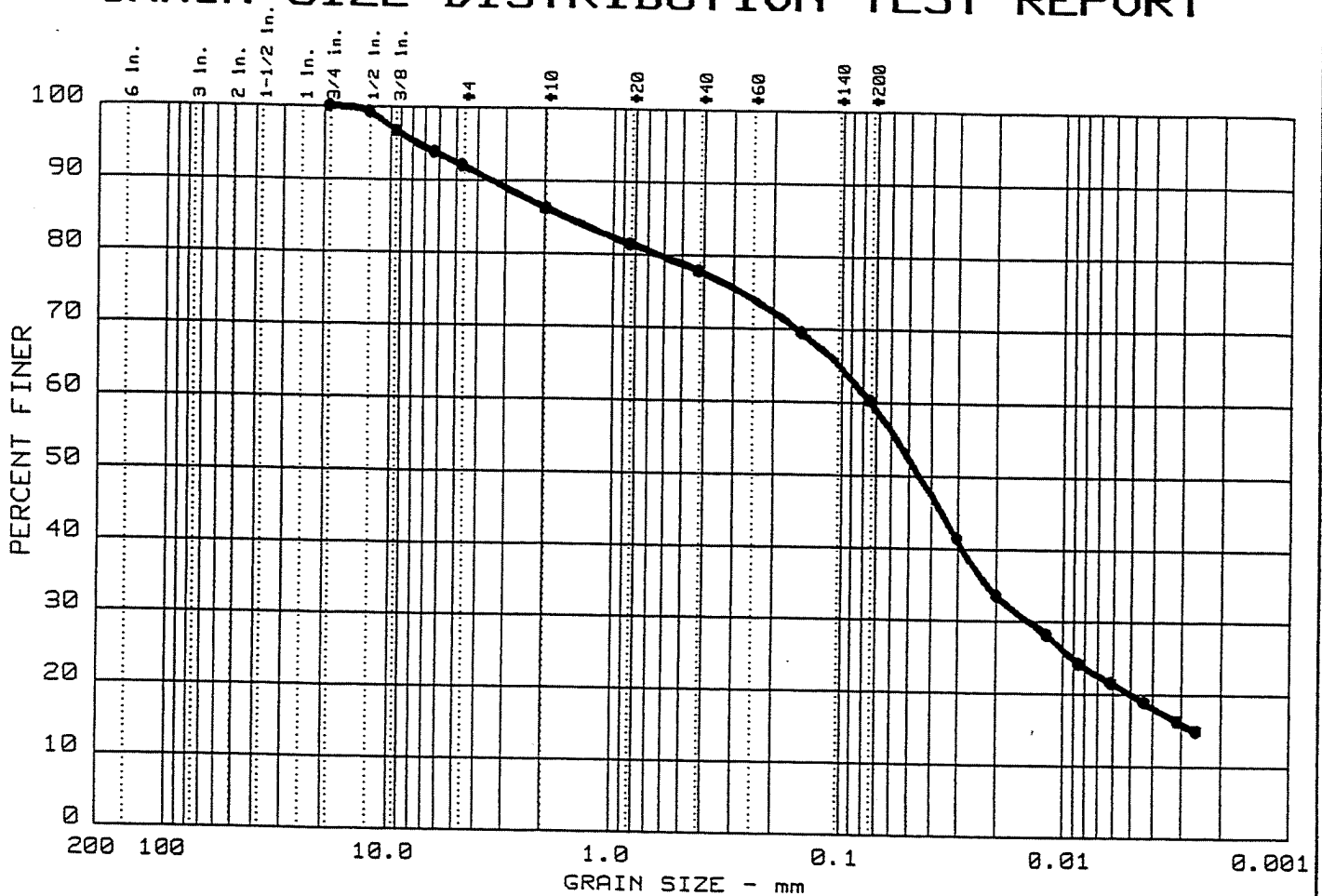
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-024

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 3	0.0	8.0	31.7	40.3	20.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		1.64		0.0447	0.0143	0.0026			

MATERIAL DESCRIPTION	USCS	AASHTO
• SILT, Some Sand and Clay, trace gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-18 7987-025

Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-025

Grain size distribution test report graph showing Percent Finer vs Grain Size (mm). The curve starts at 100% finer for 200 mm and decreases to approximately 9% finer for 0.075 mm.

Grain Size (mm)	Percent Finer (%)
200	100
100	100
75	100
60	100
40	100
30	100
25	100
20	100
15	100
12.5	100
10	100
7.5	100
6	100
4.75	100
4	100
3.75	100
3.5	100
3.0	100
2.5	100
2.0	100
1.5	100
1.25	100
1.0	100
0.85	100
0.75	100
0.6	100
0.5	100
0.425	100
0.375	100
0.3	100
0.25	100
0.2	100
0.15	100
0.125	100
0.106	100
0.085	100
0.075	100
0.063	100
0.053	100
0.045	100
0.037	100
0.03	100
0.025	100
0.02	100
0.016	100
0.013	100
0.010	100
0.0075	100
0.006	100
0.005	100
0.004	100
0.003	100
0.0025	100
0.002	100
0.0015	100
0.00125	100
0.00106	100
0.00085	100
0.00075	100
0.00063	100
0.00053	100
0.00045	100
0.00037	100
0.0003	100
0.00025	100
0.0002	100
0.00016	100
0.00013	100
0.00010	100
0.000075	100
0.00006	100
0.00005	100
0.00004	100
0.00003	100
0.000025	100
0.00002	100
0.000016	100
0.000013	100
0.000010	100
0.0000075	100
0.000006	100
0.000005	100
0.000004	100
0.000003	100
0.0000025	100
0.000002	100
0.0000016	100
0.0000013	100
0.0000010	100
0.00000075	100
0.0000006	100
0.0000005	100
0.0000004	100
0.0000003	100
0.00000025	100
0.0000002	100
0.00000016	100
0.00000013	100
0.00000010	100
0.000000075	100
0.00000006	100
0.00000005	100
0.00000004	100
0.00000003	100
0.000000025	100
0.00000002	100
0.000000016	100
0.000000013	100
0.000000010	100
0.0000000075	100
0.000000006	100
0.000000005	100
0.000000004	100
0.000000003	100
0.0000000025	100
0.000000002	100
0.0000000016	100
0.0000000013	100
0.0000000010	100
0.00000000075	100
0.0000000006	100
0.0000000005	100
0.0000000004	100
0.0000000003	100
0.00000000025	100
0.0000000002	100
0.00000000016	100
0.00000000013	100
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0.000000000075	100
0.00000000006	100
0.00000000005	100
0.00000000004	100
0.00000000003	100
0.000000000025	

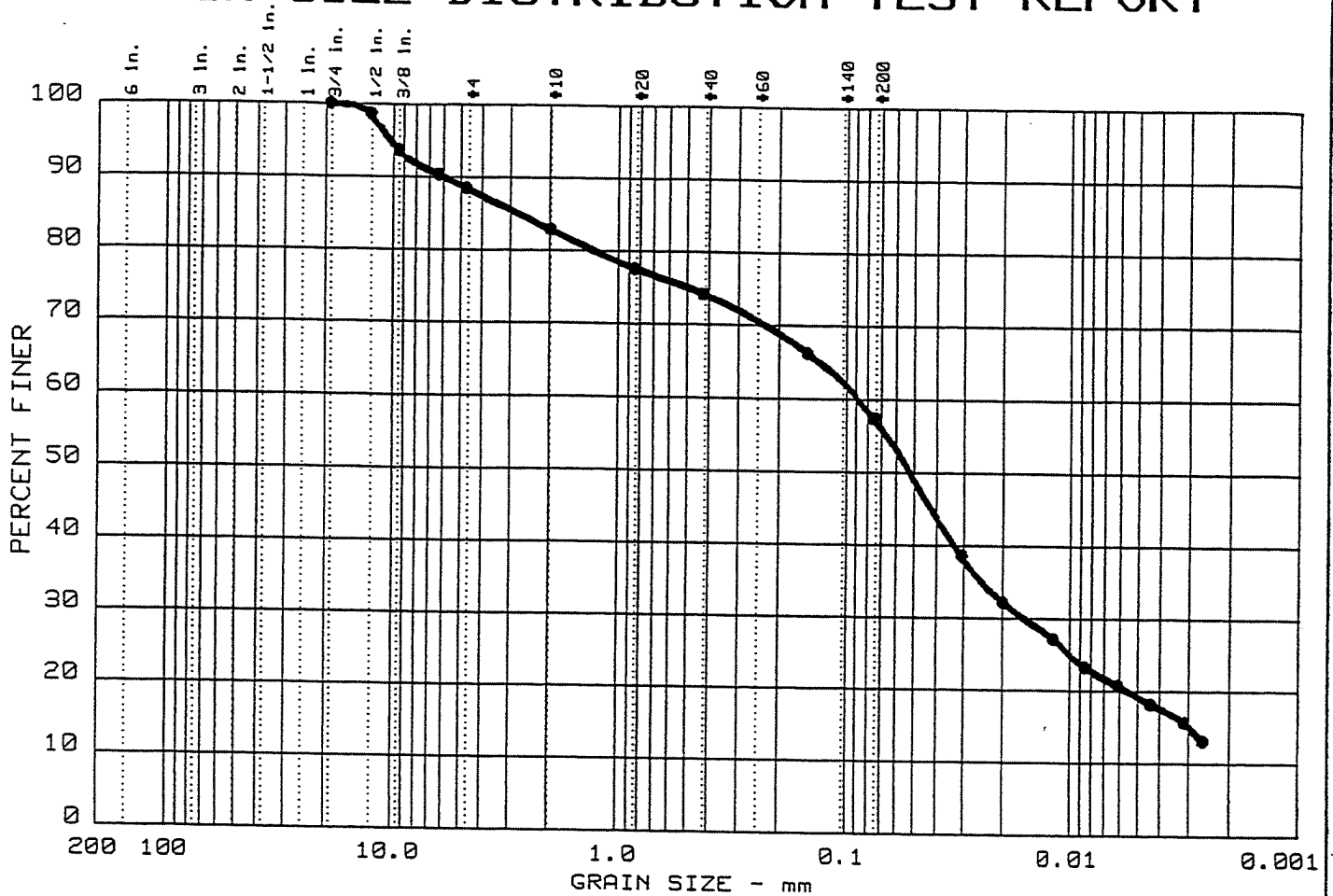
[illegible]

Project No.: 6003-6-00137
Project: Gratwick Park Site
● Location: ~~24120~~ 7987-027
PW-1 KOS
Oct 22/96
Date: 7/19/96

Figure No. 7987-027

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 4	0.0	11.6	31.0	38.3	19.1

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		2.82	0.0871	0.0519	0.0160	0.0030			

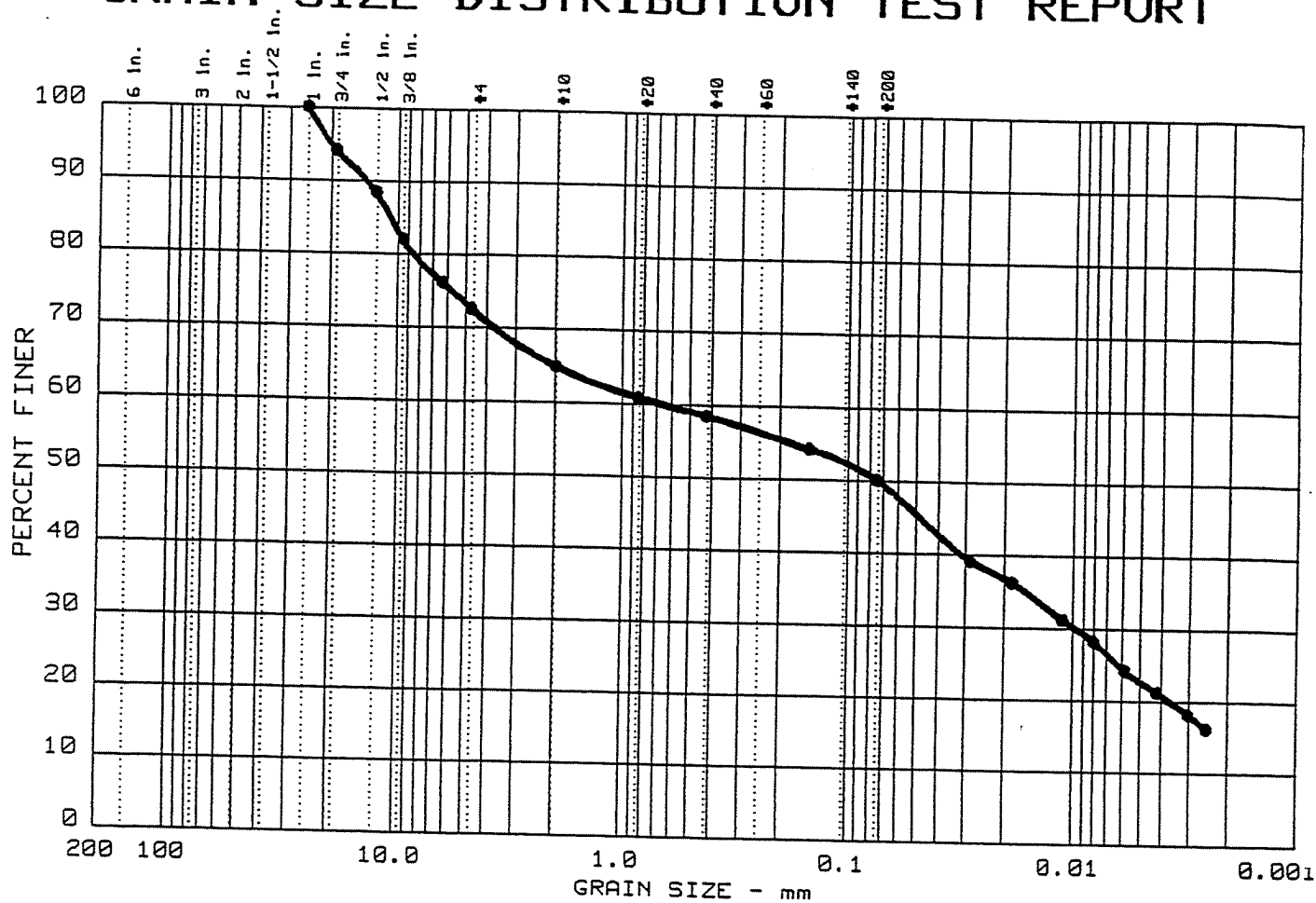
MATERIAL DESCRIPTION	USCS	AASHTO
• SILT, Some Sand, little clay and gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-19 7987-026
 Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon
 Sampled on 7/12/96
 Figure No. 7987-026

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 4	0.0	27.5	22.4	27.5	22.6

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		10.8	0.668	0.0741	0.0097				

MATERIAL DESCRIPTION	USCS	AASHTO
• GRAVEL and SILT, Some Sand and Clay		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-20 7987-028

Date: 7/19/96

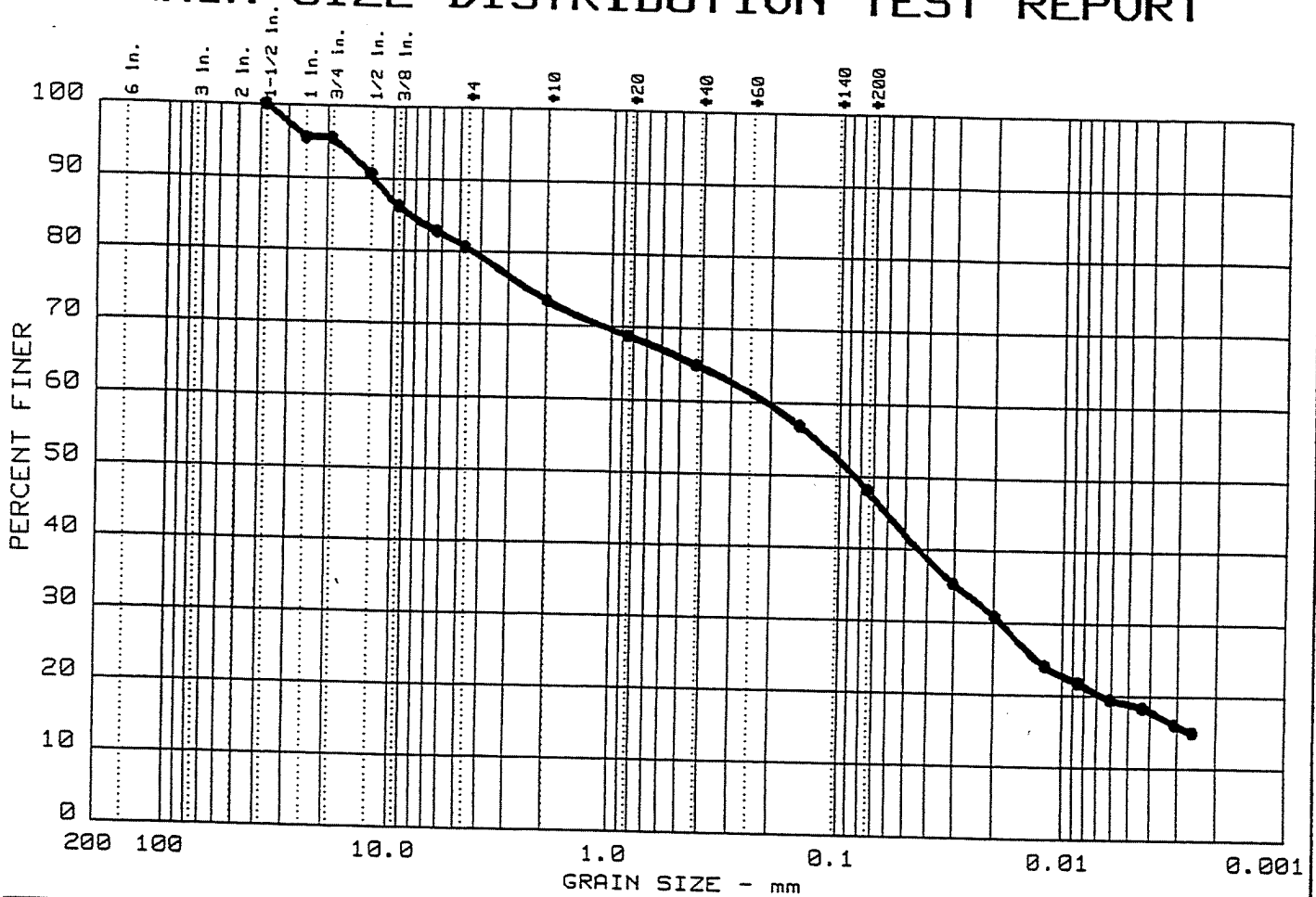
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-028

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 10	0.0	19.4	32.4	29.4	18.8

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		8.61	0.211	0.0841	0.0186				

MATERIAL DESCRIPTION	USCS	AASHTO
• SAND, Some Silt, little gravel and clay		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 • Location: BH-21 7987-031

Date: 7/19/96

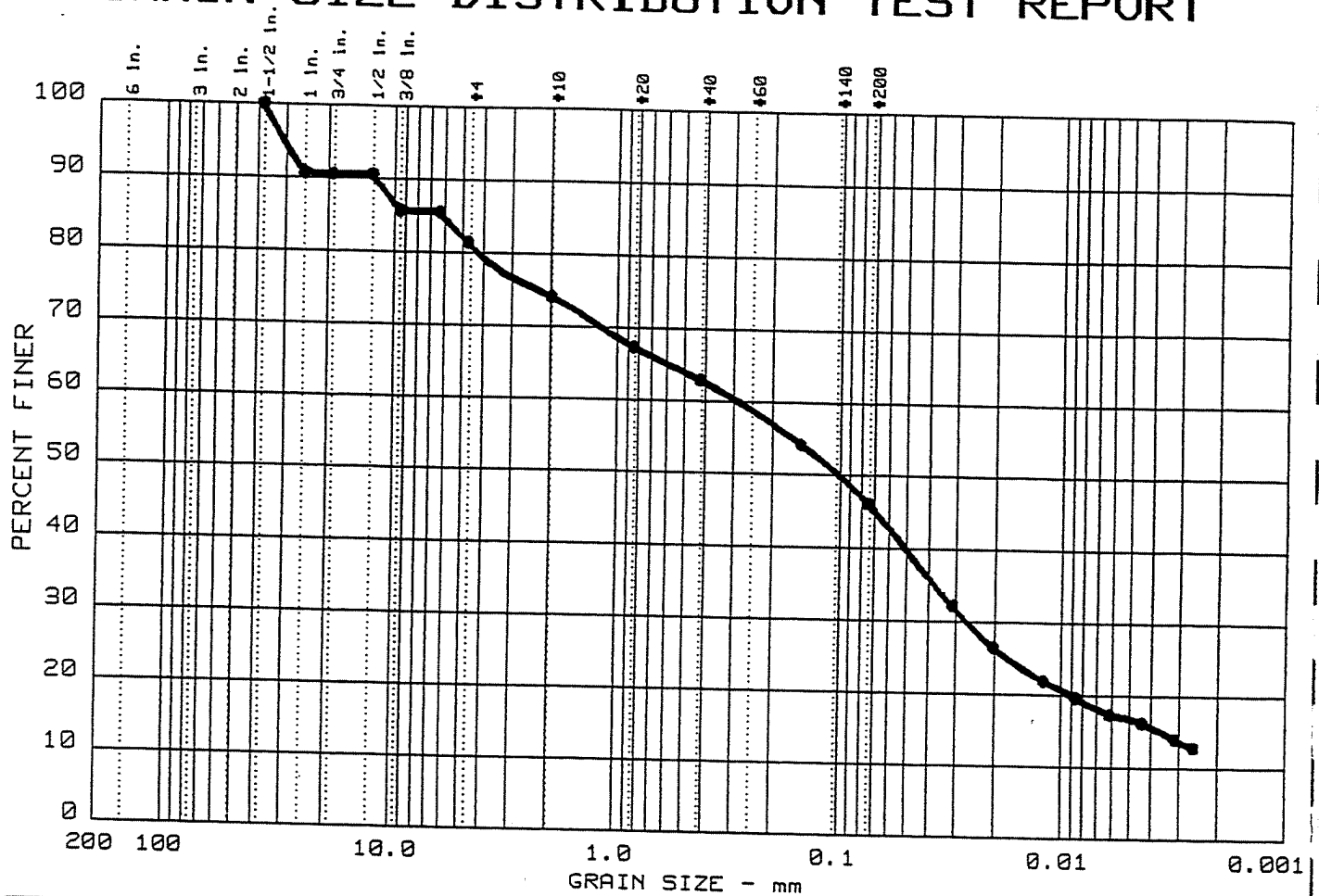
GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Sample obtained by
 split spoon

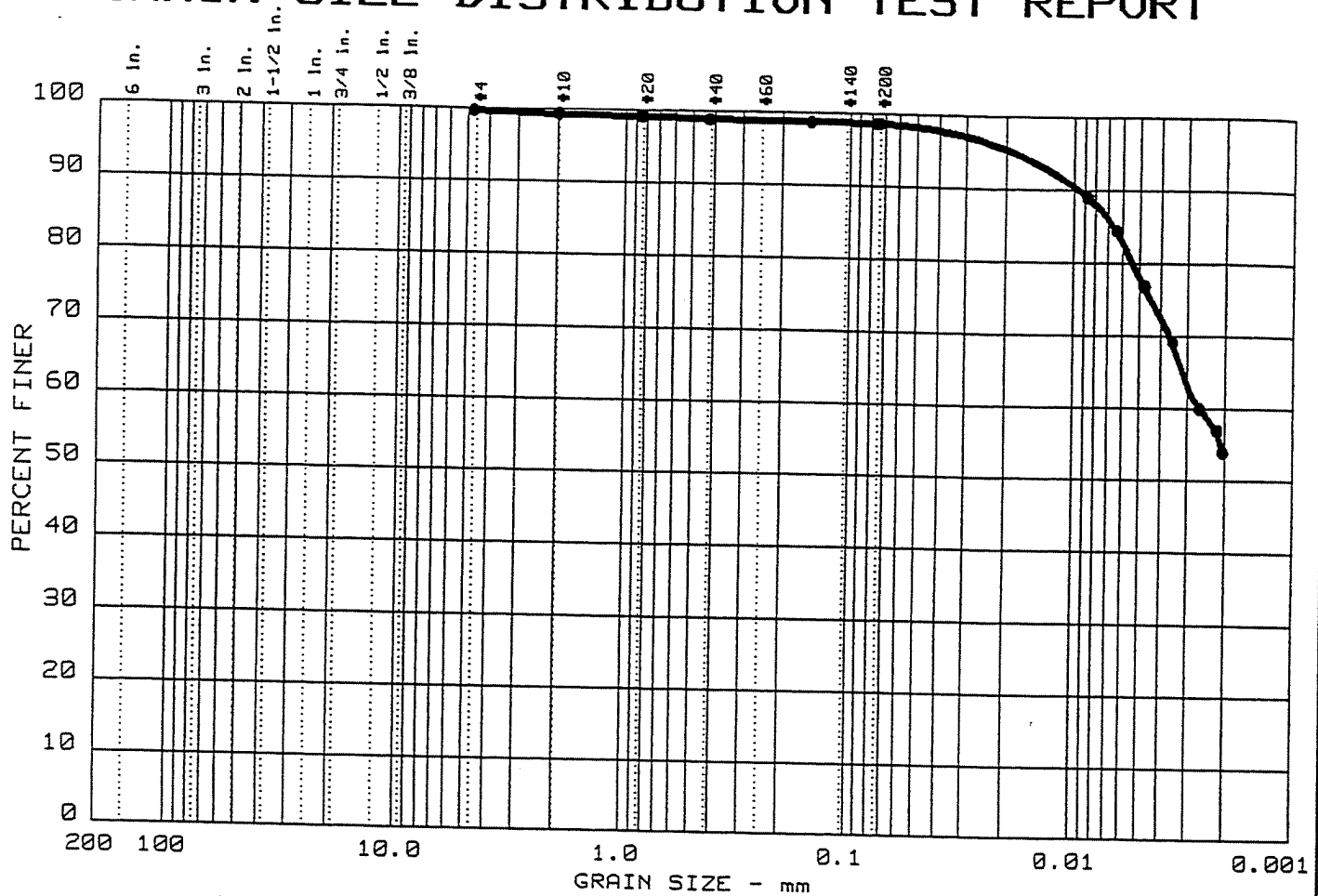
Sampled on 7/12/96

Figure No. 7987-031

GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
7	0.0	0.4	1.1	20.5	78.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u

MATERIAL DESCRIPTION	USCS	AASHTO
CLAY, Some Silt, trace sand and gravel		

Project No.: 6003-6-00137
 Project: Gratwick Park Site
 Location: BH-23 7987-033

Date: 7/19/96

GRAIN SIZE DISTRIBUTION TEST REPORT
MAXIM TECHNOLOGIES

Remarks:

Sample obtained by
 split spoon

Sampled on 7/12/96

Figure No. 7987-033

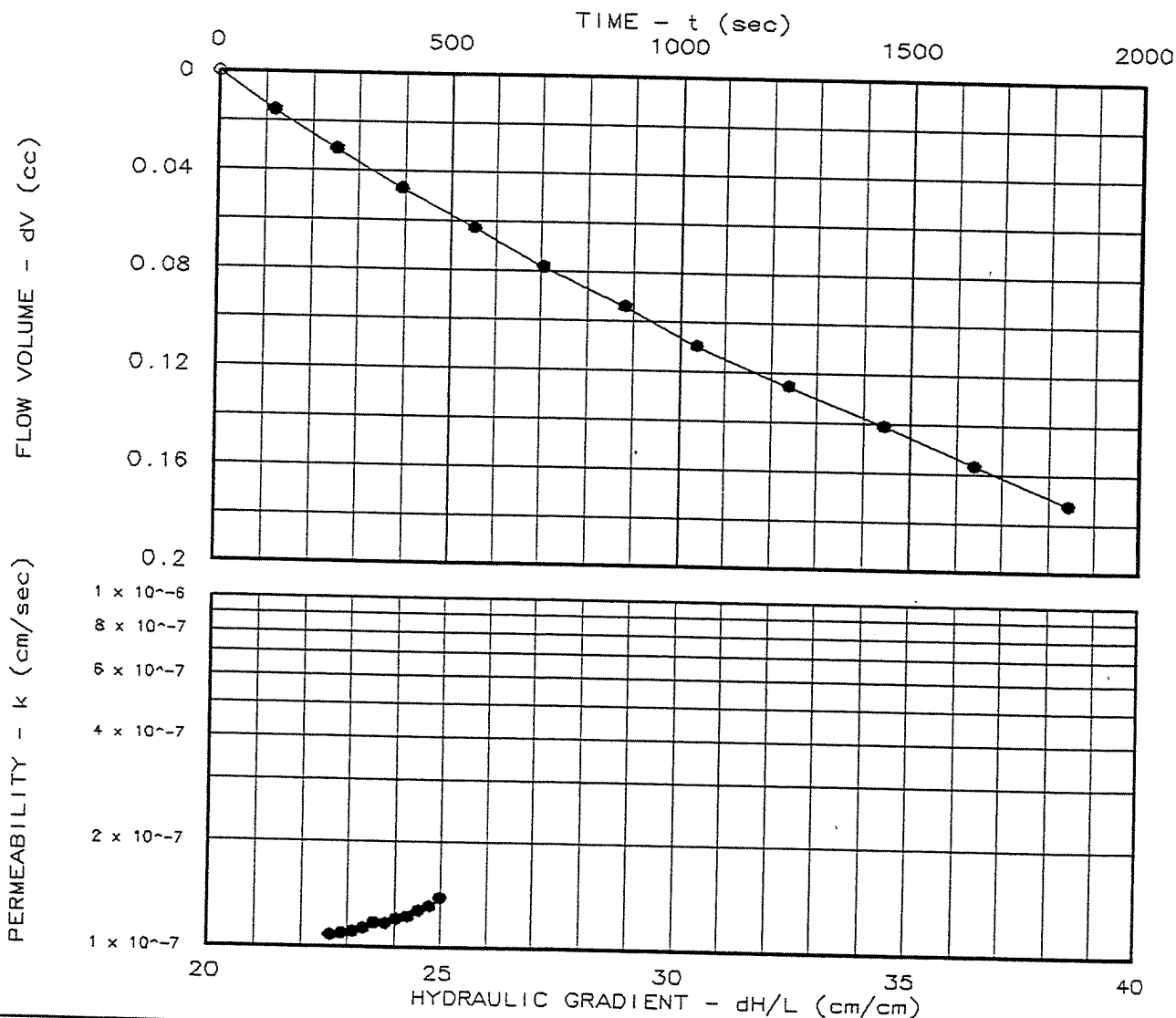
PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 13.90
 Specimen Diameter (cm): 7.00
 Dry Unit Weight (pcf): 88.9
 Moisture Before Test (%): 29.9
 Moisture After Test (%): 36.5
 Run Number: 1 ● 2 ▲
 Cell Pressure (psi): 95.0
 Sat. Pressure (psi): 80.0
 Diff. Head (psi): 4.5
 Perm. (cm/sec): 1.10×10^{-7}

SAMPLE DATA:

Sample Identification: Shelby Tube BH-1
 Sample No. 7987-002
 Visual Description: Layers of Reddish-brown
 and brown Silt and Clay, shale fragmts
 Remarks:
 Maximum Dry Density (pcf):
 Optimum Moisture Content (%):
 Percent Compaction:
 Permeameter type: Flexible wall
 Sample type: Undisturbed

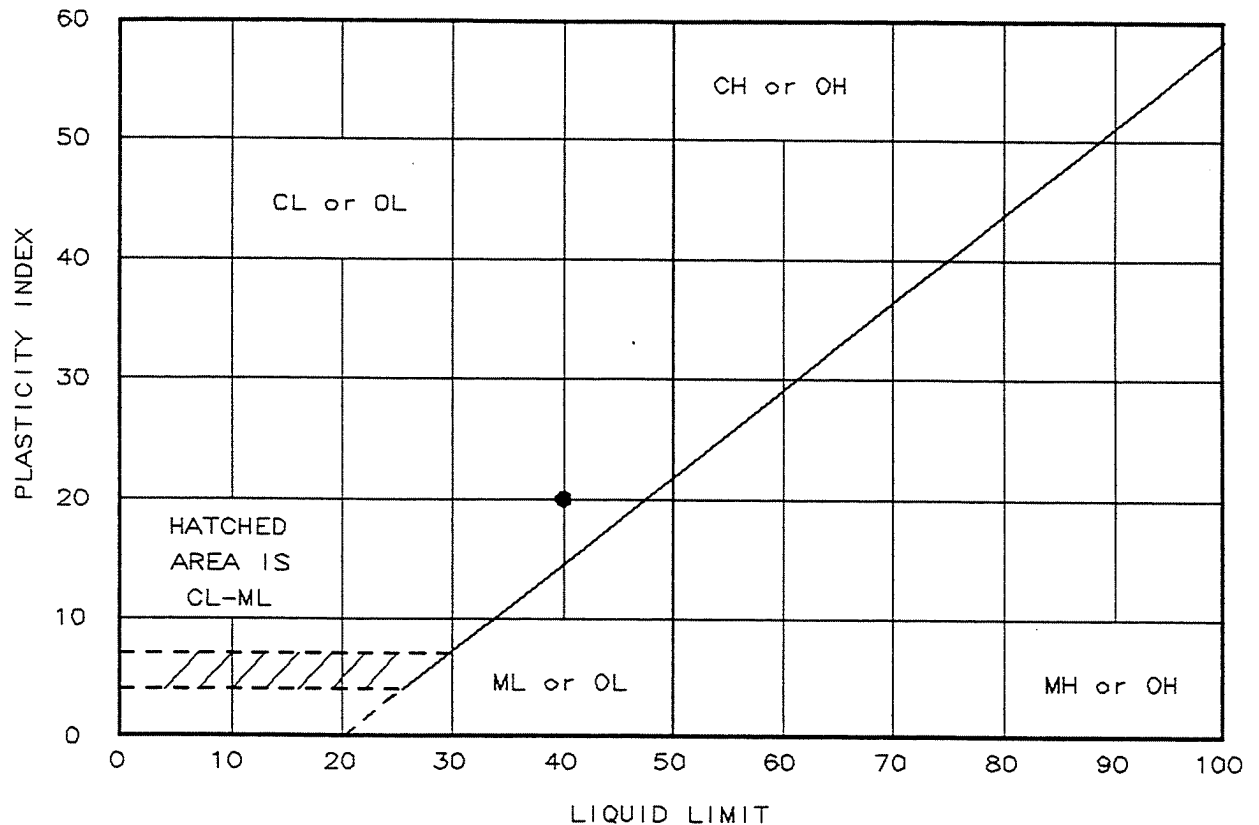


Project: Gratwick-Riverside Park
 Location: Buffalo, New York
 Date: 07169696

Project No.: 6003600137
 File No.: 96254
 Lab No.: 96294
 Tested by: AM
 Checked by: TAH
 Test: CV - Constant volume

PERMEABILITY TEST REPORT
MAXIM TECHNOLOGIES

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-90
● BH-1, 15 - 17 ft. Tube No. 7987-002	40	20	20		

Project No.: 6003600137
 Project: Gratwick-Riverside Park
 Client: Trea-Tek - CRA Company
 Location: Buffalo, New York

Date: Aug. 1, 1996

LIQUID AND PLASTIC LIMITS TEST REPORT
MAXIM TECHNOLOGIES

Remarks:
 Proposed Material
 sieved through # 40.

Fig. No. _____

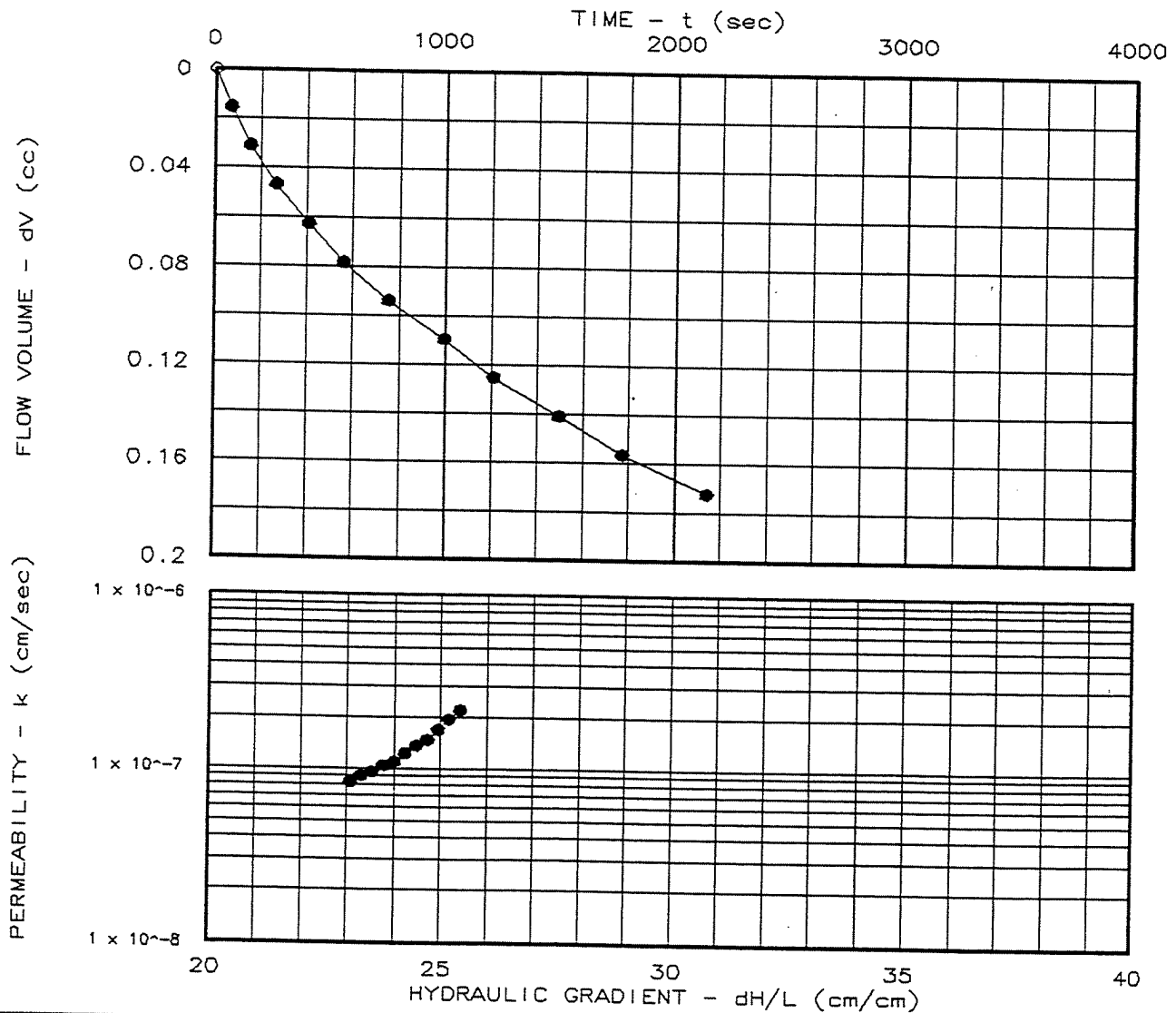
PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 13.91
Specimen Diameter (cm): 7.36
Dry Unit Weight (pcf): 80.4
Moisture Before Test (%): 41.1
Moisture After Test (%): 32.9
Run Number: 1 2
Cell Pressure (psi): 95.0
Sat. Pressure (psi): 80.0
Diff. Head (psi): 4.6
Perm. (cm/sec): 9.22×10^{-8}

SAMPLE DATA:

Sample Identification: Shelby Tube BH-14
Sample No. 7987-022
Visual Description: Red and Gray layers of Clay with Silt, soft
Remarks:
Maximum Dry Density (pcf):
Optimum Moisture Content (%):
Percent Compaction:
Permeameter type: Flexible wall
Sample type: Undisturbed



Project: Gratwick-Riverside Park
Location: Buffalo, New York
Date: 07-24-96

Project No.: 6003600137
File No.: 96272
Lab No.: 96272
Tested by: AM
Checked by: TAH
Test: CV - Constant volume

PERMEABILITY TEST REPORT
MAXIM TECHNOLOGIES

PERMEABILITY TEST REPORT

TEST DATA:

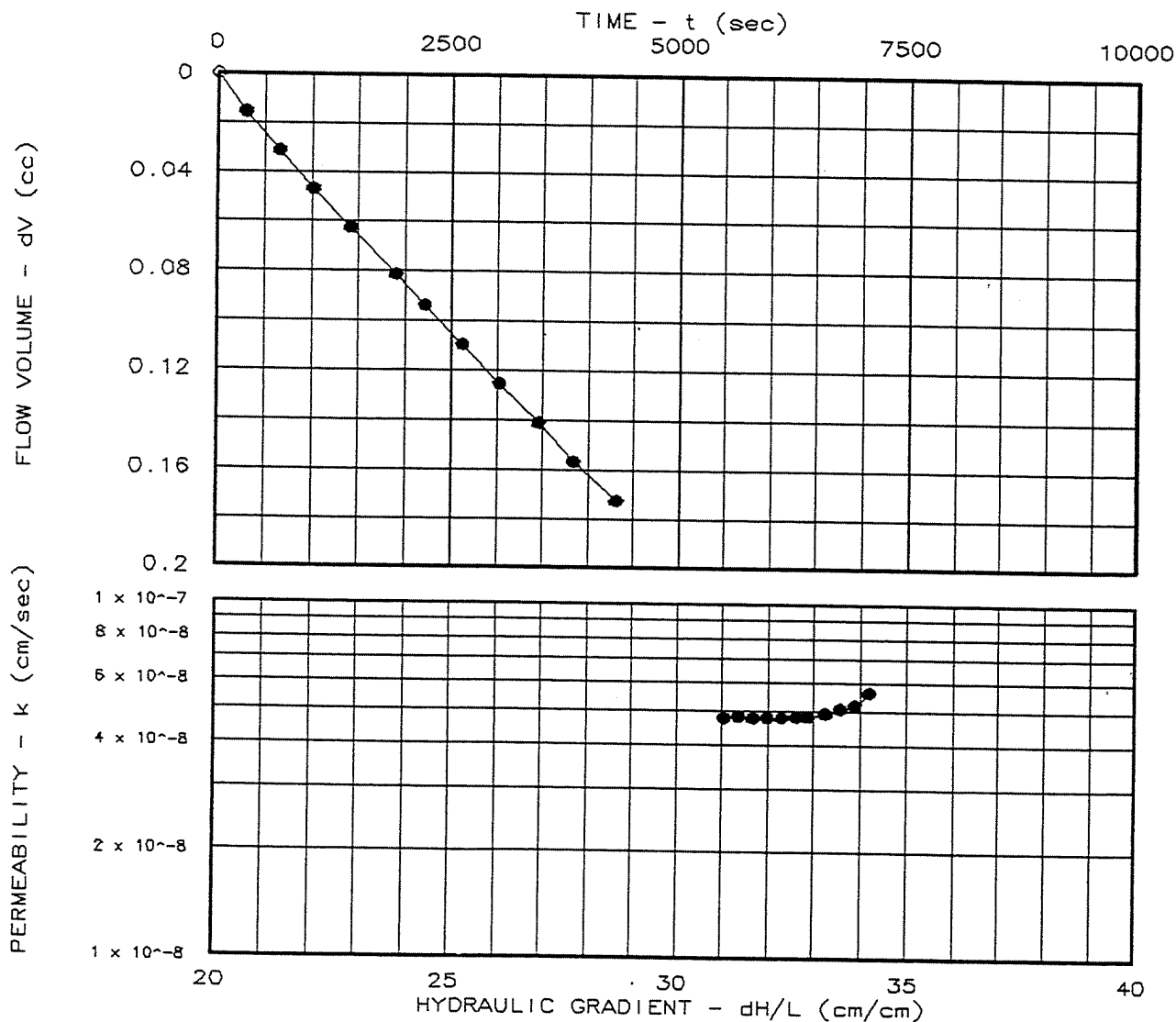
Specimen Height (cm): 10.34
 Specimen Diameter (cm): 5.88
 Dry Unit Weight (pcf): 140.6
 Moisture Before Test (%): 7.0
 Moisture After Test (%): 7.2
 Run Number: 1 ♦ 2 ▲
 Cell Pressure (psi): 95.0
 Sat. Pressure (psi): 80.0
 Diff. Head (psi): 4.6
 Perm. (cm/sec): 4.78×10^{-8}

SAMPLE DATA:

Sample Identification: Shelby Tube BH-20
 Sample No. 7987-029
 Visual Description:

Remarks:

Maximum Dry Density (pcf):
 Optimum Moisture Content (%):
 Percent Compaction:
 Permeameter type: Flexible wall
 Sample type: Undisturbed



Project: Gratwick-Riverside Park
 Location: Buffalo, New York
 Date: 07-25-96

Project No.: 6003600137

File No.: 96273

Lab No.: 96273

Tested by: AM

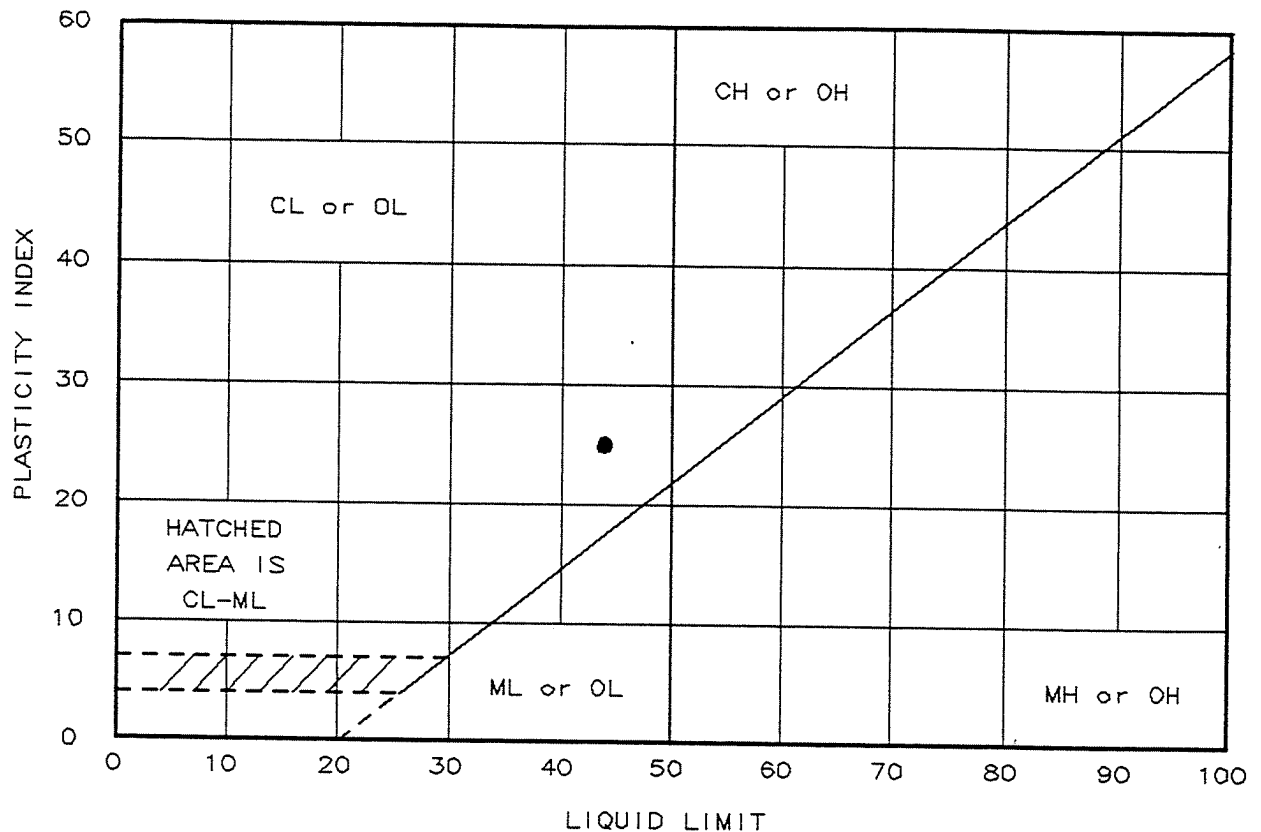
Checked by: TAH

Test: CV - Constant volume

PERMEABILITY TEST REPORT

MAXIM TECHNOLOGIES

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-90
● BH-14, 18 - 20 ft. Sample No. 7987-022 Lab No. 96272	44	19	25		
▲ BH-20, 14 - 16 ft. Sample No. 7987-029 Lab No. 96273	17	NP	None		

NP - Non-Plastic

Project No.: 6003600137
Project: Gratwick-Riverside Park

Client: TreaTek - CRA Company
Location: Buffalo, New York

Date: Aug. 1, 1996

Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT

MAXIM TECHNOLOGIES

Fig. No. _____

APPENDIX H

ANALYTICAL RESULTS AND QA/QC REVIEW SHORELINE CHARACTERIZATION SAMPLES

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(Following Report)

ATTACHMENT A	CHAIN-OF-CUSTODY FORMS

1.0 EXECUTIVE SUMMARY

Soil samples were collected in support of the Remedial Design Program at the Gratwick-Riverside Park Site in North Tonawanda, New York (Site). Composite samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analytes, corrosivity, ignitability, reactivity, and paint filter liquid.

All data were acceptable. All results were less than their associated EPA regulatory levels except for lead in sample BH21-BH23 (10 mg/L), which concentration is slightly above the EPA regulatory level (5 mg/L).

2.0 INTRODUCTION

Samples were collected from 25 discrete locations (BH1 to BH23, PW-1 and PW-2) and field composited to form five samples which were submitted for analysis in support of the Remedial Design Program at the Gratwick-Riverside Park Site in North Tonawanda, New York (Site). Sample collection was performed from June 1996 to July 1996. The samples were analyzed by Roy F. Weston, Inc. of Lionville, Pennsylvania. A summary of the sampling and analysis program is presented in Tables 1A and 1B.

Samples were analyzed in accordance with the methods referenced in Table 2. A summary of the analytical data is presented in Table 3. The Quality Assurance/Quality Control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the "Quality Assurance Project Plan (QAPP) for the Remedial Design Work Plan at the Gratwick-Riverside Park Site, North Tonawanda, New York, March 1996". Additional validation guidance was referenced from the following documents:

- i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" EPA 540/R-94/012, February 1994; and
- ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-5400/R-94-013, February 1994.

All raw data including calibration, spike, duplicate and blank results for TCLP analyses were assessed.

Due to the nature of the tests, a limited evaluation of the reactivity analyses was performed and no validation of the ignitability, corrosivity and paint filter liquid test was performed.

3.0 QA/QC REVIEW

3.1 HOLDING TIMES

Sample holding time data are presented in Table 4. Holding time criteria, as specified in the QAPP and the associated methods, were met for all sample preparation and analyses.

3.2 INSTRUMENT CALIBRATION

Gas Chromatograph/Mass Spectrometer (GC/MS) - Volatiles, Semi-Volatiles

The GC/MS instrumentation was properly tuned prior to sample analyses. Calibration data showed adequate instrument sensitivity, and calibration curves showed acceptable linearity.

Gas Chromatograph (GC) - Pesticides/Herbicides

Initial and continuing calibration data showed adequate instrument sensitivity and linearity.

Metals

Calibration curves and initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the proper frequency.

The calibration curves were acceptable and all ICV and CCV recoveries were within the required control limits.

Interference check standards were analyzed at the proper frequency; all recoveries were acceptable.

Contract Required Detection Limit (CRDL) standards were analyzed at the proper frequency. All recoveries were acceptable with the exception of a slightly high chromium recovery. All sample results for chromium were non-detect and would not have been affected by the potential high bias.

Wet Chemistry - Cyanide/Sulfide Reactivity

All calibrations were performed as required by the methods. Initial and continuing calibration verification standards were analyzed at the proper frequency and the results were acceptable.

3.3 INTERNAL STANDARD ANALYSES - GC/MS ANALYSES

The proper internal standard (IS) compounds were added to all samples, blanks, standards and spiked samples prior to volatile and semi-volatile analyses. All internal standard recoveries were acceptable.

3.4 SURROGATE COMPOUND ANALYSES - ORGANICS

Surrogates were added to all samples, blanks and QC samples prior to extraction and/or analysis.

A summary of surrogate recoveries is presented in Table 5. Surrogate recoveries met the acceptance criteria with the following exceptions:

- i) Semi-volatile analysis of samples BH1-BH5 and BH16-BH20 had one outlying acid/phenol surrogate recovery which is acceptable as specified in Method 8270.

- ii) Semi-volatile analysis of sample BH6-BH10 had two slightly high acid/phenol surrogate recoveries. All associated results were non-detect and the data were not qualified.

3.5 BLANK ANALYSES

Method blanks and leachate blanks were analyzed and/or extracted at the proper frequency for all parameters, and the results are summarized in Table 6. Generally, blank results were non-detect. The exceptions were low level metal and chloroform concentrations detected in some of the blanks. All associated positive sample results up to five times the concentrations detected in the blanks were qualified non-detect.

3.6 MATRIX SPIKE AND DUPLICATE ANALYSES

3.6.1 Volatiles

Matrix spike/matrix spike duplicates (MS/MSD) were analyzed with each batch of samples. A summary of the MS/MSD results is presented in Table 7. All recoveries were acceptable indicating good analytical accuracy and precision.

3.6.2 Semi-Volatiles/Pesticides/Herbicides

MS/MSD was performed on sample BH6-BH10 and an MS was performed on sample BH21-BH23. All MS/MSD recoveries showed acceptable precision. Spike recoveries showed acceptable accuracy except for a slightly high pentachlorophenol MS recovery reported for sample BH6-BH10. Associate sample results were non-detect and would not be impacted by the high bias (see Table 7).

3.6.3 Metals

Matrix spikes were prepared and/or analyzed with each batch of samples. Three of the four MS analyses had low recoveries for silver, barium and lead when spiked at TCLP regulatory levels. Based on acceptable laboratory control standard (LCS) results the low recoveries appeared to be a result of sample matrix interferences (probably sulfates). A second aliquot of sample BH16-BH20 was spiked at a lower level to minimize the formation of insoluble sulfate salts. The results of this MS were acceptable and overall analytical accuracy was judged to be acceptable on this basis (see Table 7).

3.7 DUPLICATE ANALYSES - CYANIDE/SULFIDE REACTIVITY AND CORROSIVITY

Duplicate samples were analyzed for cyanide/sulfide reactivity with each batch of samples, a duplicate analysis was also reported for corrosivity. A summary of duplicate results are provided in Table 8. These data showed acceptable analytical accuracy and precision.

3.8 BLANK SPIKE SAMPLE ANALYSES - ORGANICS

Blank spike (BS) samples were prepared and analyzed on a regular basis. The results are summarized in Table 9A. The BS contained all analytes of interest, and recoveries indicated acceptable overall analytical accuracy.

3.9 LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE (LCS/LCSD) - METALS AND CYANIDE/SULFIDE REACTIVITY

LCSs were prepared and analyzed for all metals of interest. The results are summarized in Table 9B. The recoveries indicated acceptable overall accuracy.

LCS/LCSD were prepared and analyzed for cyanide/sulfide reactivity (see Table 9B). The laboratory has not established control limits for the sulfide reactivity and uses 80 to 120 percent and a relative percent difference (RPD) of 20 percent as guidance. A LCS/LCSD was prepared and/or analyzed with each batch of samples for cyanide and sulfide reactivity. All recoveries were acceptable indicating good analytical accuracy and precision with the following exceptions:

- i) A high RPD resulted from the sulfide reactivity LCS/LCSD analyzed on July 15, 1996. All associated sample results were non-detect and would not have been affected by the variability of the analysis.
- ii) High LCS/LCSD recoveries were reported for the cyanide reactivity performed on July 12, 1996. The associated sample results were non-detect and would not have been impacted by the high bias.

3.10 ICP SERIAL DILUTION - METALS

A serial dilution was performed on one sample and the results showed acceptable correlation.

4.0 CONCLUSION

Based on this QA/QC review, these data are judged acceptable with the qualifications noted. All results were less than their associated EPA regulatory levels except for lead in sample BH21-BH23 (10 mg/L), which concentration is slightly above the EPA regulatory level (5 mg/L).

TABLE 1A

SAMPLE COLLECTION SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

<i>Sample ID</i>	<i>Sample Location</i>	<i>Interval Sampled (1)</i>	<i>Collection Date</i>	<i>Time</i>	<i>Collection Type</i>	<i>Analyses</i>
7987-008	BH1 - BH5	Fill Material	06/25/96	1300	Composite	TCLP and RCRA Characteristics
7987-013	BH6 - BH10	Fill Material	06/26/96	1400	Composite	TCLP and RCRA Characteristics
7987-021	BH11 - BH15	Fill Material	07/08/96	0900	Composite	TCLP and RCRA Characteristics
7987-030	BH16 - BH20	Fill Material	07/10/96	0900	Composite	TCLP and RCRA Characteristics
7987-033	BH21 - BH23	Fill Material	07/10/96	1600	Composite	TCLP and RCRA Characteristics

Notes:

- (1) See Table 1B for specific sample intervals.
RCRA Resource Conservation and Recovery Act.
TCLP Toxicity Characteristic Leaching Procedure.

TABLE 1B

LOCATION AND THICKNESS SUMMARY
 SHORELINE CHARACTERIZATION SAMPLES
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JUNE - JULY 1996

<i>Borehole Location</i>	<i>Fill Thickness (Ft.)</i>
BH1-96	0.0-11.8
BH2-96	0.0-13.5
BH3-96	0.0-14.0
BH4-96	0.0-14.3
BH5-96	0.0-14.2
BH6-96	0.0-16.1
BH7-96	0.0-17.0
BH8-96	0.0-20.2
BH9-96	0.0-20.1
BH10-96	0.0-19.5
BH11-96	0.0-12.0
PW-2	0.0-16.5
BH12-96	0.0-17.5
BH13-96	0.0-17.5
BH14-96	0.0-10.0
BH15-96	0.0-8.0
BH16-96	0.0-14.5
BH17-96	0.0-15.0
BH18-96	0.0-13.5
PW-1	0.0-13.0
BH19-96	0.0-13.5
BH20-96	0.0-12.5
BH21-96	0.0-12.0
BH22-96	0.0-12.5
BH23-96	0.0-9.0

TABLE 2

ANALYTICAL METHODS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE-JULY 1996

<i>Analytical Parameter</i>	<i>Method⁽¹⁾</i>
TCLP Volatiles	1311/8260
TCLP Semi-Volatiles	1311/8270
TCLP Pesticides	1311/8080
TCLP Herbicides	1311/8150
TCLP Metals	1311/6010/7000
Ignitability	1010
Corrosivity	1110
Sulfide Reactivity	7.3.4.2
Cyanide Reactivity	7.3.4.2
Paint Filter test	9095

Notes:

- (1) Methods referenced from "Test methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Third Edition, August 1993, USEPA Office of Solid Waste.
TCLP Toxicity Characteristic Leaching Procedure.

TABLE 3
ANALYTICAL RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Sample Location: Collection Date:	Regulatory Limits	Units	BH1 - BH5 06/25/96	BH6 - BH10 06/26/96	BH11 - BH15 07/08/96	BH16 - BH20 07/10/96	BH21 - BH23 07/10/96
TCLP Volatiles							
Vinyl chloride	0.2	mg/L	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
1,1-Dichloroethene	0.7	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Chloroform	6.0	mg/L	ND 0.005	ND 0.005	0.002j	0.002j	0.002j
1,2-Dichloroethane	0.5	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
2-Butanone	200	mg/L	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
Carbon Tetrachloride	0.5	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Trichloroethene	0.5	mg/L	ND 0.005	0.001j	ND 0.005	ND 0.005	ND 0.005
Benzene	0.5	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Tetrachloroethene	0.7	mg/L	0.002j	0.003j	ND 0.005	ND 0.005	0.004j
Chlorobenzene	100	mg/L	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
TCLP Semi-Volatiles							
Pyridine	5.0	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
1,4-Dichlorobenzene	7.5	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
2-Methylphenol	200	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
3- and/or 4-Methylphenol	200	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
Hexachloroethane	3.0	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
Nitrobenzene	2.0	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
Hexachlorobutadiene	0.5	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
2,4,6-Trichlorophenol	2.0	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
2,4,5-Trichlorophenol	400	mg/L	ND 0.12	ND 0.12	ND 0.20	ND 0.20	ND 0.20
2,4-Dinitrotoluene	0.13	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
Hexachlorobenzene	0.13	mg/L	ND 0.025	ND 0.025	ND 0.040	ND 0.040	ND 0.040
Pentachlorophenol	100	mg/L	ND 0.12	ND 0.12	ND 0.20	ND 0.20	ND 0.20

TABLE 3
ANALYTICAL RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Sample Location: Collection Date:	Regulatory Limits	Units	BH1 - BH5 06/25/96	BH6 - BH10 06/26/96	BH11 - BH15 07/08/96	BH16 - BH20 07/10/96	BH21 - BH23 07/10/96
TCLP Pesticides							
Heptachlor	0.008	mg/L	ND 0.00005	ND 0.0005	ND 0.00005	ND 0.00005	ND 0.00005
alpha-Chlordane	0.03	mg/L	ND 0.00005	ND 0.0005	ND 0.00005	ND 0.00005	ND 0.00005
gamma-Chlordane	0.03	mg/L	ND 0.00005	ND 0.0005	ND 0.00005	ND 0.00005	ND 0.00005
gamma-BHC (Lindane)	0.4	mg/L	ND 0.00005	ND 0.0005	ND 0.00005	ND 0.00005	ND 0.00005
Endrin	0.02	mg/L	ND 0.0001	ND 0.001	ND 0.0001	ND 0.0001	ND 0.0001
Methoxychlor	10	mg/L	ND 0.0005	ND 0.005	ND 0.0005	ND 0.0005	ND 0.0005
Toxophene	0.5	mg/L	ND 0.005	ND 0.05	ND 0.005	ND 0.005	ND 0.005
Heptachlor Epoxide	0.008	mg/L	ND 0.00005	ND 0.0005	ND 0.00005	ND 0.00005	ND 0.00005
TCLP Herbicides							
2,4-D	10	mg/L	ND 0.001	ND 0.001	ND 0.001	ND 0.001	ND 0.001
2,4,5-TP	1.0	mg/L	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005	ND 0.0005
TCLP Metals							
Silver	5.0	mg/L	ND 0.0068	ND 0.0068	ND 0.0068	ND 0.0068	ND 0.0068
Arsenic	5.0	mg/L	0.034	0.030	ND 0.052	ND 0.076	ND 0.071
Barium	100	mg/L	ND 0.38	0.50	ND 0.36	0.86	1.1
Cadmium	1.0	mg/L	ND 0.0033	ND 0.0033	ND 0.0033	ND 0.0035	0.053
Chromium	5.0	mg/L	ND 0.0052	ND 0.0052	ND 0.0052	ND 0.0052	ND 0.0052
Lead	5.0	mg/L	ND 0.026	ND 0.026	ND 0.026	ND 0.026	10
Mercury	0.2	mg/L	ND 0.0001	ND 0.0001	ND 0.0001	ND 0.0001	0.00059
Selenium	1.0	mg/L	ND 0.036	ND 0.036	ND 0.036	ND 0.036	ND 0.036

TABLE 3
ANALYTICAL RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Sample Location: Collection Date:		BH1 - BH5 06/25/96		BH6 - BH10 06/26/96		BH11 - BH15 07/08/96		BH16 - BH20 07/10/96		BH21 - BH23 07/10/96	
RCRA Characteristics	Units	Regulatory Limits									
Ignitability	°F	<140									
Cyanide, Reactive	mg/Kg	250		neg		neg		neg		neg	
Corrosivity by pH	s.u.	2.0-12.5		ND 0.25		ND 0.25		ND 0.50		ND 0.50	
Corrosivity by Coupon	mm/yr	<6.35		11		11		11		10	
Paint Filter Test	-	-		neg		neg		neg		neg	
Sulfide, Reactive	mg/Kg	500		neg		neg		neg		neg	
				ND 25		ND 25		ND 25		ND 25	

Notes:

- Not applicable.
- J Estimated.
- NDx Not detected at or above x.
- neg Negative.
- RCRA Resource Conservation and Recovery Act.
- RE Reanalysis.
- s.u. Standard Unit.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE 4

HOLDING TIME SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)		
					to TCLP Extraction	to Sample Extraction	to Sample Analysis
TCLP Volatiles							
BH1 - BH5	06/25/96	07/03/96	-	07/05/96	0	-	0
BH6 - BH10	06/26/96	07/03/96	-	07/08/96	0	-	0
BH11 - BH15	07/08/96	07/12/96	-	07/18/96	0	-	0
BH16 - BH20	07/10/96	07/12/96	-	07/18/96	0	-	0
BH21 - BH23	07/10/96	07/12/96	-	07/18/96	0	-	0
TCLP Semi-Volatiles							
BH1 - BH5	06/25/96	07/03/96	07/05/96	07/12/96	0	0	0
BH6 - BH10	06/26/96	07/03/96	07/05/96	07/17/96	0	0	0
BH11 - BH15	07/08/96	07/12/96	07/16/96	07/23/96	0	0	0
BH16 - BH20	07/10/96	07/12/96	07/16/96	07/23/96	0	0	0
BH21 - BH23	07/10/96	07/12/96	07/16/96	07/23/96	0	0	0
TCLP Pesticides							
BH1 - BH5	06/25/96	07/03/96	07/06/96	07/08/96	0	0	0
BH1 - BH5 RE	06/25/96	07/03/96	07/06/96	07/15/96	0	0	0
BH6 - BH10	06/26/96	07/03/96	07/06/96	07/08/96	0	0	0
BH6 - BH10 RE	06/26/96	07/03/96	07/06/96	07/15/96	0	0	0
BH11 - BH15	07/08/96	07/12/96	07/16/96	07/21/96	0	0	0
BH16 - BH20	07/10/96	07/12/96	07/16/96	07/21/96	0	0	0
BH21 - BH23	07/10/96	07/12/96	07/16/96	07/21/96	0	0	0

TABLE 4

**HOLDING TIME SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996**

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)		
					to TCLP Extraction	to Sample Extraction	to Sample Analysis
TCLP Herbicides							
BH1 - BH5	06/25/96	07/03/96	07/07/96	07/09/96	0	0	0
BH1 - BH5 RE	06/25/96	07/03/96	07/07/96	07/18/96	0	0	0
BH6 - BH10	06/26/96	07/03/96	07/07/96	07/09/96	0	0	0
BH6 - BH10 RE	06/26/96	07/03/96	07/07/96	07/18/96			
BH11 - BH15	07/08/96	07/12/96	07/16/96	07/18/96	0	0	0
BH16 - BH20	07/10/96	07/12/96	07/16/96	07/18/96	0	0	0
BH21 - BH23	07/10/96	07/12/96	07/16/96	07/18/96	0	0	0
TCLP Metals (except mercury)							
BH1 - BH5	06/25/96	07/96	-	07/96	0	-	0
BH6 - BH10	06/26/96	07/96	-	07/96	0	-	0
BH11 - BH15	07/08/96	07/96	-	07/96	0	-	0
BH16 - BH20	07/10/96	07/96	-	07/96	0	-	0
BH21 - BH23	07/10/96	07/96	-	07/96	0	-	0
TCLP Mercury							
BH1 - BH5	06/25/96	07/03/96	07/05/96	07/07/96	0	-	0
BH6 - BH10	06/26/96	07/03/96	07/05/96	07/07/96	0	-	0
BH11 - BH15	07/08/96	07/12/96	07/25/96	07/26/96	0	-	0
BH16 - BH20	07/10/96	07/12/96	07/25/96	07/26/96	0	-	0
BH21 - BH23	07/10/96	07/12/96	07/25/96	07/26/96	0	-	0

TABLE 4
HOLDING TIME SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Location ID	Collection Date	TCLP Extraction Date	Sample Extraction Date	Sample Analysis Date	Holding Time Exceedance (days)		
					to TCLP Extraction	to Sample Extraction	to Sample Analysis
RCRA Characteristics							
Cyanide, Reactive							
BH1 - BH5	06/25/96	-	-	07/11/96	-	-	0
BH6 - BH10	06/26/96	-	-	07/18/96	-	-	0
BH11 - BH15	07/08/96	-	-	07/12/96	-	-	0
BH16 - BH20	07/10/96	-	-	07/15/96	-	-	0
BH21 - BH23	07/10/96	-	-	07/15/96	-	-	0
Sulfide, Reactive							
BH1 - BH5	06/25/96	-	-	07/12/96	-	-	0
BH6 - BH10	06/26/96	-	-	07/12/96	-	-	0
BH11 - BH15	07/08/96	-	-	07/12/96	-	-	0
BH16 - BH20	07/10/96	-	-	07/15/96	-	-	0
BH21 - BH23	07/10/96	-	-	07/15/96	-	-	0

Notes:

- Not applicable.
- RCRA Resource Conservation and Recovery Act.
- RE Reanalysis.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE 5

SURROGATE SPIKE RECOVERIES (PERCENT)
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

	<i>Surrogate:</i> <i>Recovery Limits:</i>	<i>DCE</i> <i>(76-114)</i>	<i>TOL</i> <i>(88-110)</i>	<i>BFB</i> <i>(86-115)</i>			
<i>TCLP Volatiles</i>							
BH1-BH5		103	102	96			
BH6-BH10		103	103	99			
BH11-BH15		84	92	89			
BH16-BH20		97	104	99			
BH21-BH23		95	94	93			
	<i>Surrogate:</i> <i>Recovery Limits:</i>	<i>NBZ</i> <i>(35-114)</i>	<i>FBP</i> <i>(43-116)</i>	<i>TPH</i> <i>(33-141)</i>	<i>PHL</i> <i>(10-94)</i>	<i>2FP</i> <i>(21-100)</i>	<i>TBP</i> <i>(10-123)</i>
<i>TCLP Semi-Volatiles</i>							
BH1-BH5		100	79	84	98*	91	81
BH6-BH10		81	70	71	126*	108*	116
BH11-BH15		58	49	66	66	70	70
BH16-BH20		71	41*	104	85	89	91
BH21-BH23		74	54	90	82	85	84
	<i>Surrogate:</i> <i>Recovery Limits:</i>	<i>DCB</i> <i>(22-126)</i>	<i>TCX</i> <i>(27-129)</i>				
<i>TCLP Pesticides</i>							
BH1-BH5		87	55				
BH6-BH10		87	48				
BH11-BH15		83	50				
BH16-BH20		76	62				
BH21-BH23		78	30				
	<i>Surrogate:</i> <i>Recovery Limits:</i>	<i>DCAA</i> <i>(40-150)</i>					
<i>TCLP Herbicides</i>							
BH1-BH5		81					
BH6-BH10		98					
BH11-BH15		44					
BH16-BH20		48					
BH21-BH23		48					

Notes:

* Value outside the Control Limits.

TCLP Toxicity Characteristic Leaching Procedure.

Surrogates:

2FP	2-Fluorophenol	NBZ	Nitrobenzene-d5
BFB	Bromofluorobenzene	PHL	Phenol-d5
DCAA	2,4-Dichlorophenylacetic acid	TBP	2,4,6-Tribromophenol
DCB	Decachlorobiphenyl	TCX	Tetrachloro-m-xylene
DCE	1,2-Dichloroethane-d4	TOL	Toluene-d8
FBP	2-Fluorobiphenyl	TPH	p-Terphenyl-d14

BLANK RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Analysis Date: Units:		Method Blank 07/05/96 (mg/L)	TCLP Blank 07/05/96 (mg/L)	Method Blank 07/08/96 (mg/L)	TCLP Blank 07/08/96 (mg/L)	Method Blank 07/18/96 (mg/L)	Method Blank 07/23/96 (mg/L)
TCLP Volatiles							
	Vinyl Chloride	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
	1,1-Dichloroethene	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	Chloroform	ND 0.005	ND 0.005	ND 0.005	0.002]	ND 0.005	ND 0.005
	1,2-Dichloroethane	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	2-Butanone	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
	Carbon Tetrachloride	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	Trichloroethene	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	Benzene	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	Tetrachloroethene	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
	Chlorobenzene	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Sample Extraction Date: Units:							
	TCLP Semi-Volatiles	Method Blank 07/05/96 (mg/L)	TCLP Blank 07/05/96 (mg/L)	Method Blank 07/16/96 (mg/L)	TCLP Blank 07/16/96 (mg/L)		
	Pyridine	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	1,4-Dichlorobenzene	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	2-Methylphenol	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	3- and / or 4-Methylphenol	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	Hexachloroethane	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	Nitrobenzene	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	Hexachlorobutadiene	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	2,4,6-Trichlorophenol	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	2,4,5-Trichlorophenol	ND 0.12	ND 0.12	ND 0.20	ND 0.10		
	2,4-Dinitrotoluene	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	Hexachlorobenzene	ND 0.025	ND 0.025	ND 0.040	ND 0.020		
	Pentachlorophenol	ND 0.12	ND 0.12	ND 0.20	ND 0.10		

TABLE 6

BLANK RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

<i>Sample Extraction Date:</i>	<i>TCLP Blank</i>	<i>Method Blank</i>	<i>TCLP Blank</i>	<i>Method Blank</i>
<i>Units:</i>	<i>07/06/96</i>	<i>07/06/96</i>	<i>07/16/96</i>	<i>07/16/96</i>
	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
<i>TCLP Pesticides</i>				
Heptachlor	ND 0.000050	ND 0.00050	ND 0.000050	ND 0.000050
alpha-Chlordane	ND 0.000050	ND 0.00050	ND 0.000050	ND 0.000050
gamma-Chlordane	ND 0.000050	ND 0.00050	ND 0.000050	ND 0.000050
gamma-BHC (Lindane)	ND 0.000050	ND 0.00050	ND 0.000050	ND 0.000050
Endrin	ND 0.00010	ND 0.0010	ND 0.00010	ND 0.00010
Methoxychlor	ND 0.00050	ND 0.0050	ND 0.00050	ND 0.00050
Toxaphene	ND 0.00050	ND 0.050	ND 0.00050	ND 0.00050
Heptachlor epoxide	ND 0.000050	ND 0.00050	ND 0.000050	ND 0.000050
<i>Sample Extraction Date:</i>	<i>TCLP Blank</i>	<i>Method Blank</i>	<i>TCLP Blank</i>	<i>Method Blank</i>
<i>Units:</i>	<i>07/07/96</i>	<i>07/07/96</i>	<i>07/16/96</i>	<i>07/16/96</i>
	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
<i>TCLP Herbicides</i>				
2,4-D	ND 0.0010	ND 0.0010	ND 0.0010	ND 0.0010
2,4,5-TP (Silvex)	ND 0.00050	ND 0.00050	ND 0.00050	ND 0.00050
<i>Analysis Date:</i>	<i>TCLP Blank</i>	<i>Method Blank</i>	<i>TCLP Blank</i>	<i>Method Blank</i>
<i>Units:</i>	<i>07/08/96</i>	<i>07/08/96</i>	<i>07/19/96</i>	<i>07/19/96</i>
	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
<i>TCLP Metals</i>				
Silver	ND 0.0068	ND 0.0068	ND 0.0068	ND 0.0068
Arsenic	ND 0.027	ND 0.027	0.049	ND 0.027
Barium	0.094	ND 0.0015	0.082	ND 0.0015
Cadmium	ND 0.0033	ND 0.0033	ND 0.0033	ND 0.0033
Chromium	ND 0.0052	ND 0.0052	0.0082	ND 0.0052
Lead	0.038	ND 0.026	ND 0.026	ND 0.026
Selenium	ND 0.036	ND 0.036	ND 0.036	ND 0.036

TABLE 6

BLANK RESULTS SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

Mercury	Analysis Date:	TCLP Blank	Method Blank	Method Blank
	Units:	7/7/96	7/7/96	07/26/96
		(mg/L) ND 0.00010	(mg/L) ND 0.00010	(mg/L) ND 0.00010
RCRA Characteristics Cyanide Reactive Sulfide, Reactive	Analysis Date:	Method Blank	Method Blank	Method Blank
	Units:	07/11/96	07/15/96	07/18/96
		(mg/Kg) ND 0.25	(mg/Kg) ND 0.50	(mg/Kg) ND 0.50
			ND 25	ND 31

Notes:

- Not applicable.
- J Estimated.
- NDx Not detected at or above x.
- RCRA Resource Conservation and Recovery Act.
- TCLP Toxicity Characteristic Leaching Procedure.

TABLE 7

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY (PERCENT)
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

MS/MSD Control Limits	RPD Control Limits	BH1-BH5			BH6-BH10			BH11-BH15			BH16-BH20			BH21-BH23			
		MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	
TCLP Volatiles																	
Vinyl chloride	50-150	20	129	116	11	-	-	-	-	-	-	83	87	5	-	-	-
1,1-Dichloroethene	61-145	14	114	106	7	-	-	-	-	-	-	104	106	2	-	-	-
Chloroform	50-150	20	112	105	6	-	-	-	-	-	-	104	105	1	-	-	-
1,2-Dichloroethane	50-150	20	110	106	4	-	-	-	-	-	-	97	102	5	-	-	-
2-Butanone	50-150	20	114	112	2	-	-	-	-	-	-	89	104	16	-	-	-
Carbon tetrachloride	50-150	20	115	107	7	-	-	-	-	-	-	79	86	8	-	-	-
Trichloroethene	71-120	14	112	105	6	-	-	-	-	-	-	101	103	2	-	-	-
Benzene	76-127	11	110	104	6	-	-	-	-	-	-	104	106	2	-	-	-
Tetrachloroethene	50-150	20	113	107	5	-	-	-	-	-	-	100	100	0	-	-	-
Chlorobenzene	75-130	13	109	105	4	-	-	-	-	-	-	103	106	3	-	-	-
TCLP Semi-Volatiles																	
Pyridine	6-94	50	-	-	-	46	42	9	-	-	-	-	-	-	70	-	-
1,4-Dichlorobenzene	19-103	28	-	-	-	55	47	16	-	-	-	-	-	-	28	-	-
2-Methylphenol	28-111	50	-	-	-	82	73	12	-	-	-	-	-	-	70	-	-
3- and /or 4-Methylphenol	18-117	50	-	-	-	97	79	20	-	-	-	-	-	-	79	-	-
Hexachloroethane	15-100	50	-	-	-	49	42	15	-	-	-	-	-	-	34	-	-
Nitrobenzene	41-120	50	-	-	-	89	75	17	-	-	-	-	-	-	83	-	-
Hexachlorobutadiene	7-117	50	-	-	-	52	43	19	-	-	-	-	-	-	31	-	-
2,4,6-Trichlorophenol	41-125	50	-	-	-	106	92	14	-	-	-	-	-	-	55	-	-
2,4,5-Trichlorophenol	42-122	50	-	-	-	98	82	18	-	-	-	-	-	-	44	-	-
2,4-Dinitrotoluene	32-113	38	-	-	-	105	92	13	-	-	-	-	-	-	64	-	-
Hexachlorobenzene	47-127	50	-	-	-	83	82	1	-	-	-	-	-	-	92	-	-
Pentachlorophenol	41-147	50	-	-	-	155*	146	6	-	-	-	-	-	-	67	-	-
TCLP Pesticides																	
Heptachlor	34-111	NA	-	-	-	80	75	6	-	-	-	-	-	-	80	-	-
alpha-Chlordane	45-119	NA	-	-	-	90	90	0	-	-	-	-	-	-	75	-	-
gamma-Chlordane	45-119	NA	-	-	-	90	90	0	-	-	-	-	-	-	90	-	-
gamma-BHC (Lindane)	19-140	NA	-	-	-	80	80	0	-	-	-	-	-	-	80	-	-
Endrin	30-147	NA	-	-	-	95	95	0	-	-	-	-	-	-	90	-	-
Methoxychlor	30-147	NA	-	-	-	103	102	1	-	-	-	-	-	-	104	-	-
Heptachlor Epoxide	37-142	NA	-	-	-	90	90	0	-	-	-	-	-	-	85	-	-

TABLE 7

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY (PERCENT)
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

MS/MSD Control Limits	RPD Control Limits	BH1-BH5			BH6-BH10			BH11-BH15			BH16-BH20			BH16-BH20 RE			BH21-BH23			
		MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	MS	MSD	RPD	
		TCLP Herbicides																		
2,4-D	28-154	NA	-	-	-	115	108	6	-	-	-	-	-	-	-	-	-	49	-	-
	30-150	NA	-	-	-	98	94	4	-	-	-	-	-	-	-	-	-	48	-	-
TCLP Metals																				
Silver	80-120	-	39*	-	-	43*	-	-	23*	-	-	15*	-	-	109	-	-	-	-	-
Arsenic	80-120	-	94	-	-	91	-	-	98	-	-	95	-	-	-	-	-	-	-	-
Barium	80-120	-	9*	-	-	104	-	-	2*	-	-	5*	-	-	97	-	-	-	-	-
Cadmium	80-120	-	91	-	-	89	-	-	94	-	-	92	-	-	-	-	-	-	-	-
Chromium	80-120	-	87	-	-	85	-	-	91	-	-	89	-	-	-	-	-	-	-	-
Lead	80-120	-	7*	-	-	87	-	-	7*	-	-	8*	-	-	100	-	-	-	-	-
Mercury	80-120	-	108	-	-	106	-	-	92	-	-	110	-	-	-	-	-	-	-	-
Selenium	80-120	-	97	-	-	90	-	-	93	-	-	90	-	-	-	-	-	-	-	-

Notes:

- Not applicable.
- * Value outside Control Limits.
- MS Matrix Spike.
- MSD Matrix Spike Duplicate.
- RE Reanalyzed.
- RPD Relative Percent Difference.

TABLE 8

LABORATORY DUPLICATE SUMMARY
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

RCRA Characteristics	BH1 - BH5 (mg/Kg)			BH6 - BH10 (mg/Kg)			BH16 - BH20 (mg/Kg)		
	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD
Cyanide, Reactive	ND 0.25	ND 0.25	*	ND 0.50	ND 0.50	*	ND 0.50	ND 0.50	*
Corrosivity by pH	-	-	-	11	11	*	-	-	-
Sulfide, Reactive	ND 25	ND 25	*	-	-	-	ND 25	ND 25	*

Notes:

- * Value could not be calculated due to one or more non-detect results.
- NDx Not detected at or above x.
- RCRA Resource Conservation and Recovery Act.
- RPD Relative Percent Difference.

TABLE 9A

BLANK SPIKE RESULTS SUMMARY (PERCENT)
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

<i>Sample Analysis Date:</i>		<u>07/05/96</u>	<u>07/08/96</u>	<u>07/18/96</u>	<u>07/23/96</u>
<i>BS/BSD</i>		<i>BS</i>	<i>BS</i>	<i>BS</i>	<i>BS</i>
<i>Control</i>					
<i>Limits</i>					
<i>TCLP Volatiles</i>					
Vinyl chloride	50-150	123	103	119	76
1,1-Dichloroethene	61-145	105	113	109	91
Chloroform	50-150	100	113	108	89
1,2-Dichloroethane	50-150	98	115	105	95
2-Butanone	50-150	95	104	84	94
Carbon tetrachloride	50-150	104	115	87	91
Trichloroethene	71-120	102	116	102	92
Benzene	76-127	101	115	105	93
Tetrachloroethene	50-150	104	115	100	92
Chlorobenzene	75-130	101	116	104	93

<i>Sample Analysis Date:</i>		<u>07/05/96</u>	<u>07/16/96</u>
<i>BS/BSD</i>		<i>BS</i>	<i>BS</i>
<i>Control</i>			
<i>Limits</i>			
<i>TCLP Semi-Volatiles</i>			
Pyridine	6-94	47	52
1,4-Dichlorobenzene	19-103	46	22
2-Methylphenol	28-111	91	65
3- and /or 4-Methylphenol	18-117	93	67
Hexachloroethane	15-100	41	27
Nitrobenzene	41-120	79	84
Hexachlorobutadiene	7-117	49	27
2,4,6-Trichlorophenol	41-125	90	64
2,4,5-Trichlorophenol	42-122	61	87
2,4-Dinitrotoluene	32-113	92	71
Hexachlorobenzene	47-127	68	104
Pentachlorophenol	41-147	76	75

<i>Sample Analysis Date:</i>		<u>07/06/96</u>	<u>07/16/96</u>
<i>BS/BSD</i>		<i>BS</i>	<i>BS</i>
<i>Control</i>			
<i>Limits</i>			
<i>TCLP Pesticides</i>			
Heptachlor	34-111	70	70
alpha-Chlordane	45-119	80	75
gamma-Chlordane	45-119	85	85
gamma-BHC (Lindane)	19-140	80	90
Endrin	30-147	85	90
Methoxychlor	30-147	96	96
Heptachlor epoxide	37-142	85	85

TABLE 9A

BLANK SPIKE RESULTS SUMMARY (PERCENT)
 SHORELINE CHARACTERIZATION SAMPLES
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JUNE - JULY 1996

	<i>Sample Analysis Date:</i>	
	<u>07/07/96</u>	<u>07/16/96</u>
	<i>BS/BSD</i>	<i>BS</i>
	<i>Control</i>	<i>BS</i>
	<i>Limits</i>	
<i>TCLP Herbicides</i>		
2,4-D	28-154	102
2,4,5-TP (Silvex)	30-150	90
		100
		79

Notes:

BS Blank Spike.

BSD Blank Spike Duplicate.

TABLE 9B

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS (PERCENT)
 SHORELINE CHARACTERIZATION SAMPLES
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 JUNE - JULY 1996

		Sample Analysis Date:			07/08/96			07/19/96			
		BS/BSD	RPD		LCS	LCSD	RPD	LCS	LCSD	RPD	
Control		Control									
Limits		Limits									
TCLP Metals (except mercury)											
Silver	80-120	-			101	-	-	98	-	-	
Arsenic	80-120	-			102	-	-	98	-	-	
Barium	80-120	-			103	-	-	98	-	-	
Cadmium	80-120	-			102	-	-	93	-	-	
Chromium	80-120	-			101	-	-	98	-	-	
Lead	80-120	-			101	-	-	98	-	-	
Selenium	80-120	-			101	-	-	98	-	-	
		Sample Analysis Date:			07/07/96			07/26/96			
		BS/BSD	RPD		LCS	LCSD	RPD	LCS	LCSD	RPD	
Control		Control									
Limits		Limits									
Mercury	80-120	-			104	-	-	110	-	-	

TABLE 9B

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS (PERCENT)
SHORELINE CHARACTERIZATION SAMPLES
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
JUNE - JULY 1996

	<i>Sample Analysis Date:</i>	07/12/96			07/15/96			07/15/96		
		BS/BSD	RPD	Control Limits	LCS	LCSD	RPD	LCS	LCSD	RPD
<i>RCRA Characteristics</i>										
Cyanide, Reactive		0-22.1	35		23*	31*	30	7.7	6.2	22
Sulfide, Reactive		80-120	20		105	94	11	119	83	36*
								13	15	14
								-	-	-

Notes:

- Not applicable.
- * Value outside Control Limits.
- BS Blank Spike.
- BSD Blank Spike Duplicate.
- RPD Relative Percent Difference.

ATTACHMENT A

CHAIN OF CUSTODY FORMS

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request



Page _____ of _____

Client Conestoga Power & Assoc. (C&A)
Est. Final Proj. Sampling Date _____
Work Order # _____
Project Contact/Phone # _____
AD Project Manager _____
QC _____ Del _____ TAT _____
Date Rec'd _____ Date Due _____
Account # _____

Matrix Code	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions: TCLP Denise Tubarak
Analyses is content

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<u>John Doe</u>		<u>6/25/16</u>	<u>1600</u>				

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

WESTON Analytics Use Only

Samples were: _____ or _____
1) Shipping Hand Delivered _____
2) Ambient or Collected _____
3) Received In Good Condition _____
4) Labels Indicate Properly Preserved _____
5) Received Within Holding Times _____

COC Tape was:
1) Present on Outer Package _____
2) Unbroken on Outer Package _____
3) Present on Sample _____
4) Unbroken on Sample _____
COC Record Present Upon Sample Rec't _____

Treatek - CRATM COMPANY

2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-2160

SAMPLER'S SIGNATURE: [Signature] PRINTED NAME: _____

PRINTED NAME: Grey G:11

SEQ. No.	DATE	TIME	SAMPLE No.

SAMPLE No.

7-10	0900	7987 - 030
7-10	1600	7987 - 033

7-10	0900	7987 - 030
7-10	1600	7987 - 033

REMARKS

PARAMETERS

No. OF	CONTAINERS
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	1
20	1
21	1
22	1
23	1
24	1
25	1
26	1
27	1
28	1
29	1
30	1

**SAMPLE
TYPE**

ms

REFERENCE NUMBER:

✓36✓#

Graceland Park

TOTAL NUMBER OF CONTAINERS

HEALTH/CHEMICAL HAZARDS unknown

[Signature]

DATE: 7-10-96 RECEIVED BY:
TIME: 17300 ②

QID B1:

DATE:		RECEIVED BY:
TIME:		

DD BY:

TIME:	RECEIVED BY:
DATE:	
TIME:	

WAY BILL No.

METHOD OF SHIPMENT:

White	-Fully Executed Copy
Yellow	-Receiving Laboratory Copy
Pink	-Shipper Copy
Goldenrod	-Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

Nº NF- 1030

DATE: _____ TIME: _____

1001 (D) OCT 31/94(NF) REV.0 (F-13)



APPENDIX I

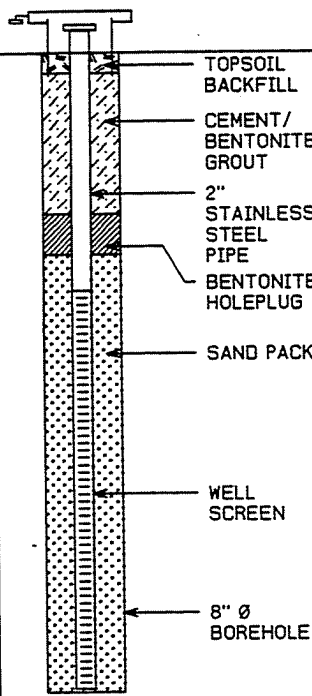
MONITORING WELL STRATIGRAPHIC
AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-24)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1113533.60
EAST: 1063134.73

HOLE DESIGNATION: CRA-MW-1
DATE COMPLETED: JULY 2, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	572.87 570.6	 TOPSOIL BACKFILL CEMENT/BENTONITE GROUT 2" STAINLESS STEEL PIPE BENTONITE HOLEPLUG SAND PACK WELL SCREEN 8" Ø BOREHOLE SCREEN DETAILS Screened Interval: 5.9 to 15.9ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 5.0 to 16.0ft BGS Material: #4 Quartzite Sand				
	ML-SILT (TOPSOIL), little fine sand, dark brown, moist	570.0		1SS	X	5	0
-2.5	SP-SAND (FILL), glass, slag, wood fragments, loose, fine to medium grained, brown, moist			2SS	X	2	0
-5.0	- wet			3SS	X	2	0
-7.5				4SS	X	3	0
	- black stained, slight sheen on water			5SS	X	17	0
-10.0	SLAG, granular, hard, stained black, moderate chemical odor	560.6		6SS	X	53	0
-12.5				7SS	X	13	0
-15.0	ML-SILT (NATIVE), trace to little clay, red brown, wet	556.4 555.5		8SS	X	40	0
	ML-SILT (TILL), little to some gravel, little fine sand, red brown, moist	554.6					
-17.5	END OF HOLE @ 16.0ft BGS						
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

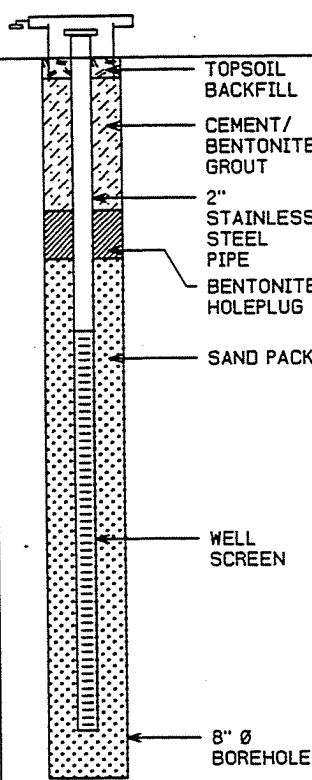
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-25)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1112226.47
EAST: 1064245.18

HOLE DESIGNATION: CRA-MW-2
DATE COMPLETED: JULY 2, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	570.17 568.2	 TOPSOIL BACKFILL CEMENT/BENTONITE GROUT 2" STAINLESS STEEL PIPE BENTONITE HOLEPLUG SAND PACK WELL SCREEN 8" Ø BOREHOLE				
	ML-SILT (TOPSOIL), little clay, red brown, moist	567.2		1SS	X	17	0
-2.5	SP-SAND (FILL), some gravel, some slag, fine to medium grained, moist - wet			2SS	X	56	0
-5.0	SLAG, granular and vesicular, hard, gray	563.2		3SS	X	30	0
-7.5				4SS	X	39	0
-10.0				5SS	X	>50	0
-12.5	- green			6SS	X	>82	0
-15.0				7SS	X	44	0
-17.5	ML-SILT (NATIVE), some fine sand, little to some gravel, soft, gray brown, wet	552.7		8SS	X	>50	0
	END OF HOLE @ 18.0ft BGS	550.2		9SS	X	13	0
-20.0			SCREEN DETAILS Screened interval: 6.8 to 16.8ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 5.0 to 18.0ft BGS Material: #4 Quartzite Sand				
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

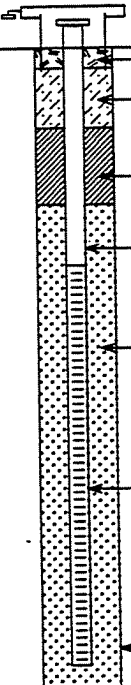
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-26)
Page 1 of 1

PROJECT NAME: GRATWICK-RIVERSIDE PARK SITE
PROJECT NUMBER: 7987
CLIENT: GRATWICK-RIVERSIDE PARK
NORTH: 1111659.93
EAST: 1065156.70

HOLE DESIGNATION: CRA-MW-3
DATE COMPLETED: JULY 1, 1996
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	574.06 571.6	 TOPSOIL BACKFILL CEMENT/BENTONITE GROUT BENTONITE HOLEPLUG 2" STAINLESS STEEL PIPE SAND PACK WELL SCREEN 8" Ø BOREHOLE				
-2.5	SM-SAND (TOPSOIL), little to some silt, dark brown, moist SP-SAND (FILL), brown slag fragments, glass, wood and sheet metal, fine to medium	571.2		1SS		12	0
-5.0				2SS		13	0
-7.5	SLAG, gray and dark green - wet	565.6		3SS		30	0
-10.0				4SS		9	0
-12.5				5SS		11	0
-15.0	ML-SILT (NATIVE), little clay, little fine sand, little gravel, black, wet	556.8 555.8 555.6		6SS		39	0
-17.5	SP-SAND, some gravel, medium grained, black, wet END OF HOLE @ 16.0ft BGS			7SS		46	0
-20.0				8SS		16	0
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

SCREEN DETAILS
Screened interval:
5.4 to 15.4ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
3.9 to 16.0ft BGS
Material: #4 Quartzite Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

(WL-37)
Page 1 of 1

HOLE DESIGNATION: MW-5SR
DATE COMPLETED: JULY 10, 1996
DRILLING METHOD: 4 1/2" ID HSA
CRA SUPERVISOR: G. GILL

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL $\blacktriangledown$

APPENDIX J

PUMPING TEST WATER LEVELS AND HYDROGRAPHS

TABLE J.1

PW-1 STEP TEST WATER LEVELS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Static Water Level (ft btoc)</i>	<i>Pump Rate (gpm)</i>	<i>Drawdown (feet)</i>
8.66	0	0
9.14	5	0.48
9.86	10	1.2
11.76	16.5	3.1
16.00	18	6.22

Note: Transducer not installed for test.

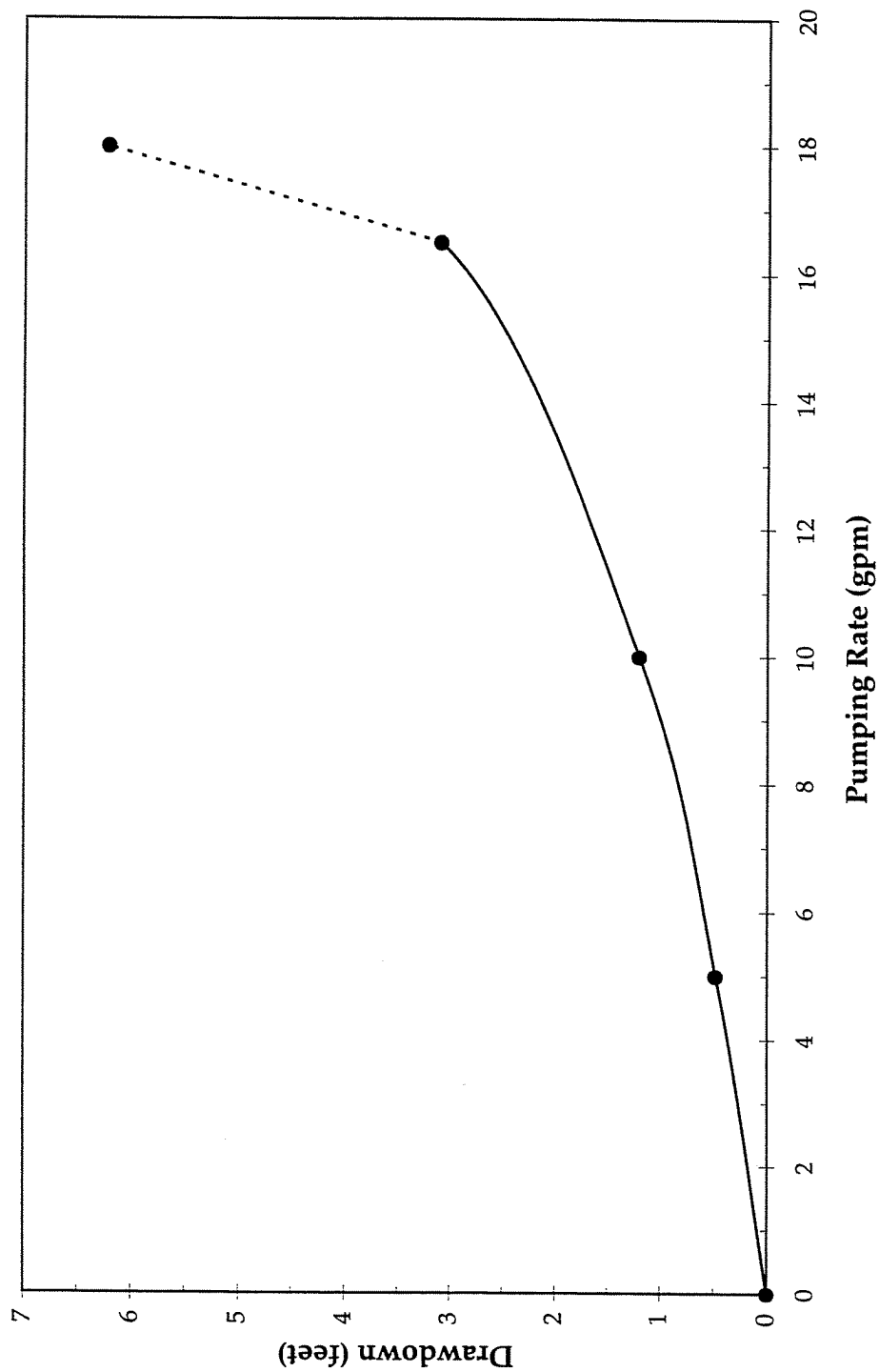


figure J.1
STEP-TEST DRAWDOWN
WITHDRAWAL WELL PW-1
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)								
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River	
Reference Elevation (ft amsl)												
8/26/96	17:58:00	-1000	0.0	573.67	573.30	573.20	576.58	572.87	575.01	574.93	575.57	566.60
8/26/96	18:08:00	-990	0.0	564.94	564.30	564.74	567.80	564.56	565.57	565.64	565.90 (563.98)	
8/26/96	18:08:00	-990	0.0	564.94	564.29	564.73	567.79	564.56	565.60	565.64	565.90	
8/26/96	18:18:00	-980	0.0	564.95	564.30	564.74	567.79	564.56	565.64	565.64	565.90	
8/26/96	18:28:00	-970	0.0	564.94	564.30	564.74	567.79	564.56	565.64	565.64	565.90	
8/26/96	18:38:00	-960	0.0	564.94	564.29	564.74	567.79	564.56	565.64	565.64	565.90	
8/26/96	18:48:00	-950	0.0	564.92	564.28	564.73	567.79	564.56	565.67	565.62	565.64	
8/26/96	18:58:00	-940	0.0	564.90	564.25	564.73	567.77	564.56	565.62	565.62	565.90	
8/26/96	19:08:00	-930	0.0	564.88	564.25	564.72	567.77	564.56	565.64	565.62	563.80	
8/26/96	19:18:00	-920	0.0	564.90	564.23	564.72	567.76	564.56	565.67	565.62	563.80	
8/26/96	19:28:00	-910	0.0	564.87	564.22	564.72	567.76	564.56	565.67	565.62	563.80	
8/26/96	19:38:00	-900	0.0	564.87	564.21	564.71	567.74	564.56	565.67	565.62	563.80	
8/26/96	19:48:00	-890	0.0	564.85	564.19	564.71	567.72	564.56	565.67	565.62	563.80	
8/26/96	19:58:00	-880	0.0	564.83	564.18	564.71	567.72	564.52	565.67	565.62	563.70	
8/26/96	20:08:00	-870	0.0	564.81	564.17	564.71	567.71	564.52	565.64	565.62	563.70	
8/26/96	20:18:00	-860	0.0	564.81	564.16	564.71	567.69	564.52	565.64	565.62	563.70	
8/26/96	20:28:00	-850	0.0	564.80	564.15	564.71	567.69	564.52	565.62	565.61	563.60	
8/26/96	20:38:00	-840	0.0	564.78	564.14	564.70	567.69	564.52	565.62	565.61	563.60	
8/26/96	20:48:00	-830	0.0	564.78	564.12	564.70	567.66	564.47	565.62	565.61	563.60	
8/26/96	20:58:00	-820	0.0	564.76	564.11	564.71	567.63	564.47	565.62	565.61	563.50	
8/26/96	21:08:00	-810	0.0	564.76	564.09	564.71	567.62	564.47	565.62	565.62	563.50	
8/26/96	21:18:00	-800	0.0	564.73	564.09	564.71	567.62	564.47	565.62	565.62	563.40	
8/26/96	21:28:00	-790	0.0	564.73	564.07	564.70	567.58	564.47	565.62	565.62	563.40	
8/26/96	21:38:00	-780	0.0	564.71	564.07	564.71	567.60	564.42	565.64	565.62	563.30	
8/26/96	21:48:00	-770	0.0	564.69	564.04	564.71	567.55	564.38	565.64	565.62	563.30	
8/26/96	21:58:00	-760	0.0	564.68	564.02	564.71	567.55	564.38	565.64	565.62	563.20	
8/26/96	22:08:00	-750	0.0	564.68	564.01	564.70	567.52	564.38	565.64	565.62	563.20	
8/26/96	22:18:00	-740	0.0	564.66	564.00	564.70	567.51	564.38	565.62	565.62	563.20	
8/26/96	22:28:00	-730	0.0	564.64	563.97	564.70	567.51	564.33	565.62	565.62	563.10	
8/26/96	22:38:00	-720	0.0	564.62	563.96	564.70	567.49	564.33	565.62	565.62	563.10	
8/26/96	22:48:00	-710	0.0	564.61	563.95	564.70	567.51	564.28	565.62	565.62	563.10	
8/26/96	22:58:00	-700	0.0	564.61	563.93	564.70	567.49	564.28	565.62	565.62	563.10	
8/26/96	23:08:00	-690	0.0	564.59	563.92	564.70	567.49	564.28	565.62	565.62	563.10	
8/26/96	23:18:00	-680	0.0	564.57	563.91	564.70	567.51	564.24	565.64	565.64	563.10	
8/26/96	23:28:00	-670	0.0	564.57	563.89	564.71	567.49	564.24	565.64	565.62	563.10	
8/26/96	23:38:00	-660	0.0	564.55	563.88	564.70	567.49	564.24	565.62	565.65	563.20	

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)							
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River
Reference Elevation (ft amsl)											
8/26/96	23:48:00	-650	0.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/26/96	23:48:00	-650	0.0	564.55	563.87	564.71	567.54	564.24	565.64	565.62	563.20
8/26/96	23:58:00	-640	0.0	564.54	563.87	564.70	567.51	564.24	565.62	565.64	563.20
8/26/96	0:08:00	-630	0.0	564.52	563.86	564.70	567.51	564.24	565.62	565.64	563.20
8/26/96	0:18:00	-620	0.0	564.52	563.86	564.70	567.52	564.19	565.61	565.64	563.20
8/26/96	0:28:00	-610	0.0	564.52	563.85	564.70	567.52	564.19	565.61	565.64	563.20
8/26/96	0:38:00	-600	0.0	564.50	563.84	564.70	567.52	564.19	565.63	565.64	563.30
8/26/96	0:48:00	-590	0.0	564.50	563.84	564.70	567.52	564.19	565.61	565.64	563.30
8/26/96	0:58:00	-580	0.0	564.50	563.84	564.70	567.52	564.19	565.63	565.64	563.30
8/26/96	1:08:00	-570	0.0	564.50	563.84	564.70	567.55	564.19	565.63	565.64	563.30
8/26/96	1:18:00	-560	0.0	564.48	563.82	564.70	567.55	564.19	565.63	565.64	563.40
8/26/96	1:28:00	-550	0.0	564.50	563.82	564.70	567.55	564.19	565.63	565.67	563.40
8/26/96	1:38:00	-540	0.0	564.48	563.84	564.70	567.55	564.19	565.63	565.67	563.40
8/27/96	1:48:00	-530	0.0	564.48	563.82	564.70	567.57	564.19	565.63	565.67	563.40
8/27/96	1:58:00	-520	0.0	564.48	563.82	564.69	567.57	564.19	565.63	565.69	563.40
8/27/96	2:08:00	-510	0.0	564.48	563.82	564.70	567.57	564.19	565.63	565.69	563.50
8/27/96	2:18:00	-500	0.0	564.48	563.82	564.70	567.57	564.19	565.63	565.69	563.50
8/27/96	2:28:00	-490	0.0	564.50	563.82	564.70	567.57	564.19	565.63	565.69	563.50
8/27/96	2:38:00	-480	0.0	564.50	563.84	564.70	567.58	564.24	565.63	565.67	563.50
8/27/96	2:48:00	-470	0.0	564.50	563.84	564.70	567.58	564.24	565.63	565.67	563.50
8/27/96	2:58:00	-460	0.0	564.50	563.84	564.70	567.58	564.24	565.63	565.67	563.50
8/27/96	3:08:00	-450	0.0	564.50	563.82	564.69	567.58	564.24	565.63	565.67	563.50
8/27/96	3:18:00	-440	0.0	564.50	563.84	564.70	567.58	564.24	565.63	565.67	563.50
8/27/96	3:28:00	-430	0.0	564.52	563.84	564.69	567.60	564.24	565.63	565.64	563.50
8/27/96	3:38:00	-420	0.0	564.50	563.84	564.70	567.60	564.24	565.66	565.69	563.50
8/27/96	3:48:00	-410	0.0	564.50	563.84	564.69	567.60	564.24	565.63	565.67	563.50
8/27/96	3:58:00	-400	0.0	564.52	563.85	564.70	567.60	564.28	565.66	565.67	563.50
8/27/96	4:08:00	-390	0.0	564.52	563.85	564.70	567.60	564.28	565.66	565.67	563.50
8/27/96	4:18:00	-380	0.0	564.52	563.85	564.69	567.60	564.28	565.63	565.67	563.50
8/27/96	4:28:00	-370	0.0	564.52	563.85	564.70	567.60	564.28	565.63	565.62	563.50
8/27/96	4:38:00	-360	0.0	564.52	563.85	564.70	567.60	564.28	565.63	565.60	563.50
8/27/96	4:48:00	-350	0.0	564.52	563.86	564.69	567.60	564.24	565.63	565.60	563.50
8/27/96	4:58:00	-340	0.0	564.54	563.86	564.69	567.62	564.24	565.63	565.60	563.60
8/27/96	5:08:00	-330	0.0	564.54	563.86	564.69	567.60	564.24	565.63	565.60	563.50
8/27/96	5:18:00	-320	0.0	564.54	563.86	564.70	567.60	564.24	565.63	565.62	563.60
8/27/96	5:28:00	-310	0.0	564.54	563.86	564.69	567.62	564.28	565.63	565.64	563.60

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-1	GW-6S	GW-6I	GW-6D	MW-1		
Reference Elevation (ft amsl)										
8/27/96	5:38:00	-300	0.0	573.67	573.30	573.20	576.58	572.87	575.01	566.60
8/27/96	5:48:00	-290	0.0	564.54	563.87	564.69	567.60	564.28	565.63	563.60
8/27/96	5:48:00	-290	0.0	564.54	563.86	564.70	567.60	564.28	565.63	563.60
8/27/96	5:58:00	-280	0.0	564.55	563.87	564.69	567.62	564.28	565.63	563.60
8/27/96	6:08:00	-270	0.0	564.55	563.87	564.70	567.62	564.28	565.63	563.60
8/27/96	6:18:00	-260	0.0	564.55	563.88	564.69	567.62	564.28	565.63	563.60
8/27/96	6:28:00	-250	0.0	564.55	563.87	564.70	567.62	564.28	565.63	563.70
8/27/96	6:38:00	-240	0.0	564.55	563.87	564.70	567.62	564.33	565.67	563.70
8/27/96	6:48:00	-230	0.0	564.55	563.89	564.69	567.62	564.28	565.63	563.70
8/27/96	6:58:00	-220	0.0	564.57	563.88	564.70	567.62	564.28	565.64	563.70
8/27/96	7:08:00	-210	0.0	564.55	563.88	564.69	567.62	564.33	565.66	563.70
8/27/96	7:18:00	-200	0.0	564.57	563.88	564.69	567.63	564.33	565.66	563.80
8/27/96	7:28:00	-190	0.0	564.57	563.89	564.70	567.65	564.33	565.63	563.80
8/27/96	7:38:00	-180	0.0	564.57	563.89	564.69	567.65	564.33	565.66	563.80
8/27/96	7:48:00	-170	0.0	564.59	563.89	564.69	567.66	564.33	565.63	563.80
8/27/96	7:58:00	-160	0.0	564.59	563.92	564.69	567.68	564.33	565.63	563.90
8/27/96	8:08:00	-150	0.0	564.61	563.93	564.69	567.71	564.38	565.63	563.90
8/27/96	8:18:00	-140	0.0	564.61	563.93	564.70	567.72	564.38	565.63	564.00
8/27/96	8:28:00	-130	0.0	564.62	563.95	564.69	567.76	564.38	565.63	564.10
8/27/96	8:38:00	-120	0.0	564.66	563.96	564.69	567.76	564.38	565.67	564.10
8/27/96	8:48:00	-110	0.0	564.66	563.97	564.69	567.76	564.42	565.67	564.10
8/27/96	8:58:00	-100	0.0	564.68	564.00	564.70	567.77	564.42	565.69	564.20
8/27/96	9:08:00	-90	0.0	564.69	564.01	564.69	567.77	564.42	565.69	564.10
8/27/96	9:18:00	-80	0.0	564.71	564.02	564.69	567.76	564.47	565.67	564.20
8/27/96	9:28:00	-70	0.0	564.74	564.03	564.69	567.77	564.47	565.69	564.20
8/27/96	9:38:00	-60	0.0	564.76	564.04	564.69	567.77	564.47	565.71	564.20
8/27/96	9:48:00	-50	0.0	564.76	564.06	564.69	567.77	564.52	565.74	564.20
8/27/96	9:58:00	-40	0.0	564.80	564.07	564.69 (564.66)	567.79 (567.39)	564.52	565.78	564.20
8/27/96	10:00:00	-38	0.0	564.80 (564.71)	564.07 (564.02)	564.70	567.79	564.52 (564.44)	565.78 (565.63)	564.20
8/27/96	10:08:00	-30	0.0	564.83	564.07	564.70	567.79	564.47	565.76	564.20
8/27/96	10:18:00	-20	0.0	564.83	564.08	564.69	567.79	564.42	565.71	564.20
8/27/96	10:28:00	-10	0.0	564.85	564.09	564.70	567.82	564.42	565.63	564.30
8/27/96	10:38:00	0	16.5	559.58 (564.71)	564.09	564.69	567.82	564.28	565.63	564.30
8/27/96	10:48:00	10	16.5	560.88	564.10	564.69	567.83	564.19	565.63	564.30
8/27/96	10:58:00	20	16.5	561.30	564.07	564.67	567.82	563.82	565.63	564.20
8/27/96	11:02:00	24	16.5	561.35 (561.21)	564.08 (564.08)	564.69 (564.66)	567.82 (567.46)	563.59 (564.33)	565.63 (565.59)	564.30

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					River
					PW-1	GW-6S	GW-6I	GW-6D	MW-1	
					573.67	573.30	573.20	576.58	572.87	575.01
8/27/96	11:08:00	30	16.5		561.25	564.11	564.70	567.83	563.68	565.11 (565.63)
8/27/96	11:18:00	40	16.5		560.90	564.14	564.70	567.82	564.33	565.60
8/27/96	11:28:00	50	16.5		560.48	564.15	564.70	567.82	564.38	565.64
8/27/96	11:38:00	60	16.5		560.81 (560.66)	564.14 (564.10)	564.69 (564.65)	567.82	564.38 (564.33)	565.64
8/27/96	11:48:00	70	16.5		560.41	564.15	564.70	567.82 (567.46)	564.38	565.62 (565.62)
8/27/96	11:58:00	80	16.5		560.08	564.14	564.69	567.80	564.33	565.60
8/27/96	12:05:00	87	13.0		559.93	564.10	564.70	567.79	564.28	565.53
8/27/96	12:08:00	90	13.0		559.27 (559.71)	564.11	564.70	567.79	564.33 (564.31)	565.57
8/27/96	12:18:00	100	13.0		559.11	564.10 (564.10)	564.69 (564.65)	567.76 (567.42)	564.28	565.57
8/27/96	12:28:00	110	13.0		558.06	564.11	564.70	567.77	564.28	565.57
8/27/96	12:38:00	120	13.0		558.73 (557.04)	564.08 (564.08)	564.70 (564.65)	567.74 (567.40)	564.28 (564.29)	565.62
8/27/96	12:48:00	130	13.0		562.20	564.11	564.71	567.76	564.33	565.55
8/27/96	12:58:00	140	13.0		561.82	564.09	564.71	567.74	564.28	565.67
8/27/96	13:08:00	150	13.0		562.13	564.07	564.70	567.72	564.24	565.55
8/27/96	13:18:00	160	13.0		561.94	564.07	564.70	567.71	564.28	565.55
8/27/96	13:28:00	170	13.0		562.01	564.08	564.70	567.72	564.28	565.55
8/27/96	13:38:00	180	13.0		561.38	564.07	564.70	567.71	564.24	565.57
8/27/96	13:40:00	182	11.5		560.90 (561.30)	564.06	564.70	567.71	564.28	565.55
8/27/96	13:41:00	183	12.0		560.64	564.08	564.71	567.72	564.24	565.57
8/27/96	13:58:00	200	12.0		557.76	564.06	564.70	567.69	564.24	565.57
8/27/96	14:04:00	206	12.0		557.88 (557.13)	564.03	564.70	567.69	564.24	565.57
8/27/96	14:05:00	207	11.0		558.35	564.04	564.70	567.69	564.24	565.55
8/27/96	14:08:00	210	11.0		559.29	564.02	564.70	567.68	564.24	565.55
8/27/96	14:18:00	220	11.0		559.51	564.09	564.73	567.71	564.28	565.53
8/27/96	14:28:00	230	11.0		559.41 (559.59)	564.02 (563.99)	564.70 (564.67)	567.69 (567.32)	564.19 (564.22)	565.67
8/27/96	14:38:00	240	11.0		558.91	564.04	564.73	567.68	564.19	565.61
8/27/96	14:48:00	250	11.0		558.06	564.04	564.73	567.68	564.24	565.62
8/27/96	14:58:00	260	11.0		557.26	564.01	564.70	567.66	564.19	565.60
8/27/96	15:08:00	270	11.0		560.34	564.01	564.70	567.65	564.19	565.57
8/27/96	15:18:00	280	11.0		562.63	564.02	564.72	567.65	564.24	565.67
8/27/96	15:28:00	290	12.0		562.99 (562.71)	563.97	564.70	567.63	564.19	565.59
8/27/96	15:31:00	293	13.0		562.65	563.99	564.71	567.63	564.19	565.60
8/27/96	15:38:00	300	13.0		562.65	563.97	564.71	567.63	564.19	565.60
8/27/96	15:48:00	310	13.0		562.44	563.99	564.72	567.62	564.24	565.64

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)						River
					PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	
8/27/96	15:58:00	320	13.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/27/96	16:08:00	330	13.0	562.58	563.95	564.70	567.60	564.19	565.63	565.62	563.70
8/27/96	16:08:00	330	13.0	562.49	563.96	564.72	567.60	564.19	565.63	565.62	563.60
8/27/96	16:18:00	340	13.0	562.42	563.96	564.71	567.60	564.19	565.63	565.71	563.50
8/27/96	16:28:00	350	13.0	562.20	563.93	564.71	567.58	564.15	565.63	565.62	563.50
8/27/96	16:38:00	360	13.0	562.37	563.94	564.72	567.58	564.15	565.63	565.67	563.40
8/27/96	16:45:00	367	13.0	562.02 (562.11)	563.92 (563.85)	564.71 (564.63)	567.57 (567.19)	564.10 (564.22)	565.63	565.64	563.40
8/27/96	16:48:00	370	13.0	562.25	563.92	564.70	567.58	564.10	565.63 (565.58)	565.64 (565.62)	563.40
8/27/96	16:50:00	372	14.0	560.83	563.91	564.71	567.58	564.10	565.63	565.67	563.40
8/27/96	16:54:00	376	14.0	559.84	563.92	564.71	567.58	564.10	565.63	565.67	563.40
8/27/96	16:55:00	377	14.0	559.39	563.91	564.71	567.57	564.10	565.63	565.67	563.50
8/27/96	16:56:00	378	14.0	559.41	563.91	564.70	567.57	564.10	565.63	565.67	563.40
8/27/96	16:57:00	379	14.0	558.96	563.91	564.71	567.57	564.10	565.63	565.67	563.50
8/27/96	16:58:00	380	14.0	558.89	563.92	564.72	567.58	564.10	565.63	565.67	563.40
8/27/96	17:05:00	387	13.5	558.46 (558.46)	563.91	564.72	567.58	564.10	565.63	565.69	563.40
8/27/96	17:08:00	390	13.5	558.94	563.91	564.71	567.57	564.10	565.63	565.69	563.40
8/27/96	17:18:00	400	13.5	558.91 (558.61)	563.89	564.71	567.58	564.10	565.63	565.71	563.40
8/27/96	17:28:00	410	13.5	558.09	563.89	564.71	567.58	564.10	565.63	565.69	563.50
8/27/96	17:38:00	420	13.5	557.05	563.86	564.71	567.57	564.10	565.63	565.69	563.30
8/27/96	17:48:00	430	12.0	559.69 (559.84)	563.85	564.71	567.57	564.05	565.63	565.64	563.30
8/27/96	17:58:00	440	12.0	561.90	563.85	564.70	567.58	564.10	565.63	565.67	563.30
8/27/96	18:08:00	450	12.0	562.08	563.85	564.70	567.57	564.10	565.63	565.67	563.40
8/27/96	18:18:00	460	12.0	561.76	563.84	564.70	567.57	564.10	565.63	565.69	563.40
8/27/96	18:28:00	470	12.0	562.04	563.84	564.70	567.57	564.10	565.63	565.67	563.40
8/27/96	18:38:00	480	12.0	561.96	563.84	564.71	567.57	564.10	565.63	565.69	563.40
8/27/96	18:40:00	482	12.0	561.71 (561.67)	563.82 (563.78)	564.7 (564.63)	567.55 (567.19)	564.10 (564.04)	565.63	565.69	563.40
8/27/96	18:48:00	490	12.0	561.61	563.82	564.70	567.57	564.10	565.63 (565.59)	565.69 (565.62)	563.40 (563.52)
8/27/96	18:58:00	500	12.0	561.45	563.82	564.71	567.55	564.05	565.63	565.71	563.40
8/27/96	19:02:00	504	12.0	561.25 (561.10)	563.82	564.70	567.57	564.05	565.63	565.71	563.40
8/27/96	19:08:00	510	12.0	561.37	563.82	564.70	567.57	564.05	565.63	565.71	563.40
8/27/96	19:18:00	520	12.0	560.86	563.81	564.70	567.57	564.05	565.63	565.71	563.40
8/27/96	19:28:00	530	12.0	560.15	563.80	564.70	567.57	564.05	565.63	565.71	563.40
8/27/96	19:38:00	540	12.0	559.95	563.81	564.70	567.55	564.05	565.63	565.71	563.50
8/27/96	19:48:00	550	12.0	559.29	563.80	564.70	567.55	564.10	565.63	565.71	563.50
8/27/96	19:58:00	560	12.0	558.92 (559.03)	563.80	564.70	567.57	564.10	565.63	565.71	563.50
8/27/96	20:08:00	570	12.0	558.13	563.79	564.70	567.58	564.10	565.63	565.69	563.50

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)						River	
					PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S		GW-3I
Reference Elevation (ft amsl)												
					573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/27/96	20:18:00	580	12.0		557.31	563.79	564.70	567.58	564.10	565.63	565.69	563.50
8/27/96	20:28:00	590	12.0		557.21	563.79	564.70	567.57	564.05	565.66	565.69	563.50
8/27/96	20:38:00	600	12.0		562.28	563.79	564.70	567.55	564.10	565.66	565.69	563.40
8/27/96	20:48:00	610	12.0		562.06	563.78	564.69	567.52	564.10	565.63	565.71	563.40
8/27/96	20:58:00	620	12.0		561.50 (561.39)	563.78	564.69	567.52	564.05	565.66	565.71	563.40
8/27/96	21:08:00	630	12.0		561.19	563.78	564.69	567.51	564.05	565.66	565.69	563.40
8/27/96	21:18:00	640	12.0		560.69	563.75	564.70	567.49	564.05	565.63	565.71	563.30
8/27/96	21:28:00	650	12.0		560.45	563.75	564.70	567.48	564.05	565.63	565.69	563.30
8/27/96	21:38:00	660	12.0		559.77	563.74	564.69	567.46	564.05	565.63	565.69	563.10
8/27/96	21:48:00	670	12.0		559.51	563.73	564.69	567.44	564.01	565.63	565.71	563.20
8/27/96	21:58:00	680	12.0		557.97 (558.09)	563.73	564.69	567.43	564.01	565.63	565.71	563.20
8/27/96	22:08:00	690	12.0		557.10	563.72	564.69	567.43	564.01	565.63	565.69	563.00
8/27/96	22:18:00	700	12.0		557.23	563.71	564.69	567.41	564.01	565.63	565.71	563.10
8/27/96	22:28:00	710	12.0		557.07	563.71	564.69	567.40	564.01	565.61	565.71	563.00
8/27/96	22:38:00	720	12.0		556.91	563.70	564.70	567.40	563.96	565.63	565.71	563.00
8/27/96	22:48:00	730	12.0		557.10	563.69	564.69	567.41	563.96	565.63	565.71	563.00
8/27/96	22:58:00	740	12.0		557.30	563.67	564.69	567.41	563.96	565.63	565.69	563.10
8/27/96	23:06:00	748	12.0		557.21 (557.01)	563.67	564.69	567.41	563.96	565.61	565.71	563.20
8/27/96	23:08:00	750	12.0		557.97	563.67	564.69	567.43	563.96	565.59	565.71	563.10
8/27/96	23:18:00	760	12.0		557.42	563.66	564.69	567.43	563.96	565.59	565.71	563.20
8/27/96	23:28:00	770	12.0		557.24	563.66	564.69	567.43	563.96	565.59	565.71	563.20
8/27/96	23:38:00	780	12.0		557.17	563.66	564.69	567.44	563.96	565.59	565.71	563.20
8/27/96	23:48:00	790	12.0		557.24	563.65	564.69	567.46	563.96	565.59	565.71	563.30
8/27/96	23:58:00	800	12.0		557.21	563.65	564.69	567.46	563.96	565.56	565.71	563.20
8/27/96	0:08:00	810	12.0		557.30	563.65	564.67	567.46	563.96	565.56	565.71	563.30
8/27/96	0:18:00	820	12.0		557.43	563.65	564.69	567.48	563.91	565.54	565.71	563.20
8/27/96	0:28:00	830	12.0		557.30 (557.01)	563.65	564.67	567.49	563.91	565.63	565.71	563.20
8/27/96	0:38:00	840	12.0		557.00	563.65	564.70	567.49	563.91	565.63	565.71	563.40
8/27/96	0:48:00	850	12.0		557.14	563.65	564.69	567.48	563.91	565.61	565.71	563.30
8/27/96	0:58:00	860	12.0		557.21	563.65	564.67	567.49	563.91	565.54	565.71	563.40
8/27/96	1:08:00	870	12.0		556.83	563.65	564.69	567.49	563.96	565.54	565.71	563.30
8/27/96	1:18:00	880	12.0		557.04	563.65	564.69	567.49	563.96	565.49	565.71	563.40
8/27/96	1:28:00	890	12.0		556.88	563.65	564.69	567.49	563.96	565.49	565.71	563.30
8/27/96	1:38:00	900	12.0		557.24	563.65	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	1:48:00	910	12.0		557.10	563.66	564.67	567.51	563.91	565.59	565.71	563.30

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)						River	
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S		GW-3I
Reference Elevation (ft amsl)											
8/28/96	1:58:00	920	12.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/28/96	2:00:00	920	11.0	556.91	563.66	564.69	567.51	563.91	565.56	565.71	563.40
8/28/96	2:00:00	922	11.0	557.36 (557.01)	563.66	564.67	567.51	563.91	565.59	565.71	563.30
8/28/96	2:08:00	930	11.0	557.26	563.66	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	2:18:00	940	11.0	557.07	563.66	564.67	567.51	563.96	565.52	565.74	563.40
8/28/96	2:28:00	950	11.0	557.23	563.66	564.67	567.51	563.96	565.47	565.71	563.40
8/28/96	2:38:00	960	11.0	556.84	563.67 (563.62)	564.69 (564.62)	567.52 (567.08)	563.96 (563.89)	565.49 (565.57)	565.71 (565.62)	563.40
8/28/96	2:48:00	970	11.0	557.28	563.69	564.69	567.51	563.96	565.56	565.74	563.40
8/28/96	2:58:00	980	11.0	557.35	563.67	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	3:03:00	985	10.0	557.17 (556.99)	563.67	564.67	567.51	563.96	565.47	565.71	563.40
8/28/96	3:08:00	990	10.0	559.34	563.67	564.67	567.52	563.96	565.49	565.71	563.40
8/28/96	3:18:00	1000	10.0	558.30	563.69	564.67	567.52	563.96	565.49	565.71	563.40
8/28/96	3:28:00	1010	10.0	557.36	563.67	564.67	567.52	563.96	565.52	565.69	563.40
8/28/96	3:38:00	1020	10.0	557.23	563.67	564.69	567.51	563.96	565.54	565.71	563.30
8/28/96	3:48:00	1030	10.0	557.36	563.69	564.67	567.51	563.96	565.54	565.71	563.30
8/28/96	3:58:00	1040	10.0	557.42	563.69	564.67	567.51	563.96	565.52	565.71	563.40
8/28/96	4:03:00	1045	10.0	557.76 (557.01)	563.69	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	4:08:00	1050	10.0	558.66	563.69	564.69	567.51	563.96	565.52	565.71	563.40
8/28/96	4:18:00	1060	10.0	559.60	563.69	564.67	567.51	563.96	565.49	565.71	563.30
8/28/96	4:28:00	1070	10.0	560.22	563.69	564.67	567.51	563.96	565.54	565.71	563.40
8/28/96	4:38:00	1080	10.0	560.33	563.69	564.67	567.51	563.96	565.52	565.71	563.30
8/28/96	4:48:00	1090	10.0	560.43	563.69	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	4:58:00	1100	10.0	560.03	563.69	564.67	567.52	563.96	565.52	565.71	563.30
8/28/96	5:01:00	1103	10.0	559.55 (559.95)	563.69	564.67	567.51	563.96	565.49	565.71	563.40
8/28/96	5:08:00	1110	10.0	557.57	563.69	564.67	567.51	563.96	565.52	565.71	563.30
8/28/96	5:18:00	1120	10.0	557.45	563.69	564.67	567.51	563.96	565.52	565.71	563.40
8/28/96	5:28:00	1130	10.0	557.28	563.69	564.69	567.51	563.96	565.47	565.71	563.30
8/28/96	5:38:00	1140	10.0	561.61	563.69	564.66	567.51	563.96	565.49	565.71	563.40
8/28/96	5:48:00	1150	10.0	562.22	563.69	564.67	567.51	564.01	565.49	565.71	563.30
8/28/96	5:58:00	1160	10.0	562.48	563.69	564.67	567.51	564.01	565.49	565.71	563.40
8/28/96	6:08:00	1170	10.0	562.22	563.69	564.67	567.52	564.01	565.52	565.74	563.40
8/28/96	6:18:00	1180	10.0	562.35	563.67	564.67	567.52	564.01	565.49	565.74	563.40
8/28/96	6:28:00	1190	10.0	562.32	563.70	564.67	567.54	564.01	565.52	565.71	563.40
8/28/96	6:38:00	1200	10.0	562.35	563.69	564.67	567.55	564.01	565.52	565.71	563.40
8/28/96	6:48:00	1210	10.0	562.42	563.69	564.66	567.55	564.01	565.52	565.71	563.40
8/28/96	6:58:00	1220	10.0	561.94	563.69	564.66	567.57	564.01	565.54	565.71	563.50

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)							
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River
Reference Elevation (ft amsl)											
8/28/96	7:08:00	1230	10.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/28/96	7:10:00	1232	10.0	562.37	563.69	564.66	567.57	564.01	565.54	565.69	563.60
8/28/96	7:18:00	1240	10.0	562.04 (562.17)	563.69	564.66	567.58	564.01	565.54	565.69	563.60
8/28/96	7:28:00	1250	10.0	562.49	563.70	564.66	567.58	563.96	565.56	565.71	563.60
8/28/96	7:38:00	1260	10.0	561.59	563.71	564.67	567.60	563.96	565.54	565.71	563.70
8/28/96	7:48:00	1270	10.0	561.82	563.72	564.67	567.63	563.96	565.54	565.71	563.70
8/28/96	7:58:00	1280	10.0	562.13	563.72	564.66	567.66	563.96	565.56	565.69	563.80
8/28/96	8:08:00	1290	10.0	562.02	563.72	564.67	567.69	563.96	565.54	565.67	563.90
8/28/96	8:18:00	1300	10.0	562.23 (562.03)	563.77	564.67	567.71	564.01	565.54	565.67	564.00
8/28/96	8:28:00	1310	10.0	562.20	563.78	564.67	567.72	564.05	565.52	565.67	564.10
8/28/96	8:38:00	1320	10.0	562.51	563.80	564.66	567.77	564.10	565.52	565.67	564.30
8/28/96	8:48:00	1330	10.0	562.42	563.82	564.67	567.74	564.10	565.52	565.64	564.20
8/28/96	8:48:00	1330	10.0	560.90	563.82	564.67	567.74	564.10	565.52	565.67	564.30
8/28/96	8:58:00	1340	10.0	558.61	563.84	564.66	567.76	564.15	565.52	565.60	564.30
8/28/96	9:08:00	1350	10.0	559.30	563.89	564.67	567.76	564.19	565.54	565.74	564.40
8/28/96	9:18:00	1360	10.0	557.83	563.92	564.67	567.77	564.24	565.54	565.71	564.20
8/28/96	9:28:00	1370	10.0	558.49	563.94	564.67	567.77	564.24	565.56	565.69	564.30
8/28/96	9:38:00	1380	10.0	558.80	563.92	564.66	567.76	564.24	565.56	565.64	564.40
8/28/96	9:48:00	1390	10.0	557.23	563.96	564.67	567.79	564.24	565.56	565.60	564.40
8/28/96	9:58:00	1400	10.0	557.43	563.96	564.67	567.76	564.24	565.56	565.57	564.40
8/28/96	10:08:00	1410	10.0	557.73	563.99	564.66	567.77	564.28	565.56	565.60	564.40
8/28/96	10:15:00	1417	9.5	557.94 (558.23)	563.99 (563.96)	564.67 (564.62)	567.77	564.28 (564.23)	565.56	565.55	564.40
8/28/96	10:18:00	1420	9.5	558.61	564.00	564.67	567.77 (567.40)	564.28	565.56 (565.58)	565.57 (565.61)	564.40
8/28/96	10:28:00	1430	9.5	559.30	564.02	564.67	567.77	564.33	565.56	565.67	564.50
8/28/96	10:38:00	1440	9.5	559.93	564.01	564.66	567.79	564.28	565.59	565.62	564.60
8/28/96	10:48:00	1450	9.5	560.45	564.04	564.66	567.79	564.28	565.61	565.60	564.60
8/28/96	10:58:00	1460	9.5	561.73	564.08	564.70	567.82	564.33	565.61	565.57	564.70
8/28/96	11:08:00	1470	9.5	561.82	564.07	564.67	567.80	564.38	565.61	565.57	564.70
8/28/96	11:18:00	1480	9.5	561.68	564.08	564.67	567.80	564.33	565.59	565.57	564.80
8/28/96	11:28:00	1490	9.5	562.02	564.15	564.70	567.83	564.38	565.61	565.62	564.80
8/28/96	11:38:00	1500	9.5	562.25	564.12	564.67	567.82	564.38	565.61	565.57	564.80
8/28/96	11:48:00	1510	9.5	562.35	564.16	564.69	567.82	564.38	565.61	565.57	564.80
8/28/96	11:58:00	1520	9.5	562.49	564.15	564.69	567.83	564.38	565.63	565.57	564.90
8/28/96	12:05:00	1527	11.0	560.19	564.16	564.69	567.82	564.38	565.63	565.60	565.00
8/28/96	12:08:00	1530	11.0	559.18	564.17	564.69	567.83	564.42	565.63	565.60	564.90
8/28/96	12:18:00	1540	11.0	557.02	564.19	564.70	567.83	564.42	565.63	565.60	564.90

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSUDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)							
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River
Reference Elevation (ft amsl)											
8/28/96	12:28:00	1550	11.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/28/96	12:38:00	1560	11.0	557.07	564.19	564.67	567.82	564.42	565.63	565.60	565.00
8/28/96	12:48:00	1570	11.0	557.33	564.21	564.69	567.80	564.42	565.63	565.60	565.00
8/28/96	12:58:00	1580	11.0	557.43	564.22	564.70	567.82	564.42	565.63	565.57	565.00
8/28/96	13:08:00	1590	11.0	557.33 (557.35)	564.22	564.70	567.82	564.42	565.63	565.57	565.00
8/28/96	13:10:00	1592	10.5	557.42	564.24	564.70	567.82	564.42	565.63	565.57	565.00
8/28/96	13:18:00	1600	10.5	557.33	564.22	564.70	567.82	564.42	565.63	565.57	565.00
8/28/96	13:28:00	1610	10.5	557.47	564.22	564.67	567.80	564.42	565.63	565.57	565.10
8/28/96	13:38:00	1620	10.5	557.21	564.23	564.69	567.80	564.47	565.63	565.60	565.00
8/28/96	13:48:00	1630	10.5	557.55	564.24	564.69	567.82	564.42	565.63	565.60	565.10
8/28/96	13:58:00	1640	10.5	557.49	564.22	564.67	567.80	564.42	565.63	565.57	565.10
8/28/96	14:08:00	1650	10.5	557.26	564.21	564.66	567.80	564.42	565.63	565.57	565.10
8/28/96	14:13:00	1655	10.5	557.87 (557.37)	564.23	564.70	567.80	564.42	565.63	565.57	565.10
8/28/96	14:18:00	1660	10.5	557.54	564.25	564.70	567.80	564.42	565.63	565.57	565.10
8/28/96	14:28:00	1670	10.5	557.28	564.22	564.69	567.80	564.42	565.63	565.57	565.00
8/28/96	14:38:00	1680	10.5	557.85	564.24	564.71	567.80	564.42	565.63	565.62	564.90
8/28/96	14:48:00	1690	10.5	557.36	564.23	564.69	567.79	564.42	565.63	565.60	564.80
8/28/96	14:58:00	1700	10.5	557.47	564.23	564.69	567.77	564.42	565.63	565.57	564.60
8/28/96	15:06:00	1708	10.0	557.26 (557.03)	564.21	564.69	567.79	564.42	565.63	565.60	564.60
8/28/96	15:08:00	1710	10.0	557.49	564.22	564.69	567.79	564.42	565.63	565.60	564.40
8/28/96	15:18:00	1720	10.0	557.28	564.22	564.70	567.79	564.42	565.63	565.62	564.30
8/28/96	15:28:00	1730	10.0	557.47	564.22	564.69	567.79	564.42	565.63	565.62	564.20
8/28/96	15:38:00	1740	10.0	557.24	564.21	564.69	567.77	564.42	565.63	565.62	564.00
8/28/96	15:48:00	1750	10.0	557.50	564.22	564.70	567.76	564.42	565.63	565.62	564.00
8/28/96	15:58:00	1760	10.0	557.47	564.19	564.69	567.76	564.42	565.63	565.64	564.00
8/28/96	16:08:00	1770	10.0	557.26 (557.02)	564.17	564.69	567.76	564.42	565.63	565.62	563.90
8/28/96	16:18:00	1780	10.0	557.36	564.16	564.67	567.76	564.38	565.63	565.62	563.80
8/28/96	16:28:00	1790	10.0	557.45	564.18	564.70	567.74	564.42	565.63	565.64	563.80
8/28/96	16:38:00	1800	10.0	557.38	564.16	564.69	567.72	564.38	565.66	565.62	563.80
8/28/96	16:48:00	1810	10.0	557.31	564.17	564.69	567.72	564.38	565.63	565.62	563.80
8/28/96	16:58:00	1820	10.0	557.30 (557.01)	564.17	564.70	567.74	564.38	565.66	565.62	563.80
8/28/96	17:08:00	1830	10.0	557.26	564.15	564.69	567.72	564.38	565.66	565.60	563.80
8/28/96	17:18:00	1840	10.0	557.04	564.14	564.69	567.72	564.38	565.63	565.60	563.70
8/28/96	17:28:00	1850	10.0	557.17	564.14	564.70	567.71	564.38	565.63	565.60	563.70
8/28/96	17:38:00	1860	10.0	557.05	564.14	564.70	567.72	564.38	565.66	565.60	563.80

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)							
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River
Reference Elevation (ft amsl)											
8/28/96	17:48:00	1870	10.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/28/96	17:58:00	1880	10.0	557.30	564.12	564.70	567.71	564.33	565.66	565.62	563.80
8/28/96	18:02:00	1884	10.0	557.24	564.10	564.70	567.69	564.33	565.63	565.62	563.70
8/28/96	18:08:00	1890	10.0	557.16 (557.01)	564.11	564.70	567.71	564.33	565.63	565.62	563.70
8/28/96	18:18:00	1900	10.0	557.42	564.10	564.70 (564.62)	567.71 (567.33)	564.38 (564.36)	565.63	565.64	563.70
8/28/96	18:28:00	1910	10.0	557.28	564.10	564.70	567.69	564.38	565.63 (565.58)	565.64 (565.62)	563.70 (563.72)
8/28/96	18:38:00	1920	10.0	557.14	564.08	564.70	567.69	564.33	565.63	565.64	563.70
8/28/96	18:48:00	1930	10.0	557.28	564.08	564.70	567.68	564.33	565.63	565.64	563.70
8/28/96	18:58:00	1940	10.0	557.19	564.08	564.70	567.68	564.33	565.66	565.64	563.70
8/28/96	19:03:00	1945	10.0	559.24 (558.17)	564.07	564.70	567.68	564.33	565.66	565.64	563.70
8/28/96	19:08:00	1950	10.0	561.90	564.07	564.70	567.66	564.33	565.66	565.67	563.70
8/28/96	19:18:00	1960	10.0	557.31	564.06	564.69	567.66	564.28	565.66	565.69	563.70
8/28/96	19:28:00	1970	10.0	557.31	564.06	564.70	567.68	564.33	565.66	565.69	563.70
8/28/96	19:38:00	1980	10.0	557.21	564.04	564.69	567.68	564.33	565.66	565.69	563.60
8/28/96	19:48:00	1990	10.0	556.97	564.04	564.69	567.66	564.33	565.66	565.69	563.60
8/28/96	19:58:00	2000	10.0	557.43	564.03	564.69	567.66	564.28	565.66	565.67	563.60
8/28/96	20:08:00	2010	10.0	557.35 (557.01)	564.02	564.67	567.65	564.28	565.66	565.69	563.50
8/28/96	20:18:00	2020	10.0	557.42	564.01	564.67	567.65	564.28	565.66	565.69	563.50
8/28/96	20:28:00	2030	10.0	557.24	564.00	564.67	567.65	564.28	565.66	565.69	563.60
8/28/96	20:38:00	2040	10.0	557.36	563.97	564.67	567.62	564.28	565.66	565.69	563.40
8/28/96	20:48:00	2050	10.0	557.38	563.97	564.66	567.63	564.28	565.66	565.71	563.50
8/28/96	20:58:00	2060	10.0	557.12	563.96	564.66	567.60	564.24	565.66	565.71	563.50
8/28/96	21:04:00	2066	10.0	556.88 (557.01)	563.95	564.66	567.58	564.24	565.66	565.71	563.50
8/28/96	21:08:00	2070	10.0	557.21	563.95	564.66	567.60	564.24	565.66	565.71	563.50
8/28/96	21:18:00	2080	10.0	557.31	563.93	564.66	567.57	564.19	565.66	565.71	563.50
8/28/96	21:28:00	2090	10.0	557.21	563.93	564.66	567.55	564.19	565.66	565.71	563.20
8/28/96	21:38:00	2100	10.0	557.10	563.91	564.65	567.55	564.19	565.63	565.71	563.20
8/28/96	21:48:00	2110	10.0	557.42	563.89	564.66	567.54	564.19	565.63	565.71	563.20
8/28/96	21:58:00	2120	10.0	557.31 (557.01)	563.88	564.66	567.52	564.15	565.63	565.71	563.40
8/28/96	22:08:00	2130	10.0	557.24	563.87	564.66	567.52	564.15	565.63	565.71	563.20
8/28/96	22:18:00	2140	10.0	556.98	563.86	564.66	567.51	564.10	565.63	565.71	563.40
8/28/96	22:28:00	2150	10.0	557.36	563.85	564.66	567.49	564.10	565.63	565.71	563.10
8/28/96	22:38:00	2160	10.0	557.17	563.84	564.66	567.49	564.10	565.63	565.71	563.30
8/28/96	22:48:00	2170	10.0	557.26	563.82	564.66	567.49	564.10	565.63	565.71	563.20
8/28/96	22:58:00	2180	10.0	557.23	563.82	564.66	567.51	564.10	565.61	565.71	563.30

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)							
					PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	River
Reference Elevation (ft amsl)												
			573.67	573.20	573.30	573.20	576.58	572.87	574.93	575.01		566.60
8/28/96	23:02:00	2184	10.0				567.51	564.10	565.61	565.71		563.30
8/28/96	23:08:00	2190	10.0	557.24 (557.01)	563.81	564.66	567.51	564.10	565.61	565.71		563.40
8/28/96	23:18:00	2200	10.0	557.16	563.80	564.66	567.51	564.10	565.61	565.71		563.50
8/28/96	23:28:00	2210	10.0	557.23	563.79	564.65	567.52	564.10	565.61	565.71		563.30
8/28/96	23:38:00	2220	10.0	557.21	563.79	564.66	567.54	564.10	565.61	565.71		563.40
8/28/96	23:48:00	2230	10.0	557.23	563.79	564.66	567.54	564.10	565.61	565.71		563.40
8/28/96	23:58:00	2240	10.0	557.33	563.78	564.66	567.57	564.10	565.63	565.71		563.40
8/28/96	0:08:00	2250	10.0	557.26	563.78	564.66	567.57	564.10	565.63	565.71		563.60
8/28/96	0:12:00	2254	10.0	556.83 (557.01)	563.78	564.66	567.57	564.10	565.63	565.71		563.50
8/28/96	0:18:00	2260	10.0	557.26	563.79	564.66	567.57	564.10	565.63	565.71		563.60
8/28/96	0:28:00	2270	10.0	557.23	563.79	564.65	567.58	564.10	565.63	565.71		563.60
8/28/96	0:38:00	2280	10.0	557.40	563.79	564.66	567.58	564.10	565.63	565.71		563.60
8/28/96	0:48:00	2290	10.0	557.26	563.79	564.65	567.60	564.10	565.63	565.71		563.60
8/28/96	0:58:00	2300	10.0	557.12	563.79	564.66	567.60	564.10	565.63	565.71		563.60
8/28/96	1:08:00	2310	10.0	557.07 (557.01)	563.80	564.66	567.60	564.10	565.63	565.71		563.60
8/28/96	1:18:00	2320	10.0	557.12	563.80	564.66	567.60	564.10	565.63	565.71		563.60
8/28/96	1:28:00	2330	10.0	557.23	563.81	564.66	567.62	564.10	565.63	565.71		563.80
8/28/96	1:38:00	2340	10.0	557.36	563.81	564.66	567.62	564.15	565.63	565.71		563.60
8/29/96	1:48:00	2350	10.0	557.47	563.81	564.65	567.63	564.15	565.63	565.74		563.90
8/29/96	1:58:00	2360	10.0	557.26	563.81	564.65	567.63	564.15	565.63	565.71		563.80
8/29/96	2:08:00	2370	10.0	557.30	563.84	564.65	567.63	564.19	565.66	565.71		563.90
8/29/96	2:18:00	2380	10.0	557.02	563.85	564.65	567.65	564.19	565.66	565.74		563.80
8/29/96	2:28:00	2390	10.0	557.26	563.85	564.65	567.65	564.19	565.66	565.71		563.90
8/29/96	2:38:00	2400	10.0	557.02	563.87	564.65	567.66	564.19	565.66	565.71		563.80
8/29/96	2:48:00	2410	10.0	557.43	563.88	564.65	567.66	564.19	565.66	565.71		563.80
8/29/96	2:58:00	2420	10.0	557.24	563.87	564.65	567.68	564.24	565.66	565.71		564.00
8/29/96	3:00:00	2422	10.0	557.26 (557.01)	563.88 (563.84)	564.65	567.68	564.24 (564.16)	565.66	565.71		563.90
8/29/96	3:08:00	2430	10.0	557.19	563.88	564.66 (564.61)	567.68 (567.26)	564.24	565.66 (565.58)	565.71 (565.61)		563.90
8/29/96	3:18:00	2440	10.0	557.35	563.89	564.66	567.69	564.24	565.66	565.71		563.90
8/29/96	3:28:00	2450	10.0	557.26	563.89	564.66	567.69	564.24	565.66	565.71		564.00
8/29/96	3:38:00	2460	10.0	557.33	563.91	564.65	567.69	564.24	565.66	565.74		564.00
8/29/96	3:48:00	2470	10.0	556.84	563.92	564.65	567.72	564.28	565.66	565.74		563.90
8/29/96	3:58:00	2480	10.0	557.12	563.93	564.65	567.71	564.28	565.66	565.74		564.00
8/29/96	4:03:00	2485	10.0	557.43 (557.00)	563.93	564.65	567.72	564.28	565.66	565.74		564.10
8/29/96	4:08:00	2490	10.0	556.81	563.93	564.65	567.72	564.28	565.66	565.74		564.10

TABLE J.2

PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

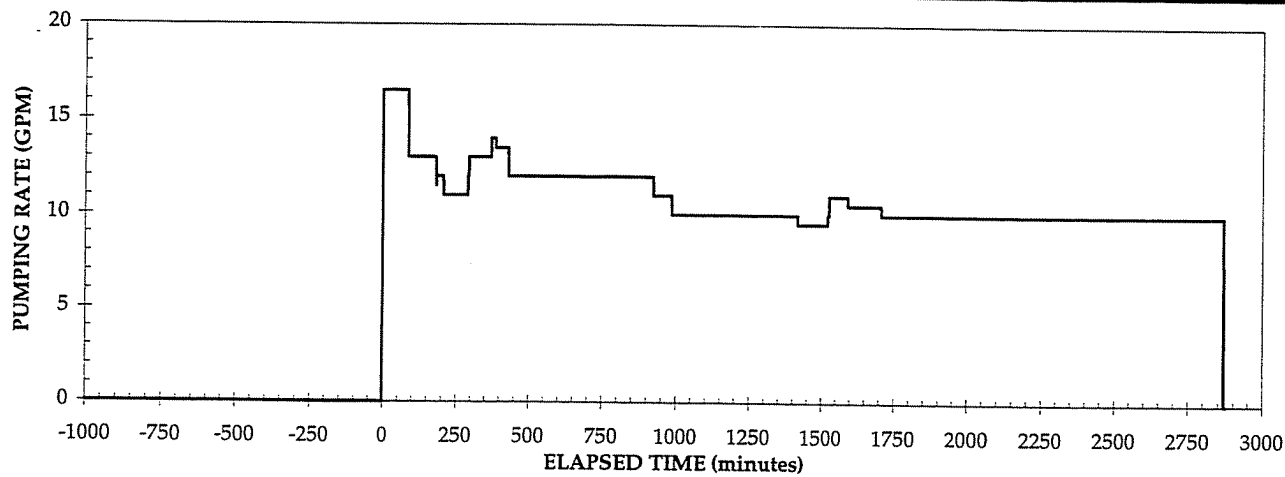
Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)						River	
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S		GW-3I
Reference Elevation (ft amsl)											
8/29/96	4:18:00	2500	10.0	573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/29/96	4:28:00	2510	10.0	557.16	563.94	564.65	567.72	564.28	565.66	565.74	564.10
8/29/96	4:38:00	2520	10.0	557.26	563.95	564.66	567.76	564.33	565.66	565.74	564.10
8/29/96	4:48:00	2530	10.0	557.17	563.96	564.65	567.74	564.33	565.63	565.74	564.10
8/29/96	4:58:00	2540	10.0	556.86	563.97	564.65	567.76	564.33	565.63	565.74	564.10
8/29/96	5:05:00	2547	10.0	557.26	563.97	564.65	567.76	564.33	565.63	565.74	564.00
8/29/96	5:08:00	2550	10.0	556.95 (557.01)	563.99	564.65	567.76	564.33	565.63	565.74	564.20
8/29/96	5:18:00	2560	10.0	557.30	563.99	564.65	567.76	564.33	565.63	565.74	564.10
8/29/96	5:28:00	2570	10.0	556.95	563.99	564.64	567.76	564.38	565.63	565.74	564.00
8/29/96	5:38:00	2580	10.0	557.23	564.00	564.65	567.76	564.33	565.63	565.74	564.10
8/29/96	5:48:00	2590	10.0	557.28	564.01	564.65	567.76	564.38	565.63	565.74	564.10
8/29/96	5:58:00	2600	10.0	557.26	564.01	564.65	567.77	564.38	565.63	565.74	564.10
8/29/96	6:08:00	2610	10.0	556.88 (557.01)	564.03	564.65	567.76	564.38	565.61	565.74	564.20
8/29/96	6:18:00	2620	10.0	557.23	564.03	564.65	567.76	564.38	565.61	565.74	564.10
8/29/96	6:28:00	2630	10.0	557.02	564.03	564.65	567.76	564.38	565.61	565.71	564.10
8/29/96	6:38:00	2640	10.0	556.90	564.04	564.65	567.76	564.38	565.61	565.71	564.10
8/29/96	6:48:00	2650	10.0	557.07	564.04	564.66	567.76	564.38	565.61	565.71	564.10
8/29/96	6:58:00	2660	10.0	557.26	564.04	564.65	567.74	564.38	565.61	565.71	564.10
8/29/96	7:05:00	2667	10.0	557.38	564.03	564.65	567.72	564.38	565.63	565.71	564.10
8/29/96	7:08:00	2670	10.0	557.09 (557.01)	564.03	564.64	567.74	564.38	565.63	565.71	564.00
8/29/96	7:18:00	2680	10.0	556.97	564.03	564.65	567.72	564.38	565.63	565.71	564.00
8/29/96	7:28:00	2690	10.0	557.30	564.03	564.64	567.72	564.33	565.63	565.71	564.00
8/29/96	7:38:00	2700	10.0	557.28	564.03	564.65	567.72	564.33	565.63	565.71	564.00
8/29/96	7:48:00	2710	10.0	557.23	564.03	564.65	567.72	564.33	565.63	565.71	564.00
8/29/96	7:58:00	2720	10.0	557.10	564.02	564.65	567.74	564.33	565.63	565.69	564.00
8/29/96	8:08:00	2730	10.0	557.21	564.02	564.65	567.76	564.33	565.63	565.69	564.10
8/29/96	8:18:00	2740	10.0	557.42	564.03	564.65	567.76	564.33	565.63	565.69	564.10
8/29/96	8:28:00	2750	10.0	557.23 (557.01)	564.04	564.65	567.79	564.33	565.63	565.69	564.20
8/29/96	8:38:00	2760	10.0	557.21	564.06	564.65	567.80	564.33	565.63	565.69	564.30
8/29/96	8:48:00	2770	10.0	557.10	564.07	564.65	567.79	564.38	565.63	565.69	564.20
8/29/96	8:58:00	2780	10.0	556.91	564.07	564.65	567.77	564.38	565.63	565.71	564.30
8/29/96	9:01:00	2783	10.0	557.43	564.08	564.66	567.77	564.38	565.63	565.71	564.30
8/29/96	9:08:00	2790	10.0	556.86 (557.01)	564.08	564.65	567.79	564.38	565.66	565.71	564.20
8/29/96	9:18:00	2800	10.0	557.10	564.08	564.65	567.77	564.38	565.66	565.71	564.20
8/29/96	9:28:00	2810	10.0	557.26	564.09	564.65	567.77	564.38	565.66	565.71	564.10
8/29/96	9:38:00	2810	10.0	557.21	564.09	564.65	567.76	564.38	565.66	565.71	564.10

TABLE J.2
PW-1 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

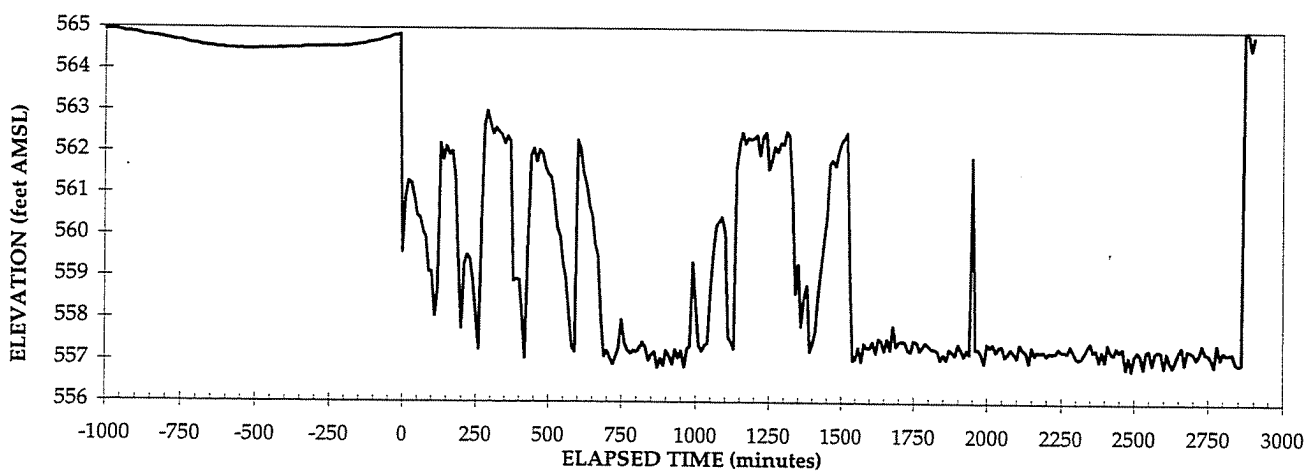
Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)							River
				PW-1	GW-6S	GW-6I	GW-6D	MW-1	GW-3S	GW-3I	
Reference Elevation (ft amsl)											
8/29/96	9:38:00	2820		573.67	573.30	573.20	576.58	572.87	574.93	575.01	566.60
8/29/96	9:48:00	2830	10.0	557.21	564.09	564.65	567.76	564.38	565.66	565.71	564.10
8/29/96	9:58:00	2840	10.0	557.23	564.10	564.65	567.77	564.38	565.66	565.71	564.20
8/29/96	10:08:00	2850	10.0	557.00	564.10	564.65	567.76	564.38	565.66	565.69	564.20
8/29/96	10:18:00	2860	10.0	556.95	564.10	564.65	567.76	564.38	565.66	565.67	564.30
8/29/96	10:27:00	2869	10.0	556.97 (557.01)	564.10 (564.05)	564.66 (564.59)	567.76 (567.39)	564.38 (564.37)	565.66	565.67	564.30
8/29/96	10:32:00	2870	0.0	564.83	564.10	564.66	567.76	564.38	565.66	565.67	564.40
8/29/96	10:38:00	2874	0.0	564.97 (563.27)	564.10 (564.05)	564.66	567.76	564.42 (564.41)	565.66 (565.58)	565.67 (565.60)	564.40
8/29/96	10:38:00	2880	0.0	564.97 (564.91)	564.10	564.66	567.77	564.47 (564.44)	565.66	565.67	564.40
8/29/96	10:48:00	2890	0.0	565.00	564.10	564.65	567.76	564.47	565.66	565.67	564.50
8/29/96	10:58:00	2900	0.0	564.57	564.12	564.66	567.76	564.42	565.66	565.64	564.50
8/29/96	11:08:00	2910	0.0	564.87	564.11	564.66	567.76	564.47	565.66	565.64	564.60
8/29/96	11:18:00	2920	0.0		564.15	564.69	567.79		565.66	565.64	564.60
8/29/96	11:28:00	2930	0.0						565.66		564.60
8/29/96	11:38:00	2940	0.0						565.66		564.70
8/29/96	11:48:00	2950	0.0						565.63		564.60
8/29/96	11:58:00	2960	0.0						565.63		564.80
8/29/96	12:08:00	2970	0.0						565.63		564.70
8/29/96	12:18:00	2980	0.0						565.63		564.80
8/29/96	12:28:00	2990	0.0						565.63		564.80
8/29/96	12:38:00	3000	0.0						565.63		564.80

Notes:

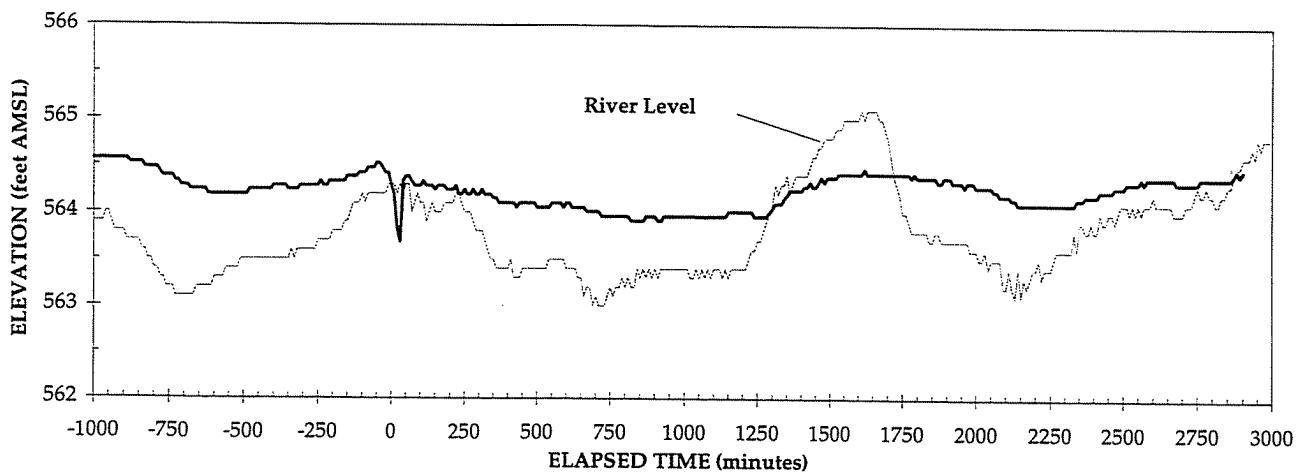
- River level transducer data calibrated by matching curve to manual readings. transducer readings by subtracting a constant of 4.80 feet from the reference elevation.
- (564.91) indicates manual water level measurement.



PUMPING RATE : PW-1



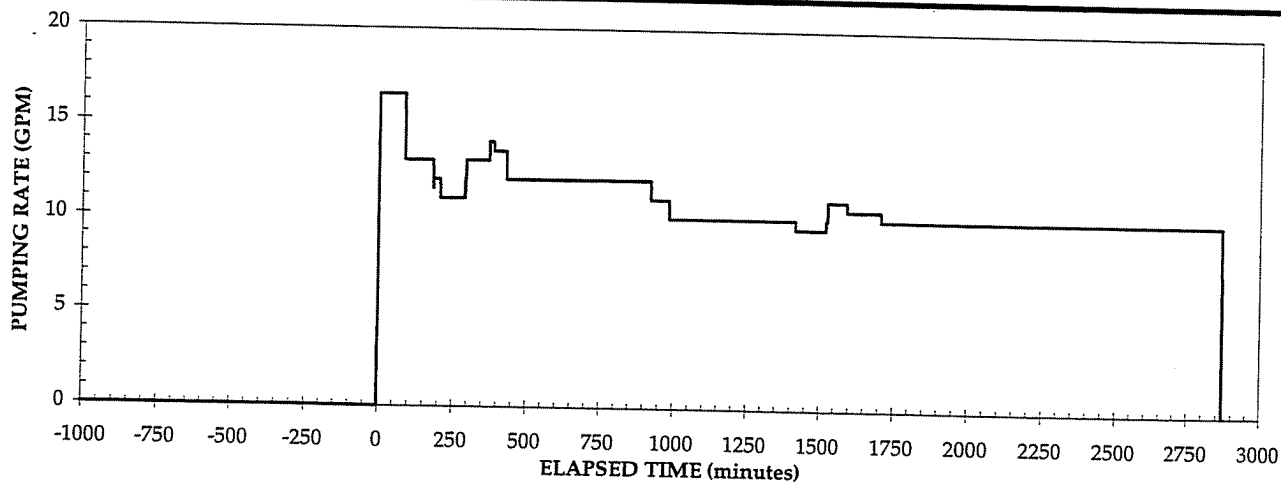
PUMPING WELL : PW-1



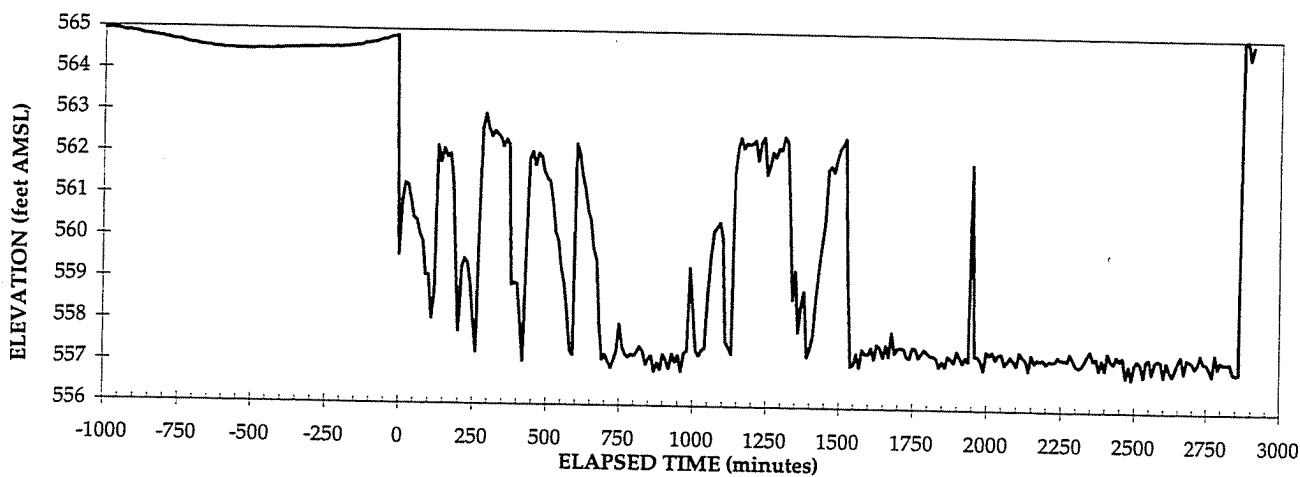
OBSERVATION WELL : MW-1

figure J.2
MW-1 WELL RESPONSE
PW-1 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

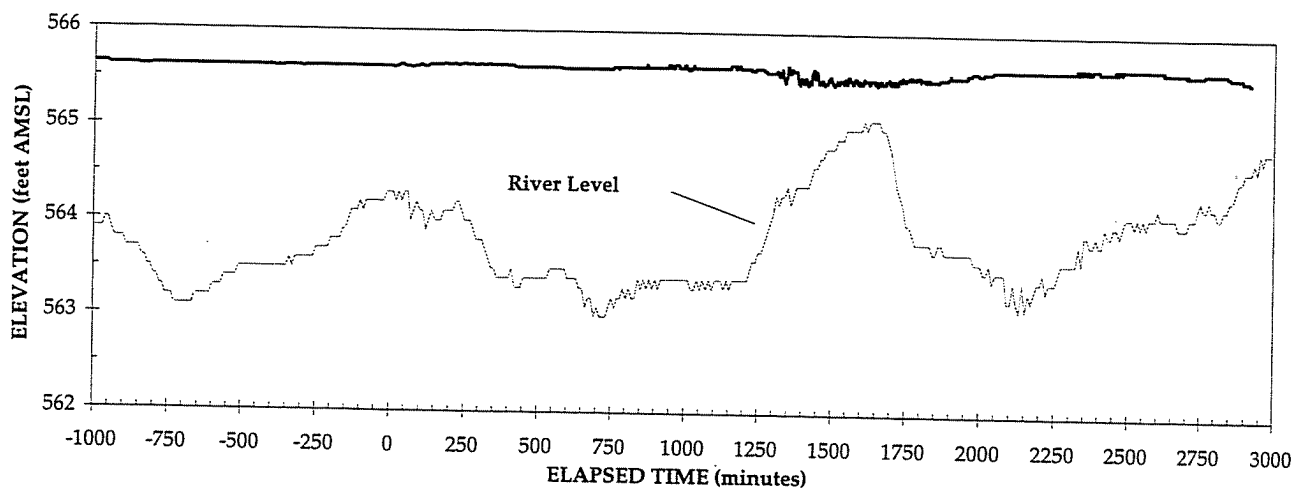
CRA



PUMPING RATE : PW-1



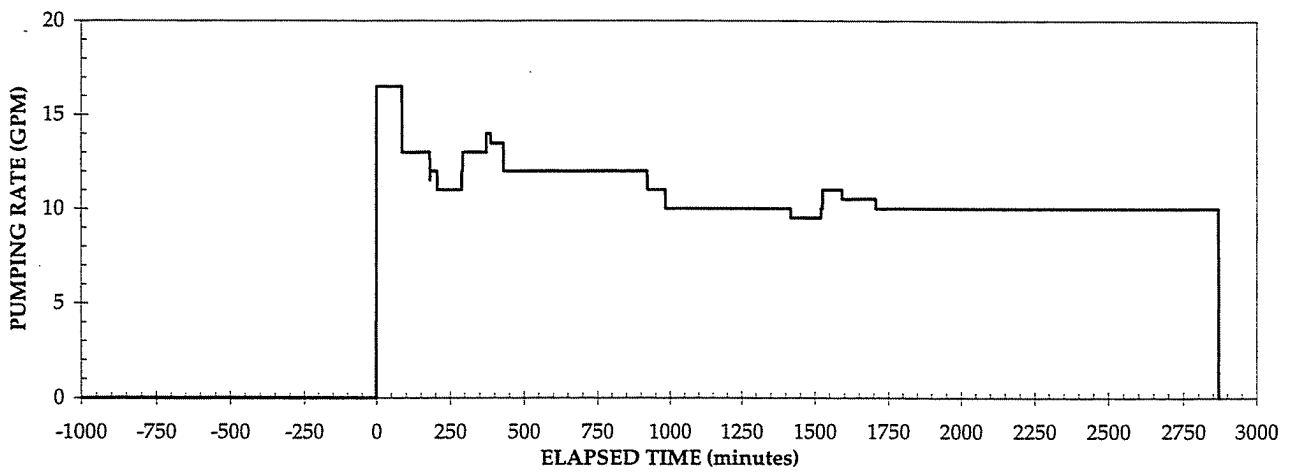
PUMPING WELL : PW-1



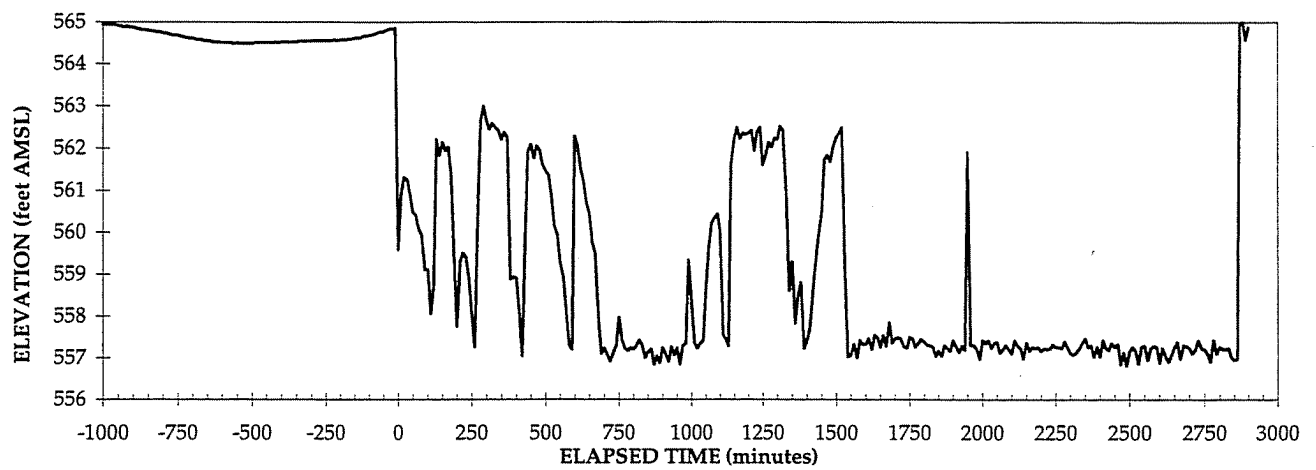
OBSERVATION WELL : GW-3S

CRA

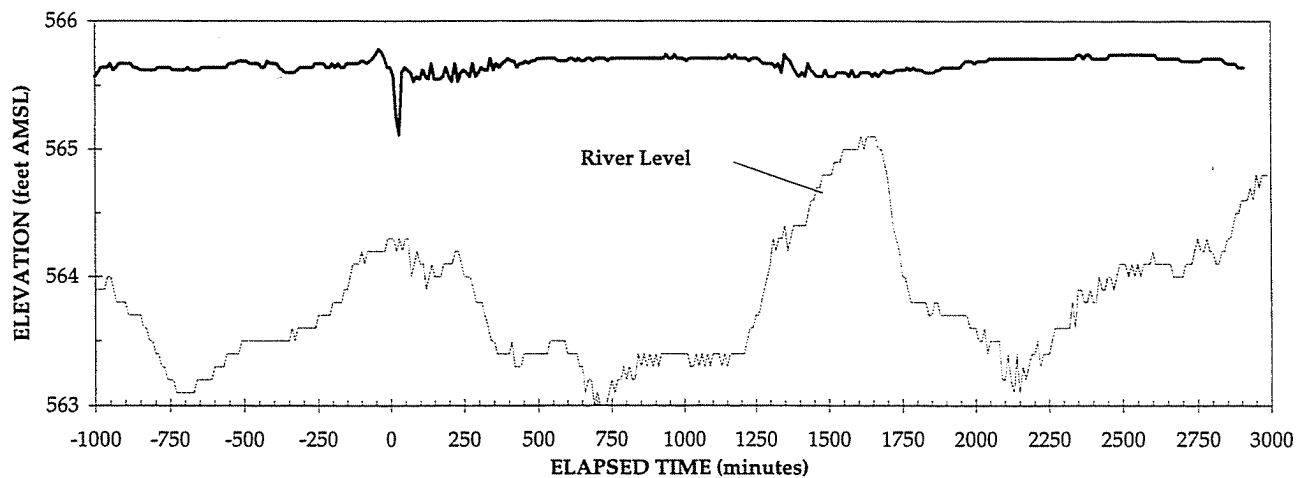
figure J.3
 GW-3S WELL RESPONSE
 PW-1 PUMPING TEST
 GRATWICK-RIVERSIDE PARK
 North Tonawanda, New York



PUMPING RATE : PW-1



PUMPING WELL : PW-1



OBSERVATION WELL : GW-3I

figure J.4
GW-3I WELL RESPONSE
PW-1 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

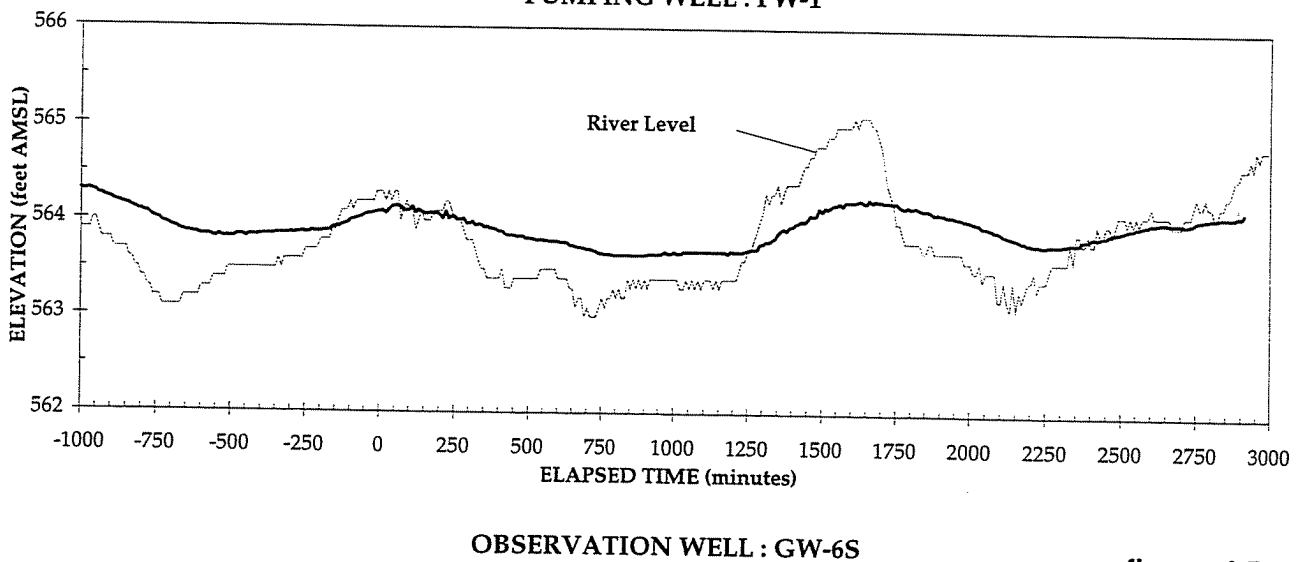
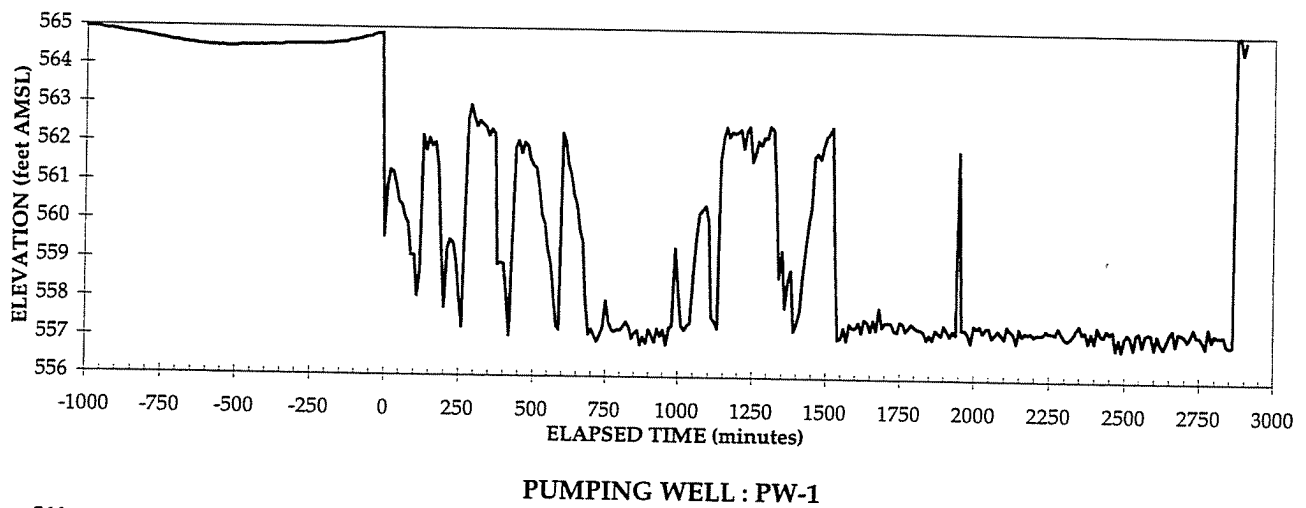
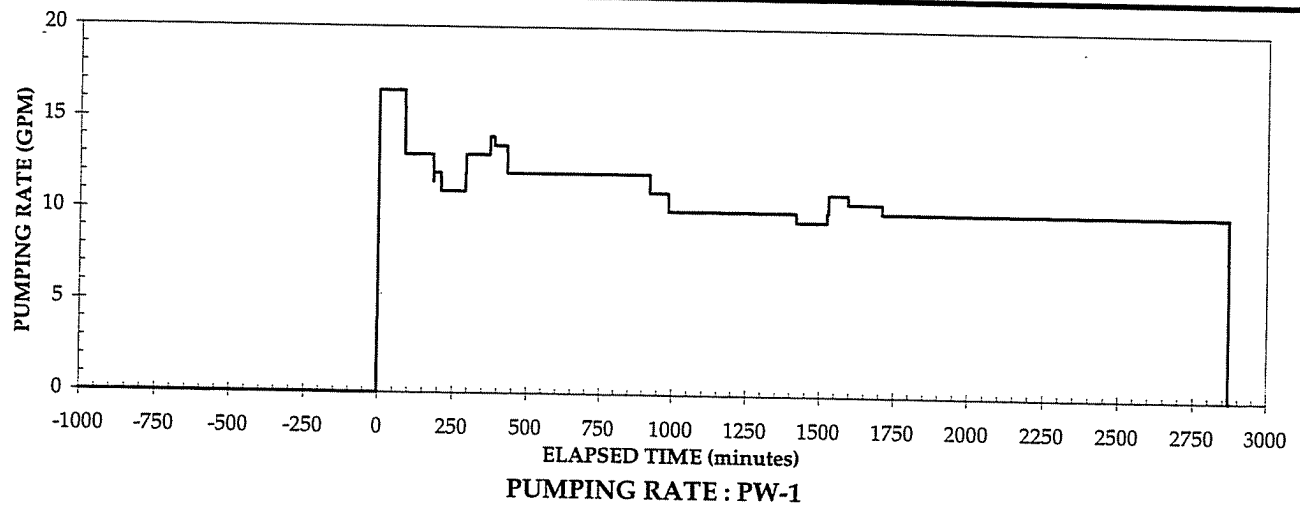


figure J.5
GW-6S WELL RESPONSE
PW-1 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

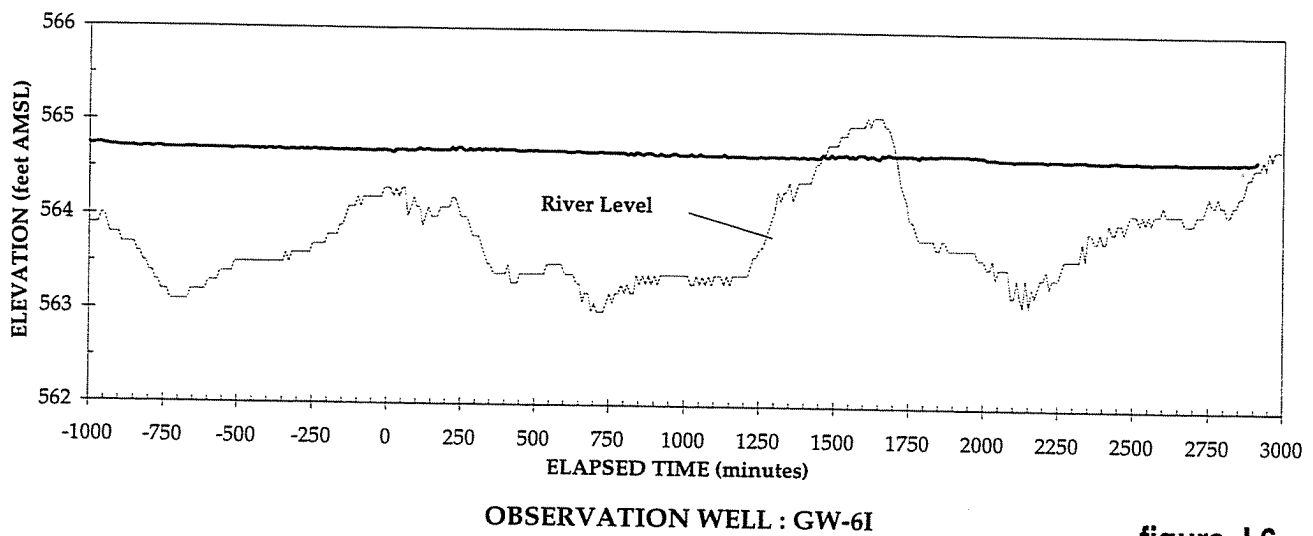
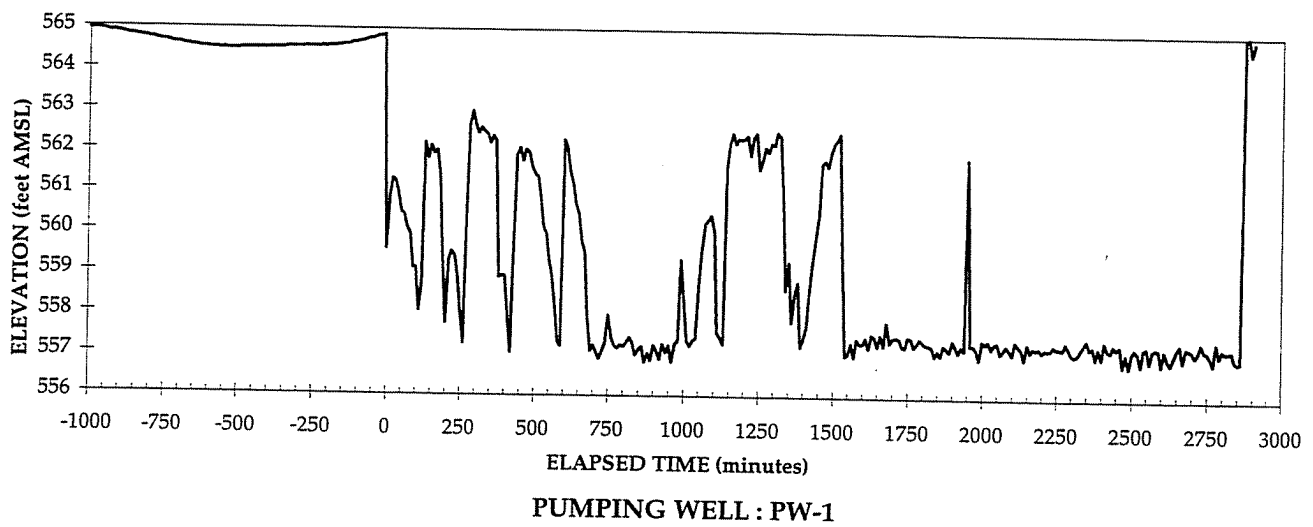
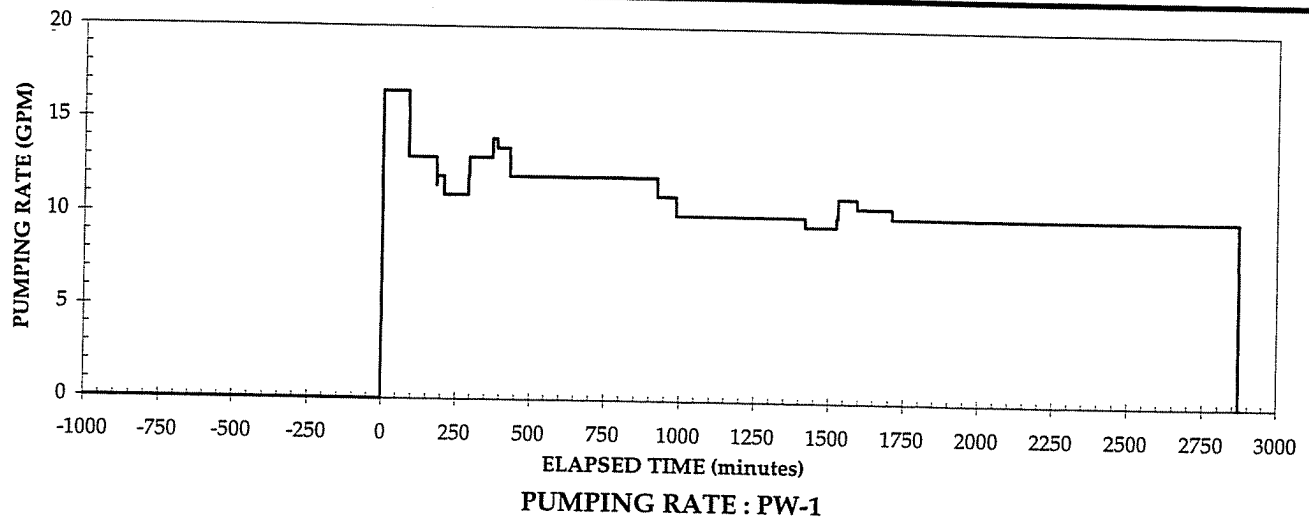


figure J.6
GW-6I WELL RESPONSE
PW-1 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

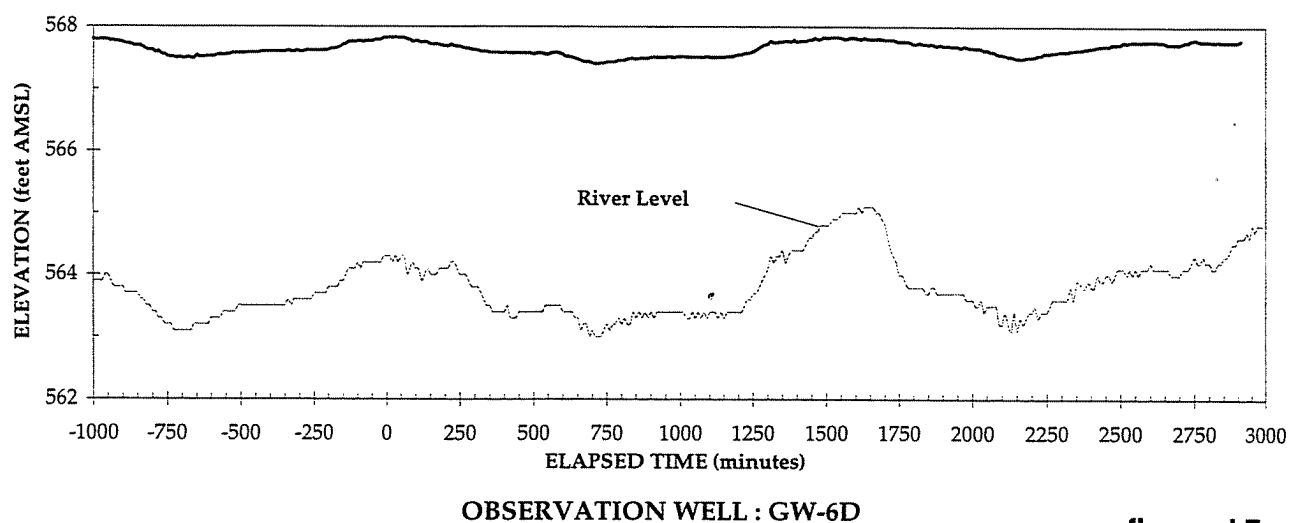
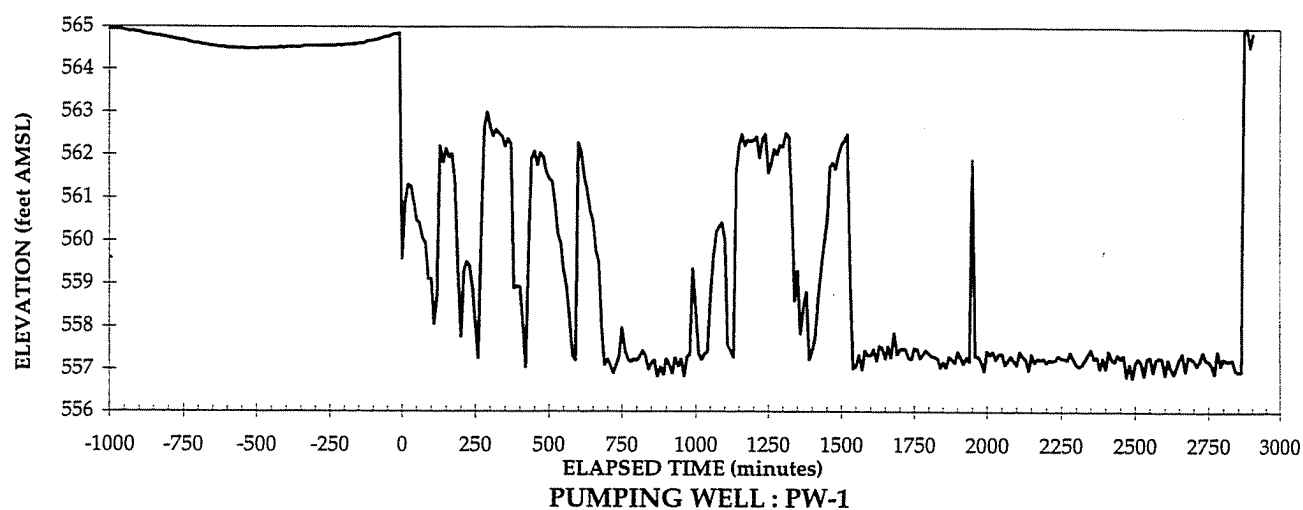
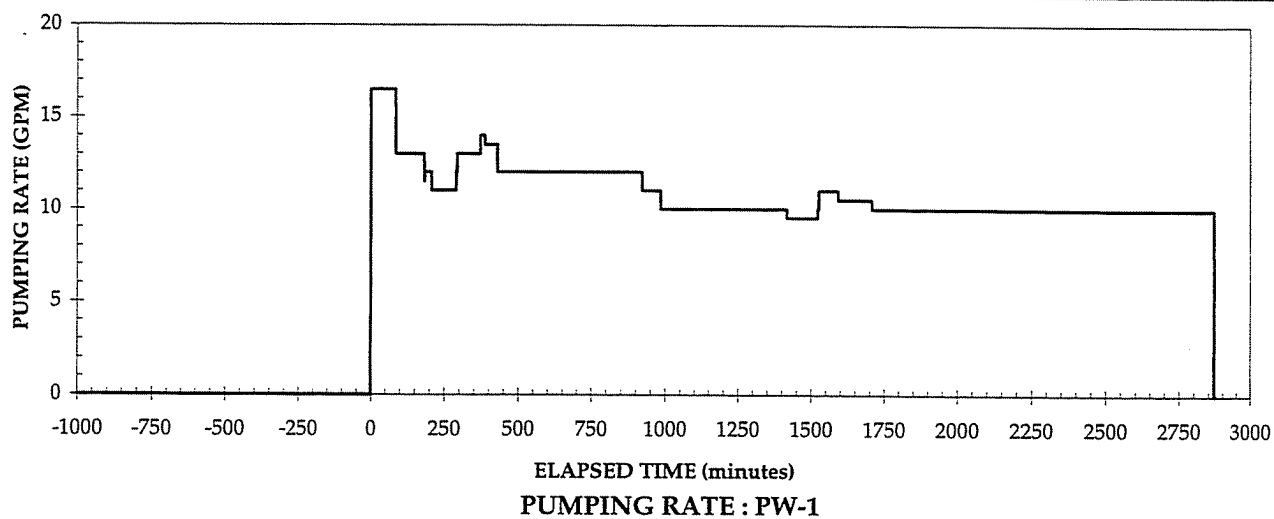


figure J.7
GW-6D WELL RESPONSE
PW-1 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	13:13:30	-25.5	6.33 (6.40)	0.00
8/29/96	13:14:00	-25.0	6.33	0.00
8/29/96	13:14:30	-24.5	6.33	0.00
8/29/96	13:15:00	-24.0	6.31	-0.02
8/29/96	13:15:30	-23.5	6.31	-0.02
8/29/96	13:16:00	-23.0	6.31	-0.02
8/29/96	13:16:30	-22.5	12.43	6.10
8/29/96	13:17:00	-22.0	18.48	12.15
8/29/96	13:17:30	-21.5	18.48	12.15
8/29/96	13:18:00	-21.0	18.48	12.15
8/29/96	13:18:30	-20.5	18.48	12.15
8/29/96	13:19:00	-20.0	18.48	12.15
8/29/96	13:19:30	-19.5	18.48	12.15
8/29/96	13:20:00	-19.0	18.48	12.15
8/29/96	13:20:30	-18.5	18.48	12.15
8/29/96	13:21:00	-18.0	18.48	12.15
8/29/96	13:21:30	-17.5	18.48	12.15
8/29/96	13:22:00	-17.0	18.48	12.15
8/29/96	13:22:30	-16.5	18.48	12.15
8/29/96	13:23:00	-16.0	15.09	8.76
8/29/96	13:23:30	-15.5	6.52	0.19
8/29/96	13:24:00	-15.0	6.47	0.14
8/29/96	13:24:30	-14.5	6.49	0.16
8/29/96	13:25:00	-14.0	6.52	0.19
8/29/96	13:25:30	-13.5	6.52	0.19
8/29/96	13:26:00	-13.0	6.54	0.21
8/29/96	13:26:30	-12.5	6.56	0.23
8/29/96	13:27:00	-12.0	6.56	0.23
8/29/96	13:27:30	-11.5	6.52	0.19
8/29/96	13:28:00	-11.0	6.56	0.23
8/29/96	13:28:30	-10.5	6.56	0.23
8/29/96	13:29:00	-10.0	6.56	0.23
8/29/96	13:29:30	-9.5	6.56	0.23
8/29/96	13:30:00	-9.0	6.56	0.23
8/29/96	13:30:30	-8.5	6.56	0.23
8/29/96	13:31:00	-8.0	6.56	0.23
8/29/96	13:31:30	-7.5	6.56	0.23
8/29/96	13:32:00	-7.0	6.56	0.23
8/29/96	13:32:30	-6.5	6.54	0.21
8/29/96	13:33:00	-6.0	8.76	2.43
8/29/96	13:33:30	-5.5	10.35	4.02
8/29/96	13:34:00	-5.0	17.05	10.72
8/29/96	13:34:30	-4.5	15.96	9.63
8/29/96	13:35:00	-4.0	13.84	7.51
8/29/96	13:35:30	-3.5	11.78	5.45
8/29/96	13:36:00	-3.0	10.10	3.77
8/29/96	13:36:30	-2.5	8.92	2.59
8/29/96	13:37:00	-2.0	8.32	1.99
8/29/96	13:37:30	-1.5	8.04	1.71
8/29/96	13:38:00	-1.0	7.90	1.57
8/29/96	13:38:30	-0.5	7.88	1.55

Pump Rate 5 gpm at 13:39

8/29/96	13:39:00	0.0	7.86	1.53

TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	13:39:30	0.5	7.81	1.48
8/29/96	13:40:00	1.0	7.83	1.50
8/29/96	13:40:30	1.5	7.83	1.50
8/29/96	13:41:00	2.0	7.81	1.48
8/29/96	13:41:30	2.5	7.83	1.50
8/29/96	13:42:00	3.0	7.83	1.50
8/29/96	13:42:30	3.5	7.83	1.50
8/29/96	13:43:00	4.0	7.83	1.50
8/29/96	13:43:30	4.5	7.83	1.50
8/29/96	13:44:00	5.0	7.83 (7.92)	1.50
8/29/96	13:44:30	5.5	7.83	1.50
8/29/96	13:45:00	6.0	7.81	1.48
8/29/96	13:45:30	6.5	7.81	1.48
8/29/96	13:46:00	7.0	7.81	1.48
8/29/96	13:46:30	7.5	7.81	1.48
8/29/96	13:47:00	8.0	7.81	1.48
8/29/96	13:47:30	8.5	7.81	1.48
8/29/96	13:48:00	9.0	7.83	1.50
8/29/96	13:48:30	9.5	7.83	1.50
8/29/96	13:49:00	10.0	7.83	1.50
8/29/96	13:49:30	10.5	7.83	1.50
8/29/96	13:50:00	11.0	7.83	1.50
8/29/96	13:50:30	11.5	7.86	1.53
8/29/96	13:51:00	12.0	7.86	1.53
8/29/96	13:51:30	12.5	7.86	1.53
8/29/96	13:52:00	13.0	7.83	1.50
8/29/96	13:52:30	13.5	7.86	1.53
8/29/96	13:53:00	14.0	7.86	1.53
8/29/96	13:53:30	14.5	7.86	1.53
8/29/96	13:54:00	15.0	7.86	1.53
8/29/96	13:54:30	15.5	7.88	1.55
8/29/96	13:55:00	16.0	7.86	1.53
8/29/96	13:55:30	16.5	7.86	1.53
8/29/96	13:56:00	17.0	7.86	1.53
8/29/96	13:56:30	17.5	7.88	1.55
8/29/96	13:57:00	18.0	7.86	1.53
8/29/96	13:57:30	18.5	7.88	1.55
8/29/96	13:58:00	19.0	7.88 (7.97)	1.55
8/29/96	13:58:30	19.5	7.88	1.55
8/29/96	13:59:00	20.0	7.88	1.55
8/29/96	13:59:30	20.5	7.88	1.55
8/29/96	14:00:00	21.0	7.88	1.55
8/29/96	14:00:30	21.5	7.88	1.55
8/29/96	14:01:00	22.0	7.88	1.55
8/29/96	14:01:30	22.5	7.90	1.57
8/29/96	14:02:00	23.0	7.90	1.57
8/29/96	14:02:30	23.5	7.90	1.57
8/29/96	14:03:00	24.0	7.90	1.57
8/29/96	14:03:30	24.5	7.90	1.57
8/29/96	14:04:00	25.0	7.90	1.57
8/29/96	14:04:30	25.5	7.90	1.57
8/29/96	14:05:00	26.0	7.90	1.57
8/29/96	14:05:30	26.5	7.90	1.57
8/29/96	14:06:00	27.0	7.92	1.59
8/29/96	14:06:30	27.5	7.92	1.59
8/29/96	14:07:00	28.0	7.92	1.59

TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	14:07:30	28.5	7.92	1.59
8/29/96	14:08:00	29.0	7.92	1.59
8/29/96	14:08:30	29.5	7.95	1.62
8/29/96	14:09:00	30.0	7.95	1.62
8/29/96	14:09:30	30.5	7.95	1.62
8/29/96	14:10:00	31.0	7.95	1.62
8/29/96	14:10:30	31.5	7.95	1.62
8/29/96	14:11:00	32.0	7.95	1.62
8/29/96	14:11:30	32.5	7.95	1.62
8/29/96	14:12:00	33.0	7.97	1.64
8/29/96	14:12:30	33.5	7.95	1.62
8/29/96	14:13:00	34.0	7.95 (8.04)	1.62
8/29/96	14:13:30	34.5	7.97	1.64
8/29/96	14:14:00	35.0	7.97	1.64
8/29/96	14:14:30	35.5	7.97	1.64
8/29/96	14:15:00	36.0	7.97	1.64
8/29/96	14:15:30	36.5	7.97	1.64
8/29/96	14:16:00	37.0	7.97	1.64
8/29/96	14:16:30	37.5	7.99	1.66
8/29/96	14:17:00	38.0	7.99	1.66
8/29/96	14:17:30	38.5	7.99	1.66
8/29/96	14:18:00	39.0	7.99	1.66
8/29/96	14:18:30	39.5	7.99	1.66
8/29/96	14:19:00	40.0	8.02	1.69
8/29/96	14:19:30	40.5	8.02	1.69
8/29/96	14:20:00	41.0	8.02	1.69
8/29/96	14:20:30	41.5	8.02	1.69
8/29/96	14:21:00	42.0	8.02	1.69
8/29/96	14:21:30	42.5	8.02	1.69
8/29/96	14:22:00	43.0	8.02	1.69
8/29/96	14:22:30	43.5	8.02	1.69
8/29/96	14:23:00	44.0	8.02	1.69
8/29/96	14:23:30	44.5	8.02	1.69
8/29/96	14:24:00	45.0	8.04	1.71
8/29/96	14:24:30	45.5	8.02	1.69
8/29/96	14:25:00	46.0	8.04	1.71
8/29/96	14:25:30	46.5	8.04	1.71
8/29/96	14:26:00	47.0	8.04	1.71
8/29/96	14:26:30	47.5	8.04	1.71
8/29/96	14:27:00	48.0	8.04	1.71
8/29/96	14:27:30	48.5	8.04	1.71
8/29/96	14:28:00	49.0	8.04	1.71
8/29/96	14:28:30	49.5	8.04	1.71
8/29/96	14:29:00	50.0	8.04 (8.14)	1.71
8/29/96	14:29:30	50.5	8.06	1.73
8/29/96	14:30:00	51.0	8.06	1.73
8/29/96	14:30:30	51.5	8.06	1.73
8/29/96	14:31:00	52.0	8.06	1.73
8/29/96	14:31:30	52.5	8.06	1.73
8/29/96	14:32:00	53.0	8.09	1.76
8/29/96	14:32:30	53.5	8.09	1.76
8/29/96	14:33:00	54.0	8.09	1.76
8/29/96	14:33:30	54.5	8.09	1.76
8/29/96	14:34:00	55.0	8.09	1.76
8/29/96	14:34:30	55.5	8.09	1.76
8/29/96	14:35:00	56.0	8.11	1.78

TABLE J.3
 PW-2 STEP TEST WATER LEVELS
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	14:35:30	56.5	8.11	1.78
8/29/96	14:36:00	57.0	8.11	1.78
8/29/96	14:36:30	57.5	8.09 (8.18)	1.76
<i>Pump Rate 10 gpm at 14:37</i>				
8/29/96	14:37:00	58.0	8.11	1.78
8/29/96	14:37:30	58.5	8.71	2.38
8/29/96	14:38:00	59.0	9.56	3.23
8/29/96	14:38:30	59.5	9.93	3.60
8/29/96	14:39:00	60.0	10.19	3.86
8/29/96	14:39:30	60.5	10.35	4.02
8/29/96	14:40:00	61.0	10.49	4.16
8/29/96	14:40:30	61.5	10.63	4.30
8/29/96	14:41:00	62.0	10.70	4.37
8/29/96	14:41:30	62.5	10.79	4.46
8/29/96	14:42:00	63.0	10.88 (10.53)	4.55
8/29/96	14:42:30	63.5	10.93	4.60
8/29/96	14:43:00	64.0	11.00	4.67
8/29/96	14:43:30	64.5	11.04	4.71
8/29/96	14:44:00	65.0	11.09	4.76
8/29/96	14:44:30	65.5	11.16	4.83
8/29/96	14:45:00	66.0	11.23	4.90
8/29/96	14:45:30	66.5	11.27	4.94
8/29/96	14:46:00	67.0	11.34	5.01
8/29/96	14:46:30	67.5	11.39	5.06
8/29/96	14:47:00	68.0	11.44	5.11
8/29/96	14:47:30	68.5	11.48	5.15
8/29/96	14:48:00	69.0	11.55 (11.44)	5.22
8/29/96	14:48:30	69.5	11.60	5.27
8/29/96	14:49:00	70.0	11.62	5.29
8/29/96	14:49:30	70.5	11.67	5.34
8/29/96	14:50:00	71.0	11.69	5.36
8/29/96	14:50:30	71.5	11.74	5.41
8/29/96	14:51:00	72.0	11.78	5.45
8/29/96	14:51:30	72.5	11.83	5.50
8/29/96	14:52:00	73.0	11.87	5.54
8/29/96	14:52:30	73.5	11.87	5.54
8/29/96	14:53:00	74.0	11.94 (11.80)	5.61
8/29/96	14:53:30	74.5	11.97	5.64
8/29/96	14:54:00	75.0	12.01	5.68
8/29/96	14:54:30	75.5	12.06	5.73
8/29/96	14:55:00	76.0	12.08	5.75
8/29/96	14:55:30	76.5	12.13	5.80
8/29/96	14:56:00	77.0	12.20	5.87
8/29/96	14:56:30	77.5	12.24	5.91
8/29/96	14:57:00	78.0	12.27	5.94
8/29/96	14:57:30	78.5	12.34	6.01
8/29/96	14:58:00	79.0	12.38	6.05
8/29/96	14:58:30	79.5	12.45	6.12
8/29/96	14:59:00	80.0	12.48	6.15
8/29/96	14:59:30	80.5	12.54	6.21
8/29/96	15:00:00	81.0	12.61 (12.41)	6.28
8/29/96	15:00:30	81.5	12.64	6.31
8/29/96	15:01:00	82.0	12.71	6.38
8/29/96	15:01:30	82.5	12.78	6.45

TABLE J.3
 PW-2 STEP TEST WATER LEVELS
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	15:02:00	83.0	12.84	6.51
8/29/96	15:02:30	83.5	12.89	6.56
8/29/96	15:03:00	84.0	12.96	6.63
8/29/96	15:03:30	84.5	13.01	6.68
8/29/96	15:04:00	85.0	13.05	6.72
8/29/96	15:04:30	85.5	13.17	6.84
8/29/96	15:05:00	86.0	13.21 (12.96)	6.88
8/29/96	15:05:30	86.5	13.28	6.95
8/29/96	15:06:00	87.0	13.33	7.00
8/29/96	15:06:30	87.5	13.42	7.09
8/29/96	15:07:00	88.0	13.47	7.14
8/29/96	15:07:30	88.5	13.54	7.21
8/29/96	15:08:00	89.0	13.61	7.28
8/29/96	15:08:30	89.5	13.65	7.32
8/29/96	15:09:00	90.0	13.72	7.39
8/29/96	15:09:30	90.5	13.79	7.46
8/29/96	15:10:00	91.0	13.86	7.53
8/29/96	15:10:30	91.5	13.91	7.58
8/29/96	15:11:00	92.0	14.00	7.67
8/29/96	15:11:30	92.5	14.05	7.72
8/29/96	15:12:00	93.0	14.12 (13.86)	7.79
8/29/96	15:12:30	93.5	14.16	7.83
8/29/96	15:13:00	94.0	14.25	7.92
8/29/96	15:13:30	94.5	14.32	7.99
8/29/96	15:14:00	95.0	14.39	8.06
8/29/96	15:14:30	95.5	14.46	8.13
8/29/96	15:15:00	96.0	14.53	8.20
8/29/96	15:15:30	96.5	14.60	8.27
8/29/96	15:16:00	97.0	14.67	8.34
8/29/96	15:16:30	97.5	14.76	8.43
8/29/96	15:17:00	98.0	14.83	8.50
8/29/96	15:17:30	98.5	14.90	8.57
8/29/96	15:18:00	99.0	14.97	8.64
8/29/96	15:18:30	99.5	15.06	8.73
8/29/96	15:19:00	100.0	15.13	8.80
8/29/96	15:19:30	100.5	15.22	8.89
8/29/96	15:20:00	101.0	15.29	8.96
8/29/96	15:20:30	101.5	15.39	9.06
8/29/96	15:21:00	102.0	15.48	9.15
8/29/96	15:21:30	102.5	15.57	9.24
8/29/96	15:22:00	103.0	15.66	9.33
8/29/96	15:22:30	103.5	15.76	9.43
8/29/96	15:23:00	104.0	15.87 (15.46)	9.54
8/29/96	15:23:30	104.5	15.96	9.63
8/29/96	15:24:00	105.0	16.06	9.73
8/29/96	15:24:30	105.5	16.13	9.80
8/29/96	15:25:00	106.0	16.19	9.86
8/29/96	15:25:30	106.5	16.29	9.96
8/29/96	15:26:00	107.0	16.38	10.05
8/29/96	15:26:30	107.5	16.47	10.14
8/29/96	15:27:00	108.0	16.56	10.23
8/29/96	15:27:30	108.5	16.66	10.33
8/29/96	15:28:00	109.0	16.75	10.42
8/29/96	15:28:30	109.5	16.89	10.56
8/29/96	15:29:00	110.0	16.93	10.60
8/29/96	15:29:30	110.5	17.00	10.67

TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	15:30:00	111.0	17.16	10.83
8/29/96	15:30:30	111.5	17.53	11.20
8/29/96	15:31:00	112.0	17.88	11.55
8/29/96	15:31:30	112.5	18.13	11.80
8/29/96	15:32:00	113.0	18.16	11.83
8/29/96	15:32:30	113.5	18.16	11.83
8/29/96	15:33:00	114.0	18.18	11.85
8/29/96	15:33:30	114.5	18.16	11.83
8/29/96	15:34:00	115.0	18.16	11.83
8/29/96	15:34:30	115.5	18.16	11.83
8/29/96	15:35:00	116.0	18.18	11.85
8/29/96	15:35:30	116.5	18.18	11.85
<i>Pump Off at 15:36</i>				
8/29/96	15:36:00	117.0	18.16	11.83
8/29/96	15:36:30	117.5	17.81	11.48
8/29/96	15:37:00	118.0	16.75	10.42
8/29/96	15:37:30	118.5	16.08	9.75
8/29/96	15:38:00	119.0	15.48	9.15
8/29/96	15:38:30	119.5	14.85	8.52
8/29/96	15:39:00	120.0	14.28	7.95
8/29/96	15:39:30	120.5	13.68	7.35
8/29/96	15:40:00	121.0	13.12	6.79
8/29/96	15:40:30	121.5	12.59	6.26
8/29/96	15:41:00	122.0	12.06	5.73
8/29/96	15:41:30	122.5	11.60	5.27
8/29/96	15:42:00	123.0	11.20	4.87
8/29/96	15:42:30	123.5	10.90	4.57
8/29/96	15:43:00	124.0	10.65	4.32
8/29/96	15:43:30	124.5	10.47	4.14
<i>Pump Rate 8 gpm at 15:44</i>				
8/29/96	15:44:00	125.0	10.37	4.04
8/29/96	15:44:30	125.5	10.44	4.11
8/29/96	15:45:00	126.0	10.53	4.20
8/29/96	15:45:30	126.5	10.58	4.25
8/29/96	15:46:00	127.0	10.63	4.30
8/29/96	15:46:30	127.5	10.67	4.34
8/29/96	15:47:00	128.0	10.70	4.37
8/29/96	15:47:30	128.5	10.74	4.41
8/29/96	15:48:00	129.0	10.72	4.39
8/29/96	15:48:30	129.5	10.74	4.41
8/29/96	15:49:00	130.0	10.74 (11.25)	4.41
8/29/96	15:49:30	130.5	10.74	4.41
8/29/96	15:50:00	131.0	10.77	4.44
8/29/96	15:50:30	131.5	10.77	4.44
8/29/96	15:51:00	132.0	10.77	4.44
8/29/96	15:51:30	132.5	10.74	4.41
8/29/96	15:52:00	133.0	10.74	4.41
8/29/96	15:52:30	133.5	10.74	4.41
8/29/96	15:53:00	134.0	10.74	4.41
8/29/96	15:53:30	134.5	10.72	4.39
8/29/96	15:54:00	135.0	10.74	4.41
8/29/96	15:54:30	135.5	10.72	4.39

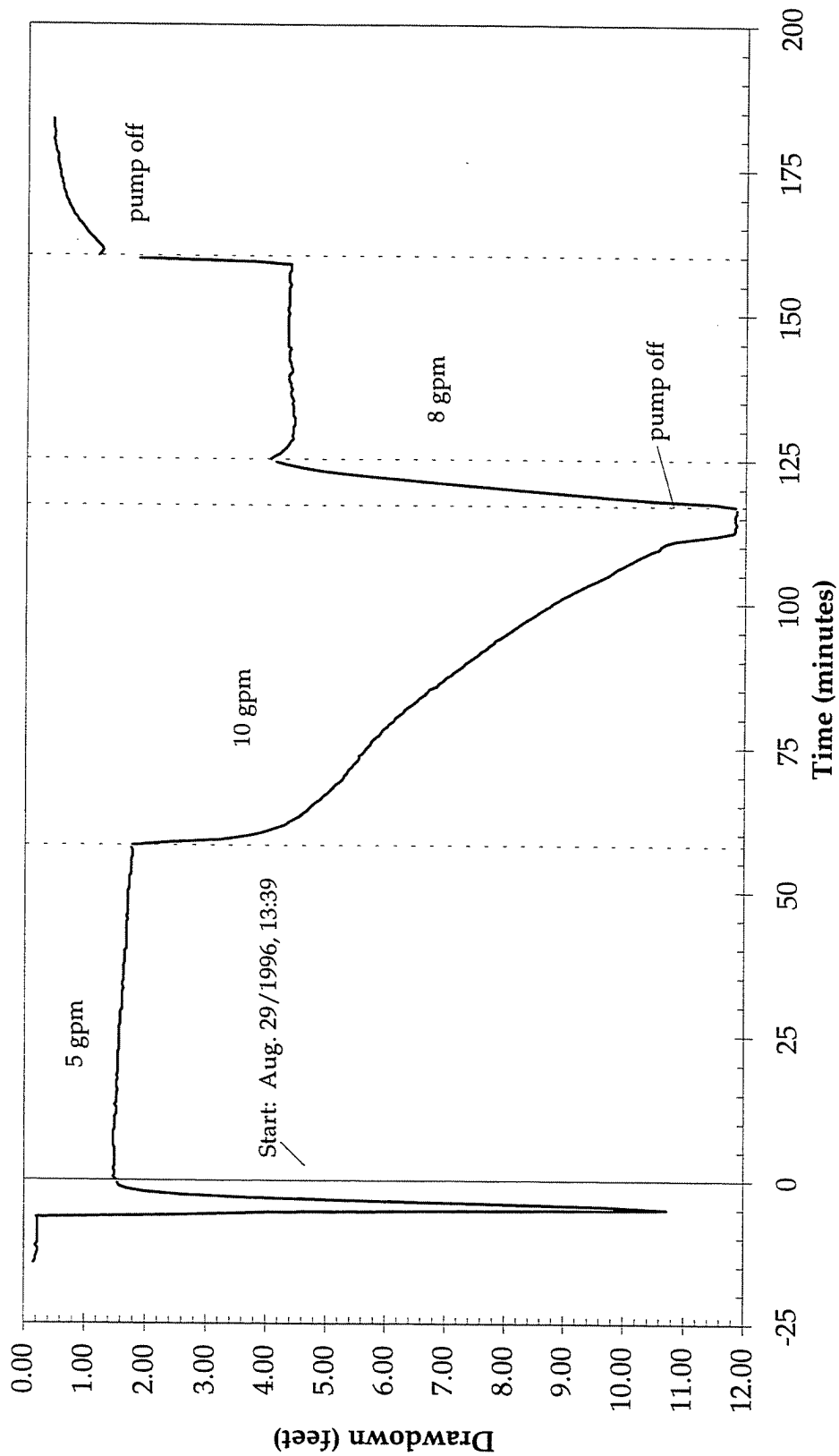
TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	15:55:00	136.0	10.70	4.37
8/29/96	15:55:30	136.5	10.70	4.37
8/29/96	15:56:00	137.0	10.72	4.39
8/29/96	15:56:30	137.5	10.70	4.37
8/29/96	15:57:00	138.0	10.70	4.37
8/29/96	15:57:30	138.5	10.67	4.34
8/29/96	15:58:00	139.0	10.67	4.34
8/29/96	15:58:30	139.5	10.67	4.34
8/29/96	15:59:00	140.0	10.72	4.39
8/29/96	15:59:30	140.5	10.72	4.39
8/29/96	16:00:00	141.0	10.70	4.37
8/29/96	16:00:30	141.5	10.70	4.37
8/29/96	16:01:00	142.0	10.67	4.34
8/29/96	16:01:30	142.5	10.67	4.34
8/29/96	16:02:00	143.0	10.67	4.34
8/29/96	16:02:30	143.5	10.67	4.34
8/29/96	16:03:00	144.0	10.70	4.37
8/29/96	16:03:30	144.5	10.65	4.32
8/29/96	16:04:00	145.0	10.65	4.32
8/29/96	16:04:30	145.5	10.65	4.32
8/29/96	16:05:00	146.0	10.65 (11.76)	4.32
8/29/96	16:05:30	146.5	10.65	4.32
8/29/96	16:06:00	147.0	10.65	4.32
8/29/96	16:06:30	147.5	10.65	4.32
8/29/96	16:07:00	148.0	10.65	4.32
8/29/96	16:07:30	148.5	10.65	4.32
8/29/96	16:08:00	149.0	10.65	4.32
8/29/96	16:08:30	149.5	10.65	4.32
8/29/96	16:09:00	150.0	10.67	4.34
8/29/96	16:09:30	150.5	10.65	4.32
8/29/96	16:10:00	151.0	10.65	4.32
8/29/96	16:10:30	151.5	10.67	4.34
8/29/96	16:11:00	152.0	10.67	4.34
8/29/96	16:11:30	152.5	10.67	4.34
8/29/96	16:12:00	153.0	10.67	4.34
8/29/96	16:12:30	153.5	10.67	4.34
8/29/96	16:13:00	154.0	10.67	4.34
8/29/96	16:13:30	154.5	10.67	4.34
8/29/96	16:14:00	155.0	10.70	4.37
8/29/96	16:14:30	155.5	10.67	4.34
8/29/96	16:15:00	156.0	10.67 (11.75)	4.34
8/29/96	16:15:30	156.5	10.67	4.34
8/29/96	16:16:00	157.0	10.67	4.34
8/29/96	16:16:30	157.5	10.70	4.37
8/29/96	16:17:00	158.0	10.70	4.37
8/29/96	16:17:30	158.5	10.70	4.37
8/29/96	16:18:00	159.0	10.07	3.74
8/29/96	16:18:30	159.5	8.18	1.85
<i>Pump Off at 16:19</i>				
8/29/96	16:19:00	160.0	7.51	1.18
8/29/96	16:19:30	160.5	7.56	1.23
8/29/96	16:20:00	161.0	7.58	1.25
8/29/96	16:20:30	161.5	7.56	1.23
8/29/96	16:21:00	162.0	7.51	1.18

TABLE J.3
PW-2 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
8/29/96	16:21:30	162.5	7.46	1.13
8/29/96	16:22:00	163.0	7.42	1.09
8/29/96	16:22:30	163.5	7.37	1.04
8/29/96	16:23:00	164.0	7.32	0.99
8/29/96	16:23:30	164.5	7.28	0.95
8/29/96	16:24:00	165.0	7.25	0.92
8/29/96	16:24:30	165.5	7.21	0.88
8/29/96	16:25:00	166.0	7.16	0.83
8/29/96	16:25:30	166.5	7.14	0.81
8/29/96	16:26:00	167.0	7.09	0.76
8/29/96	16:26:30	167.5	7.07	0.74
8/29/96	16:27:00	168.0	7.05	0.72
8/29/96	16:27:30	168.5	7.02	0.69
8/29/96	16:28:00	169.0	7.00	0.67
8/29/96	16:28:30	169.5	6.98	0.65
8/29/96	16:29:00	170.0	6.95	0.62
8/29/96	16:29:30	170.5	6.95	0.62
8/29/96	16:30:00	171.0	6.93	0.60
8/29/96	16:30:30	171.5	6.91	0.58
8/29/96	16:31:00	172.0	6.91	0.58
8/29/96	16:31:30	172.5	6.89	0.56
8/29/96	16:32:00	173.0	6.89	0.56
8/29/96	16:32:30	173.5	6.86	0.53
8/29/96	16:33:00	174.0	6.86	0.53
8/29/96	16:33:30	174.5	6.86	0.53
8/29/96	16:34:00	175.0	6.84	0.51
8/29/96	16:34:30	175.5	6.84	0.51
8/29/96	16:35:00	176.0	6.82	0.49
8/29/96	16:35:30	176.5	6.82	0.49
8/29/96	16:36:00	177.0	6.82	0.49
8/29/96	16:36:30	177.5	6.82	0.49
8/29/96	16:37:00	178.0	6.79	0.46
8/29/96	16:37:30	178.5	6.79	0.46
8/29/96	16:38:00	179.0	6.77	0.44
8/29/96	16:38:30	179.5	6.77	0.44
8/29/96	16:39:00	180.0	6.75	0.42
8/29/96	16:39:30	180.5	6.77	0.44
8/29/96	16:40:00	181.0	6.77	0.44
8/29/96	16:40:30	181.5	6.77	0.44
8/29/96	16:41:00	182.0	6.75	0.42
8/29/96	16:41:30	182.5	6.75	0.42
8/29/96	16:42:00	183.0	6.75	0.42
8/29/96	16:42:30	183.5	6.75	0.42
8/29/96	16:43:00	184.0	11.02	4.69
8/29/96	16:43:30	184.5	18.41	12.08
8/29/96	16:44:00	185.0	18.44	12.11
8/29/96	16:44:30	185.5	18.44	12.11
8/29/96	16:45:00	186.0	18.44	12.11
8/29/96	16:45:30	186.5	18.44	12.11
8/29/96	16:46:00	187.0	18.41	12.08
8/29/96	16:46:30	187.5	18.41	12.08
8/29/96	16:47:00	188.0	18.41	12.08

Note: (10.53) indicates a manual water level measurement.



Initial Water Level = 564.61 ft amsl
 Bottom of Screen = 554.2 ft amsl
 Pump Inlet = 555.6± ft amsl

CRA

figure J.8
STEP TEST RESPONSE
WITHDRAWAL WELL PW-2
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

TABLE J.4
PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
Reference Elevation (ft amsl)										
9/3/96	18:10:00	-1000	0.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/3/96	18:20:00	-990	0.0	564.93	564.73	565.03	565.95	564.06	565.86	563.10
9/3/96	18:30:00	-980	0.0	564.93	564.72	565.02	565.95	564.06	565.88	563.20
9/3/96	18:40:00	-970	0.0	564.93	564.72	565.02	565.95	564.06	565.88	563.20
9/3/96	18:50:00	-960	0.0	564.93	564.72	565.02	565.95	564.05	565.91	563.20
9/3/96	19:00:00	-950	0.0	564.91	564.71	565.02	565.95	564.05	565.88	563.10
9/3/96	19:10:00	-940	0.0	564.91	564.71	565.02	565.95	564.05	565.88	563.10
9/3/96	19:20:00	-930	0.0	564.91	564.71	565.02	565.95	564.02	565.88	563.10
9/3/96	19:30:00	-920	0.0	564.91	564.69	565.01	565.95	564.02	565.88	563.10
9/3/96	19:40:00	-910	0.0	564.91	564.69	565.01	565.97	564.02	565.91	563.10
9/3/96	19:50:00	-900	0.0	564.91	564.69	565.01	565.97	564.01	565.88	563.20
9/3/96	20:00:00	-890	0.0	564.89	564.69	565.01	565.95	564.01	565.88	563.20
9/3/96	20:10:00	-880	0.0	564.89	564.68	565.01	565.95	564.00	565.88	563.10
9/3/96	20:20:00	-870	0.0	564.87	564.68	565.01	565.95	564.00	565.88	563.20
9/3/96	20:30:00	-860	0.0	564.89	564.69	564.99	565.95	564.00	565.88	563.20
9/3/96	20:40:00	-850	0.0	564.89	564.67	564.99	565.95	563.99	565.88	563.20
9/3/96	20:50:00	-840	0.0	564.87	564.68	564.99	565.97	563.99	565.88	563.10
9/3/96	21:00:00	-830	0.0	564.87	564.67	564.99	565.97	563.99	565.88	563.10
9/3/96	21:10:00	-820	0.0	564.87	564.67	564.99	565.97	563.98	565.88	563.10
9/3/96	21:20:00	-810	0.0	564.87	564.66	564.99	565.97	563.98	565.88	563.10
9/3/96	21:30:00	-800	0.0	564.87	564.66	564.99	565.95	563.97	565.86	563.20
9/3/96	21:40:00	-790	0.0	564.85	564.67	564.99	565.95	563.98	565.86	563.20
9/3/96	21:50:00	-780	0.0	564.85	564.66	564.99	565.95	563.96	565.86	563.00
9/3/96	22:00:00	-770	0.0	564.85	564.65	564.98	565.95	563.97	565.86	563.20
9/3/96	22:10:00	-760	0.0	564.85	564.65	564.99	565.95	563.97	565.84	563.20
9/3/96	22:20:00	-750	0.0	564.87	564.65	564.99	565.95	563.96	565.86	563.00
9/3/96	22:30:00	-740	0.0	564.87	564.65	564.98	565.95	563.96	565.84	563.00
9/3/96	22:40:00	-730	0.0	564.87	564.65	564.98	565.95	563.97	565.86	563.10
9/3/96	22:50:00	-720	0.0	564.85	564.65	564.98	565.95	563.97	565.86	563.30
9/3/96	23:00:00	-710	0.0	564.85	564.65	564.98	565.95	563.98	565.86	563.20
9/3/96	23:10:00	-700	0.0	564.85	564.65	564.98	565.95	563.99	565.86	563.10
9/3/96	23:20:00	-690	0.0	564.85	564.65	564.98	565.95	563.99	565.86	563.20
9/3/96	23:30:00	-680	0.0	564.85	564.65	564.98	565.95	564.00	565.86	563.30
9/3/96	23:40:00	-670	0.0	564.85	564.65	564.98	565.95	564.01	565.86	563.30
9/3/96	23:50:00	-660	0.0	564.85	564.65	564.98	565.95	564.02	565.86	563.40

TABLE J.4
PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
Reference Elevation (ft amsl)										
9/4/96	0:00:00	-650	0.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/4/96	0:10:00	-640	0.0	564.85	564.65	564.96	565.95	564.01	565.86	563.20
9/4/96	0:20:00	-630	0.0	564.85	564.66	564.96	565.95	564.02	565.86	563.30
9/4/96	0:30:00	-620	0.0	564.85	564.66	564.98	565.95	564.05	565.86	563.30
9/4/96	0:40:00	-610	0.0	564.83	564.67	564.96	565.95	564.05	565.86	563.50
9/4/96	0:50:00	-600	0.0	564.85	564.67	564.96	565.95	564.06	565.86	563.30
9/4/96	1:00:00	-590	0.0	564.85	564.67	564.96	565.95	564.06	565.86	563.40
9/4/96	1:10:00	-580	0.0	564.85	564.67	564.96	565.95	564.07	565.86	563.60
9/4/96	1:20:00	-570	0.0	564.85	564.68	564.96	565.97	564.07	565.86	563.40
9/4/96	1:30:00	-560	0.0	564.85	564.68	564.96	565.95	564.08	565.86	563.60
9/4/96	1:40:00	-550	0.0	564.87	564.68	564.96	565.95	564.09	565.86	563.60
9/4/96	1:50:00	-540	0.0	564.85	564.68	564.96	565.95	564.09	565.86	563.70
9/4/96	2:00:00	-530	0.0	564.85	564.69	564.98	565.95	564.09	565.86	563.50
9/4/96	2:10:00	-520	0.0	564.87	564.69	564.96	565.95	564.11	565.86	563.50
9/4/96	2:20:00	-510	0.0	564.85	564.69	564.96	565.95	564.11	565.86	563.70
9/4/96	2:30:00	-500	0.0	564.87	564.71	564.96	565.95	564.12	565.86	563.80
9/4/96	2:40:00	-490	0.0	564.87	564.72	564.96	565.95	564.13	565.86	563.80
9/4/96	2:50:00	-480	0.0	564.87	564.72	564.96	565.95	564.13	565.86	563.80
9/4/96	3:00:00	-470	0.0	564.87	564.72	564.96	565.95	564.13	565.86	563.60
9/4/96	3:10:00	-460	0.0	564.87	564.72	564.96	565.95	564.14	565.86	563.60
9/4/96	3:20:00	-450	0.0	564.87	564.73	564.96	565.95	564.14	565.86	563.60
9/4/96	3:30:00	-440	0.0	564.87	564.72	564.98	565.95	564.15	565.86	563.60
9/4/96	3:40:00	-430	0.0	564.89	564.73	564.96	565.95	564.15	565.86	563.60
9/4/96	3:50:00	-420	0.0	564.89	564.73	564.98	565.95	564.15	565.86	563.60
9/4/96	4:00:00	-410	0.0	564.89	564.73	564.98	565.95	564.15	565.86	563.70
9/4/96	4:10:00	-400	0.0	564.87	564.73	564.96	565.95	564.15	565.86	563.90
9/4/96	4:20:00	-390	0.0	564.89	564.74	564.98	565.95	564.16	565.84	563.90
9/4/96	4:30:00	-380	0.0	564.89	564.74	564.98	565.95	564.16	565.86	563.70
9/4/96	4:40:00	-370	0.0	564.91	564.75	564.98	565.95	564.17	565.86	563.80
9/4/96	4:50:00	-360	0.0	564.91	564.75	564.98	565.95	564.19	565.86	563.80
9/4/96	5:00:00	-350	0.0	564.91	564.76	564.98	565.95	564.19	565.88	563.80
9/4/96	5:10:00	-340	0.0	564.91	564.76	564.98	565.95	564.19	565.88	563.80
9/4/96	5:20:00	-330	0.0	564.91	564.76	564.98	565.95	564.20	565.88	563.80
9/4/96	5:30:00	-320	0.0	564.91	564.76	564.98	565.93	564.21	565.88	564.00
9/4/96	5:40:00	-310	0.0	564.91	564.76	564.98	565.95	564.21	565.86	563.80

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
Reference Elevation (ft amsl)										
9/4/96	5:50:00	-300	0.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/4/96	6:00:00	-290	0.0	564.91	564.77	564.98	565.95	564.21	565.86	563.80
9/4/96	6:10:00	-280	0.0	564.93	564.77	564.98	565.95	564.21	565.86	563.90
9/4/96	6:20:00	-270	0.0	564.93	564.79	564.99	565.95	564.21	565.86	563.90
9/4/96	6:30:00	-260	0.0	564.93	564.79	564.99	565.95	564.22	565.86	564.00
9/4/96	6:40:00	-250	0.0	564.93	564.79	564.99	565.95	564.22	565.84	564.10
9/4/96	6:50:00	-240	0.0	564.93	564.79	564.99	565.95	564.22	565.86	564.10
9/4/96	7:00:00	-230	0.0	564.95	564.79	564.99	565.95	564.23	565.86	564.10
9/4/96	7:10:00	-220	0.0	564.93	564.80	564.99	565.95	564.23	565.86	563.90
9/4/96	7:20:00	-210	0.0	564.95	564.80	564.99	565.95	564.23	565.86	563.90
9/4/96	7:30:00	-200	0.0	564.95	564.80	564.99	565.95	564.24	565.86	564.00
9/4/96	7:40:00	-190	0.0	564.95	564.81	564.99	565.95	564.26	565.86	564.10
9/4/96	7:50:00	-180	0.0	564.95	564.81	564.99	565.93	564.29	565.84	564.20
9/4/96	8:00:00	-170	0.0	564.95	564.82	564.99	565.93	564.30	565.84	564.10
9/4/96	8:10:00	-160	0.0	564.97	564.82	564.99	565.93	564.31	565.84	564.20
9/4/96	8:20:00	-150	0.0	564.95	564.82	565.01	565.93	564.32	565.84	564.30
9/4/96	8:30:00	-140	0.0	564.97	564.83	565.01	565.93	564.31	565.79	564.30
9/4/96	8:40:00	-130	0.0	564.97	564.83	565.01	565.93	564.31	565.81	564.20
9/4/96	8:50:00	-120	0.0	564.97	564.86	565.01	565.93	564.31	565.81	564.20
9/4/96	9:00:00	-110	0.0	564.97	564.86	565.01	565.93	564.31	565.81	564.20
9/4/96	9:10:00	-100	0.0	564.99	564.86	565.01	565.93	564.31	565.81	564.20
9/4/96	9:20:00	-90	0.0	564.99	564.86	565.02	565.93	564.32	565.79	564.10
9/4/96	9:30:00	-80	0.0	565.01	564.87	565.02	565.93	564.31	565.79	564.10
9/4/96	9:40:00	-70	0.0	565.01	564.86	565.02	565.90	564.32	565.79	564.10
9/4/96	9:50:00	-60	0.0	565.03	564.88	565.03	565.93	564.32	565.81	564.10
9/4/96	10:00:00	-50	0.0	565.01	564.87	565.03	565.90	564.32	565.77	564.10
9/4/96	10:10:00	-40	0.0	565.03	564.88	565.03	565.90	564.32	565.77	564.10
9/4/96	10:20:00	-30	0.0	565.05	564.90	565.05	565.90	564.34	565.77	564.10
9/4/96	10:30:00	-20	0.0	565.05	564.89 (564.87)	565.05 (565.01)	565.93 (565.79)	564.34 (564.31)	565.79 (565.77)	564.10 (563.88)
9/4/96	10:40:00	-10	0.0	565.53	564.89	565.05	565.93	564.34	565.84	564.10
9/4/96	10:50:00	0	8.5	562.01 (561.89)	564.84	564.99	565.90	564.32	565.81	564.10
9/4/96	10:55:00	5	8.5	562.01 (561.87)	564.82	564.98	565.93	564.32	565.81	564.10
9/4/96	11:00:00	10	8.5	561.87	564.80	564.98	565.93	564.32	565.81	564.10
9/4/96	11:10:00	20	8.5	561.56	564.77	564.98	565.93	564.34	565.81	564.00
9/4/96	11:15:00	25	8.5	561.52 (561.45)	564.76	564.96	565.90	564.32	565.81	564.00

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)						River
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D	GW-8S	
Reference Elevation (ft amsl)										
9/4/96	11:20:00	30	8.5	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/4/96	11:30:00	40	8.5	561.58 (561.35)	564.75 (564.74)	564.95 (564.91)	565.90 (565.79)	564.32 (564.31)	565.81 (565.78)	564.00
9/4/96	11:40:00	50	8.5	561.19	564.74	564.95	565.93	564.35	565.81	564.00 (563.88)
9/4/96	11:50:00	60	8.5	560.92 (560.98)	564.69	564.93	565.90	564.34	565.79	564.00
9/4/96	12:00:00	70	8.5	560.72 (560.74)	564.68 (564.68)	564.93 (564.89)	565.90 (565.79)	564.29 (564.32)	565.79 (565.78)	564.00
9/4/96	12:10:00	80	8.5	560.33	564.67	564.93	565.90	564.34	565.79	563.90
9/4/96	12:20:00	90	8.5	560.20 (560.28)	564.66	564.92 (564.87)	565.90 (565.79)	564.34 (564.29)	565.79 (565.78)	563.90
9/4/96	12:30:00	100	8.5	559.89	564.64	564.90	565.90	564.32	565.77	563.90
9/4/96	12:40:00	110	8.5	559.56	564.61	564.90	565.88	564.31	565.77	563.80
9/4/96	12:49:00	119	8.5	559.61 (559.85)	564.61	564.90	565.90	564.31	565.77	563.80
9/4/96	12:50:00	120	8.5	559.34	564.61 (564.59)	564.90 (564.85)	565.90 (565.78)	564.31 (564.28)	565.77 (565.78)	563.80
9/4/96	13:00:00	130	8.5	558.52	564.59	564.89	565.90	564.31	565.79	563.80
9/4/96	13:10:00	140	8.5	558.31	564.59	564.88	565.90	564.31	565.79	563.80
9/4/96	13:20:00	150	8.5	556.69	564.58	564.88	565.90	564.32	565.79	563.80
9/4/96	13:30:00	160	8.5	555.51	564.57	564.86	565.90	564.31	565.79	563.80
9/4/96	13:38:00	168	8.0	554.12 (553.37)	564.54	564.86	565.90	564.30	565.79	563.80
9/4/96	13:40:00	170	8.0	553.95	564.54	564.85	565.90	564.31	565.79	563.80
9/4/96	13:50:00	180	8.0	552.62	564.54	564.85	565.90	564.31	565.79	563.80
9/4/96	14:00:00	190	8.0	552.16	564.54 (564.51)	564.85 (564.80)	565.90 (565.77)	564.30 (564.27)	565.79 (565.78)	563.80
9/4/96	14:06:00	196	8.0	553.58 (554.64)	564.52	564.85	565.90	564.30	565.79	563.80
9/4/96	14:10:00	200	8.0	554.42	564.52	564.83	565.90	564.29	565.79	563.70
9/4/96	14:20:00	210	8.0	555.47	564.50	564.83	565.88	564.28	565.79	563.80
9/4/96	14:30:00	220	8.0	556.11	564.50	564.85	565.88	564.29	565.79	563.80
9/4/96	14:40:00	230	8.0	556.48	564.51	564.85	565.90	564.28	565.77	563.80
9/4/96	14:50:00	240	8.0	556.46 (557.42)	564.51 (564.49)	564.85 (564.79)	565.90 (565.77)	564.29 (564.26)	565.77 (565.78)	563.80
9/4/96	15:00:00	250	8.0	556.19	564.46	564.83	565.86	564.28	565.77	563.70
9/4/96	15:10:00	260	8.0	555.76	564.49	564.83	565.88	564.30	565.77	563.70
9/4/96	15:20:00	270	8.0	555.95	564.47	564.83	565.88	564.29	565.77	563.60
9/4/96	15:30:00	280	8.0	555.97	564.49	564.83	565.88	564.30	565.74	563.60
9/4/96	15:40:00	290	8.0	555.93	564.49	564.83	565.88	564.28	565.74	563.50
9/4/96	15:50:00	300	8.0	555.56	564.49	564.83	565.88	564.30	565.74	563.50
9/4/96	16:00:00	310	8.0	554.82	564.47	564.83	565.88	564.29	565.74	563.50
9/4/96	16:10:00	320	8.0	554.34	564.47	564.82	565.88	564.29	565.74	563.50
9/4/96	16:20:00	330	8.0	553.44	564.47	564.82	565.90	564.29	565.74	563.60
9/4/96	16:30:00	340	8.0	553.17	564.47	564.82	565.88	564.28	565.74	563.50

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)						River
				PW-2	MW-2	MW-SSR	GW-51	GW-5D	GW-8S	
Reference Elevation (ft amsl)										
9/4/96	16:40:00	350	7.5	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/4/96	16:50:00	360	7.5	551.48 (552.98)	564.49	564.82	565.90	564.30	565.74	563.60
9/4/96	17:00:00	370	7.5	553.95	564.49 (564.43)	564.82 (564.72)	565.90 (565.75)	564.29 (564.17)	565.77 (565.78)	563.60
9/4/96	17:10:00	380	7.5	556.09	564.45	564.80	565.88	564.27	565.77	563.60
9/4/96	17:15:00	385	7.5	557.16	564.46	564.80	565.90	564.28	565.77	563.60
9/4/96	17:20:00	390	7.5	557.24 (557.92)	564.47	564.79	565.90	564.27	565.77	563.60
9/4/96	17:30:00	400	7.5	557.39	564.47	564.79	565.90	564.26	565.79	563.60
9/4/96	17:40:00	410	7.5	557.30	564.46	564.79	565.90	564.24	565.81	563.60
9/4/96	17:50:00	420	7.5	557.47	564.45	564.79	565.88	564.22	565.81	563.60
9/4/96	18:00:00	430	7.5	558.23	564.44	564.79	565.88	564.22	565.81	563.60
9/4/96	18:10:00	440	7.5	558.27	564.43	564.79	565.88	564.22	565.81	563.60
9/4/96	18:20:00	450	7.5	558.10	564.43	564.79	565.90	564.22	565.84	563.60
9/4/96	18:30:00	460	7.5	558.47	564.43	564.77	565.90	564.21	565.81	563.60
9/4/96	18:40:00	470	7.5	558.19	564.42	564.77	565.90	564.21	565.81	563.60
9/4/96	18:50:00	480	7.5	558.06	564.42	564.77	565.90	564.21	565.84	563.60
9/4/96	19:00:00	490	7.5	558.43 (558.90)	564.42 (564.39)	564.77 (564.53)	565.90 (565.74)	564.21 (564.17)	565.84 (565.78)	563.60 (563.61)
9/4/96	19:10:00	500	7.5	558.17	564.42	564.76	565.90	564.20	565.84	563.50
9/4/96	19:20:00	510	7.5	558.25	564.40	564.76	565.90	564.20	565.84	563.50
9/4/96	19:30:00	520	7.5	558.10 (558.79)	564.40	564.76	565.90	564.19	565.84	563.50
9/4/96	19:40:00	530	7.5	558.08	564.39	564.75	565.90	564.17	565.86	563.50
9/4/96	19:50:00	540	7.5	558.13	564.39	564.76	565.93	564.17	565.84	563.50
9/4/96	20:00:00	550	7.5	557.78	564.39	564.75	565.90	564.16	565.84	563.40
9/4/96	20:10:00	560	7.5	557.71	564.37	564.73	565.90	564.15	565.86	563.40
9/4/96	20:20:00	570	7.5	557.12	564.37	564.73	565.90	564.14	565.86	563.40
9/4/96	20:30:00	580	7.5	557.18	564.37	564.72	565.88	564.12	565.86	563.40
9/4/96	20:40:00	590	7.5	556.79	564.36	564.72	565.88	564.12	565.86	563.40
9/4/96	20:50:00	600	7.5	556.83	564.36	564.72	565.88	564.12	565.86	563.40
9/4/96	21:00:00	610	7.5	556.95	564.36	564.72	565.88	564.12	565.86	563.40
9/4/96	21:03:00	613	7.5	556.83	564.35	564.72	565.90	564.09	565.86	563.30
9/4/96	21:10:00	620	7.5	556.54 (557.63)	564.35	564.72	565.90	564.09	565.86	563.30
9/4/96	21:20:00	630	7.5	556.95	564.34	564.70	565.90	564.08	565.86	563.30
9/4/96	21:30:00	640	7.5	556.87	564.34	564.70	565.90	564.08	565.86	563.30
9/4/96	21:40:00	650	7.5	556.89	564.34	564.70	565.90	564.06	565.86	563.20
9/4/96	21:50:00	660	7.5	556.87	564.31	564.70	565.90	564.06	565.86	563.20
9/4/96	22:00:00	670	7.5	557.18	564.31	564.70	565.90	564.05	565.86	563.20
9/4/96				557.26	564.31	564.70	565.90	564.02	565.86	563.10

**PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonaawanda, New York**

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
Reference Elevation (ft amsl)										
9/4/96	22:10:00	680	7.5	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/4/96	22:10:00	680	7.5	557.18 (557.96)	564.31	564.69	565.90	564.01	565.86	563.10
9/4/96	22:20:00	690	7.5	557.06	564.29	564.69	565.90	564.00	565.86	563.10
9/4/96	22:30:00	700	7.5	556.95	564.29	564.69	565.90	564.00	565.86	563.10
9/4/96	22:40:00	710	7.5	556.97	564.28	564.67	565.88	563.99	565.86	563.10
9/4/96	22:50:00	720	7.5	556.73	564.28	564.67	565.90	563.99	565.86	563.10
9/4/96	23:00:00	730	7.5	556.54	564.28	564.67	565.90	564.00	565.86	563.10
9/4/96	23:10:00	740	7.5	556.52	564.27	564.67	565.90	564.00	565.86	563.10
9/4/96	23:15:00	745	0.0	556.46	564.25	564.67	565.90	564.00	565.86	563.10
9/4/96	23:20:00	750	0.0	563.33	564.29	564.73	565.90	564.00	565.86	563.10
9/4/96	23:25:00	755	7.5	563.98	564.31	564.76	565.90	564.00	565.86	563.10
9/4/96	23:30:00	760	7.5	561.33	564.31	564.73	565.90	564.01	565.86	563.10
9/4/96	23:40:00	770	7.5	560.06	564.29	564.70	565.88	564.01	565.86	563.10
9/4/96	23:50:00	780	7.5	559.77	564.28	564.70	565.88	564.01	565.86	563.10
9/5/96	0:00:00	790	7.5	559.50	564.27	564.69	565.88	564.02	565.86	563.20
9/5/96	0:10:00	800	7.5	559.28	564.27	564.67	565.88	564.02	565.86	563.20
9/5/96	0:20:00	810	7.5	559.01	564.27	564.67	565.90	564.04	565.86	563.20
9/5/96	0:30:00	820	7.5	558.31	564.25	564.67	565.90	564.04	565.86	563.20
9/5/96	0:40:00	830	7.5	557.92	564.25	564.66	565.90	564.04	565.86	563.20
9/5/96	0:49:00	839	7.5	557.65 (558.39)	564.24	564.66	565.90	564.05	565.86	563.20
9/5/96	0:50:00	840	7.5	557.76	564.25	564.66	565.90	564.05	565.86	563.20
9/5/96	1:00:00	850	7.5	557.22	564.24	564.64	565.90	564.05	565.86	563.30
9/5/96	1:10:00	860	7.5	556.73	564.24	564.64	565.90	564.05	565.86	563.40
9/5/96	1:20:00	870	7.5	556.67	564.24	564.64	565.90	564.06	565.86	563.40
9/5/96	1:30:00	880	7.5	556.30	564.23	564.63	565.90	564.06	565.86	563.40
9/5/96	1:40:00	890	7.5	555.90	564.24	564.63	565.88	564.06	565.86	563.40
9/5/96	1:50:00	900	7.5	555.78	564.23	564.63	565.88	564.06	565.86	563.40
9/5/96	2:00:00	910	7.5	555.45	564.23	564.63	565.90	564.07	565.86	563.40
9/5/96	2:10:00	920	7.5	554.98	564.24	564.63	565.90	564.08	565.86	563.40
9/5/96	2:20:00	930	7.5	555.06	564.23	564.63	565.90	564.08	565.86	563.40
9/5/96	2:30:00	940	7.5	554.93	564.23	564.63	565.90	564.09	565.86	563.40
9/5/96	2:40:00	950	7.5	554.49	564.24	564.62	565.90	564.09	565.86	563.50
9/5/96	2:50:00	960	7.5	554.36 (555.58)	564.24 (564.23)	564.62	565.90 (565.72)	564.11	565.86	563.60
9/5/96	3:00:00	970	7.5	554.36	564.25	564.62 (564.59)	565.90	564.12 (564.11)	565.86 (565.79)	563.60
9/5/96	3:10:00	980	7.5	554.34	564.25	564.62	565.90	564.12	565.86	563.60 (563.57)
9/5/96	3:20:00	990	7.5	553.66	564.25	564.62	565.90	564.13	565.86	563.50

TABLE J.4
PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)					River	
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
Reference Elevation (ft amsl)										
9/5/96	3:30:00	1000	7.5	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/5/96	3:40:00	1010	7.5	553.79	564.25	564.62	565.90	564.13	565.86	563.60
9/5/96	3:50:00	1020	7.5	553.77	564.25	564.62	565.90	564.14	565.84	563.60
9/5/96	4:00:00	1030	7.5	553.48	564.27	564.62	565.88	564.15	565.84	563.60
9/5/96	4:10:00	1040	7.5	553.36	564.27	564.62	565.88	564.15	565.84	563.60
9/5/96	4:20:00	1050	7.5	553.46	564.28	564.60	565.88	564.16	565.84	563.60
9/5/96	4:30:00	1060	7.5	553.25	564.27	564.62	565.88	564.16	565.84	563.80
9/5/96	4:40:00	1070	7.5	553.23	564.27	564.60	565.88	564.16	565.84	563.70
9/5/96	4:50:00	1080	7.5	553.33	564.28	564.60	565.88	564.17	565.84	563.80
9/5/96	5:00:00	1090	7.5	553.23	564.28	564.62	565.88	564.17	565.84	563.80
9/5/96	5:10:00	1100	7.5	553.19	564.28	564.60	565.88	564.17	565.84	563.80
9/5/96	5:20:00	1110	7.5	553.21	564.29	564.60	565.88	564.19	565.84	563.80
9/5/96	5:30:00	1120	7.5	553.17	564.29	564.60	565.88	564.19	565.84	563.80
9/5/96	5:40:00	1130	7.5	553.29	564.29	564.60	565.88	564.20	565.84	563.80
9/5/96	5:50:00	1140	7.5	553.15	564.29	564.60	565.88	564.20	565.84	563.90
9/5/96	6:00:00	1150	7.5	553.21	564.29	564.60	565.88	564.20	565.84	563.90
9/5/96	6:10:00	1160	7.5	553.03	564.30	564.60	565.88	564.20	565.84	563.90
9/5/96	6:20:00	1170	7.5	552.90	564.30	564.60	565.88	564.21	565.84	563.90
9/5/96	6:30:00	1180	7.5	553.15	564.30	564.59	565.88	564.21	565.84	563.90
9/5/96	6:36:00	1186	7.5	553.36 (554.57)	564.30	564.59	565.88	564.21	565.84	563.90
9/5/96	6:40:00	1190	7.5	553.13	564.31	564.59	565.88	564.21	565.84	563.90
9/5/96	6:50:00	1200	7.5	552.88	564.31	564.59	565.88	564.21	565.84	563.90
9/5/96	7:00:00	1210	7.5	552.76	564.30	564.59	565.88	564.21	565.84	563.80
9/5/96	7:10:00	1220	7.5	552.90	564.31	564.59	565.88	564.21	565.84	563.80
9/5/96	7:20:00	1230	7.5	553.07	564.31	564.59	565.88	564.21	565.84	563.80
9/5/96	7:30:00	1240	7.5	553.01	564.31	564.59	565.88	564.21	565.84	563.80
9/5/96	7:40:00	1250	7.5	552.99	564.31	564.59	565.88	564.23	565.84	563.90
9/5/96	7:50:00	1260	7.5	553.17	564.31	564.59	565.88	564.24	565.84	563.90
9/5/96	8:00:00	1270	7.5	553.17	564.32	564.59	565.88	564.26	565.86	564.00
9/5/96	8:10:00	1280	7.5	553.27	564.34	564.59	565.88	564.28	565.86	564.00
9/5/96	8:20:00	1290	7.5	553.73	564.34	564.59	565.86	564.28	565.86	564.10
9/5/96	8:30:00	1300	7.5	553.46	564.34	564.59	565.86	564.29	565.86	564.10
9/5/96	8:40:00	1310	7.5	553.25	564.35	564.59	565.86	564.28	565.86	564.10
9/5/96	8:50:00	1320	7.5	552.25	564.35	564.59	565.86	564.28	565.86	564.10
9/5/96	9:00:00	1330	7.5	551.22	564.35	564.59	565.86	564.29	565.86	564.10

TABLE J.4
PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					River	
					PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
9/5/96	9:10:00	1340	7.5		571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/5/96	9:20:00	1350	7.5		551.30	564.36	564.59	565.86	564.29	565.86	564.10
9/5/96	9:30:00	1360	7.0		551.48	564.36	564.59	565.86	564.29	565.86	564.10
9/5/96	9:40:00	1370	7.0		551.09 (552.98)	564.36	564.59	565.86	564.29	565.86	564.00
9/5/96	9:44:00	1374	7.0		553.89	564.35	564.59	565.86	564.29	565.86	564.00
9/5/96	9:44:00	1374	7.0		554.94 (556.14)	564.36	564.59	565.83	564.29	565.84	564.00
9/5/96	9:47:00	1377	7.3		555.68 (556.68)	564.36	564.59	565.86	564.29	565.84	564.10
9/5/96	9:50:00	1380	7.3		555.80	564.36	564.59	565.86	564.29	565.84	564.00
9/5/96	10:00:00	1390	7.3		556.03	564.36	564.60	565.86	564.29	565.84	564.00
9/5/96	10:03:00	1393	7.5		555.82 (556.98)	564.37	564.59	565.86	564.29	565.84	564.00
9/5/96	10:10:00	1400	7.5		554.92	564.35	564.59	565.83	564.27	565.84	563.90
9/5/96	10:20:00	1410	7.5		553.95	564.35	564.59	565.83	564.28	565.81	564.00
9/5/96	10:30:00	1420	7.5		553.54	564.37	564.60	565.86	564.29	565.81	563.90
9/5/96	10:40:00	1430	7.5		553.31	564.38	564.60	565.86	564.29	565.81	563.90
9/5/96	10:50:00	1440	7.5		552.99 (554.37)	564.36 (564.34)	564.59	565.83	564.28	565.81	564.00
9/5/96	11:00:00	1450	7.5		553.13	564.37	564.59	565.83 (565.65)	564.29 (564.26)	565.81	564.00
9/5/96	11:10:00	1460	7.5		553.17	564.38	564.60	565.86	564.29	565.79 (565.76)	564.00
9/5/96	11:20:00	1470	7.5		552.80	564.37	564.59	565.86	564.27	565.81	564.00 (563.80)
9/5/96	11:30:00	1480	7.5		552.55	564.36	564.59	565.83	564.27	565.79	563.80
9/5/96	11:40:00	1490	7.5		552.29	564.36	564.59	565.83	564.27	565.77	563.90
9/5/96	11:50:00	1500	7.5		552.27	564.37	564.60	565.83	564.30	565.77	563.80
9/5/96	12:00:00	1510	7.5		552.18	564.38	564.60	565.83	564.30	565.79	563.80
9/5/96	12:10:00	1520	7.5		551.90	564.35	564.60	565.81	564.29	565.74	563.70
9/5/96	12:15:00	1525	7.0		551.55 (552.98)	564.34	564.59	565.81	564.28	565.74	563.80
9/5/96	12:20:00	1530	7.0		552.78	564.40	564.62	565.86	564.32	565.81	563.80
9/5/96	12:30:00	1540	7.0		554.18	564.38	564.60	565.83	564.30	565.79	563.70
9/5/96	12:40:00	1550	7.0		555.19	564.36	564.59	565.83	564.27	565.72	563.80
9/5/96	12:50:00	1560	7.0		556.21	564.32	564.59	565.81	564.26	565.72	563.70
9/5/96	13:00:00	1570	7.0		556.85	564.34	564.59	565.81	564.27	565.70	563.80
9/5/96	13:10:00	1580	7.0		556.95	564.35	564.60	565.81	564.27	565.70	563.70
9/5/96	13:20:00	1590	7.0		558.02	564.36	564.62	565.79	564.27	565.72	563.80
9/5/96	13:30:00	1600	7.0		558.56	564.43	564.64	565.83	564.29	565.72	563.70
9/5/96	13:40:00	1610	7.0		558.82	564.42	564.63	565.83	564.32	565.81	563.70
9/5/96	13:50:00	1620	7.0		558.82	564.38	564.62	565.83	564.30	565.81	563.60
9/5/96	14:00:00	1630	7.0		558.84	564.35	564.62	565.81	564.27	565.79	563.60
9/5/96	14:10:00	1640	7.0		558.82	564.38	564.62	565.83	564.24	565.77	563.60
									564.28	565.77	563.60

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					River	
					PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
9/5/96	14:20:00	1650	7.0		571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/5/96	14:30:00	1660	7.0		558.87	564.39	564.62	565.83	564.27	565.81	563.60
9/5/96	14:40:00	1670	7.0		558.93	564.38	564.62	565.83	564.26	565.81	563.60
9/5/96	14:50:00	1680	7.0		558.97	564.36	564.62	565.83	564.24	565.84	563.50
9/5/96	15:00:00	1690	7.0		559.26	564.36	564.62	565.83	564.24	565.84	563.60
9/5/96	15:10:00	1700	7.0		558.97	564.36	564.62	565.83	564.24	565.86	563.50
9/5/96	15:20:00	1710	7.0		559.11	564.36	564.60	565.88	564.23	565.86	563.50
9/5/96	15:30:00	1720	7.0		559.01	564.36	564.60	565.93	564.22	565.86	563.50
9/5/96	15:40:00	1730	7.0		559.11	564.32	564.59	565.88	564.21	565.88	563.50
9/5/96	15:50:00	1740	7.0		559.03	564.32	564.59	565.88	564.20	565.91	563.40
9/5/96	16:00:00	1750	7.0		559.03	564.31	564.59	565.86	564.19	565.86	563.40
9/5/96	16:06:00	1756	7.0	558.97 (559.46)	558.97	564.30	564.59	565.81	564.17	565.79	563.40
9/5/96	16:10:00	1760	7.0		558.93	564.29	564.59	565.79	564.17	565.70	563.40
9/5/96	16:20:00	1770	7.0		558.70	564.30	564.59	565.81	564.17	565.58	563.40
9/5/96	16:30:00	1780	7.0		558.76	564.30	564.59	565.83	564.17	565.84	563.40
9/5/96	16:40:00	1790	7.0		558.72	564.30	564.59	565.83	564.17	565.84	563.40
9/5/96	16:50:00	1800	7.0		558.50	564.30	564.59	565.83	564.17	565.88	563.40
9/5/96	17:00:00	1810	7.0		558.76	564.30	564.59	565.83	564.17	565.88	563.40
9/5/96	17:05:00	1815	7.0	558.6 (559.18)	558.6	564.29	564.59	565.83	564.16	565.91	563.40
9/5/96	17:10:00	1820	7.0		558.54	564.29	564.59	565.83	564.16	565.91	563.40
9/5/96	17:20:00	1830	7.0		558.62	564.29	564.59	565.86	564.15	565.88	563.40
9/5/96	17:30:00	1840	7.0		558.64	564.29	564.59	565.86	564.15	565.88	563.40
9/5/96	17:40:00	1850	7.0		558.62	564.28	564.59	565.86	564.14	565.88	563.40
9/5/96	17:50:00	1860	7.0		558.64	564.27	564.57	565.86	564.14	565.88	563.40
9/5/96	18:00:00	1870	7.0		558.52	564.28	564.59	565.86	564.14	565.88	563.30
9/5/96	18:10:00	1880	7.0		558.50	564.27	564.59	565.86	564.14	565.88	563.30
9/5/96	18:20:00	1890	7.0		558.64	564.27	564.57	565.86	564.13	565.88	563.30
9/5/96	18:30:00	1900	7.0		558.68	564.25	564.57	565.86	564.13	565.88	563.30
9/5/96	18:40:00	1910	7.0		558.66	564.25	564.57	565.86	564.13	565.88	563.30
9/5/96	18:50:00	1920	7.0	558.64 (559.18)	558.64	564.25 (564.22)	564.57 (564.53)	565.86 (565.64)	564.12 (564.08)	565.88 (565.76)	563.30 (563.46)
9/5/96	19:00:00	1930	7.0		558.35	564.25	564.57	565.86	564.13	565.88	563.30
9/5/96	19:10:00	1940	7.0		558.35	564.25	564.57	565.86	564.12	565.88	563.40
9/5/96	19:20:00	1950	7.0		557.90	564.24	564.56	565.86	564.12	565.88	563.40
9/5/96	19:30:00	1960	7.0		557.61	564.24	564.56	565.86	564.12	565.88	563.40
9/5/96	19:40:00	1970	7.0		557.55	564.24	564.56	565.86	564.12	565.88	563.30

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					River	
					PW-2	MW-2	MW-5SR	GW-5I	GW-5D		GW-8S
9/5/96	19:50:00	1980	7.0		571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/5/96	20:00:00	1990	7.0		557.51	564.24	564.56	565.86	564.11	565.88	563.30
9/5/96	20:10:00	2000	7.0		557.26	564.23	564.56	565.86	564.11	565.88	563.30
9/5/96	20:20:00	2010	7.0		557.30	564.23	564.56	565.83	564.09	565.88	563.30
9/5/96	20:30:00	2020	7.0		557.45	564.23	564.54	565.83	564.09	565.88	563.30
9/5/96	20:40:00	2030	7.0		557.82	564.22	564.54	565.83	564.09	565.88	563.30
9/5/96	20:50:00	2040	7.0		557.67	564.22	564.54	565.83	564.08	565.88	563.30
9/5/96	21:00:00	2050	7.0		557.49	564.22	564.54	565.83	564.07	565.88	563.30
9/5/96	21:10:00	2060	7.0		557.76	564.22	564.54	565.83	564.06	565.88	563.30
9/5/96	21:20:00	2070	7.0		557.78	564.21	564.54	565.83	564.07	565.88	563.30
9/5/96	21:30:00	2080	7.0		557.55 (558.40)	564.21	564.54	565.83	564.05	565.88	563.20
9/5/96	21:40:00	2090	7.0		558.06	564.21	564.54	565.83	564.05	565.88	563.20
9/5/96	21:50:00	2100	7.0		557.73	564.20	564.53	565.83	564.02	565.88	563.20
9/5/96	22:00:00	2110	7.0		557.98	564.19	564.53	565.83	564.01	565.88	563.10
9/5/96	22:10:00	2120	7.0		558.15	564.19	564.53	565.83	563.99	565.88	563.10
9/5/96	22:20:00	2130	7.0		557.84	564.19	564.53	565.83	563.99	565.88	563.10
9/5/96	22:30:00	2140	7.0		557.63 (558.43)	564.17	564.53	565.83	563.97	565.88	563.10
9/5/96	22:40:00	2150	7.0		557.43	564.17	564.53	565.83	563.97	565.88	563.10
9/5/96	22:50:00	2160	7.0		557.59	564.16	564.53	565.86	563.97	565.88	563.00
9/5/96	23:00:00	2170	7.0		557.57	564.16	564.53	565.86	563.97	565.88	563.00
9/5/96	23:10:00	2180	7.0		557.69	564.15	564.51	565.86	563.96	565.88	563.10
9/5/96	23:20:00	2190	7.0		557.45	564.15	564.51	565.86	563.97	565.88	563.00
9/5/96	23:30:00	2200	7.0		557.26	564.14	564.51	565.83	563.97	565.88	563.00
9/5/96	23:37:00	2207	7.0		557.3 (558.04)	564.15	564.51	565.83	563.97	565.88	563.00
9/5/96	23:40:00	2210	7.0		557.28	564.14	564.51	565.83	563.96	565.88	563.10
9/5/96	23:50:00	2220	7.0		557.24	564.14	564.51	565.83	563.97	565.88	563.00
9/6/96	0:00:00	2230	7.0		556.99	564.13	564.50	565.83	563.96	565.88	563.10
9/6/96	0:10:00	2240	7.0		556.89	564.13	564.50	565.83	563.96	565.88	563.00
9/6/96	0:20:00	2250	7.0		557.08	564.14	564.50	565.83	563.96	565.88	563.10
9/6/96	0:30:00	2260	7.0		557.10 (557.96)	564.13	564.50	565.83	563.94	565.88	563.10
9/6/96	0:40:00	2270	7.0		557.26	564.12	564.50	565.83	563.94	565.88	563.00
9/6/96	0:50:00	2280	7.0		557.06	564.12	564.50	565.83	563.94	565.88	563.10
9/6/96	1:00:00	2290	7.0		556.91	564.12	564.50	565.83	563.94	565.88	563.00
9/6/96	1:10:00	2300	7.0		556.89	564.12	564.50	565.83	563.96	565.88	563.00
9/6/96	1:20:00	2310	7.0		556.71	564.12	564.49	565.83	563.94	565.86	563.10

TABLE J.4

PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					River
					PW-2	MW-2	MW-5SR	GW-5I	GW-5D	
9/6/96	1:30:00	2320	7.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/6/96	1:40:00	2330	7.0	556.97	564.12	564.49	565.83	563.96	565.86	563.10
9/6/96	1:50:00	2340	7.0	556.89	564.12	564.49	565.83	563.96	565.88	563.00
9/6/96	2:00:00	2350	7.0	556.60	564.10	564.49	565.83	563.97	565.88	563.10
9/6/96	2:10:00	2360	7.0	556.75	564.10	564.49	565.83	563.97	565.88	563.10
9/6/96	2:20:00	2370	7.0	556.77	564.12	564.49	565.83	563.98	565.88	563.10
9/6/96	2:30:00	2380	7.0	556.56	564.10	564.47	565.83	563.98	565.88	563.10
9/6/96	2:40:00	2390	7.0	556.44	564.10	564.47	565.83	563.99	565.88	563.10
9/6/96	2:48:00	2398	7.0	556.48 (557.29)	564.10	564.47	565.83	564.00	565.88	563.10
9/6/96	2:50:00	2400	7.0	556.36	564.12 (564.09)	564.47	565.83 (565.61)	564.00	565.88	563.10
9/6/96	3:00:00	2410	7.0	556.44	564.12	564.47 (564.45)	565.83	564.00 (563.98)	565.88 (565.76)	563.20 (563.37)
9/6/96	3:10:00	2420	7.0	556.36	564.12	564.47	565.83	564.01	565.88	563.20
9/6/96	3:20:00	2430	7.0	556.34	564.12	564.47	565.81	564.02	565.88	563.30
9/6/96	3:30:00	2440	7.0	556.21	564.12	564.47	565.81	564.04	565.88	563.30
9/6/96	3:40:00	2450	7.0	556.50	564.12	564.47	565.81	564.05	565.88	563.30
9/6/96	3:50:00	2460	7.0	555.99	564.14	564.47	565.81	564.04	565.88	563.30
9/6/96	4:00:00	2470	7.0	556.19	564.13	564.47	565.81	564.05	565.88	563.40
9/6/96	4:10:00	2480	7.0	556.46	564.13	564.47	565.81	564.06	565.86	563.40
9/6/96	4:20:00	2490	7.0	556.13	564.14	564.47	565.81	564.07	565.86	563.40
9/6/96	4:30:00	2500	7.0	556.19 (557.27)	564.14	564.47	565.81	564.07	565.86	563.50
9/6/96	4:40:00	2510	7.0	556.17	564.15	564.46	565.81	564.08	565.86	563.50
9/6/96	4:50:00	2520	7.0	556.17	564.15	564.47	565.81	564.09	565.86	563.50
9/6/96	5:00:00	2530	7.0	556.25	564.15	564.47	565.81	564.09	565.86	563.50
9/6/96	5:10:00	2540	7.0	556.17	564.16	564.46	565.81	564.09	565.86	563.50
9/6/96	5:20:00	2550	7.0	556.21	564.16	564.46	565.79	564.09	565.88	563.60
9/6/96	5:30:00	2560	7.0	556.15	564.16	564.46	565.79	564.11	565.88	563.60
9/6/96	5:40:00	2570	7.0	556.01	564.17	564.46	565.79	564.12	565.88	563.60
9/6/96	5:50:00	2580	7.0	556.27	564.17	564.46	565.79	564.12	565.88	563.60
9/6/96	6:00:00	2590	7.0	556.25 (557.26)	564.17	564.46	565.79	564.13	565.88	563.70
9/6/96	6:10:00	2600	7.0	556.17	564.19	564.46	565.79	564.12	565.88	563.70
9/6/96	6:20:00	2610	7.0	556.48	564.19	564.46	565.79	564.14	565.88	563.70
9/6/96	6:30:00	2620	7.0	556.40	564.19	564.46	565.79	564.13	565.88	563.70
9/6/96	6:40:00	2630	7.0	556.25	564.20	564.46	565.79	564.14	565.88	563.70
9/6/96	6:50:00	2640	7.0	556.40	564.20	564.46	565.79	564.15	565.88	563.70
9/6/96	7:00:00	2650	7.0	556.42 (557.26)	564.21	564.46	565.79	564.15	565.88	563.80

TABLE J.4
PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Reference Elevation (ft amsl)	Water Level (ft amsl)					
					PW-2	MW-2	MW-5SR	GW-5I	GW-5D	GW-8S
9/6/96	7:10:00	2660	7.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/6/96	7:20:00	2670	7.0	556.44	564.21	564.46	565.79	564.15	565.88	563.80
9/6/96	7:30:00	2680	7.0	556.48	564.20	564.46	565.79	564.16	565.88	563.80
9/6/96	7:40:00	2690	7.0	556.46	564.22	564.46	565.79	564.17	565.88	563.90
9/6/96	7:50:00	2700	7.0	556.25	564.22	564.46	565.79	564.19	565.88	564.00
9/6/96	8:00:00	2710	7.0	556.67	564.23	564.46	565.79	564.22	565.88	564.00
9/6/96	8:10:00	2720	7.0	556.67	564.23	564.46	565.79	564.23	565.88	564.10
9/6/96	8:20:00	2730	7.0	556.44	564.24	564.46	565.79	564.26	565.88	564.10
9/6/96	8:30:00	2740	7.0	556.73	564.24	564.46	565.79	564.27	565.88	564.10
9/6/96	8:40:00	2750	7.0	556.50	564.25	564.46	565.77	564.27	565.88	564.10
9/6/96	8:50:00	2760	7.0	556.46 (557.42)	564.27	564.46	565.77	564.28	565.88	564.10
9/6/96	9:00:00	2770	7.0	556.69	564.27	564.47	565.77	564.28	565.86	564.00
9/6/96	9:10:00	2780	7.0	556.48	564.27	564.47	565.77	564.27	565.84	564.20
9/6/96	9:20:00	2790	7.0	556.71	564.31	564.47	565.79	564.29	565.88	564.00
9/6/96	9:30:00	2800	7.0	556.81	564.30	564.47	565.79	564.28	565.84	564.10
9/6/96	9:40:00	2810	7.0	556.81	564.30	564.47	565.79	564.27	565.79	564.10
9/6/96	9:50:00	2820	7.0	556.67	564.29	564.47	565.77	564.27	565.79	564.10
9/6/96	10:00:00	2830	7.0	556.89	564.30	564.49	565.77	564.27	565.81	564.00
9/6/96	10:10:00	2840	7.0	556.50	564.31	564.47	565.79	564.27	565.81	564.00
9/6/96	10:20:00	2850	7.0	556.46	564.32	564.49	565.79	564.29	565.84	564.00
9/6/96	10:30:00	2860	7.0	556.36	564.29	564.47	565.77	564.26	565.81	564.00
9/6/96	10:40:00	2870	7.0	556.57	564.28	564.47	565.74	564.24	565.79	564.00
9/6/96	10:50:00	2880	7.0	556.71	564.28	564.47	565.74 (565.56)	564.26 (564.22)	565.79	564.00
9/6/96	10:55:00	2885	7.0	556.52 (557.45)	564.29 (564.28)	564.47	565.77	564.27	565.79 (565.76)	563.90 (563.71)
9/6/96	11:00:00	2890	7.0	556.58	564.30	564.49	565.77	564.27	565.79	564.00
9/6/96	11:10:00	2900	0.0	560.02 (559.08)	564.32 (564.28)	564.50	565.77	564.27	565.79	564.00
9/6/96	11:12:00	2902	0.0	562.57 (562.63)	564.34 (564.30)	564.54 (564.48)	565.79 (565.56)	564.28 (564.22)	565.81	563.90
9/6/96	11:15:00	2905	0.0	563.04 (562.89)	564.36 (564.31)	564.56 (564.49)	565.77 (565.56)	564.27 (564.22)	565.81	563.90
9/6/96	11:17:00	2907	0.0	563.18 (563.02)	564.35	564.56	565.77	564.24	565.79	563.90
9/6/96	11:19:00	2909	0.0	563.31 (563.12)	564.32	564.56	565.74	564.22	565.77	563.80
9/6/96	11:20:00	2910	0.0	563.31	564.32	564.56	565.74	564.23	565.77	563.90
9/6/96	11:24:00	2914	0.0	563.59 (563.34)	564.37	564.57	565.77	564.24	565.81	563.80
9/6/96	11:29:00	2919	0.0	563.8 (563.54)	564.39	564.59	565.77	564.24	565.79	563.70
9/6/96	11:30:00	2920	0.0	563.82	564.39	564.59	565.77	564.26	565.79	563.70
9/6/96	11:34:00	2924	0.0	563.92 (563.72)	564.37	564.59	565.74	564.22	565.77	563.80

TABLE J.4

**PW-2 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonaawanda, New York**

Date	Time	Elapsed Time (min)	Pumping Rate (gpm)	Water Level (ft amsl)						River
				PW-2	MW-2	MW-5SR	GW-5I	GW-5D	GW-8S	
Reference Elevation (ft amsl)										
9/6/96	11:40:00	2930	0.0	571.38	570.45	570.36	570.58	570.84	575.60	566.60
9/6/96	11:46:00	2936	0.0	564.17	564.45	564.62	565.77	564.27	565.79	563.70
9/6/96	11:50:00	2940	0.0	564.27 (563.94)	564.42	564.62	565.74	564.24	565.77	563.70
9/6/96	11:56:00	2946	0.0	564.29	564.43	564.62	565.74	564.23	565.77	563.70
9/6/96	12:00:00	2950	0.0	564.40 (564.04)	564.44	564.62	565.74	564.23	565.74	563.60
9/6/96	12:10:00	2960	0.0	564.38	564.44	564.63	565.74	564.22	565.74	563.50
9/6/96	12:18:00	2968	0.0	564.42	564.42	564.63	565.74	564.21	565.72	563.50
9/6/96	12:20:00	2970	0.0	564.52 (564.30)	564.46	564.63	565.77	564.21	565.77	563.50
9/6/96	12:30:00	2980	0.0	564.52	564.49	564.64	565.77	564.23	565.77	563.50
9/6/96	12:30:00	2980	0.0	564.56	564.49	564.64	565.77	564.23	565.77	563.50

Note:

- River level transducer data calibrated by matching curve to manual readings. Transducer readings by subtracting a constant of 4.40 feet from the reference elevation.
- (564.04) indicates a manual water level measurement.

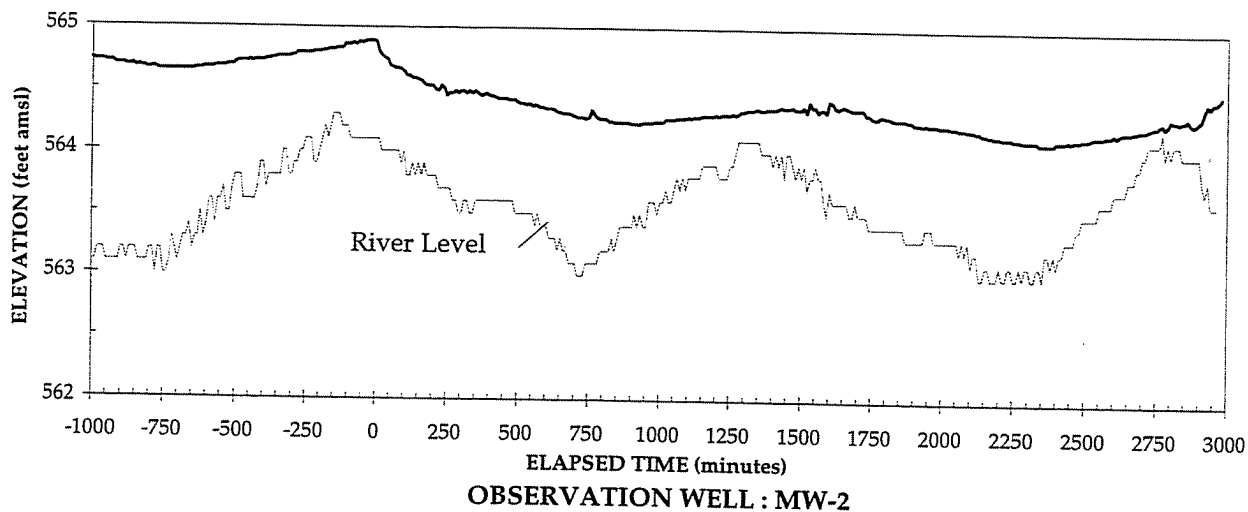
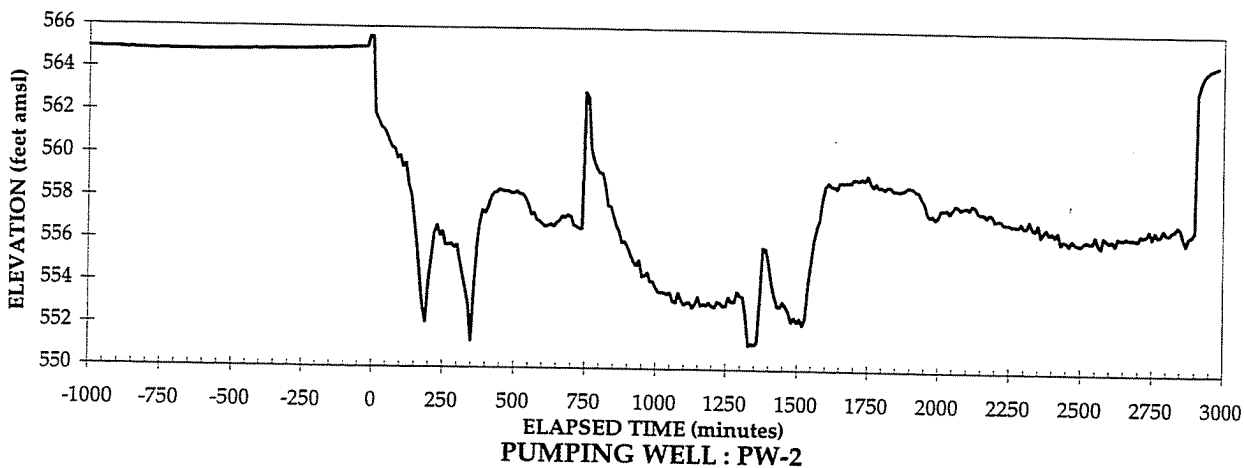
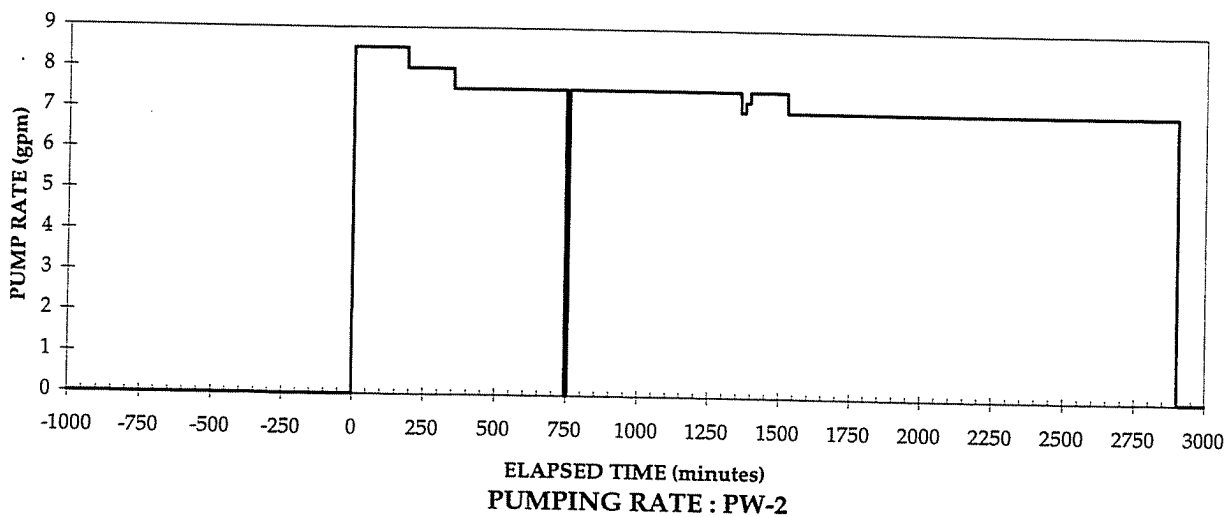


figure J.9
MW-2 WELL RESPONSE
PW-2 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

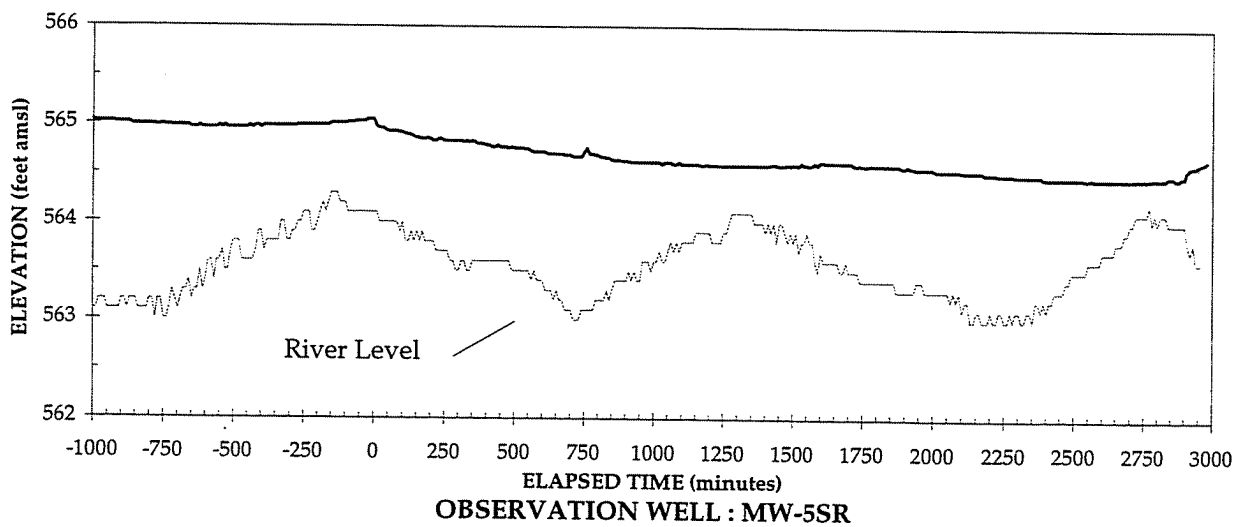
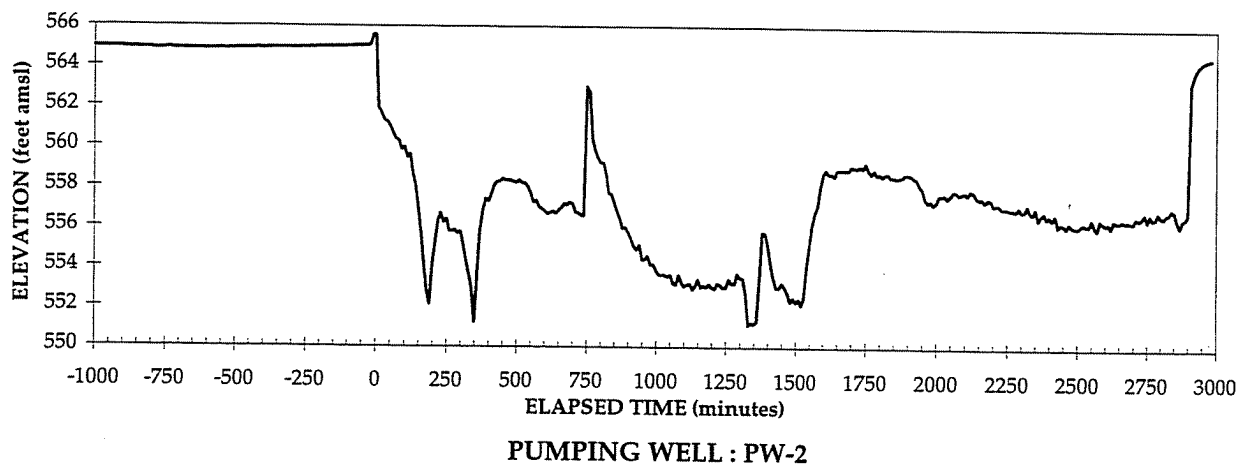
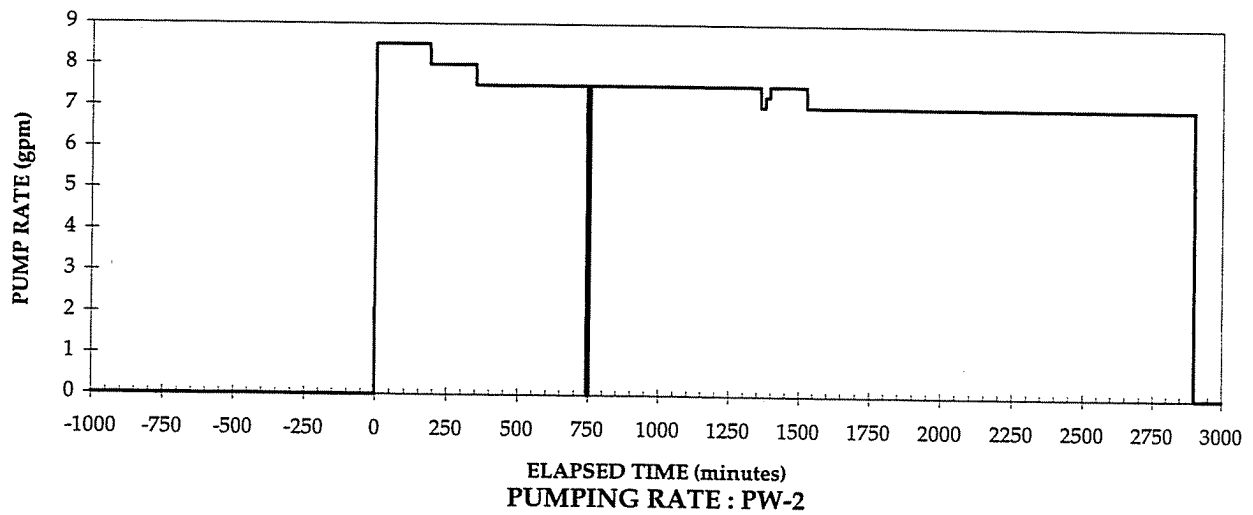


figure J.10
 MW-5SR WELL RESPONSE
 PW-2 PUMPING TEST
 GRATWICK-RIVERSIDE PARK
 North Tonawanda, New York

CRA

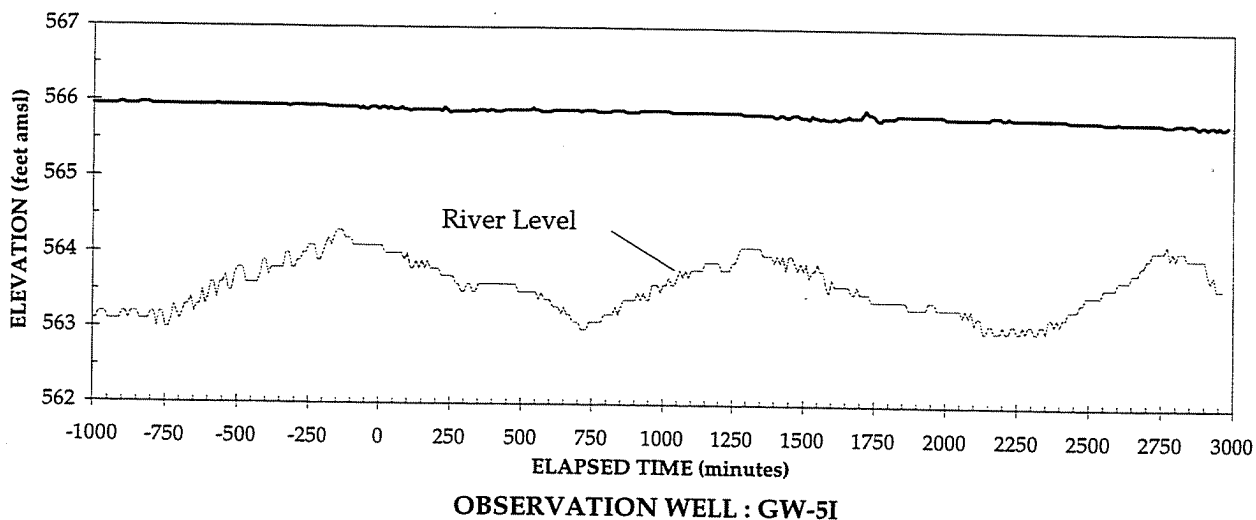
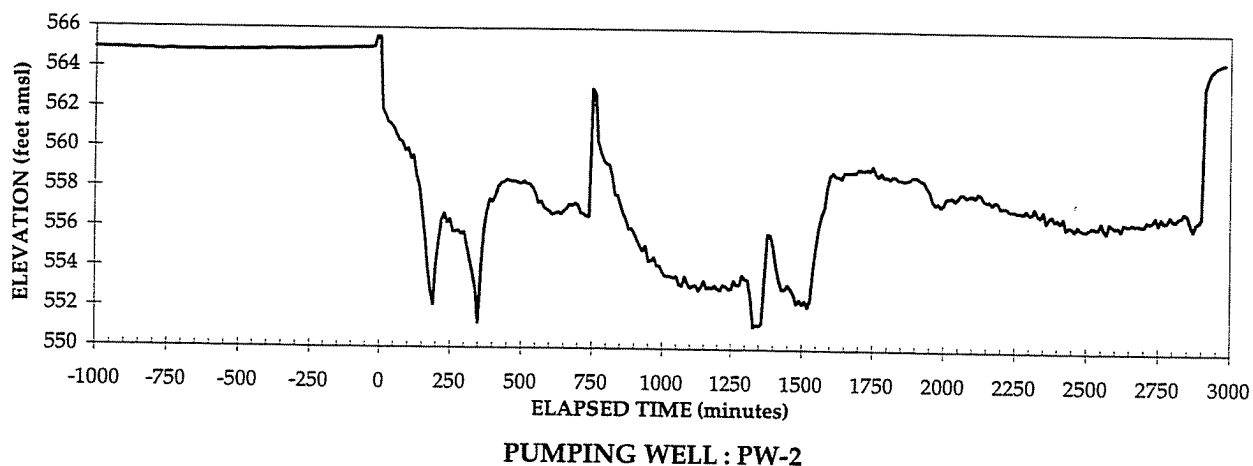
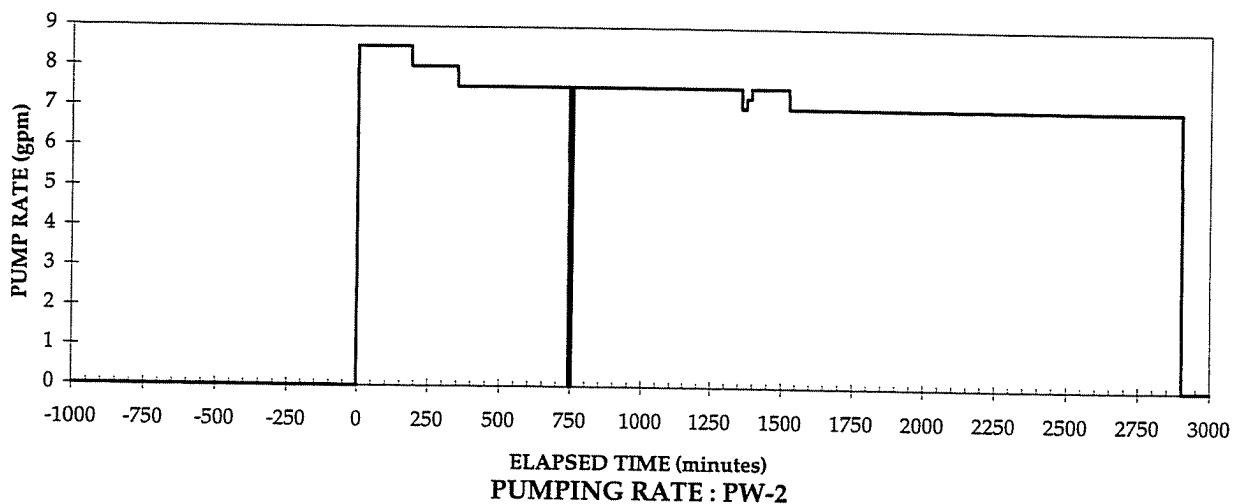


figure J.11
 GW-5I WELL RESPONSE
 PW-2 PUMPING TEST
 GRATWICK-RIVERSIDE PARK
 North Tonawanda, New York

CRA

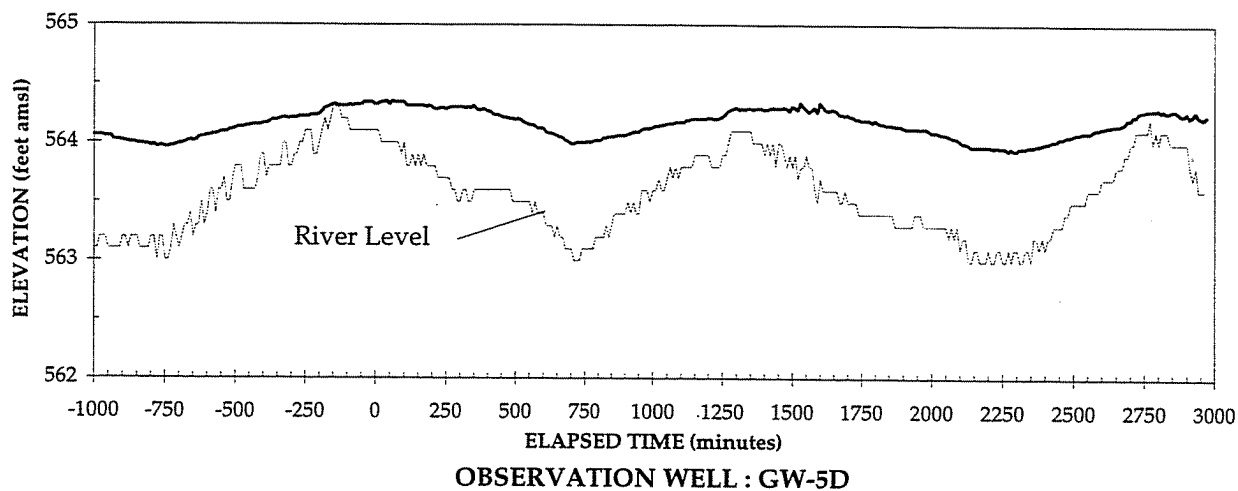
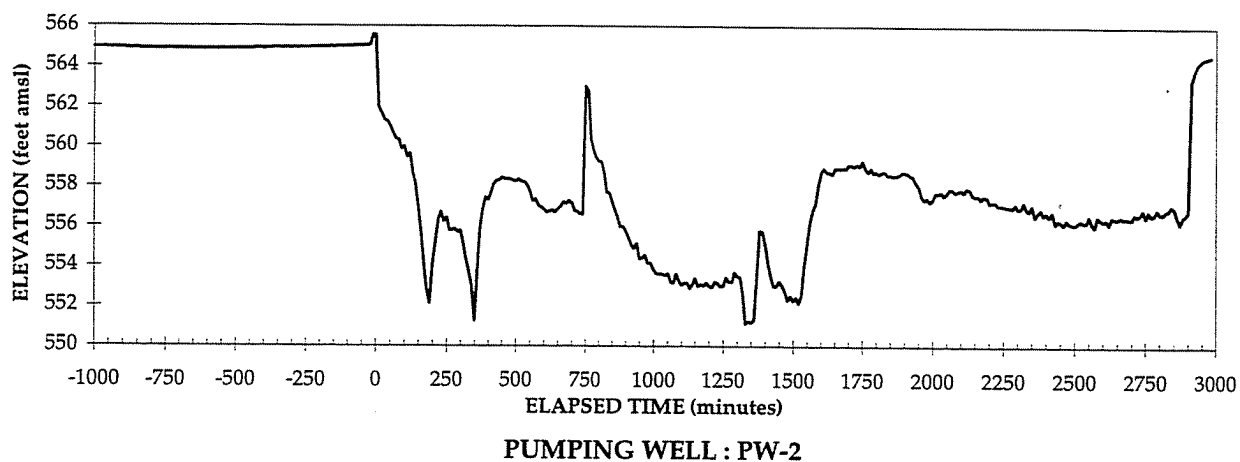
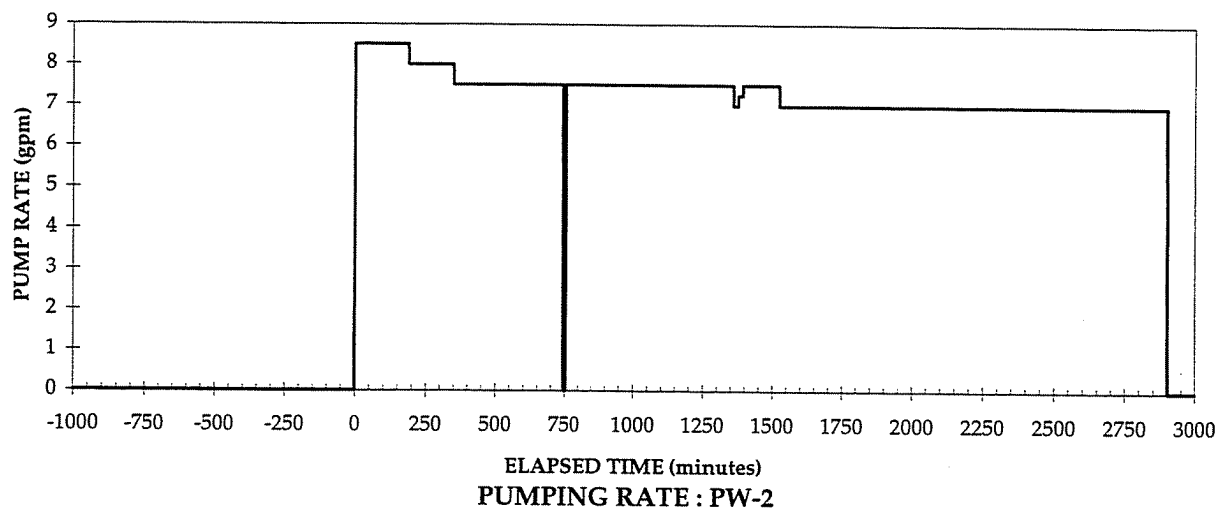


figure J.12
 GW-5D WELL RESPONSE
 PW-2 PUMPING TEST
 GRATWICK-RIVERSIDE PARK
 North Tonawanda, New York

CRA

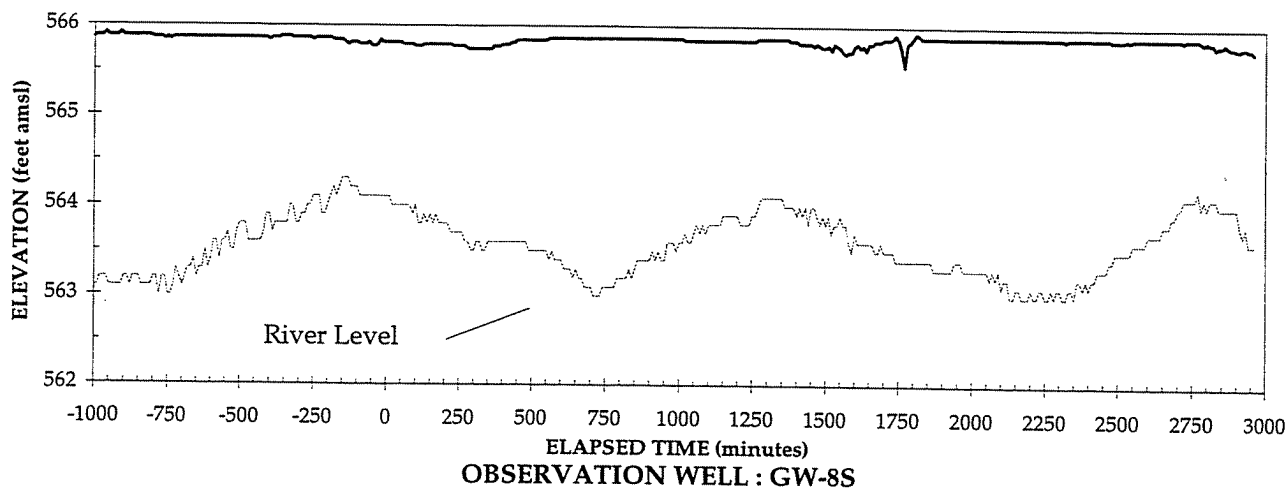
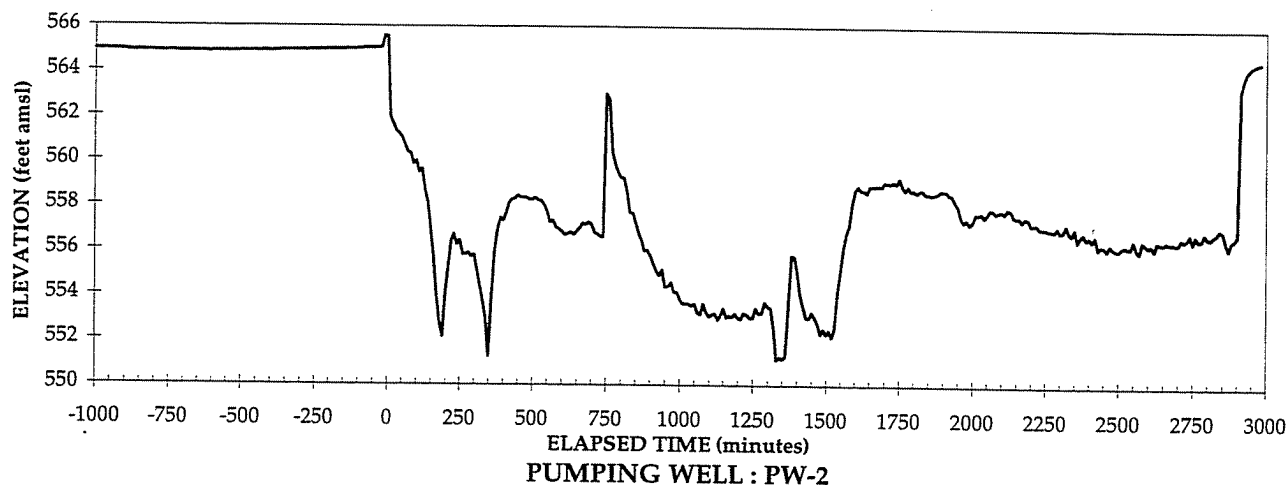
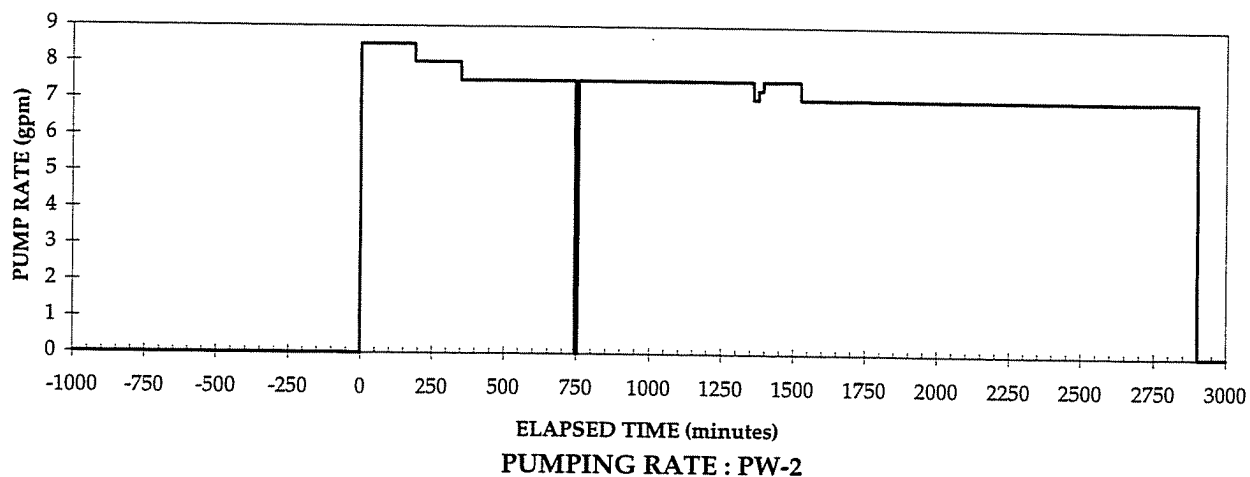


figure J.13
GW-8S WELL RESPONSE
PW-2 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

TABLE J.5
 PW-3 STEP TEST WATER LEVELS
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
9/6/96	13:57:00	-25	9.21	0.05
9/6/96	13:58:00	-24	9.27	0.11
9/6/96	13:59:00	-23	9.28	0.12
9/6/96	14:00:00	-22	9.28	0.12
9/6/96	14:01:00	-21	9.28	0.12
9/6/96	14:02:00	-20	9.28	0.12
9/6/96	14:03:00	-19	9.27	0.11
9/6/96	14:04:00	-18	9.25	0.09
9/6/96	14:05:00	-17	9.25	0.09
9/6/96	14:06:00	-16	9.27	0.11
9/6/96	14:07:00	-15	9.27	0.11
9/6/96	14:08:00	-14	9.28	0.12
9/6/96	14:09:00	-13	9.28	0.12
9/6/96	14:10:00	-12	9.30	0.14
9/6/96	14:11:00	-11	9.32	0.16
9/6/96	14:12:00	-10	9.35	0.19
9/6/96	14:13:00	-9	9.35	0.19
9/6/96	14:14:00	-8	9.30	0.14
9/6/96	14:15:00	-7	9.28 (9.29)	0.12
9/6/96	14:16:00	-6	9.27	0.11
9/6/96	14:17:00	-5	9.27	0.11
9/6/96	14:18:00	-4	9.30	0.14
9/6/96	14:19:00	-3	9.33	0.17
9/6/96	14:20:00	-2	9.33	0.17
9/6/96	14:21:00	-1	9.35	0.19

Pump Rate 5 gpm at 14:22

9/6/96	14:22:00	0	10.04	0.88
9/6/96	14:23:00	1	9.72 (9.70)	0.56
9/6/96	14:24:00	2	9.70	0.54
9/6/96	14:25:00	3	9.75	0.59
9/6/96	14:26:00	4	9.75	0.59
9/6/96	14:27:00	5	9.70	0.54
9/6/96	14:28:00	6	9.70 (9.72)	0.54
9/6/96	14:29:00	7	9.66	0.50
9/6/96	14:30:00	8	9.68	0.52
9/6/96	14:31:00	9	9.59	0.43
9/6/96	14:32:00	10	9.73	0.57
9/6/96	14:33:00	11	9.68	0.52
9/6/96	14:34:00	12	9.70	0.54
9/6/96	14:35:00	13	9.66	0.50
9/6/96	14:36:00	14	9.72	0.56
9/6/96	14:37:00	15	9.73	0.57
9/6/96	14:38:00	16	9.68	0.52
9/6/96	14:39:00	17	9.73	0.57
9/6/96	14:40:00	18	9.79	0.63
9/6/96	14:41:00	19	9.80	0.64
9/6/96	14:42:00	20	9.75	0.59
9/6/96	14:43:00	21	9.73	0.57
9/6/96	14:44:00	22	9.73	0.57
9/6/96	14:45:00	23	9.72	0.56
9/6/96	14:46:00	24	9.77	0.61
9/6/96	14:47:00	25	9.75	0.59
9/6/96	14:48:00	26	9.75	0.59
9/6/96	14:49:00	27	9.77	0.61

TABLE J.5
PW-3 STEP TEST WATER LEVELS
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
9/6/96	14:50:00	28	9.73	0.57
9/6/96	14:51:00	29	9.77	0.61
9/6/96	14:52:00	30	9.72	0.56
9/6/96	14:53:00	31	9.73	0.57
9/6/96	14:54:00	32	9.77	0.61
9/6/96	14:55:00	33	9.77 (9.79)	0.61
9/6/96	14:56:00	34	9.73	0.57
9/6/96	14:57:00	35	9.75	0.59
9/6/96	14:58:00	36	9.75	0.59
9/6/96	14:59:00	37	9.77	0.61
9/6/96	15:00:00	38	9.75	0.59
9/6/96	15:01:00	39	9.77	0.61
9/6/96	15:02:00	40	9.80	0.64
9/6/96	15:03:00	41	9.77 (9.80)	0.61

Pump Rate 10 gpm at 15:04

9/6/96	15:04:00	42	9.80	0.64
9/6/96	15:05:00	43	10.27	1.11
9/6/96	15:06:00	44	10.34 (10.40)	1.18
9/6/96	15:07:00	45	10.39	1.23
9/6/96	15:08:00	46	10.39	1.23
9/6/96	15:09:00	47	10.41	1.25
9/6/96	15:10:00	48	10.36	1.20
9/6/96	15:11:00	49	10.41	1.25
9/6/96	15:12:00	50	10.39	1.23
9/6/96	15:13:00	51	10.41	1.25
9/6/96	15:14:00	52	10.41	1.25
9/6/96	15:15:00	53	10.43	1.27
9/6/96	15:16:00	54	10.43	1.27
9/6/96	15:17:00	55	10.43	1.27
9/6/96	15:18:00	56	10.41 (10.47)	1.25
9/6/96	15:19:00	57	10.43	1.27
9/6/96	15:20:00	58	10.44	1.28
9/6/96	15:21:00	59	10.43	1.27
9/6/96	15:22:00	60	10.41	1.25
9/6/96	15:23:00	61	10.46	1.30
9/6/96	15:24:00	62	10.44 (10.49)	1.28
9/6/96	15:25:00	63	10.51	1.35
9/6/96	15:26:00	64	10.48	1.32
9/6/96	15:27:00	65	10.44	1.28
9/6/96	15:28:00	66	10.51	1.35
9/6/96	15:29:00	67	10.50	1.34
9/6/96	15:30:00	68	10.51	1.35
9/6/96	15:31:00	69	10.50	1.34
9/6/96	15:32:00	70	10.44	1.28
9/6/96	15:33:00	71	10.51	1.35
9/6/96	15:34:00	72	10.46	1.30
9/6/96	15:35:00	73	10.48	1.32
9/6/96	15:36:00	74	10.50	1.34
9/6/96	15:37:00	75	10.48	1.32

Pump Rate 20 gpm at 15:38

9/6/96	15:38:00	76	10.48 (10.54)	1.32
9/6/96	15:39:00	77	10.53	1.37

TABLE J.5
 PW-3 STEP TEST WATER LEVELS
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

<i>Date</i>	<i>Time</i>	<i>Elapsed Time (minutes)</i>	<i>Water Level (ft btoc)</i>	<i>Drawdown (feet)</i>
9/6/96	15:40:00	78	12.14 (12.05)	2.98
9/6/96	15:41:00	79	12.44 (12.48)	3.28
9/6/96	15:42:00	80	12.51	3.35
9/6/96	15:43:00	81	12.57	3.41
9/6/96	15:44:00	82	12.54	3.38
9/6/96	15:45:00	83	12.57	3.41
9/6/96	15:46:00	84	12.63 (12.68)	3.47
9/6/96	15:47:00	85	12.68	3.52
<i>Pump Rate 22 gpm at 15:50 - manual measurements</i>				
9/6/96	15:50:00	88	12.77	3.61
9/6/96	15:51:00	89	13.31	4.15
9/6/96	15:52:00	90	13.59	4.43
9/6/96	15:57:00	95	13.69	4.53
9/6/96	16:05:00	103	13.98	4.82
9/6/96	16:09:00	107	14.10	4.94

Note: (12.68) indicates a manual water level measurement.

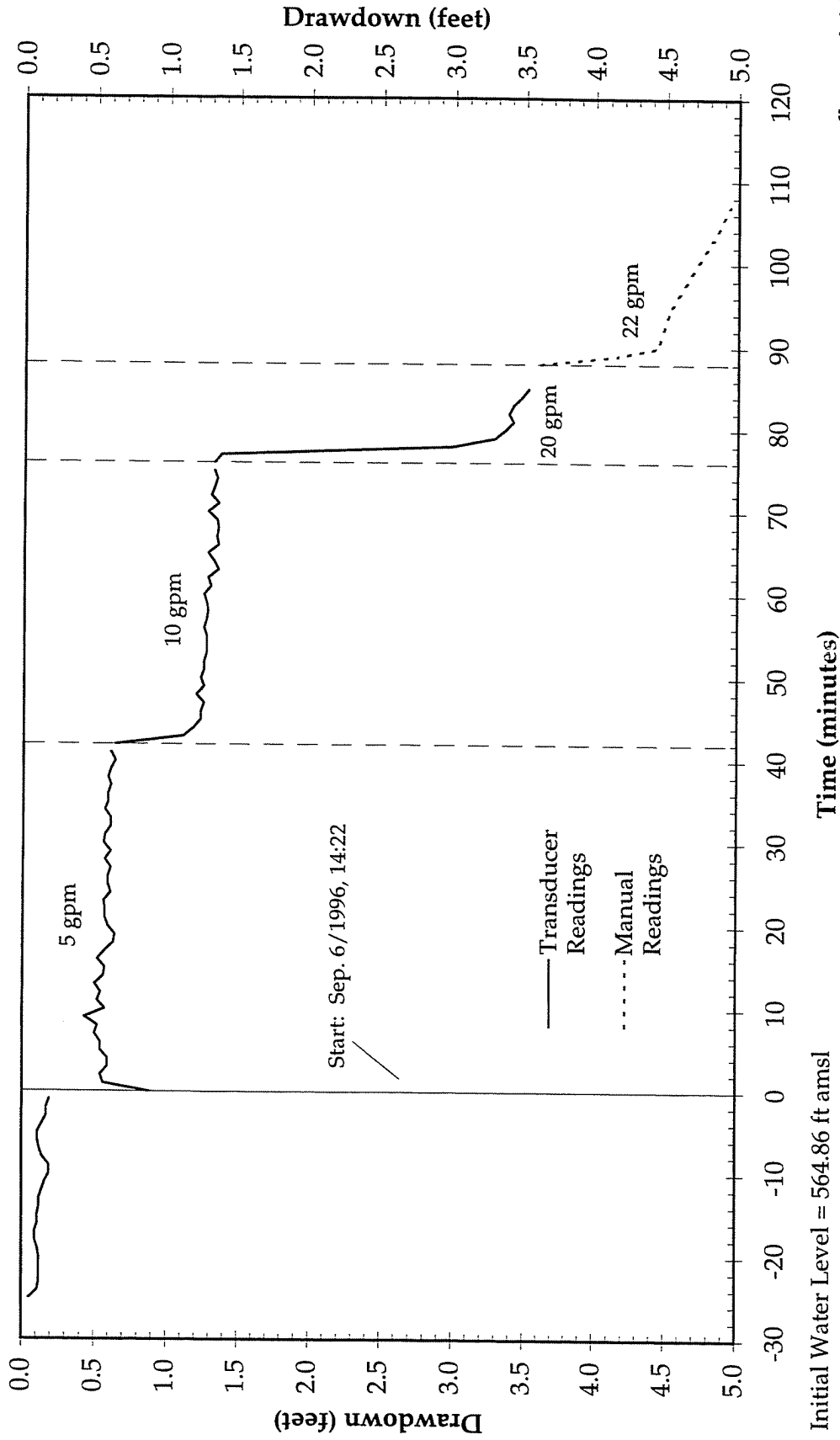


figure J.14
STEP-TEST RESPONSE
WITHDRAWAL WELL PW-3
GRATWICK RIVERSIDE PARK
North Tonawanda, New York

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TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			River
				PW-3	MW-3	GW-9S	
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/9/96	18:45:00	-1000	0.0	565.31	565.53	565.29	
9/9/96	18:55:00	-990	0.0	565.32	565.54	565.29	
9/9/96	19:05:00	-980	0.0	565.31	565.54	565.29	
9/9/96	19:15:00	-970	0.0	565.32	565.53	565.29	
9/9/96	19:25:00	-960	0.0	565.32	565.54	565.29	
9/9/96	19:35:00	-950	0.0	565.32	565.54	565.29	
9/9/96	19:45:00	-940	0.0	565.32	565.54	565.29	
9/9/96	19:55:00	-930	0.0	565.32	565.54	565.29	
9/9/96	20:05:00	-920	0.0	565.31	565.54	565.29	
9/9/96	20:15:00	-910	0.0	565.31	565.54	565.29	
9/9/96	20:25:00	-900	0.0	565.31	565.54	565.29	
9/9/96	20:35:00	-890	0.0	565.32	565.53	565.29	
9/9/96	20:45:00	-880	0.0	565.32	565.53	565.28	
9/9/96	20:55:00	-870	0.0	565.32	565.54	565.29	
9/9/96	21:05:00	-860	0.0	565.31	565.53	565.28	
9/9/96	21:15:00	-850	0.0	565.32	565.54	565.29	
9/9/96	21:25:00	-840	0.0	565.31	565.54	565.29	
9/9/96	21:35:00	-830	0.0	565.31	565.54	565.29	
9/9/96	21:45:00	-820	0.0	565.32	565.53	565.28	
9/9/96	21:55:00	-810	0.0	565.32	565.53	565.28	
9/9/96	22:05:00	-800	0.0	565.32	565.54	565.29	
9/9/96	22:15:00	-790	0.0	565.32	565.54	565.29	
9/9/96	22:25:00	-780	0.0	565.32	565.54	565.29	
9/9/96	22:35:00	-770	0.0	565.32	565.53	565.28	
9/9/96	22:45:00	-760	0.0	565.32	565.54	565.28	
9/9/96	22:55:00	-750	0.0	565.32	565.53	565.28	
9/9/96	23:05:00	-740	0.0	565.32	565.53	565.28	
9/9/96	23:15:00	-730	0.0	565.32	565.54	565.28	
9/9/96	23:25:00	-720	0.0	565.31	565.53	565.28	
9/9/96	23:35:00	-710	0.0	565.31	565.54	565.28	
9/9/96	23:45:00	-700	0.0	565.32	565.54	565.28	
9/9/96	23:55:00	-690	0.0	565.31	565.54	565.29	
9/10/96	0:05:00	-680	0.0	565.32	565.53	565.29	
9/10/96	0:15:00	-670	0.0	565.32	565.53	565.29	
9/10/96	0:25:00	-660	0.0	565.32	565.53	565.28	
9/10/96	0:35:00	-650	0.0	565.32	565.53	565.29	
9/10/96	0:45:00	-640	0.0	565.32	565.53	565.28	
9/10/96	0:55:00	-630	0.0	565.32	565.54	565.28	
9/10/96	1:05:00	-620	0.0	565.32	565.53	565.28	
9/10/96	1:15:00	-610	0.0	565.32	565.54	565.28	
9/10/96	1:25:00	-600	0.0	565.32	565.53	565.28	
9/10/96	1:35:00	-590	0.0	565.32	565.53	565.28	
9/10/96	1:45:00	-580	0.0	565.32	565.54	565.28	
9/10/96	1:55:00	-570	0.0	565.32	565.54	565.27	
9/10/96	2:05:00	-560	0.0	565.32	565.53	565.28	
9/10/96	2:15:00	-550	0.0	565.32	565.54	565.28	
9/10/96	2:25:00	-540	0.0	565.32	565.53	565.28	
9/10/96	2:35:00	-530	0.0	565.32	565.53	565.28	
9/10/96	2:45:00	-520	0.0	565.32	565.54	565.28	
9/10/96	2:55:00	-510	0.0	565.32	565.54	565.28	
9/10/96	3:05:00	-500	0.0	565.32	565.53	565.31	
9/10/96	3:15:00	-490	0.0	565.32	565.54	565.32	
9/10/96	3:25:00	-480	0.0	565.32	565.54	565.34	
9/10/96	3:35:00	-470	0.0	565.32	565.54	565.32	

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			River
				PW-3	MW-3	GW-9S	
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/10/96	3:45:00	-460	0.0	565.32	565.53	565.31	(563.84)
9/10/96	3:55:00	-450	0.0	565.32	565.54	565.31	
9/10/96	4:05:00	-440	0.0	565.32	565.53	565.29	
9/10/96	4:15:00	-430	0.0	565.32	565.53	565.31	
9/10/96	4:25:00	-420	0.0	565.32	565.53	565.29	
9/10/96	4:35:00	-410	0.0	565.34	565.54	565.28	
9/10/96	4:45:00	-400	0.0	565.32	565.53	565.28	
9/10/96	4:55:00	-390	0.0	565.32	565.53	565.29	
9/10/96	5:05:00	-380	0.0	565.32	565.54	565.29	
9/10/96	5:15:00	-370	0.0	565.32	565.53	565.29	
9/10/96	5:25:00	-360	0.0	565.31	565.53	565.29	
9/10/96	5:35:00	-350	0.0	565.31	565.54	565.29	
9/10/96	5:45:00	-340	0.0	565.31	565.53	565.29	
9/10/96	5:55:00	-330	0.0	565.31	565.53	565.29	
9/10/96	6:05:00	-320	0.0	565.31	565.53	565.29	
9/10/96	6:15:00	-310	0.0	565.32	565.53	565.29	
9/10/96	6:25:00	-300	0.0	565.32	565.54	565.29	
9/10/96	6:35:00	-290	0.0	565.32	565.53	565.29	
9/10/96	6:45:00	-280	0.0	565.32	565.53	565.29	
9/10/96	6:55:00	-270	0.0	565.32	565.53	565.29	
9/10/96	7:05:00	-260	0.0	565.32	565.53	565.29	
9/10/96	7:15:00	-250	0.0	565.32	565.54	565.28	
9/10/96	7:25:00	-240	0.0	565.32	565.53	565.27	
9/10/96	7:35:00	-230	0.0	565.32	565.53	565.27	
9/10/96	7:45:00	-220	0.0	565.32	565.53	565.27	
9/10/96	7:55:00	-210	0.0	565.31	565.53	565.24	
9/10/96	8:05:00	-200	0.0	565.32	565.53	565.24	
9/10/96	8:15:00	-190	0.0	565.32	565.53	565.25	
9/10/96	8:25:00	-180	0.0	565.32	565.53	565.28	
9/10/96	8:35:00	-170	0.0	565.32	565.53	565.28	
9/10/96	8:45:00	-160	0.0	565.32	565.53	565.29	
9/10/96	8:55:00	-150	0.0	565.32	565.53	565.28	
9/10/96	9:05:00	-140	0.0	565.32	565.53	565.28	
9/10/96	9:15:00	-130	0.0	565.32	565.53	565.28	
9/10/96	9:25:00	-120	0.0	565.31	565.53	565.29	
9/10/96	9:35:00	-110	0.0	565.32	565.53	565.29	
9/10/96	9:45:00	-100	0.0	565.32	565.53	565.29	
9/10/96	9:55:00	-90	0.0	565.34	565.54	565.29	
9/10/96	10:05:00	-80	0.0	565.34	565.53	565.29	
9/10/96	10:15:00	-70	0.0	565.32	565.52	565.29	
9/10/96	10:25:00	-60	0.0	565.36	565.55	565.31	
9/10/96	10:35:00	-50	0.0	565.32	565.47	565.28	
9/10/96	10:45:00	-40	0.0	565.32	565.48	565.29	
9/10/96	10:55:00	-30	0.0	565.34	565.51	565.29	
9/10/96	11:05:00	-20	0.0	565.37 (565.35)	565.56 (565.54)	565.31 (565.29)	
9/10/96	11:15:00	-10	0.0	565.36	565.59	565.31	
9/10/96	11:22:00	-3	0.0	565.32 (565.34)	565.53	565.29	
9/10/96	11:25:00	0	22.0	563.31	565.35	565.27	
9/10/96	11:26:00	1	22.0	562.01 (562.61)	565.28	565.25	
9/10/96	11:27:00	2	22.0	562.08 (562.09)	565.24	565.24	
9/10/96	11:28:00	3	22.0	562.00 (561.94)	565.22	565.24	
9/10/96	11:30:00	5	22.0	561.65	565.17	565.22	
9/10/96	11:35:00	10	22.0	561.46	565.09	565.18	
9/10/96	11:45:00	20	22.0	561.58	565.12	565.15	

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/10/96	11:55:00	30	22.0	560.94 (560.73)	564.99 (564.95)	565.09 (565.08)	
9/10/96	12:05:00	40	22.0	560.40	564.84	565.03	
9/10/96	12:15:00	50	22.0	560.28	564.92	565.03	
9/10/96	12:25:00	60	22.0	559.54 (559.76)	564.76 (564.80)	564.98 (564.92)	
9/10/96	12:35:00	70	22.0	558.39	564.82	564.98	
9/10/96	12:45:00	80	22.0	557.99	564.78	564.95	
9/10/96	12:50:00	85	20.0	560.04	564.69	564.92	
9/10/96	12:55:00	90	20.0	560.11	564.78 (564.64)	564.93 (564.92)	
9/10/96	13:05:00	100	20.0	560.40	564.69	564.90	
9/10/96	13:15:00	110	20.0	559.64	564.69	564.90	
9/10/96	13:25:00	120	20.0	560.49 (560.01)	564.74 (564.66)	564.89 (564.87)	(563.79)
9/10/96	13:35:00	130	20.0	559.78	564.74	564.88	
9/10/96	13:45:00	140	20.0	559.83	564.63	564.85	
9/10/96	13:49:00	144	20.0	559.45 (559.47)	564.69	564.85	
9/10/96	13:55:00	150	20.0	559.29	564.67	564.85	
9/10/96	14:05:00	160	20.0	558.74	564.62	564.82	
9/10/96	14:15:00	170	20.0	558.53	564.67	564.83	563.76 (563.80)
9/10/96	14:25:00	180	20.0	557.92	564.61	564.80	563.81
9/10/96	14:31:00	186	18.0	557.41 (557.43)	564.59 (564.57)	564.80 (564.79)	563.83
9/10/96	14:35:00	190	18.0	560.96	564.62	564.80	563.85
9/10/96	14:45:00	200	18.0	560.45	564.59	564.79	563.83
9/10/96	14:55:00	210	18.0	560.70	564.56	564.77	563.83
9/10/96	15:05:00	220	18.0	560.68	564.56	564.77	563.83
9/10/96	15:15:00	230	18.0	560.96	564.56	564.77	563.83
9/10/96	15:25:00	240	18.0	560.71	564.56	564.77	563.85
9/10/96	15:26:00	241	18.0	560.40 (560.41)	564.56 (564.54)	564.76 (564.75)	563.85
9/10/96	15:35:00	250	18.0	560.99	564.56	564.76	563.85
9/10/96	15:45:00	260	18.0	560.54	564.57	564.76	563.87
9/10/96	15:55:00	270	18.0	560.21	564.56	564.75	563.87
9/10/96	16:05:00	280	18.0	560.18	564.54	564.73	563.87
9/10/96	16:15:00	290	18.0	560.11	564.53	564.73	563.88
9/10/96	16:25:00	300	18.0	560.18 (560.02)	564.53 (564.50)	564.73	563.90
9/10/96	16:27:00	302	18.0	560.80	564.53 (564.46)	564.73	563.90
9/10/96	16:35:00	310	18.0	560.70	564.52	564.72	563.90
9/10/96	16:45:00	320	18.0	559.92	564.53	564.72	563.92
9/10/96	16:55:00	330	18.0	559.64	564.52	564.72	563.92
9/10/96	17:05:00	340	18.0	559.57	564.51	564.70	563.94
9/10/96	17:15:00	350	18.0	559.50	564.51	564.70	563.94
9/10/96	17:25:00	360	18.0	558.98	564.49	564.69	563.94
9/10/96	17:26:00	361	18.0	558.95 (559.12)	564.48	564.69 (564.67)	563.94
9/10/96	17:35:00	370	18.0	559.22	564.49	564.69	563.97
9/10/96	17:45:00	380	18.0	559.03	564.49	564.67	563.95
9/10/96	17:55:00	390	18.0	558.90	564.48	564.67	563.97
9/10/96	18:05:00	400	18.0	558.24	564.47	564.66	563.97
9/10/96	18:15:00	410	18.0	558.65	564.48	564.66	563.97
9/10/96	18:25:00	420	18.0	557.56	564.46	564.64	563.99
9/10/96	18:35:00	430	18.0	557.60	564.45	564.64	563.99
9/10/96	18:45:00	440	18.0	557.42	564.45	564.63	563.99
9/10/96	18:55:00	450	18.0	557.15	564.44	564.63	563.99
9/10/96	19:05:00	460	18.0	557.65	564.45	564.63	563.97
9/10/96	19:15:00	470	18.0	557.23	564.44	564.62	564.00
9/10/96	19:20:00	475	17.0	558.01 (557.21)	564.44	564.62	564.00
9/10/96	19:25:00	480	17.0	559.03	564.43 (564.41)	564.62 (564.64)	564.00 (563.97)
9/10/96	19:35:00	490	17.0	559.66	564.43	564.60	564.00

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/10/96	19:45:00	500	17.0	559.59	564.43	564.60	564.02
9/10/96	19:55:00	510	17.0	559.17	564.41	564.60	564.02
9/10/96	20:05:00	520	17.0	558.69	564.40	564.59	564.00
9/10/96	20:15:00	530	17.0	558.90	564.40	564.59	564.00
9/10/96	20:25:00	540	17.0	558.79	564.39	564.57	564.00
9/10/96	20:35:00	550	17.0	558.64	564.39	564.57	564.00
9/10/96	20:45:00	560	17.0	558.83	564.38	564.57	563.99
9/10/96	20:55:00	570	17.0	558.34	564.38	564.57	564.00
9/10/96	21:05:00	580	17.0	558.17	564.38	564.57	563.99
9/10/96	21:15:00	590	17.0	557.79	564.38	564.56	563.99
9/10/96	21:25:00	600	17.0	557.68	564.37	564.56	563.99
9/10/96	21:35:00	610	17.0	557.39	564.37	564.56	563.99
9/10/96	21:45:00	620	17.0	557.39	564.37	564.56	563.99
9/10/96	21:55:00	630	17.0	557.58	564.36	564.56	563.97
9/10/96	22:05:00	640	17.0	557.28	564.36	564.54	563.97
9/10/96	22:15:00	650	17.0	557.16	564.36	564.54	563.97
9/10/96	22:25:00	660	17.0	557.89	564.36	564.54	563.97
9/10/96	22:35:00	670	17.0	557.21	564.34	564.54	563.95
9/10/96	22:45:00	680	16.0	559.12 (557.29)	564.34	564.54	563.99
9/10/96	22:55:00	690	16.0	560.26	564.34	564.53	564.00
9/10/96	23:05:00	700	16.0	560.14	564.33	564.53	564.00
9/10/96	23:15:00	710	16.0	560.33	564.34	564.53	563.99
9/10/96	23:25:00	720	16.0	560.04	564.34	564.53	563.99
9/10/96	23:35:00	730	16.0	560.32	564.34	564.51	563.99
9/10/96	23:45:00	740	16.0	560.30	564.34	564.51	563.99
9/10/96	23:55:00	750	16.0	559.80	564.34	564.51	564.02
9/11/96	0:05:00	760	16.0	560.02	564.33	564.51	563.99
9/11/96	0:15:00	770	16.0	559.71	564.33	564.51	564.00
9/11/96	0:25:00	780	16.0	559.48	564.34	564.51	564.00
9/11/96	0:35:00	790	16.0	559.45	564.33	564.51	563.99
9/11/96	0:45:00	800	16.0	559.69	564.34	564.51	564.00
9/11/96	0:55:00	810	16.0	559.47	564.34	564.51	563.99
9/11/96	1:05:00	820	16.0	559.62	564.34	564.51	563.99
9/11/96	1:15:00	830	16.0	559.29	564.33	564.50	563.99
9/11/96	1:25:00	840	16.0	559.81	564.32	564.50	563.97
9/11/96	1:35:00	850	16.0	559.26	564.33	564.50	563.97
9/11/96	1:45:00	860	16.0	559.10	564.33	564.50	563.99
9/11/96	1:55:00	870	16.0	558.88	564.32	564.50	563.97
9/11/96	2:05:00	880	16.0	558.95	564.32	564.49	563.97
9/11/96	2:15:00	890	16.0	558.70	564.31	564.49	563.95
9/11/96	2:25:00	900	16.0	558.51	564.31	564.49	563.95
9/11/96	2:35:00	910	16.0	557.96	564.31	564.49	563.94
9/11/96	2:45:00	920	16.0	558.03	564.30	564.49	563.94
9/11/96	2:55:00	930	16.0	558.50	564.30	564.49	563.92
9/11/96	3:05:00	940	16.0	557.39	564.30	564.49	563.94
9/11/96	3:15:00	950	16.0	557.56	564.29	564.47	563.94
9/11/96	3:23:00	958	16.0	557.67 (557.65)	564.30	564.47	563.92
9/11/96	3:25:00	960	16.0	558.12	564.30 (564.30)	564.49 (564.51)	563.92
9/11/96	3:35:00	970	16.0	558.55	564.29	564.47	563.94 (563.87)
9/11/96	3:45:00	980	16.0	557.84	564.30	564.47	563.92
9/11/96	3:55:00	990	16.0	557.73	564.29	564.47	563.92
9/11/96	4:05:00	1000	16.0	557.18	564.29	564.47	563.92
9/11/96	4:15:00	1010	16.0	557.73	564.29	564.46	563.90
9/11/96	4:25:00	1020	16.0	557.65	564.29	564.46	563.92

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/11/96	4:30:00	1025	16.0	557.63	564.28	564.46	563.92
9/11/96	4:31:00	1026	16.0	557.30	564.29	564.46	563.92
9/11/96	4:32:00	1027	0.0	559.50	564.29	564.46	563.92
9/11/96	4:33:00	1028	0.0	563.38	564.31	564.46	563.92
9/11/96	4:34:00	1029	0.0	564.32	564.37	564.46	563.92
9/11/96	4:35:00	1030	0.0	564.40	564.40	564.46	563.92
9/11/96	4:36:00	1031	0.0	564.44	564.43	564.46	563.92
9/11/96	4:37:00	1032	16.0	563.61	564.44	564.47	563.90
9/11/96	4:38:00	1033	16.0	562.17	564.39	564.47	563.90
9/11/96	4:39:00	1034	16.0	561.68	564.37	564.47	563.92
9/11/96	4:40:00	1035	16.0	561.65	564.36	564.47	563.92
9/11/96	4:41:00	1036	16.0	561.88	564.34	564.47	563.92
9/11/96	4:42:00	1037	16.0	561.41	564.34	564.47	563.90
9/11/96	4:43:00	1038	16.0	561.81	564.34	564.47	563.92
9/11/96	4:44:00	1039	16.0	561.86	564.33	564.47	563.92
9/11/96	4:45:00	1040	16.0	561.42	564.33	564.47	563.92
9/11/96	4:46:00	1041	16.0	561.32	564.33	564.47	563.92
9/11/96	4:47:00	1042	16.0	561.56	564.32	564.47	563.90
9/11/96	4:48:00	1043	16.0	561.74	564.32	564.47	563.92
9/11/96	4:49:00	1044	16.0	561.25	564.32	564.47	563.90
9/11/96	4:50:00	1045	16.0	561.34	564.32	564.47	563.90
9/11/96	4:51:00	1046	0.0	562.67	564.33	564.47	563.90
9/11/96	4:52:00	1047	0.0	563.75	564.37	564.47	563.90
9/11/96	4:53:00	1048	0.0	564.40	564.41	564.47	563.92
9/11/96	4:54:00	1049	0.0	564.14	564.43	564.47	563.92
9/11/96	4:55:00	1050	16.0	562.13	564.39	564.47	563.92
9/11/96	4:56:00	1051	16.0	562.08	564.38	564.47	563.90
9/11/96	4:57:00	1052	0.0	563.82	564.39	564.47	563.92
9/11/96	4:58:00	1053	0.0	564.23	564.44	564.47	563.90
9/11/96	4:59:00	1054	16.0	563.21	564.44	564.49	563.92
9/11/96	5:00:00	1055	16.0	561.89	564.39	564.49	563.90
9/11/96	5:01:00	1056	0.0	564.37	564.44	564.49	563.92
9/11/96	5:02:00	1057	0.0	564.46	564.48	564.49	563.90
9/11/96	5:03:00	1058	0.0	564.49	564.49	564.49	563.92
9/11/96	5:04:00	1059	0.0	564.23	564.51	564.49	563.92
9/11/96	5:05:00	1060	16.0	563.62	564.47	564.49	563.90
9/11/96	5:06:00	1061	16.0	562.29	564.44	564.49	563.92
9/11/96	5:07:00	1062	16.0	562.34	564.43	564.49	563.92
9/11/96	5:08:00	1063	16.0	562.07	564.41	564.49	563.92
9/11/96	5:09:00	1064	16.0	561.86	564.39	564.49	563.90
9/11/96	5:10:00	1065	16.0	562.69	564.40	564.49	563.92
9/11/96	5:11:00	1066	16.0	561.81	564.39	564.49	563.90
9/11/96	5:12:00	1067	16.0	562.27	564.39	564.49	563.92
9/11/96	5:13:00	1068	16.0	561.81	564.38	564.49	563.90
9/11/96	5:14:00	1069	0.0	564.09	564.41	564.49	563.90
9/11/96	5:15:00	1070	0.0	564.37	564.46	564.49	563.90
9/11/96	5:16:00	1071	16.0	562.93	564.44	564.49	563.92
9/11/96	5:17:00	1072	16.0	562.01	564.41	564.49	563.90
9/11/96	5:18:00	1073	16.0	562.78	564.40	564.49	563.92
9/11/96	5:19:00	1074	0.0	564.40	564.46	564.49	563.92
9/11/96	5:20:00	1075	0.0	564.14	564.48	564.49	563.90
9/11/96	5:21:00	1076	16.0	562.57	564.45	564.49	563.92
9/11/96	5:22:00	1077	16.0	562.17	564.43	564.49	563.92
9/11/96	5:23:00	1078	16.0	562.52	564.41	564.50	563.90

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/11/96	5:24:00	1079	16.0	562.13	564.41	564.49	563.92
9/11/96	5:25:00	1080	16.0	562.19	564.40	564.49	563.90
9/11/96	5:26:00	1081	16.0	561.91	564.40	564.49	563.90
9/11/96	5:27:00	1082	16.0	562.29	564.39	564.49	563.90
9/11/96	5:28:00	1083	16.0	561.94	564.39	564.49	563.90
9/11/96	5:29:00	1084	16.0	562.17	564.39	564.50	563.90
9/11/96	5:30:00	1085	0.0	564.01	564.41	564.49	563.90
9/11/96	5:31:00	1086	0.0	564.44	564.47	564.50	563.90
9/11/96	5:32:00	1087	16.0	563.49	564.49	564.50	563.90
9/11/96	5:33:00	1088	16.0	562.41	564.45	564.49	563.90
9/11/96	5:34:00	1089	16.0	562.15	564.43	564.50	563.92
9/11/96	5:35:00	1090	16.0	562.03	564.41	564.50	563.90
9/11/96	5:36:00	1091	16.0	562.31	564.41	564.49	563.92
9/11/96	5:37:00	1092	16.0	562.20	564.40	564.49	563.90
9/11/96	5:38:00	1093	16.0	562.13	564.40	564.49	563.90
9/11/96	5:39:00	1094	0.0	564.35	564.45	564.50	563.90
9/11/96	5:40:00	1095	0.0	564.46	564.48	564.50	563.90
9/11/96	5:41:00	1096	0.0	564.39	564.51	564.50	563.90
9/11/96	5:42:00	1097	0.0	564.49	564.53	564.50	563.90
9/11/96	5:43:00	1098	0.0	564.53	564.54	564.50	563.90
9/11/96	5:44:00	1099	16.0	562.69	564.49	564.50	563.92
9/11/96	5:45:00	1100	16.0	562.64	564.47	564.50	563.92
9/11/96	5:46:00	1101	16.0	562.24	564.45	564.50	563.92
9/11/96	5:47:00	1102	16.0	562.08	564.45	564.50	563.92
9/11/96	5:48:00	1103	16.0	562.33	564.43	564.50	563.92
9/11/96	5:49:00	1104	16.0	562.24	564.43	564.50	563.92
9/11/96	5:50:00	1105	16.0	562.29	564.43	564.50	563.92
9/11/96	5:51:00	1106	16.0	562.19	564.41	564.50	563.92
9/11/96	5:52:00	1107	16.0	562.15	564.40	564.50	563.92
9/11/96	5:53:00	1108	16.0	561.98	564.40	564.50	563.92
9/11/96	5:54:00	1109	16.0	562.00	564.39	564.50	563.90
9/11/96	5:55:00	1110	16.0	562.19	564.39	564.50	563.92
9/11/96	5:56:00	1111	16.0	561.94	564.38	564.50	563.92
9/11/96	5:57:00	1112	16.0	562.34	564.38	564.50	563.92
9/11/96	5:58:00	1113	0.0	563.82	564.40	564.50	563.92
9/11/96	5:59:00	1114	0.0	564.44	564.48	564.50	563.92
9/11/96	6:00:00	1115	0.0	564.47	564.51	564.50	563.92
9/11/96	6:01:00	1116	0.0	564.51	564.53	564.50	563.92
9/11/96	6:02:00	1117	0.0	564.53	564.54	564.50	563.92
9/11/96	6:03:00	1118	0.0	564.54	564.55	564.50	563.92
9/11/96	6:04:00	1119	0.0	564.54	564.57	564.50	563.92
9/11/96	6:05:00	1120	0.0	564.58	564.57	564.51	563.92
9/11/96	6:06:00	1121	0.0	564.58	564.57	564.51	563.92
9/11/96	6:07:00	1122	0.0	564.58	564.59	564.51	563.92
9/11/96	6:08:00	1123	0.0	564.60	564.60	564.51	563.92
9/11/96	6:09:00	1124	0.0	564.61	564.62	564.51	563.92
9/11/96	6:10:00	1125	0.0	564.60	564.62	564.51	563.92
9/11/96	6:11:00	1126	0.0	564.60	564.63	564.51	563.92
9/11/96	6:12:00	1127	0.0	564.58	564.63	564.53	563.92
9/11/96	6:13:00	1128	0.0	564.60	564.64	564.51	563.92
9/11/96	6:14:00	1129	0.0	564.60	564.66	564.53	563.92
9/11/96	6:15:00	1130	0.0	564.60	564.66	564.53	563.92
9/11/96	6:25:00	1140	0.0	564.63	564.70	564.56	563.92
9/11/96	6:35:00	1150	0.0	564.66	564.74	564.57	563.92

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/11/96	6:45:00	1160	0.0	564.68	564.77	564.60	563.92
9/11/96	6:55:00	1170	0.0	564.70	564.79	564.62	563.92
9/11/96	7:05:00	1180	0.0	564.72	564.83	564.63	563.92
9/11/96	7:15:00	1190	0.0	564.75	564.85	564.66	563.94
9/11/96	7:25:00	1200	0.0	564.77	564.86	564.66	563.94
9/11/96	7:35:00	1210	0.0	564.79	564.89	564.67	563.94
9/11/96	7:45:00	1220	0.0	564.80	564.90	564.69	563.95
9/11/96	7:55:00	1230	0.0	564.80	564.91	564.70	563.97
9/11/96	8:05:00	1240	0.0	564.84	564.92	564.72	563.99
9/11/96	8:15:00	1250	0.0	564.84	564.92	564.73	564.02
9/11/96	8:19:00	1254	0.0	564.85 (564.79)	564.94 (564.95)	564.75 (564.55)	564.00
9/11/96	8:25:00	1260	0.0	564.85	564.95	564.75	564.02
9/11/96	8:35:00	1270	16.0	563.11	564.91	564.76	564.02
9/11/96	8:45:00	1280	16.0	562.78	564.72	564.72	563.99
9/11/96	8:52:00	1287	16.0	563.05 (562.80)	564.69	564.72	563.99
9/11/96	8:55:00	1290	16.0	562.85	564.68	564.70	563.99
9/11/96	8:56:00	1291	16.0	562.65	564.67	564.70	563.99
9/11/96	8:57:00	1292	16.0	562.67	564.66	564.69	563.99
9/11/96	8:58:00	1293	16.0	563.36	564.66	564.69	563.99
9/11/96	8:59:00	1294	16.0	562.64	564.64	564.69	563.99
9/11/96	9:00:00	1295	16.0	562.67	564.64	564.69	563.97
9/11/96	9:01:00	1296	0.0	563.30	564.64	564.69	563.97
9/11/96	9:02:00	1297	0.0	564.70	564.72	564.69	563.99
9/11/96	9:03:00	1298	0.0	564.75	564.76	564.69	563.99
9/11/96	9:04:00	1299	0.0	564.77	564.79	564.69	563.99
9/11/96	9:05:00	1300	0.0	564.80	564.80	564.69	563.99
9/11/96	9:06:00	1301	0.0	564.82	564.83	564.70	563.97
9/11/96	9:07:00	1302	0.0	564.84	564.84	564.70	563.99
9/11/96	9:08:00	1303	16.0	563.40	564.80	564.70	563.99
9/11/96	9:09:00	1304	16.0	563.05	564.76	564.70	563.99
9/11/96	9:10:00	1305	16.0	563.59	564.74	564.70	563.99
9/11/96	9:11:00	1306	16.0	562.91	564.71	564.70	563.99
9/11/96	9:12:00	1307	16.0	563.09	564.70	564.70	563.99
9/11/96	9:13:00	1308	16.0	562.83	564.69	564.70	563.99
9/11/96	9:14:00	1309	16.0	563.14	564.69	564.70	563.99
9/11/96	9:15:00	1310	16.0	562.79	564.68	564.69	563.99
9/11/96	9:25:00	1320	16.0	563.35	564.64	564.67	563.99
9/11/96	9:35:00	1330	16.0	563.09	564.59	564.66	563.99
9/11/96	9:45:00	1340	16.0	562.97	564.61	564.66	564.02
9/11/96	9:55:00	1350	16.0	562.55	564.54	564.64	564.00
9/11/96	10:00:00	1355	16.0	562.69 (562.67)	564.57 (564.52)	564.64 (564.63)	564.00
9/11/96	10:05:00	1360	16.0	562.52	564.54	564.63	563.99 (563.96)
9/11/96	10:15:00	1370	16.0	562.33	564.51	564.63	564.00
9/11/96	10:25:00	1380	16.0	562.41	564.49	564.62	564.00
9/11/96	10:35:00	1390	16.0	562.43	564.48	564.62	563.99
9/11/96	10:45:00	1400	16.0	562.33	564.46	564.60	563.97
9/11/96	10:55:00	1410	16.0	562.43	564.49	564.60	563.97
9/11/96	11:05:00	1420	16.0	562.72	564.43	564.59	563.99
9/11/96	11:15:00	1430	16.0	562.20	564.45	564.59	563.97
9/11/96	11:25:00	1440	16.0	562.34	564.47	564.60	563.99
9/11/96	11:30:00	1445	16.0	562.65 (562.29)	564.41 (564.42)	564.57 (564.56)	563.99
9/11/96	11:35:00	1450	16.0	562.07	564.40	564.57	563.99 (563.96)
9/11/96	11:45:00	1460	16.0	562.29	564.43	564.57	563.99
9/11/96	11:55:00	1470	16.0	562.27	564.41	564.57	563.99

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/11/96	12:05:00	1480	16.0	562.17	564.46	564.57	564.02
9/11/96	12:15:00	1490	16.0	562.10	564.45	564.57	564.02
9/11/96	12:25:00	1500	16.0	562.26	564.41	564.56	564.02
9/11/96	12:35:00	1510	16.0	562.01	564.38	564.54	563.99
9/11/96	12:45:00	1520	16.0	562.60	564.36	564.54	563.99
9/11/96	12:55:00	1530	16.0	562.01	564.38	564.54	563.97
9/11/96	13:05:00	1540	16.0	562.50	564.38	564.53	563.97
9/11/96	13:10:00	1545	16.0	562.43 (562.21)	564.37 (564.33)	564.54 (564.51)	563.99
9/11/96	13:15:00	1550	16.0	561.89	564.36	564.53	563.97
9/11/96	13:25:00	1560	16.0	562.00	564.37	564.53	563.99
9/11/96	13:35:00	1570	16.0	561.91	564.40	564.53	563.95
9/11/96	13:45:00	1580	16.0	561.94	564.32	564.51	563.97
9/11/96	13:55:00	1590	16.0	561.93	564.33	564.51	563.95
9/11/96	14:05:00	1600	16.0	562.01	564.37	564.51	563.94
9/11/96	14:15:00	1610	16.0	562.36	564.36	564.51	563.95
9/11/96	14:25:00	1620	16.0	562.05	564.31	564.49	563.95
9/11/96	14:35:00	1630	16.0	562.36	564.33	564.51	563.95
9/11/96	14:45:00	1640	16.0	562.81	564.32	564.50	563.95
9/11/96	14:55:00	1650	16.0	561.79	564.30	564.49	563.94
9/11/96	15:05:00	1660	16.0	562.10 (561.89)	564.31	564.50	563.94
9/11/96	15:15:00	1670	16.0	562.08	564.33	564.50	563.92
9/11/96	15:25:00	1680	15.0	562.57	564.31	564.49	563.94
9/11/96	15:35:00	1690	15.0	562.08 (561.82)	564.28 (564.25)	564.47 (564.46)	563.92 (563.88)
9/11/96	15:40:00	1695	15.5	561.77	564.28	564.47	563.94
9/11/96	15:45:00	1700	15.5	562.05	564.29	564.47	563.92
9/11/96	15:55:00	1710	15.5	561.63	564.29	564.49	563.94
9/11/96	16:05:00	1720	15.5	561.67	564.30	564.47	563.94
9/11/96	16:15:00	1730	15.5	561.91	564.29	564.47	563.94
9/11/96	16:25:00	1740	15.5	561.72	564.28	564.46	563.94
9/11/96	16:35:00	1750	15.5	561.84	564.28	564.47	563.94
9/11/96	16:45:00	1760	15.5	561.62	564.28	564.47	563.94
9/11/96	16:55:00	1770	15.5	561.68	564.28	564.46	563.94
9/11/96	17:05:00	1780	15.5	561.60	564.28	564.46	563.94
9/11/96	17:15:00	1790	15.5	561.63	564.28	564.46	563.92
9/11/96	17:25:00	1800	15.5	562.45	564.28	564.46	563.94
9/11/96	17:31:00	1806	15.5	561.88 (561.68)	564.28 (564.22)	564.46 (564.43)	563.92
9/11/96	17:35:00	1810	15.5	561.65	564.28	564.44	563.90
9/11/96	17:45:00	1820	15.5	561.48	564.26	564.44	563.92
9/11/96	17:55:00	1830	15.5	561.58	564.26	564.44	563.90
9/11/96	18:05:00	1840	15.5	561.58	564.25	564.44	563.90
9/11/96	18:15:00	1850	15.5	562.24	564.25	564.43	563.90
9/11/96	18:25:00	1860	15.5	561.77	564.25	564.43	563.90
9/11/96	18:35:00	1870	15.5	561.55	564.25	564.43	563.90
9/11/96	18:45:00	1880	15.5	561.46	564.24	564.43	563.88
9/11/96	18:55:00	1890	15.5	561.63	564.24	564.43	563.88
9/11/96	19:05:00	1900	15.5	562.24	564.24	564.41	563.87
9/11/96	19:15:00	1910	15.5	562.05	564.24	564.41	563.87
9/11/96	19:25:00	1920	15.5	561.39	564.23	564.40	563.87
9/11/96	19:30:00	1925	15.5	561.51 (561.49)	564.23 (564.19)	564.41 (564.40)	563.88
9/11/96	19:35:00	1930	15.5	561.63	564.22	564.41	563.88 (563.80)
9/11/96	19:45:00	1940	15.5	561.42	564.22	564.40	
9/11/96	19:55:00	1950	15.5	561.32	564.21	564.38	563.85
9/11/96	20:05:00	1960	15.5	561.27	564.21	564.38	563.85
9/11/96	20:15:00	1970	15.5	561.29	564.21	564.38	563.85

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/11/96	20:25:00	1980	15.5	561.44	564.21	564.38	563.83
9/11/96	20:35:00	1990	15.5	561.30	564.20	564.38	563.83
9/11/96	20:45:00	2000	15.5	561.20	564.21	564.38	563.81
9/11/96	20:55:00	2010	15.5	561.62	564.18	564.38	563.81
9/11/96	21:05:00	2020	15.5	561.27	564.18	564.38	563.80
9/11/96	21:15:00	2030	15.5	561.32	564.18	564.38	563.78
9/11/96	21:25:00	2040	15.5	561.81	564.18	564.37	563.78
9/11/96	21:35:00	2050	15.5	561.25	564.20	564.37	563.76
9/11/96	21:45:00	2060	15.5	561.65	564.18	564.37	563.76
9/11/96	21:55:00	2070	15.5	561.42	564.17	564.37	563.76
9/11/96	22:05:00	2080	15.5	561.44	564.18	564.37	563.76
9/11/96	22:15:00	2090	15.5	561.15	564.17	564.37	563.74
9/11/96	22:25:00	2100	15.5	561.62	564.17	564.37	563.74
9/11/96	22:35:00	2110	15.5	561.20	564.17	564.37	563.74
9/11/96	22:45:00	2120	15.5	561.11	564.17	564.37	563.78
9/11/96	22:55:00	2130	15.5	561.11	564.17	564.37	563.80
9/11/96	23:05:00	2140	15.5	561.48	564.16	564.36	563.80
9/11/96	23:15:00	2150	15.5	561.27	564.16	564.37	563.80
9/11/96	23:25:00	2160	15.5	561.01	564.16	564.36	563.80
9/11/96	23:35:00	2170	15.5	561.89	564.17	564.36	563.83
9/11/96	23:45:00	2180	15.5	561.37	564.18	564.37	563.94
9/11/96	23:55:00	2190	15.5	561.03	564.16	564.36	563.94
9/12/96	0:05:00	2200	15.5	561.42	564.16	564.34	563.88
9/12/96	0:15:00	2210	15.5	561.75	564.15	564.34	563.92
9/12/96	0:25:00	2220	15.5	560.80	564.15	564.34	563.88
9/12/96	0:35:00	2230	15.5	561.70	564.15	564.34	563.92
9/12/96	0:45:00	2240	15.5	561.01	564.14	564.34	563.95
9/12/96	0:55:00	2250	15.5	561.16	564.14	564.34	564.02
9/12/96	1:05:00	2260	15.5	561.41	564.14	564.34	564.16
9/12/96	1:15:00	2270	15.5	561.77	564.14	564.34	564.20
9/12/96	1:25:00	2280	15.5	560.90	564.13	564.33	564.18
9/12/96	1:35:00	2290	15.5	561.22	564.14	564.34	564.16
9/12/96	1:45:00	2300	15.5	560.97	564.15	564.34	564.13
9/12/96	1:55:00	2310	15.5	560.92	564.14	564.33	564.18
9/12/96	2:05:00	2320	15.5	561.03	564.15	564.33	564.14
9/12/96	2:15:00	2330	15.5	561.13	564.15	564.34	564.09
9/12/96	2:25:00	2340	15.5	561.49	564.16	564.34	564.07
9/12/96	2:35:00	2350	15.5	561.06	564.17	564.34	564.07
9/12/96	2:45:00	2360	15.5	560.99	564.18	564.34	564.09
9/12/96	2:55:00	2370	15.5	561.23	564.18	564.34	564.07
9/12/96	3:05:00	2380	15.5	561.29	564.21	564.34	564.07
9/12/96	3:15:00	2390	15.5	561.10	564.20	564.34	564.09
9/12/96	3:25:00	2400	15.5	560.87	564.22	564.34	564.13
9/12/96	3:26:00	2401	15.5	561.16 (561.09)	564.21 (564.23)	564.36	564.13
9/12/96	3:35:00	2410	15.5	560.92	564.22	564.36 (564.40)	564.11 (563.92)
9/12/96	3:45:00	2420	15.5	560.97	564.23	564.36	564.09
9/12/96	3:55:00	2430	15.5	560.99	564.23	564.36	564.13
9/12/96	4:05:00	2440	15.5	561.03	564.23	564.36	564.14
9/12/96	4:15:00	2450	15.5	560.90	564.23	564.37	564.18
9/12/96	4:25:00	2460	15.5	561.48	564.24	564.37	564.16
9/12/96	4:35:00	2470	15.5	560.84	564.23	564.37	564.13
9/12/96	4:45:00	2480	15.5	561.46	564.23	564.37	564.13
9/12/96	4:55:00	2490	15.5	561.08	564.23	564.37	564.11
9/12/96	5:05:00	2500	15.5	560.92	564.22	564.37	564.11

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/12/96	5:15:00	2510	15.5	560.82	564.22	564.37	564.11
9/12/96	5:25:00	2520	15.5	560.92	564.23	564.37	564.07
9/12/96	5:35:00	2530	15.5	561.22	564.22	564.37	564.04
9/12/96	5:45:00	2540	15.5	561.03	564.21	564.36	564.00
9/12/96	5:55:00	2550	15.5	560.92	564.21	564.36	564.00
9/12/96	6:05:00	2560	15.5	560.82	564.21	564.36	564.02
9/12/96	6:15:00	2570	15.5	560.78	564.21	564.36	564.00
9/12/96	6:25:00	2580	15.5	561.08	564.20	564.36	563.99
9/12/96	6:35:00	2590	15.5	560.70	564.20	564.36	563.97
9/12/96	6:45:00	2600	15.5	561.04	564.20	564.34	563.95
9/12/96	6:49:00	2604	15.5	560.66 (560.86)	564.18 (564.20)	564.34	563.94
9/12/96	6:55:00	2610	15.5	560.82	564.18	564.34 (564.37)	563.94
9/12/96	7:05:00	2620	15.5	560.78	564.18	564.34	563.94
9/12/96	7:15:00	2630	15.5	561.32	564.18	564.34	563.95
9/12/96	7:25:00	2640	15.5	561.01	564.17	564.34	563.97
9/12/96	7:35:00	2650	15.5	560.84	564.17	564.34	563.97
9/12/96	7:45:00	2660	15.5	560.63	564.17	564.34	564.02
9/12/96	7:55:00	2670	15.5	560.52	564.16	564.34	564.04
9/12/96	8:05:00	2680	15.5	560.58	564.17	564.34	564.07
9/12/96	8:15:00	2690	15.5	560.54	564.17	564.34	564.11
9/12/96	8:25:00	2700	15.5	561.41	564.17	564.33	564.18
9/12/96	8:35:00	2710	15.5	560.90	564.15	564.33	564.21
9/12/96	8:45:00	2720	15.5	560.92	564.15	564.33	564.20
9/12/96	8:55:00	2730	15.5	560.66	564.15	564.33	564.20
9/12/96	9:05:00	2740	15.5	560.28	564.15	564.33	564.14
9/12/96	9:15:00	2750	15.5	560.90	564.15	564.33	564.18
9/12/96	9:25:00	2760	15.5	560.42	564.14	564.33	564.21
9/12/96	9:35:00	2770	15.5	560.42	564.13	564.33	564.23
9/12/96	9:38:00	2773	15.5	560.51 (560.48)	564.14 (564.10)	564.33 (564.32)	564.23
9/12/96	9:45:00	2780	15.5	560.35	564.14	564.33	564.21 (564.14)
9/12/96	9:55:00	2790	15.5	560.33	564.13	564.33	564.18
9/12/96	10:05:00	2800	15.5	560.44	564.13	564.31	564.16
9/12/96	10:15:00	2810	15.5	560.49	564.11	564.31	564.14
9/12/96	10:25:00	2820	15.5	560.77	564.11	564.31	564.09
9/12/96	10:35:00	2830	15.5	560.63	564.11	564.31	564.09
9/12/96	10:45:00	2840	15.5	560.33	564.10	564.31	564.07
9/12/96	10:55:00	2850	15.5	560.30	564.11	564.31	564.11
9/12/96	11:05:00	2860	15.5	560.75	564.09	564.31	564.09
9/12/96	11:15:00	2870	15.5	560.13	564.06	564.31	564.07
9/12/96	11:24:00	2879	15.5	560.32 (560.33)	564.14 (564.09)	564.33	564.09
9/12/96	11:25:00	2880	15.5	560.63	564.14	564.33 (564.31)	564.09
9/12/96	11:35:00	2890	15.5	560.47	564.14	564.33	564.06 (564.02)
9/12/96	11:45:00	2900	15.5	560.19	564.13	564.31	564.07
9/12/96	11:55:00	2910	15.5	560.40	564.11	564.31	564.09
9/12/96	12:05:00	2920	15.5	560.18	564.13	564.31	564.07
9/12/96	12:15:00	2930	15.5	560.33	564.08	564.31	564.06
9/12/96	12:25:00	2940	15.5	560.11	564.11	564.31	564.07
9/12/96	12:29:00	2944	15.5	559.95 (560.19)	564.1 (564.07)	564.31 (564.30)	564.06
9/12/96	12:35:00	2950	15.5	560.14	564.14	564.33	564.07
9/12/96	12:45:00	2960	15.5	560.02	564.10	564.31	564.04
9/12/96	12:55:00	2970	15.5	559.88	564.09	564.31	564.07
9/12/96	13:05:00	2980	15.5	560.85	564.10	564.31	564.09
9/12/96	13:15:00	2990	15.5	559.99	564.09	564.31	564.14
9/12/96	13:21:00	2996	15.5	560.54 (560.09)	564.13	564.31	564.16

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/12/96	13:25:00	3000	15.5	560.04	564.14	564.31	564.14
9/12/96	13:35:00	3010	15.5	559.97	564.10	564.31	564.14
9/12/96	13:45:00	3020	15.5	560.33	564.11	564.31	564.14
9/12/96	13:55:00	3030	15.5	560.47	564.10	564.31	564.16
9/12/96	14:05:00	3040	15.5	560.66	564.08	564.30	564.16
9/12/96	14:15:00	3050	15.5	560.33	564.07	564.30	564.16
9/12/96	14:25:00	3060	15.5	559.95	564.10	564.31	564.14
9/12/96	14:35:00	3070	15.5	559.87	564.13	564.31	564.14
9/12/96	14:45:00	3080	15.5	559.83	564.15	564.31	564.18
9/12/96	14:55:00	3090	15.5	559.87	564.11	564.49	564.20
9/12/96	15:05:00	3100	15.5	559.92	564.10	564.47	564.18
9/12/96	15:15:00	3110	15.5	559.45	564.08	564.28	564.13
9/12/96	15:25:00	3120	15.5	559.50	564.08	564.28	564.13
9/12/96	15:28:00	3123	15.5	559.47 (559.57)	564.07 (564.04)	564.28 (564.28)	564.13
9/12/96	15:35:00	3130	15.5	560.28	564.07	564.24	564.14 (564.09)
9/12/96	15:40:00	3135	15.5	560.47 (560.41)	564.07	564.23	564.16
9/12/96	15:45:00	3140	15.5	559.87	564.08	564.21	564.18
9/12/96	15:47:00	3142	15.5	560.80 (560.05)	564.08	564.23	564.18
9/12/96	15:55:00	3150	15.5	559.87	564.09	564.25	564.18
9/12/96	16:05:00	3160	15.5	560.33	564.08	564.28	564.18
9/12/96	16:15:00	3170	15.5	559.81	564.07	564.21	564.21
9/12/96	16:25:00	3180	15.5	559.95	564.07	564.18	564.23
9/12/96	16:33:00	3188	15.5	560.23 (559.96)	564.06 (564.04)	564.14 (564.27)	564.23
9/12/96	16:35:00	3190	15.5	559.71	564.07	564.15	564.23
9/12/96	16:45:00	3200	15.5	559.83	564.07	564.27	564.25
9/12/96	16:46:00	3201	15.5	560.04 (559.96)	564.07 (564.03)	564.27 (564.27)	564.25
9/12/96	16:55:00	3210	0.0	559.67	564.07	564.27	564.25
9/12/96	16:56:00	3211	0.0	564.02 (563.51)	564.11	564.27	564.25
9/12/96	16:58:00	3213	0.0	564.23 (564.17)	564.18	564.27	564.25
9/12/96	17:00:00	3215	0.0	564.09 (564.51)	564.21	564.27	564.26
9/12/96	17:01:00	3216	0.0	564.09 (564.01)	564.23	564.28	564.26
9/12/96	17:03:00	3218	0.0	564.13 (564.04)	564.25 (564.23)	564.28	564.26
9/12/96	17:05:00	3220	0.0	564.09	564.25	564.28 (564.27)	564.28
9/12/96	17:06:00	3221	0.0	564.09 (564.06)	564.25	564.28	564.28
9/12/96	17:15:00	3230	0.0	564.20	564.33	564.31	564.26
9/12/96	17:18:00	3233	0.0	564.23 (564.13)	564.37	564.33	564.25
9/12/96	17:23:00	3238	0.0	564.23 (564.15)	564.39	564.33	564.26
9/12/96	17:25:00	3240	0.0	564.27	564.40	564.34	564.25
9/12/96	17:35:00	3250	0.0	564.30	564.46	564.36	564.26
9/12/96	17:41:00	3256	0.0	564.35 (564.24)	564.49 (564.44)	564.37 (564.35)	564.32
9/12/96	17:45:00	3260	0.0	564.34	564.49	564.37	564.32
9/12/96	17:55:00	3270	0.0	564.35	564.52	564.38	564.30
9/12/96	18:05:00	3280	0.0	564.42	564.56	564.41	564.28
9/12/96	18:06:00	3281	0.0	564.40 (564.32)	564.56 (564.52)	564.41 (564.40)	564.28
9/12/96	18:15:00	3290	0.0	564.44	564.57	564.43	564.30
9/12/96	18:25:00	3300	0.0	564.47 (564.36)	564.61 (564.56)	564.43 (564.37)	564.32
9/12/96	18:35:00	3310	0.0	564.46	564.61	564.44	564.30
9/12/96	18:45:00	3320	0.0	564.47	564.62	564.46	564.28
9/12/96	18:55:00	3330	0.0	564.51	564.66	564.47	564.32
9/12/96	19:05:00	3340	0.0	564.51	564.68	564.49	564.33
9/12/96	19:15:00	3350	0.0	564.53	564.69	564.50	564.30
9/12/96	19:25:00	3360	0.0	564.54	564.70	564.51	564.33
9/12/96	19:35:00	3370	0.0	564.54	564.71	564.51	564.35
9/12/96	19:45:00	3380	0.0	564.56	564.74	564.53	564.35

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
TRANSDUCER READINGS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/12/96	19:55:00	3390	0.0	564.58	564.74	564.54	564.33
9/12/96	20:05:00	3400	0.0	564.60	564.76	564.54	564.33
9/12/96	20:15:00	3410	0.0	564.60	564.76	564.56	564.32
9/12/96	20:25:00	3420	0.0	564.60	564.77	564.57	564.30
9/12/96	20:35:00	3430	0.0	564.63	564.78	564.57	564.30
9/12/96	20:45:00	3440	0.0	564.63	564.79	564.57	564.30
9/12/96	20:55:00	3450	0.0	564.63	564.80	564.59	564.28
9/12/96	21:05:00	3460	0.0	564.65	564.80	564.60	564.28
9/12/96	21:15:00	3470	0.0	564.65	564.82	564.60	564.30
9/12/96	21:25:00	3480	0.0	564.66	564.83	564.62	564.30
9/12/96	21:35:00	3490	0.0	564.68	564.84	564.62	564.26
9/12/96	21:45:00	3500	0.0	564.66	564.84	564.63	564.25
9/12/96	21:55:00	3510	0.0	564.70	564.86	564.63	564.26
9/12/96	22:05:00	3520	0.0	564.72	564.86	564.64	564.23
9/12/96	22:15:00	3530	0.0	564.72	564.87	564.64	564.20
9/12/96	22:25:00	3540	0.0	564.72	564.89	564.66	564.18
9/12/96	22:35:00	3550	0.0	564.73	564.90	564.67	564.16
9/12/96	22:45:00	3560	0.0	564.73	564.91	564.67	564.18
9/12/96	22:55:00	3570	0.0	564.75	564.91	564.69	564.18
9/12/96	23:05:00	3580	0.0	564.75	564.92	564.69	564.16
9/12/96	23:15:00	3590	0.0	564.77	564.92	564.69	564.16
9/12/96	23:25:00	3600	0.0	564.77	564.93	564.70	564.14
9/12/96	23:35:00	3610	0.0	564.79	564.94	564.72	564.13
9/12/96	23:45:00	3620	0.0	564.79	564.94	564.72	564.13
9/12/96	23:55:00	3630	0.0	564.79	564.95	564.72	564.11
9/13/96	0:05:00	3640	0.0	564.80	564.97	564.73	564.07
9/13/96	0:15:00	3650	0.0	564.80	564.97	564.73	564.06
9/13/96	0:25:00	3660	0.0	564.82	564.98	564.75	564.04
9/13/96	0:35:00	3670	0.0	564.82	564.99	564.75	564.04
9/13/96	0:45:00	3680	0.0	564.82	565.00	564.75	564.04
9/13/96	0:55:00	3690	0.0	564.84	565.00	564.75	564.02
9/13/96	1:05:00	3700	0.0	564.84	565.00	564.76	564.02
9/13/96	1:15:00	3710	0.0	564.84	565.01	564.76	564.02
9/13/96	1:25:00	3720	0.0	564.85	565.02	564.77	563.99
9/13/96	1:35:00	3730	0.0	564.85	565.02	564.77	564.00
9/13/96	1:45:00	3740	0.0	564.85	565.03	564.77	564.00
9/13/96	1:55:00	3750	0.0	564.87	565.03	564.79	564.00
9/13/96	2:05:00	3760	0.0	564.87	565.05	564.79	564.00
9/13/96	2:15:00	3770	0.0	564.89	565.05	564.80	564.00
9/13/96	2:25:00	3780	0.0	564.89	565.06	564.80	563.99
9/13/96	2:35:00	3790	0.0	564.89	565.06	564.80	563.97
9/13/96	2:45:00	3800	0.0	564.89	565.06	564.80	563.99
9/13/96	2:55:00	3810	0.0	564.89	565.06	564.82	563.99
9/13/96	3:05:00	3820	0.0	564.91	565.08	564.82	563.99
9/13/96	3:15:00	3830	0.0	564.91	565.07	564.83	563.97
9/13/96	3:25:00	3840	0.0	564.92	565.08	564.83	563.97
9/13/96	3:35:00	3850	0.0	564.92	565.09	564.83	563.99
9/13/96	3:45:00	3860	0.0	564.92	565.09	564.83	563.99
9/13/96	3:55:00	3870	0.0	564.92	565.10	564.85	564.00
9/13/96	4:05:00	3880	0.0	564.94	565.10	564.85	563.99
9/13/96	4:15:00	3890	0.0	564.92	565.10	564.85	564.00
9/13/96	4:25:00	3900	0.0	564.94	565.10	564.85	564.00
9/13/96	4:35:00	3910	0.0	564.96	565.12	564.86	564.00
9/13/96	4:45:00	3920	0.0	564.96	565.12	564.85	564.00

TABLE J.6

PW-3 CONSTANT-RATE PUMPING TEST
 TRANSDUCER READINGS
 GRATWICK-RIVERSIDE PARK SITE
 North Tonawanda, New York

Date	Time	Elapsed Time (minutes)	Pumping Rate (gpm)	Water Level (ft amsl)			
				PW-3	MW-3	GW-9S	River
Reference Elevation (ft amsl)				574.51	574.58	574.35	566.60
9/13/96	4:55:00	3930	0.0	564.96	565.13	564.88	564.02
9/13/96	5:05:00	3940	0.0	564.96	565.13	564.88	564.02
9/13/96	5:15:00	3950	0.0	564.98	565.13	564.88	564.04
9/13/96	5:25:00	3960	0.0	564.98	565.14	564.88	564.04
9/13/96	5:35:00	3970	0.0	564.96	565.14	564.89	564.04
9/13/96	5:45:00	3980	0.0	564.98	565.15	564.89	564.04
9/13/96	5:55:00	3990	0.0	564.99	565.14	564.89	564.06
9/13/96	6:05:00	4000	0.0	564.99	565.15	564.89	564.06
9/13/96	6:15:00	4010	0.0	564.99	565.15	564.90	564.07
9/13/96	6:25:00	4020	0.0	564.99	565.16	564.90	564.07
9/13/96	6:35:00	4030	0.0	564.99	565.17	564.90	564.09
9/13/96	6:45:00	4040	0.0	565.01	565.17	564.92	564.07
9/13/96	6:55:00	4050	0.0	564.99	565.16	564.92	564.07
9/13/96	7:05:00	4060	0.0	565.03	565.16	564.92	564.07
9/13/96	7:15:00	4070	0.0	565.01	565.17	564.92	564.07
9/13/96	7:25:00	4080	0.0	565.03	565.17	564.92	564.09
9/13/96	7:35:00	4090	0.0	565.03	565.17	564.92	564.09
9/13/96	7:45:00	4100	0.0	565.03	565.18	564.92	564.09
9/13/96	7:55:00	4110	0.0	565.03	565.18	564.93	564.07
9/13/96	8:05:00	4120	0.0	565.03	565.18	564.93	564.07
9/13/96	8:15:00	4130	0.0	565.03	565.18	564.93	564.06
9/13/96	8:25:00	4140	0.0	565.03	565.20	564.93	564.06
9/13/96	8:35:00	4150	0.0	565.03	565.20	564.95	564.06
9/13/96	8:45:00	4160	0.0	565.05	565.21	564.95	564.04
9/13/96	8:55:00	4170	0.0	565.05	565.21	564.95	564.06
9/13/96	9:05:00	4180	0.0	565.06	565.21	564.95	564.06
9/13/96	9:15:00	4190	0.0	565.05	565.22	564.95	564.04
9/13/96	9:25:00	4200	0.0	565.06	565.22	564.96	564.04
9/13/96	9:35:00	4210	0.0	565.06	565.22	564.95	564.06
9/13/96	9:45:00	4220	0.0	565.06	565.22	564.96	564.04
9/13/96	9:55:00	4230	0.0	565.06	565.22	564.96	564.04
9/13/96	10:05:00	4240	0.0	565.06	565.23	564.96	564.04
9/13/96	10:15:00	4250	0.0	565.06	565.23	564.98	564.04
9/13/96	10:25:00	4260	0.0	565.06	565.22	564.98	564.02
9/13/96	10:35:00	4270	0.0	565.08	565.23	564.98	564.02
9/13/96	10:45:00	4280	0.0	565.08	565.24	564.98	564.02
9/13/96	10:55:00	4290	0.0	565.06	565.24	564.98	564.04
9/13/96	11:05:00	4300	0.0	565.08	565.24	564.98	564.04
9/13/96	11:06:00	4301	0.0	565.08	565.24	564.98	564.06

Note: - (564.09) indicates a manual water level measurement.

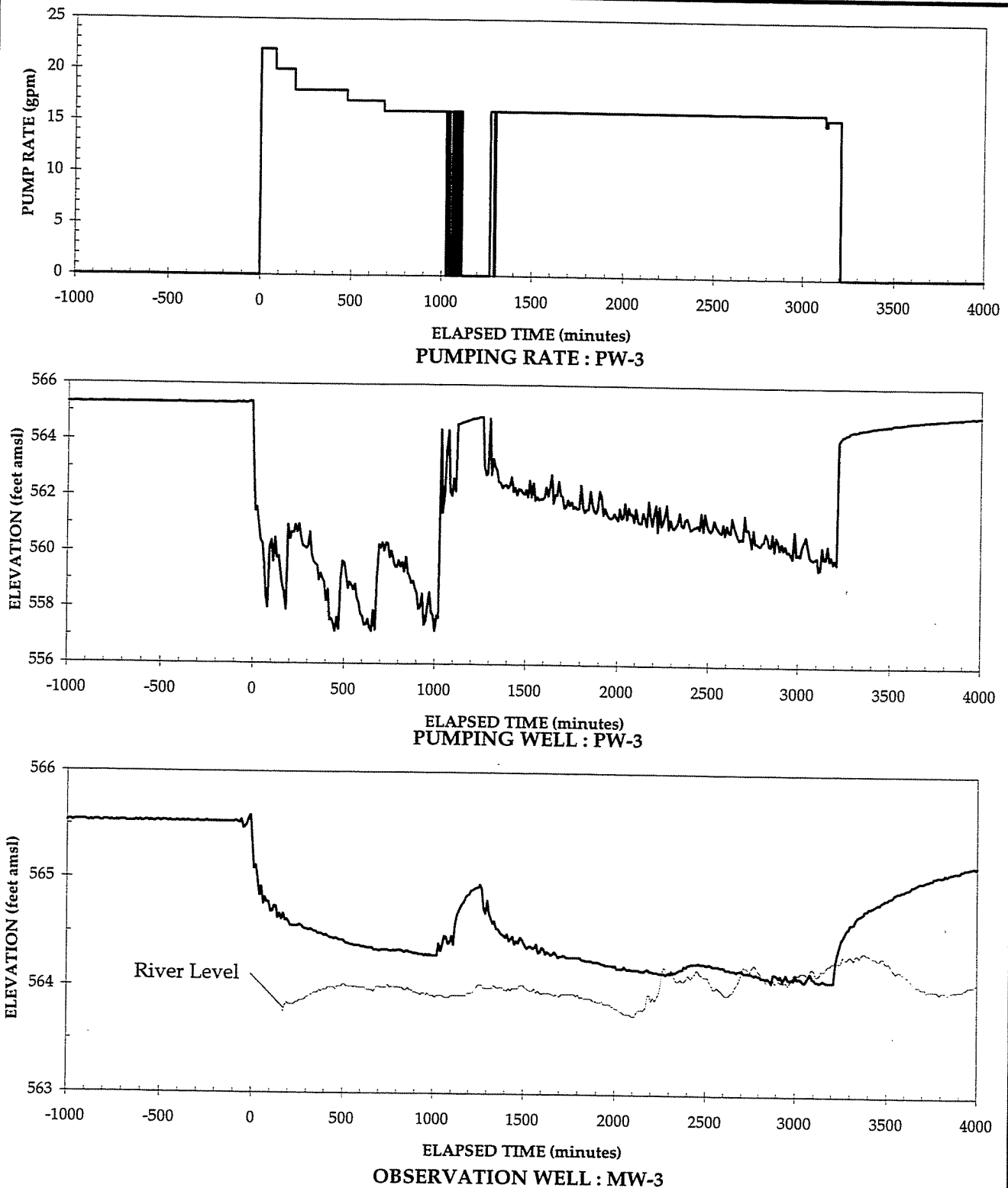


figure J.15
MW-3 WELL RESPONSE
PW-3 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

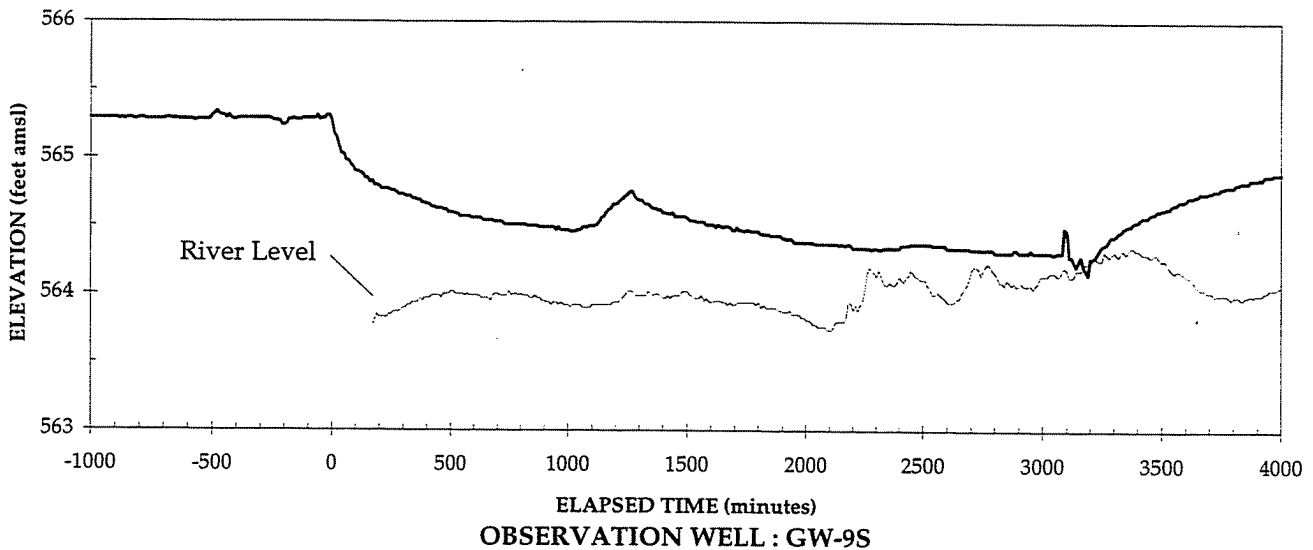
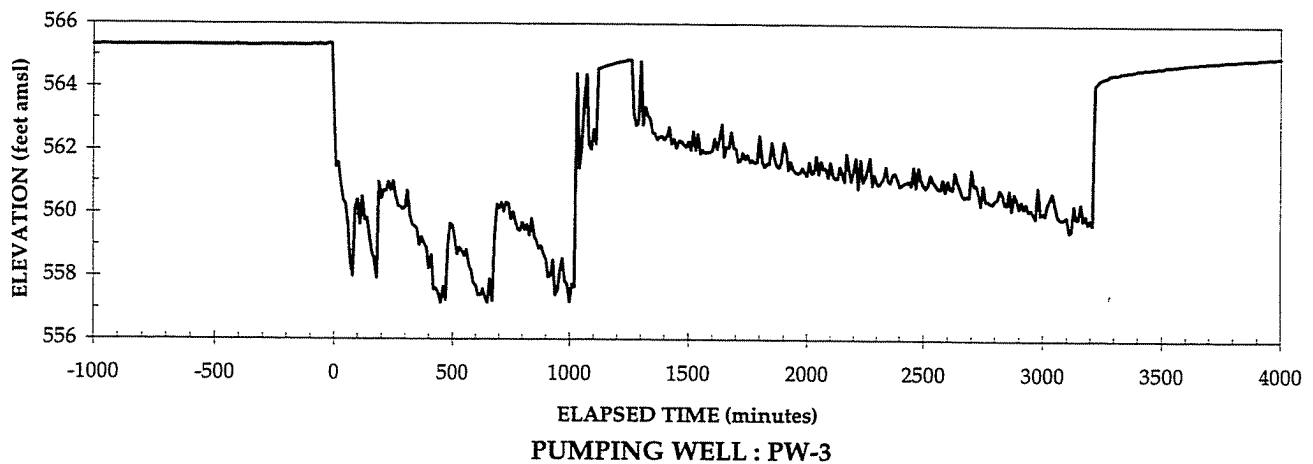
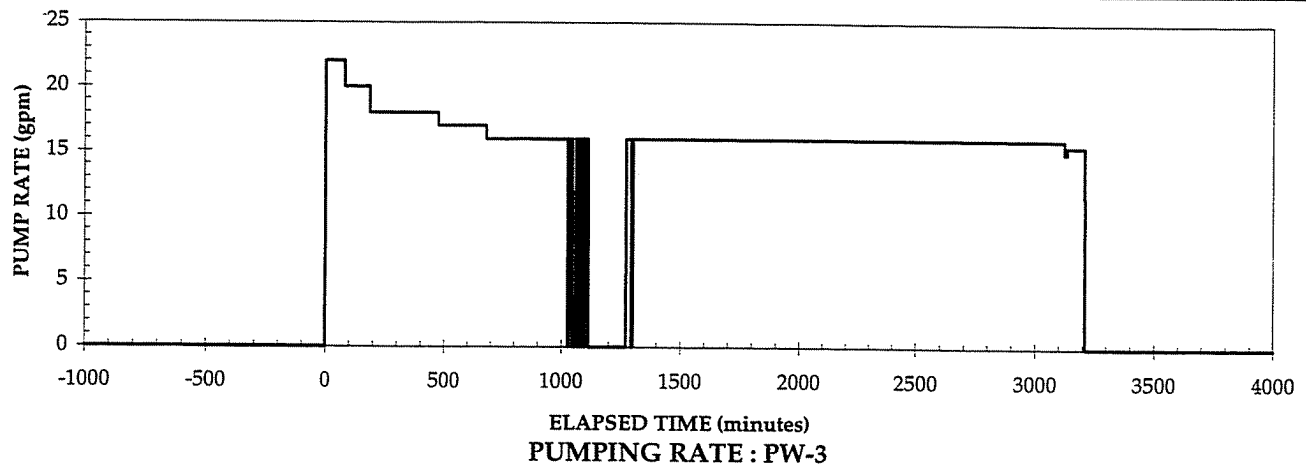


figure J.16
GW-9S WELL RESPONSE
PW-3 PUMPING TEST
GRATWICK-RIVERSIDE PARK
North Tonawanda, New York

CRA

APPENDIX K

ANALYTICAL RESULTS AND QA/QC REVIEW 48-HOUR PUMPING TESTS

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1.0 EXECUTIVE SUMMARY

Nine groundwater samples were collected from prototype withdrawal wells during pumping tests in support of the Remedial Design Program at the Gratwick-Riverside Park Site in North Tonawanda, New York. In addition, samples of influent, effluent, and decontamination rinse water were also collected. Samples were collected during August and September 1996 and were analyzed for target compound list (TCL) volatiles, TCL semi-volatiles, TCL pesticides/polychlorinated biphenyls (PCBs), target analyte list (TAL) metals, and various wet chemistry parameters.

Organics

All analytical results were acceptable with the exception of a few of the semi-volatile compounds and a pesticide result which were rejected due to poor analytical efficiency.

Metals

All analytical results were acceptable with the exception of some selenium and thallium results which were rejected due to poor matrix spike recoveries.

Wet Chemistry

All analytical results were acceptable.

2.0 INTRODUCTION

Groundwater samples were collected from three prototype withdrawal wells. Three samples from each well were collected during the pumping tests in support of the Remedial Design Program at the Gratwick-Riverside Park Site in North Tonawanda, New York (Site). An additional sample (decon water) was analyzed for disposal purposes. Samples of influent and effluent water were also collected. Sample collection was performed during August and September 1996. The samples were analyzed by Roy F. Weston, Inc. of Lionville, Pennsylvania (Weston). A sampling and analysis summary is presented in Table 1.

Samples were analyzed in accordance with the methods specified in Table 2. The laboratory used SW-846 methods for the cyanide and metals analyses. The Quality Assurance Project Plan (QAPP) specified EPA 600 methods. The data were assessed against the laboratory cited methodologies, which were sufficient to meet the accuracy, precision, and sensitivity required for the project.

Summaries of the analytical data are presented in Table 3. The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the "Quality Assurance Project Plan (QAPP) for the Remedial Design Work Plan at the Gratwick-Riverside Park Site, North Tonawanda, New York, dated March 1996".

Additional validation guidance was referenced from the following documents:

- i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA 540/R-94-012, February 1994; and
- ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA 540/R-94-013, February 1994.

All raw data including calibration, spike, duplicate and blank results were assessed.

3.0 QA/QC REVIEW

3.1 SAMPLE HOLDING TIMES

Sample holding time data are presented in Table 4. Holding time criteria, as specified in the QAPP and the associated methods, were met for all sample preparation and analyses with the following exceptions:

- i) Analyses for pH should be analyzed immediately in the field, since the analyses were performed by the laboratory, all pH results were qualified as estimated.
- ii) Samples PW1-001 and PW1-002 were inadvertently spiked during the pesticide/PCB extraction procedure. The samples were re-extracted outside of the holding time. Since the exceedance was minor and the results were non-detect, the data were not qualified.
- iii) The phosphorus analysis of sample PW2-003 was performed 10 days after the 28 day holding time. The associated sample result was non-detect, and was judged acceptable without qualification based on the marginal holding time exceedance.
- iv) The total suspended solids (TSSs) analysis of sample NTINF was performed one day after the recommended holding time. The sample result was qualified as estimated.

Samples were properly preserved after collection and maintained at $4^{\circ}\pm 2^{\circ}\text{C}$ with the exception of samples collected on August 27, 28, 29, and September 5, 1996 which were received at the laboratory at slightly elevated temperatures. Associated non-detect sample results were not qualified due to the minor extent of the temperature exceedances. Detected analytes, except metals, were qualified as estimated to reflect a potential low bias due to the loss of analyte. Technically, metals do not require preservation at $4^{\circ}\pm 2^{\circ}\text{C}$ and were judged acceptable without qualification.

3.2 INSTRUMENT CALIBRATION

Gas Chromatograph/Mass Spectrometer (GC/MS) - Volatiles and Semi-Volatiles

The GC/MS instrumentation was properly tuned prior to sample analysis. Calibration data showed adequate instrument sensitivity, and calibration curves showed acceptable linearity.

Gas Chromatography (GC) - Pesticides/PCBs

Initial calibration data showed adequate instrument sensitivity and linearity. All continuing calibration performed met the method-specified criteria with the exception of some pesticides which showed variability in the instrument response. All associated results were non-detect, and were judged to be acceptable based on adequate instrument response for the calibration standard.

Metals - Inductively Coupled Plasma - Atomic Emission Spectrometer (ICP)

Calibration curves and initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the proper frequency.

The calibration curves were acceptable and all ICV and CCV recoveries were within the required control limits.

Interference check standards were analyzed at the proper frequency; all recoveries were acceptable.

Metals - Atomic Absorption Spectrometer (AA)

All calibration curves consisted of a blank and four standards except mercury, which consisted of a blank and five standards. The calibration curves were linear.

Initial and continuing calibration verification standards were analyzed at the proper frequency and the results were acceptable.

Wet Chemistry

All calibration criteria required by the methods were performed and were acceptable.

3.3 SURROGATE COMPOUND ANALYSES - ORGANICS

Surrogates were added to all samples, blanks and QC samples prior to extraction and/or analysis.

A summary of surrogate recoveries is presented in Table 5. Surrogate recoveries met the acceptance criteria with the following exceptions:

- i) Volatile analysis and re-analysis of sample Decon-Water yielded a high bromofluorobenzene recovery indicating matrix interference. Detected volatile results for this sample were qualified as estimated, non-detect results would not have been affected by the indicated high bias.
- ii) Due to necessary sample dilutions, surrogate recoveries could not be reported for some samples. Analytical accuracy for these samples was assessed based on spike recoveries (see Sections 3.6 and 3.8).
- iii) A low tetrachloro-meta-xylene recovery was reported for sample PW3-003. All sample results were non-detect. Since the surrogate recovery was not excessively low, and the remaining surrogate recovery was acceptable, the data were not qualified.

3.4 INTERNAL STANDARD ANALYSES - VOLATILES AND SEMI-VOLATILES

The proper internal standard (IS) compounds were added to all samples, blanks, standards, and spiked samples prior to volatile and semi-volatile analyses. All internal standard recoveries were acceptable with the following exceptions:

- i) Low recoveries were reported for two volatile ISs in sample PW3-001. Associated positive results were qualified as estimated. Non-detect results were judged to be acceptable due to adequate instrument sensitivity.
- ii) Semi-volatile analyses of samples PW1-002 and PW1-003 yielded high IS recoveries. Associated positive results were qualified as estimated. Non-detect results would not have been affected by the indicated high bias and were judged to be acceptable without qualification.

3.5 METHOD BLANK ANALYSES

Method blanks were analyzed and/or extracted at the proper frequency for all parameters, and the results are summarized in Table 6. Generally, method blank results were non-detect. The exceptions were as follows:

- i) Methylene chloride, acetone, bis(2-ethylhexyl)phthalate, and di-n-butylphthalate were detected in various samples. All associated positive sample results up to ten times the concentration detected in the blank were qualified non-detect.
- ii) Total kjeldahl nitrogen (TKN) and various metals were detected in the preparation and calibration blanks. Associated positive sample results up to five times the concentrations detected in the blanks were qualified as non-detect.

3.6 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)
ANALYSES - ORGANICS, METALS, AND WET CHEMISTRY

Sample PW3-002 was submitted as the MS/MSD sample for all applicable parameters. Additional spike analyses were performed by the laboratory. A summary of the spike results is presented in Table 7.

Spike recoveries showed acceptable analytical accuracy and precision with the following exceptions:

- i) Low carbon tetrachloride recoveries and a high relative percent difference (RPD) were reported for the MS/MSD analyses. All sample results were non-detect for this compound and were judged acceptable based on sufficient analyte recovery.
- ii) High RPD values were reported for chloroethane, carbon disulfide, 4-chloroaniline, and bromoform. Positive results for sample PW3-002 for these compounds were qualified as estimated. Non-detect results were not impacted by the indicated variability.
- iii) High MS and/or MSD recoveries were reported for bis(2-chloroethyl)ether, 2,4-dimethylphenol, 4-chloro-3-methylphenol, and 4-nitrophenol. All associated results were non-detect and would not be affected by the high bias.
- iv) 3,3-Dichlorobenzidine was not recovered in the MS or MSD. Non-detect results for this compound were rejected due to the poor analytical efficiency.
- v) Low MS/MSD recoveries and high RPD values were reported for gamma-BHC and endosulfan II. Associated sample results were non-detect, and were judged acceptable based on sufficient analyte recovery.
- vi) A slightly low aldrin MSD recovery and a slightly high beta-BHC MS recovery were reported. All sample results were non-detect and were

judged acceptable without qualification based on acceptable recoveries of the associated MS or MSD.

- vii) Zero percent recoveries of endosulfan I were reported for the MS/MSD analysis of PW3-002. The associated sample result was rejected due to the poor analytical efficiency.
- viii) Low selenium and thallium MS/MSD recoveries were reported for sample PW1-001. All associated sample results were non-detect, and were rejected based on the poor recoveries.
- ix) A high iron MSD recovery and RPD were reported for sample PW1-001. Based on an acceptable MS recovery and good precision in the laboratory duplicate analysis (see Section 3.7), the data were judged acceptable without qualification.
- x) High silver MS/MSD recoveries were reported for the analysis of sample PW3-002. Associated positive results were qualified as estimated, non-detect results were not impacted by the high bias.
- xi) Low selenium MS/MSD recoveries were reported for sample PW3-002. Associated positive results were qualified as estimated, non-detect results were judged acceptable without qualification based on sufficient analyte recovery.
- xii) Spike recoveries were not evaluated when the sample result was greater than four times the spike added.

3.7 DUPLICATE ANALYSES - WET CHEMISTRY AND METALS

A summary of the duplicate results is provided in Table 8. Metals results less than five times the contract required detection limit (CRDL) were assessed based on the difference between the sample and duplicate results, and the difference must be less than the CRDL.

All duplicate analyses showed acceptable precision.

3.8 BLANK SPIKE/BLANK SPIKE DUPLICATE (BS/BSD) ANALYSES - ORGANICS, METALS AND WET CHEMISTRY

BS/BSD were prepared and analyzed on a regular basis. The results are summarized in Table 9. The BSs contained all analytes of interest. Most BS recoveries were acceptable and all RPDs from BS/BSD analyses were acceptable. Samples associated with outlying recoveries were qualified as follows:

- i) Positive sample results associated with outlying BS recoveries were qualified as estimated.
- ii) Non-detect results associated with high BS recoveries were not qualified. The indicated high bias would not impact the data.
- iii) Non-detect results associated with BS recoveries greater than ten percent were judged to be acceptable without qualification based on sufficient analyte recovery.
- iv) Non-detect results associated with BS recoveries less than ten percent were rejected due to the demonstrated poor analytical efficiency.

3.9 ICP SERIAL DILUTION - METALS

Serial dilutions were performed on all samples analyzed by ICP which were designated as MS/MSD samples. Most serial dilution criteria were met for the ICP elements of interest. Some detected calcium, manganese, magnesium, and barium results were qualified as estimated based on outlying percent differences.

3.10 FURNACE ATOMIC ABSORPTION (AA) QC ANALYSES

Post Digestion Spikes

Post-digestion spikes were analyzed for all samples as required. Most recoveries were acceptable. The selenium result for sample PW2-003 was qualified as estimated due to a low recovery. All remaining sample results associated with outlying recoveries were non-detect, and were judged acceptable without qualification based on sufficient analyte recoveries.

Coefficient of Variation (CV)

All sample results of sufficient concentration met the CV requirements, indicating good instrumental precision.

3.11 FIELD QA/QC

Trip Blank Analysis

Trip blanks were collected on September 5 and 6, 1996 and were submitted with the investigative samples for VOC analysis. The results are summarized in Table 10. Methylene chloride was detected in the trip blanks. Associated sample results up to ten times the levels present in the blanks were qualified as non-detect.

4.0 CONCLUSION

Based on the preceding assessment, the data were acceptable with the exceptions and qualifications noted.

TABLE 1
SAMPLE COLLECTION SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Sample ID	Sample Location	Collection Date	Collection Time	Matrix	Analyses	Comments
PW1-001	PW1	08/27/96	1050	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW1-002	PW1	08/28/96	1100	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW1-003	PW1	08/29/96	1100	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW2-001	PW2	09/04/96	1100	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW2-002	PW2	09/05/96	1050	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW2-003	PW2	09/06/96	1050	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW3-001	PW3	09/10/96	1135	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
PW3-002	PW3	09/11/96	1400	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	MS/MSD
PW3-003	PW3	09/12/96	1700	Groundwater	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
Decon - Water	-	09/10/96	1300	Water	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
NTINF	-	09/11/96	1200	Influent	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	
NTFE	-	09/11/96	1200	Effluent	TCL VOC, TCL SVOC, TCL Pest/PCB, TAL Metals, Wet Chemistry*	

Notes:

Pest/PCB Pesticides/Polychlorinated Biphenyls.
SVOC Semi-Volatile Organic Compounds.
TAL Target Analyte List.
TCL Target Compound List.
VOC Volatile Organic Compounds.
Wet Chemistry Cyanide, pH, biochemical oxygen demand, oil and grease, total kjeldahl nitrogen, ammonia, manganese, phosphorus (total), chloride, total dissolved solids, total suspended solids.

TABLE 2
SAMPLING AND ANALYSIS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Analytical Parameters</i>	<i>Analytical Method</i>
TCL Volatiles	624 (1)
TCL Semi-volatiles	625 (1)
TCL Pesticides/PCBs	608 (1)
TAL Metals	6010/7470/7060/7421/7841/7740 (2)
Cyanide	9012 (2)
pH	150.1 (3)
BOD	405.1 (3)
Oil and Greases	413.1 (3)
TKN	351.2 (3)
Ammonia	350.1 (3)
Manganese	200.7 (3)
Phosphorus, total	365.1 (3)
Chloride	325.2 (3)
TDS	160.1 (3)
TSS	160.2 (3)

Notes:

Methods referenced from:

- (1) "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", EPA-600/4-82-057, July 1982.
 - (2) "Test Methods for Evaluating Solid Waste", USEPA SW-846, 3rd Edition, 1986 and subsequent revisions.
 - (3) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983.
- BOD Biochemical Oxygen Demand.
PCBs Polychlorinated Biphenyls.
TAL Target Analyte List.
TCL Target Compound List.
TDS Total Dissolved Solids.
TKN Total Kjeldahl Nitrogen.
TSS Total Suspended Solids.

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date:	PW1-001 08/27/96	PW1-002 08/28/96	PW1-003 08/29/96	PW2-001 09/04/96
	Units				
<i>TCL Volatiles</i>					
Chloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
Bromomethane	µg/L	ND 10	ND 10	ND 10	ND 10
Vinyl chloride	µg/L	ND 10	ND 10	ND 10	ND 10
Chloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Methylene chloride	µg/L	ND 10	ND 10	ND 10	ND 10
Acetone	µg/L	ND 10	ND 10	ND 10	ND 10
Carbon disulfide	µg/L	ND 10	ND 10	ND 10	ND 10
1,1-Dichloroethene	µg/L	ND 10	ND 10	ND 10	ND 10
1,1-Dichloroethane	µg/L	ND 10	ND 10	ND 10	10
1,2-Dichloroethene (total)	µg/L	1J	2J	ND 10	150
Chloroform	µg/L	ND 10	ND 10	ND 10	ND 10
1,2-Dichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
2-Butanone	µg/L	ND 10	ND 10	ND 10	ND 10
1,1,1-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Carbon tetrachloride	µg/L	ND 10	ND 10	ND 10	ND 10
Bromodichloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
1,2-Dichloropropane	µg/L	ND 10	ND 10	ND 10	ND 10
cis-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 10
Trichloroethene	µg/L	ND 10	ND 10	ND 10	94
Dibromochloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
1,1,2-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Benzene	µg/L	ND 10	ND 10	ND 10	ND 10
trans-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 10
Bromoform	µg/L	ND 10	ND 10	ND 10	ND 10
4-Methyl-2-pentanone	µg/L	ND 10	ND 10	ND 10	ND 10
2-Hexanone	µg/L	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	ND 10	ND 10	ND 10	8J
1,1,2,2-Tetrachloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Toluene	µg/L	ND 10	ND 10	ND 10	3J
Chlorobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
Ethylbenzene	µg/L	ND 10	ND 10	ND 10	ND 10
Styrene	µg/L	ND 10	ND 10	ND 10	ND 10
Xylenes (total)	µg/L	ND 10	ND 10	ND 10	1J
<i>TCL Semi-Volatiles</i>					
Phenol	µg/L	ND 10	ND 10	0.5J	13
bis(2-Chloroethyl) ether	µg/L	ND 10	ND 10	ND 10	ND 10
2-Chlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
1,3-Dichlorobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
1,4-Dichlorobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
1,2-Dichlorobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
2-Methylphenol	µg/L	ND 10	ND 10	ND 10	5J
2,2'-oxybis(1-Chloropropane)	µg/L	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	µg/L	ND 10	ND 10	ND 10	2J
N-Nitroso-di-n-propylamine	µg/L	ND 10	ND 10	ND 10	ND 10
Hexachloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Nitrobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
Isophorone	µg/L	ND 10	ND 10	ND 10	ND 10
2-Nitrophenol	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dimethylphenol	µg/L	ND 10	ND 10	ND 10	0.9J
bis(2-Chloroethoxy)methane	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
1,2,4-Trichlorobenzene	µg/L	ND 10	ND 10	ND 10	0.6J
Naphthalene	µg/L	ND 10	ND 10	ND 10	ND 10
4-Chloroaniline	µg/L	ND 10	ND 10	ND 10	R
Hexachlorobutadiene	µg/L	ND 4	ND 4	ND 4	ND 4

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date:	PW1-001 08/27/96	PW1-002 08/28/96	PW1-003 08/29/96	PW2-001 09/04/96
	Units				
<i>TCL Semi-Volatiles (Cont'd.)</i>					
4-Chloro-3-methylphenol	µg/L	ND 10	ND 10	ND 10	ND 10
2-Methylnaphthalene	µg/L	ND 10	ND 10	ND 10	ND 10
Hexachlorocyclopentadiene	µg/L	R	R	R	ND 10
2,4,6-Trichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
2,4,5-Trichlorophenol	µg/L	ND 25	ND 25	ND 25	ND 25
2-Chloronaphthalene	µg/L	ND 10	ND 10	ND 10	ND 10
2-Nitroaniline	µg/L	ND 25	ND 25	ND 25	ND 25
Dimethylphthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Acenaphthylene	µg/L	ND 10	ND 10	ND 10	ND 10
2,6-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 10
3-Nitroaniline	µg/L	ND 25	ND 25	ND 25	R
Acenaphthene	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrophenol	µg/L	ND 25	ND 25	ND 25	ND 25
4-Nitrophenol	µg/L	ND 25	ND 25	ND 25	ND 25
Dibenzofuran	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	ND 10	ND 10	ND 10	ND 10
4-Chlorophenyl-phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 10
Fluorene	µg/L	ND 10	ND 10	ND 10	ND 10
4-Nitroaniline	µg/L	ND 25	ND 25	ND 25	ND 25
4,6-Dinitro-2-methylphenol	µg/L	ND 25	ND 25	ND 25	ND 25
n-Nitrosodiphenylamine	µg/L	ND 10	ND 10	ND 10	ND 10
4-Bromophenyl phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 10
Hexachlorobenzene	µg/L	ND 8	ND 8	ND 8	ND 8
Pentachlorophenol	µg/L	ND 25	ND 25	ND 25	ND 25
Phenanthrene	µg/L	ND 10	ND 10	ND 10	ND 10
Anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Carbazole	µg/L	ND 10	ND 10	ND 10	ND 10
Di-n-butyl phthalate	µg/L	ND 10	ND 10	ND 10	0.7
Fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Butyl benzyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
3,3'-Dichlorobenzidine	µg/L	ND 10	ND 10	ND 10	R
Benzo (a) anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Chrysene	µg/L	ND 10	ND 10	ND 10	ND 10
bis (2-Ethylhexyl) phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Di-n-octyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (b) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (k) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (a) pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Indeno (1,2,3-cd) pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Dibenzo (a,h) anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (g,h,i) perylene	µg/L	ND 10	ND 10	ND 10	ND 10
<i>TCL Pesticides/PCBs</i>					
alpha-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
beta-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
delta-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
gamma-BHC (Lindane)	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Heptachlor	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Aldrin	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Heptachlor epoxide	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Endosulfan I	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Dieldrin	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
4,4'-DDE	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date:	PW1-001 08/27/96	PW1-002 08/28/96	PW1-003 08/29/96	PW2-001 09/04/96
	Units				
<i>TCL Pesticides/PCBs (Cont'd.)</i>					
Endrin	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Endosulfan II	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
4,4'-DDD	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Endosulfan sulfate	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
4,4'-DDT	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Methoxychlor	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Endrin ketone	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Endrin aldehyde	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
alpha-Chlordane	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
gamma-Chlordane	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Toxaphene	µg/L	ND 5.0	ND 5.0	ND 5.0	ND 5.0
Aroclor-1016	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1221	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1232	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1242	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1248	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1254	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Aroclor-1260	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
<i>TAL Metals</i>					
Aluminum	µg/L	480	350	88	2000
Antimony	µg/L	ND 56	ND 56	ND 56	ND 56
Arsenic	µg/L	1.9	1.1	1.4	1.2
Barium	µg/L	210J	270J	200J	160J
Beryllium	µg/L	ND 0.40	ND 0.40	ND 0.40	0.49
Cadmium	µg/L	ND 3.2	ND 3.2	ND 3.2	ND 3.2
Calcium	µg/L	110000J	160000J	130000J	130000J
Chromium	µg/L	ND 9.1	ND 9.1	ND 9.1	ND 9.1
Cobalt	µg/L	ND 7.9	ND 7.9	ND 7.9	ND 7.9
Copper	µg/L	35	27	13	30
Iron	µg/L	2800	6600	4900	710
Lead	µg/L	ND 23	ND 8.0	ND 6.7	ND 12
Magnesium	µg/L	11000J	16000J	13000J	480J
Manganese	µg/L	150J	180J	120J	85J
Mercury	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Nickel	µg/L	ND 12	ND 12	ND 12	ND 12
Potassium	µg/L	20000	31000	23000	18000
Selenium	µg/L	R	R	R	R
Silver	µg/L	ND 7.0	ND 7.0	ND 7.0	ND 7.0
Sodium	µg/L	57000	89000	66000	120000
Thallium	µg/L	R	R	R	R
Vanadium	µg/L	11	11	9.0	9.6
Zinc	µg/L	70	49	37	24

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	<i>Sample ID:</i>	<i>PW1-001</i>	<i>PW1-002</i>	<i>PW1-003</i>	<i>PW2-001</i>
	<i>Collection Date:</i>	<i>08/27/96</i>	<i>08/28/96</i>	<i>08/29/96</i>	<i>09/04/96</i>
	<i>Units</i>				
<i>Wet Chemistry</i>					
BOD	mg/L	1J	1J	1J	18
Chloride	mg/L	90J	92J	84J	190
Cyanide, Total	µg/L	ND 10	ND 5.0	ND 5.0	20
Ammonia (as N)	mg/L	0.46J	0.37J	0.29J	2.9
TKN	mg/L	ND 0.76	ND 0.59	ND 0.51	ND 3.2
Oil & Grease Gravimetric	mg/L	ND 5.0	ND 5.0	ND 5.0	ND 5.0
pH	S.U.	7.4J	7.1J	7.0J	11.3J
Phosphorus, Total	mg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Total Dissolved Solids	mg/L	560J	560J	520J	790
Total Suspended Solids	mg/L	15J	7.4J	6.6J	7.0

Notes:

BOD Biochemical Oxygen Demand
J Estimated.
NDx Not detected at or above x.
PCBs Polychlorinated biphenyls.
S.U. Standard Units.
TAL Target Analyte List.
TCL Target Compound List.
TKN Total Kjeldahl Nitrogen.

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date: Units	PW2-002 09/05/96	PW2-003 09/06/96	PW3-001 09/10/96	PW3-002 09/11/96
<i>TCL Volatiles</i>					
Chloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
Bromomethane	µg/L	ND 10	ND 10	ND 10	ND 10
Vinyl chloride	µg/L	ND 10	ND 10	38J	50
Chloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Methylene chloride	µg/L	ND 10	ND 10	ND 10	ND 10
Acetone	µg/L	ND 10	ND 10	850	520
Carbon disulfide	µg/L	ND 10	ND 10	ND 10	20J
1,1-Dichloroethene	µg/L	ND 10	ND 10	ND 10	1J
1,1-Dichloroethane	µg/L	8J	6J	2J	4J
1,2-Dichloroethene (total)	µg/L	120J	150	490	340
Chloroform	µg/L	ND 10	ND 10	ND 10	ND 10
1,2-Dichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
2-Butanone	µg/L	ND 10	ND 10	ND 10	ND 10
1,1,1-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Carbon tetrachloride	µg/L	ND 10	ND 10	ND 10	ND 10
Bromodichloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
1,2-Dichloropropane	µg/L	ND 10	ND 10	ND 10	ND 10
cis-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 10
Trichloroethene	µg/L	70J	120	650	490
Dibromochloromethane	µg/L	ND 10	ND 10	ND 10	ND 10
1,1,2-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Benzene	µg/L	ND 10	ND 10	ND 10	2J
trans-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 10
Bromoform	µg/L	ND 10	ND 10	ND 10	ND 10
4-Methyl-2-pentanone	µg/L	ND 10	ND 10	ND 10	ND 10
2-Hexanone	µg/L	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	6J	9J	340	250
1,1,2,2-Tetrachloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Toluene	µg/L	2J	4J	20J	29
Chlorobenzene	µg/L	ND 10	ND 10	13	23
Ethylbenzene	µg/L	ND 10	ND 10	18	25
Styrene	µg/L	ND 10	ND 10	4J	ND 10
Xylenes (total)	µg/L	1J	3J	49	73
<i>TCL Semi-Volatiles</i>					
Phenol	µg/L	14J	9J	170	130
bis(2-Chloroethyl) ether	µg/L	ND 10	ND 10	ND 10	ND 10
2-Chlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
1,3-Dichlorobenzene	µg/L	ND 10	ND 10	1J	1J
1,4-Dichlorobenzene	µg/L	ND 10	ND 10	14	11
1,2-Dichlorobenzene	µg/L	ND 10	ND 10	12	9J
2-Methylphenol	µg/L	7J	5J	560	420
2,2'-oxybis(1-Chloropropane)	µg/L	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	µg/L	5J	4J	180	160
N-Nitroso-di-n-propylamine	µg/L	ND 10	ND 10	ND 10	ND 10
Hexachloroethane	µg/L	ND 10	ND 10	ND 10	ND 10
Nitrobenzene	µg/L	ND 10	ND 10	ND 10	ND 10
Isophorone	µg/L	ND 10	ND 10	ND 10	ND 10
2-Nitrophenol	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dimethylphenol	µg/L	2J	1J	40	40
bis(2-Chloroethoxy)methane	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
1,2,4-Trichlorobenzene	µg/L	0.7J	1J	0.8J	0.6J
Naphthalene	µg/L	ND 10	ND 10	1J	1J
4-Chloroaniline	µg/L	R	R	R	R
Hexachlorobutadiene	µg/L	ND 4	ND 4	ND 4	ND 4

TABLE 3

**ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996**

	<i>Sample ID: Collection Date: Units</i>	<i>PW2-002 09/05/96</i>	<i>PW2-003 09/06/96</i>	<i>PW3-001 09/10/96</i>	<i>PW3-002 09/11/96</i>
<i>TCL Semi-Volatiles (Cont'd.)</i>					
4-Chloro-3-methylphenol	µg/L	ND 10	ND 10	ND 10	ND 10
2-Methylnaphthalene	µg/L	ND 10	ND 10	1J	1J
Hexachlorocyclopentadiene	µg/L	ND 10	ND 10	ND 10	ND 10
2,4,6-Trichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 10
2,4,5-Trichlorophenol	µg/L	ND 25	ND 25	ND 26	ND 26
2-Chloronaphthalene	µg/L	ND 10	ND 10	ND 10	ND 10
2-Nitroaniline	µg/L	ND 25	ND 25	ND 26	ND 26
Dimethylphthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Acenaphthylene	µg/L	ND 10	ND 10	ND 10	ND 10
2,6-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 10
3-Nitroaniline	µg/L	R	R	R	R
Acenaphthene	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrophenol	µg/L	ND 25	ND 25	ND 26	ND 26
4-Nitrophenol	µg/L	ND 25	ND 25	ND 26	ND 26
Dibenzofuran	µg/L	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	ND 10	ND 10	ND 10	ND 10
4-Chlorophenyl-phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 10
Fluorene	µg/L	ND 10	ND 10	ND 10	ND 10
4-Nitroaniline	µg/L	ND 25	ND 25	R	R
4,6-Dinitro-2-methylphenol	µg/L	ND 25	ND 25	ND 26	ND 26
n-Nitrosodiphenylamine	µg/L	ND 10	ND 10	ND 10	ND 10
4-Bromophenyl phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 10
Hexachlorobenzene	µg/L	ND 8	ND 8	ND 8	ND 8
Pentachlorophenol	µg/L	ND 25	ND 25	ND 26	ND 26
Phenanthrene	µg/L	ND 10	ND 10	ND 10	ND 10
Anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Carbazole	µg/L	ND 10	ND 10	ND 10	ND 10
Di-n-butyl phthalate	µg/L	ND 10	ND 10	0.5J	ND 10
Fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Butyl benzyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
3,3'-Dichlorobenzidine	µg/L	R	R	R	R
Benzo (a) anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Chrysene	µg/L	ND 10	ND 10	ND 10	ND 10
bis (2-Ethylhexyl) phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Di-n-octyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (b) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (k) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (a) pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Indeno (1,2,3-cd) pyrene	µg/L	ND 10	ND 10	ND 10	ND 10
Dibenzo (a,h) anthracene	µg/L	ND 10	ND 10	ND 10	ND 10
Benzo (g,h,i) perylene	µg/L	ND 10	ND 10	ND 10	ND 10
<i>TCL Pesticides/PCBs</i>					
alpha-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
beta-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.50
delta-BHC	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
gamma-BHC (Lindane)	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
Heptachlor	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
Aldrin	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
Heptachlor epoxide	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
Endosulfan I	µg/L	ND 0.050	ND 0.050	ND 0.050	R
Dieldrin	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
4,4'-DDE	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20

TABLE 3

**ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996**

	<i>Sample ID:</i>	<i>PW2-002</i>	<i>PW2-003</i>	<i>PW3-001</i>	<i>PW3-002</i>
	<i>Collection Date:</i>	<i>09/05/96</i>	<i>09/06/96</i>	<i>09/10/96</i>	<i>09/11/96</i>
	<i>Units</i>				
<i>TCL Pesticides/PCBs (Cont'd.)</i>					
Endrin	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Endosulfan II	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
4,4'-DDD	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Endosulfan sulfate	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
4,4'-DDT	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Methoxychlor	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Endrin ketone	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Endrin aldehyde	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
alpha-Chlordane	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
gamma-Chlordane	µg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.10
Toxaphene	µg/L	ND 5.0	ND 5.0	ND 5.0	ND 10
Aroclor-1016	µg/L	ND 0.010	ND 0.010	ND 0.10	ND 0.20
Aroclor-1221	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Aroclor-1232	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Aroclor-1242	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Aroclor-1248	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Aroclor-1254	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
Aroclor-1260	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.20
<i>TAL Metals</i>					
Aluminum	µg/L	580	420	660	120
Antimony	µg/L	ND 38	ND 38	ND 38	ND 38
Arsenic	µg/L	ND 1.1	ND 1.6	ND 1.1	ND 1.1
Barium	µg/L	140	130	91	80
Beryllium	µg/L	ND 0.20	ND 0.20	0.21	ND 0.20
Cadmium	µg/L	ND 3.3	ND 3.3	ND 3.3	ND 3.3
Calcium	µg/L	140000	140000	150000	150000
Chromium	µg/L	ND 5.2	ND 5.2	ND 5.2	ND 5.2
Cobalt	µg/L	ND 3.9	ND 3.9	ND 3.9	ND 3.9
Copper	µg/L	ND 5.4	6.3	ND 5.4	7.1
Iron	µg/L	60	15	230	48
Lead	µg/L	2.4	6.4	35	7.4
Magnesium	µg/L	ND 120	ND 120	270	ND 120
Manganese	µg/L	10	2.0	22	1.3
Mercury	µg/L	ND 0.10	ND 0.10	ND 0.10	ND 0.10
Nickel	µg/L	ND 6.5	ND 6.5	ND 6.5	ND 6.5
Potassium	µg/L	21000	23000	16000	15000
Selenium	µg/L	ND 11	72J	ND 1.7	ND 1.9
Silver	µg/L	ND 6.8	ND 6.8	ND 6.8	ND 6.8
Sodium	µg/L	120000	130000	120000	110000
Thallium	µg/L	ND 1.3	ND 1.3	ND 1.3	ND 1.3
Vanadium	µg/L	4.8	7.1	ND 4.4	ND 4.4
Zinc	µg/L	3.8	4.9	2.3	5.7

TABLE 3

**ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996**

	<i>Sample ID:</i>	<i>PW2-002</i>	<i>PW2-003</i>	<i>PW3-001</i>	<i>PW3-002</i>
	<i>Collection Date:</i>	<i>09/05/96</i>	<i>09/06/96</i>	<i>09/10/96</i>	<i>09/11/96</i>
	<i>Units</i>				
<i>Wet Chemistry</i>					
BOD	mg/L	17J	13	18	28
Chloride	mg/L	200J	210	230	220
Cyanide, Total	µg/L	13J	ND 5.0	ND 5.0	ND 5.0
Ammonia (as N)	mg/L	3J	3.2	5.9	5.2
TKN	mg/L	ND 3.2	ND 3.4	6.3	5.5
Oil & Grease Gravimetric	mg/L	ND 5.0	ND 5.0	ND 5.0	ND 5.0
pH	S.U.	11.2J	10.4J	11.3J	11.2J
Phosphorus, Total	mg/L	ND 0.050	ND 0.050	ND 0.050	ND 0.050
Total Dissolved Solids	mg/L	860J	860	910	890
Total Suspended Solids	mg/L	8.8J	ND 5.0	10	ND 5.0

Notes:

BOD Biochemical Oxygen Demand
 J Estimated.
 NDx Not detected at or above x.
 PCBs Polychlorinated biphenyls.
 S.U. Standard Units.
 TAL Target Analyte List.
 TCL Target Compound List.
 TKN Total Kjeldahl Nitrogen.

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date: Units	PW3-003 09/12/96	NTINF 09/11/96	NTFE 09/11/96	Decon - Water 09/10/96
TCL Volatiles					
Chloromethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Bromomethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Vinyl chloride	µg/L	57	ND 10	ND 10	ND 1000
Chloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Methylene chloride	µg/L	ND 10	ND 10	ND 10	ND 1000
Acetone	µg/L	650	76	83	2600J
Carbon disulfide	µg/L	ND 10	ND 10	1J	ND 1000
1,1-Dichloroethene	µg/L	1J	ND 10	ND 10	ND 1000
1,1-Dichloroethane	µg/L	4J	ND 10	ND 10	ND 1000
1,2-Dichloroethene (total)	µg/L	370	1J	ND 10	ND 1000
Chloroform	µg/L	ND 10	3J	8J	ND 1000
1,2-Dichloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Butanone	µg/L	7J	5J	13	ND 1000
1,1,1-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Carbon tetrachloride	µg/L	ND 10	ND 10	ND 10	ND 1000
Bromodichloromethane	µg/L	ND 10	ND 10	ND 10	ND 1000
1,2-Dichloropropane	µg/L	ND 10	ND 10	ND 10	ND 1000
cis-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 1000
Trichloroethene	µg/L	500	2J	ND 10	ND 1000
Dibromochloromethane	µg/L	ND 10	ND 10	ND 10	ND 1000
1,1,2-Trichloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Benzene	µg/L	2J	ND 10	ND 10	ND 1000
trans-1,3-Dichloropropene	µg/L	ND 10	ND 10	ND 10	ND 1000
Bromoform	µg/L	ND 10	ND 10	ND 10	ND 1000
4-Methyl-2-pentanone	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Hexanone	µg/L	ND 10	ND 10	ND 10	ND 1000
Tetrachloroethene	µg/L	270	ND 10	ND 10	ND 1000
1,1,2,2-Tetrachloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Toluene	µg/L	24	16	ND 10	180J
Chlorobenzene	µg/L	18	4J	ND 10	ND 1000
Ethylbenzene	µg/L	23	ND 10	ND 10	ND 1000
Styrene	µg/L	7J	ND 10	ND 10	ND 1000
Xylenes (total)	µg/L	68	ND 10	ND 10	110J
TCL Semi-Volatiles					
Phenol	µg/L	98	0.8J	20	180J
bis(2-Chloroethyl) ether	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Chlorophenol	µg/L	ND 10	ND 10	ND 10	ND 1000
1,3-Dichlorobenzene	µg/L	0.7J	ND 10	ND 10	ND 1000
1,4-Dichlorobenzene	µg/L	8J	ND 10	2J	ND 1000
1,2-Dichlorobenzene	µg/L	ND 10	ND 10	0.8J	ND 1000
2-Methylphenol	µg/L	330	ND 10	1J	ND 1000
2,2'-oxybis(1-Chloropropane)	µg/L	ND 10	ND 10	ND 10	ND 1000
4-Methylphenol	µg/L	120	ND 10	15	ND 1000
N-Nitroso-di-n-propylamine	µg/L	ND 10	ND 10	ND 10	ND 1000
Hexachloroethane	µg/L	ND 10	ND 10	ND 10	ND 1000
Nitrobenzene	µg/L	ND 10	ND 10	ND 10	ND 1000
Isophorone	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Nitrophenol	µg/L	ND 10	ND 10	ND 10	ND 1000
2,4-Dimethylphenol	µg/L	26	ND 10	ND 10	ND 1000
bis(2-Chloroethoxy)methane	µg/L	ND 10	ND 10	ND 10	ND 1000
2,4-Dichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 1000
1,2,4-Trichlorobenzene	µg/L	ND 10	ND 10	ND 10	ND 1000
Naphthalene	µg/L	0.8J	ND 10	ND 10	ND 1000
4-Chloroaniline	µg/L	ND 10	ND 10	ND 10	R
Hexachlorobutadiene	µg/L	ND 4	ND 4	ND 4	ND 410

TABLE 3

**ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996**

	<i>Sample ID:</i>	<i>PW3-003</i>	<i>NTINF</i>	<i>NTFE</i>	<i>Decon - Water</i>
	<i>Collection Date:</i>	<i>09/12/96</i>	<i>09/11/96</i>	<i>09/11/96</i>	<i>09/10/96</i>
	<i>Units</i>				
<i>TCL Semi-Volatiles (Cont'd.)</i>					
4-Chloro-3-methylphenol	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Methylnaphthalene	µg/L	0.9J	ND 10	ND 10	ND 1000
Hexachlorocyclopentadiene	µg/L	ND 10	ND 10	ND 10	ND 1000
2,4,6-Trichlorophenol	µg/L	ND 10	ND 10	ND 10	ND 1000
2,4,5-Trichlorophenol	µg/L	ND 26	ND 26	ND 26	ND 2600
2-Chloronaphthalene	µg/L	ND 10	ND 10	ND 10	ND 1000
2-Nitroaniline	µg/L	ND 26	ND 26	ND 26	ND 2600
Dimethylphthalate	µg/L	ND 10	ND 10	ND 10	ND 1000
Acenaphthylene	µg/L	ND 10	ND 10	ND 10	ND 1000
2,6-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 1000
3-Nitroaniline	µg/L	ND 26	ND 26	ND 26	R
Acenaphthene	µg/L	ND 10	ND 10	ND 10	55J
2,4-Dinitrophenol	µg/L	ND 26	ND 26	ND 26	ND 2600
4-Nitrophenol	µg/L	ND 26	ND 26	ND 26	ND 2600
Dibenzofuran	µg/L	ND 10	ND 10	ND 10	5300
2,4-Dinitrotoluene	µg/L	ND 10	ND 10	ND 10	ND 1000
Diethylphthalate	µg/L	ND 10	2J	5J	ND 1000
4-Chlorophenyl-phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 1000
Fluorene	µg/L	ND 10	ND 10	ND 10	ND 1000
4-Nitroaniline	µg/L	ND 26	ND 26	ND 26	R
4,6-Dinitro-2-methylphenol	µg/L	ND 26	ND 26	ND 26	ND 2600
n-Nitrosodiphenylamine	µg/L	1J	ND 10	ND 10	ND 1000
4-Bromophenyl phenyl ether	µg/L	ND 10	ND 10	ND 10	ND 1000
Hexachlorobenzene	µg/L	ND 8	ND 8	ND 8	ND 820
Pentachlorophenol	µg/L	ND 26	ND 26	ND 26	ND 2600
Phenanthrene	µg/L	ND 10	ND 10	ND 10	ND 1000
Anthracene	µg/L	ND 10	ND 10	ND 10	ND 1000
Carbazole	µg/L	ND 10	ND 10	ND 10	ND 1000
Di-n-butyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 1000
Fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 1000
Pyrene	µg/L	ND 10	ND 10	ND 10	ND 1000
Butyl benzyl phthalate	µg/L	ND 10	ND 10	2J	ND 1000
3,3'-Dichlorobenzidine	µg/L	R	R	ND 10	R
Benzo (a) anthracene	µg/L	ND 10	ND 10	ND 10	ND 1000
Chrysene	µg/L	ND 10	ND 10	ND 10	ND 1000
bis (2-Ethylhexyl) phthalate	µg/L	ND 10	ND 10	ND 10	ND 1000
Di-n-octyl phthalate	µg/L	ND 10	ND 10	ND 10	ND 1000
Benzo (b) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 1000
Benzo (k) fluoranthene	µg/L	ND 10	ND 10	ND 10	ND 1000
Benzo (a) pyrene	µg/L	ND 10	ND 10	ND 10	ND 1000
Indeno (1,2,3-cd) pyrene	µg/L	ND 10	ND 10	ND 10	ND 1000
Dibenzo (a,h) anthracene	µg/L	ND 10	ND 10	ND 10	ND 1000
Benzo (g,h,i) perylene	µg/L	ND 10	ND 10	ND 10	ND 1000
<i>TCL Pesticides/PCBs</i>					
alpha-BHC	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
beta-BHC	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
delta-BHC	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
gamma-BHC (Lindane)	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Heptachlor	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Aldrin	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Heptachlor epoxide	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Endosulfan I	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Dieldrin	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
4,4'-DDE	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0

TABLE 3

**ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996**

	<i>Sample ID:</i>	<i>PW3-003</i>	<i>NTINF</i>	<i>NTFE</i>	<i>Decon - Water</i>
	<i>Collection Date:</i>	<i>09/12/96</i>	<i>09/11/96</i>	<i>09/11/96</i>	<i>09/10/96</i>
	<i>Units</i>				
<i>TCL Pesticides/PCBs (Cont'd.)</i>					
Endrin	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Endosulfan II	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
4,4'-DDD	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Endosulfan sulfate	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
4,4'-DDT	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Methoxychlor	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Endrin ketone	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Endrin aldehyde	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
alpha-Chlordane	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 2.0
gamma-Chlordane	µg/L	ND 0.10	ND 0.50	ND 0.50	ND 1.0
Toxaphene	µg/L	ND 10	ND 50	ND 50	ND 1.0
Aroclor-1016	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 100
Aroclor-1221	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Aroclor-1232	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Aroclor-1242	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Aroclor-1248	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Aroclor-1254	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
Aroclor-1260	µg/L	ND 0.20	ND 1.0	ND 1.0	ND 2.0
<i>TAL Metals</i>					
Aluminum	µg/L	140	140	640	1300
Antimony	µg/L	40	ND 38	ND 38	ND 38
Arsenic	µg/L	ND 1.1	ND 1.7	ND 1.1	ND 1.1
Barium	µg/L	82	23	55	96
Beryllium	µg/L	ND 0.20	ND 0.20	ND 0.20	ND 0.20
Cadmium	µg/L	ND 3.3	3.4	ND 3.3	ND 3.3
Calcium	µg/L	160000	56000	62000	46000
Chromium	µg/L	ND 5.2	ND 5.2	7.7	8.8
Cobalt	µg/L	4.3	ND 3.9	ND 3.9	ND 3.9
Copper	µg/L	10	24	83	210
Iron	µg/L	58	1200	1900	2800
Lead	µg/L	7.5	5.2	9.7	110
Magnesium	µg/L	ND 120	14000	15000	5100
Manganese	µg/L	2.0	480	140	90
Mercury	µg/L	ND 0.10	ND 0.10	ND 0.10	0.11
Nickel	µg/L	ND 6.5	ND 6.5	ND 6.5	ND 6.5
Potassium	µg/L	15000	6600	6800	5500
Selenium	µg/L	ND 1.2	ND 3.5	ND 1.8	ND 2.6
Silver	µg/L	8.2	ND 6.8	9.5J	ND 6.8
Sodium	µg/L	110000	60000	63000	13000
Thallium	µg/L	ND 1.3	ND 1.3	ND 1.3	ND 1.3
Vanadium	µg/L	ND 4.4	5.9	10	9.6
Zinc	µg/L	3.6	21	97	120

TABLE 3
ANALYTICAL RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST-SEPTEMBER 1996

	Sample ID: Collection Date: Units	PW3-003 09/12/96	NTINF 09/11/96	NTFE 09/11/96	Decon - Water 09/10/96
<i>Wet Chemistry</i>					
BOD	mg/L	13	22	120	4800
Chloride	mg/L	220	160	110	29
Cyanide, Total	µg/L	ND 5.0	ND 5.0	130	ND 5.0
Ammonia (as N)	mg/L	5.0	16	16	ND 0.50
TKN	mg/L	5.4	18	22	6.5
Oil & Grease Gravimetric	mg/L	ND 5.0	ND 5.0	25	220
pH	S.U.	11.4J	6.9J	7.1J	7.4J
Phosphorus, Total	mg/L	ND 0.050	0.45	3.2	ND 0.25
Total Dissolved Solids	mg/L	880	520	460	440
Total Suspended Solids	mg/L	ND 5.0	16J	110	14

Notes:

BOD Biochemical Oxygen Demand
 J Estimated.
 NDx Not detected at or above x.
 PCBs Polychlorinated biphenyls.
 S.U. Standard Units.
 TAL Target Analyte List.
 TCL Target Compound List.
 TKN Total Kjeldahl Nitrogen.

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection	Extraction	Analysis	Holding Time Exceedance	
	Date	Date	Date	to Extraction	to Analysis
TCL Volatiles					
PW1-001	08/27/96	-	09/10/96	-	0
PW1-002	08/28/96	-	09/10/96	-	0
PW1-003	08/29/96	-	09/12/96	-	0
PW2-001	09/04/96	-	09/14/96	-	0
PW2-002	09/05/96	-	09/15/96	-	0
PW2-003	09/06/96	-	09/16/96	-	0
PW3-001	09/10/96	-	09/16/96	-	0
PW3-001 DL	09/10/96	-	09/20/96	-	0
PW3-002	09/11/96	-	09/20/96	-	0
PW3-003	09/12/96	-	09/20/96	-	0
PW3-003 DL	09/12/96	-	09/26/96	-	0
NTINF	09/11/96	-	09/20/96	-	0
NIFE	09/11/96	-	09/20/96	-	0
Decon - Water	09/10/96	-	09/20/96	-	0
TCL Semi-Volatiles					
PW1-001	08/27/96	09/03/96	09/13/96	0	0
PW1-002	08/28/96	09/03/96	09/13/96	0	0
PW1-003	08/29/96	09/03/96	09/13/96	0	0
PW2-001	09/04/96	09/11/96	09/17/96	0	0
PW2-002	09/05/96	09/11/96	09/17/96	0	0
PW2-003	09/06/96	09/11/96	09/17/96	0	0
PW3-001	09/10/96	09/13/96	09/17/96	0	0
PW3-001 DL	09/10/96	09/13/96	09/20/96	0	0
PW3-002	09/11/96	09/13/96	09/20/96	0	0
PW3-002 DL	09/10/06	09/13/96	09/20/96	0	0
PW3-003	09/12/96	09/15/96	09/20/96	0	0
PW3-003 DL	09/10/96	09/13/96	09/24/96	0	0
NTINF	09/11/96	09/15/96	09/20/96	0	0
NIFE	09/11/96	09/15/96	09/21/96	0	0
Decon - Water	09/10/96	09/13/96	09/20/96	0	0

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection Date	Extraction Date	Analysis Date	Holding Time Exceedance	
				to Extraction	to Analysis
TCL Pesticides/PCBs					
PW1-001	08/27/96	09/05/96	09/12/96	2	0
PW1-002	08/28/96	09/05/96	09/12/96	1	0
PW1-003	08/29/96	09/05/96	09/12/96	0	0
PW2-001	09/04/96	09/11/96	09/14/96	0	0
PW2-002	09/05/96	09/11/96	09/14/96	0	0
PW2-003	09/06/96	09/11/96	09/14/96	0	0
PW3-001	09/10/96	09/15/96	09/17/96	0	0
PW3-002	09/11/96	09/15/96	09/20/96	0	0
PW3-002 DL	09/11/96	09/15/96	09/23/96	0	0
PW3-003	09/12/96	09/15/96	09/20/96	0	0
NTINF	09/11/96	09/15/96	09/20/96	0	0
NIFE	09/11/96	09/15/96	09/20/96	0	0
Decon - Water	09/10/96	09/15/96	09/17/96	0	0
TAL Metals (except mercury and cyanide)					
PW1-001	08/27/96	-	09/96	0	0
PW1-002	08/28/96	-	09/96	0	0
PW1-003	08/29/96	-	09/96	0	0
PW2-001	09/04/96	-	09/96	0	0
PW2-002	09/05/96	-	09/96	0	0
PW2-003	09/06/96	-	09/96	0	0
PW3-001	09/10/96	-	09/96	0	0
PW3-002	09/11/96	-	09/96	0	0
PW3-003	09/12/96	-	09/96	0	0
NTINF	09/11/96	-	09/96	0	0
NIFE	09/11/96	-	09/96	0	0
Decon - Water	09/10/96	-	09/96	0	0
Mercury					
PW1-001	08/27/96	-	09/06/96	0	0
PW1-002	08/28/96	-	09/06/96	0	0
PW1-003	08/29/96	-	09/06/96	0	0
PW2-001	09/04/96	-	09/18/96	0	0
PW2-002	09/05/96	-	09/18/96	0	0
PW2-003	09/06/96	-	09/18/96	0	0
PW3-001	09/10/96	-	09/23/96	0	0
PW3-002	09/11/96	-	09/23/96	0	0
PW3-003	09/12/96	-	09/23/96	0	0
NTINF	09/11/96	-	09/23/96	0	0
NIFE	09/11/96	-	09/23/96	0	0
Decon - Water	09/10/96		09/23/96	0	0

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection	Preparation	Analysis	Holding Time Exceedance	
	Date	Date	Date	to Extraction	to Analysis
Wet Chemistry					
BOD 5 Day					
PW1-001	08/27/96	08/29/96	09/03/96	0	0
PW1-002	08/28/96	08/29/96	09/03/96	0	0
PW1-003	08/29/96	08/31/96	09/05/96	0	0
PW2-001	09/04/96	09/06/96	09/11/96	0	0
PW2-002	09/05/96	09/06/96	09/11/96	0	0
PW2-003	09/06/96	09/08/96	09/13/96	0	0
PW3-001	09/10/96	09/11/96	09/16/96	0	0
PW3-002	09/11/96	09/13/96	09/18/96	0	0
PW3-003	09/12/96	09/14/96	09/19/96	0	0
NTINF	09/11/96	09/13/96	09/18/96	0	0
NIFE	09/11/96	09/13/96	09/18/96	0	0
Decon - Water	09/10/96	09/11/96	09/16/96	0	0
Chloride					
PW1-001	08/27/96	-	09/09/96	-	0
PW1-002	08/28/96	-	09/09/96	-	0
PW1-003	08/29/96	-	09/09/96	-	0
PW2-001	09/04/96	-	09/17/96	-	0
PW2-002	09/05/96	-	09/17/96	-	0
PW2-003	09/06/96	-	09/17/96	-	0
PW3-001	09/10/96	-	09/24/96	-	0
PW3-002	09/11/96	-	09/24/96	-	0
PW3-003	09/12/96	-	09/17/96	-	0
NTINF	09/11/96	-	09/24/96	-	0
NIFE	09/11/96	-	09/24/96	-	0
Decon - Water	09/10/96	-	09/24/96	-	0
Total Cyanide					
PW1-001	08/27/96	-	09/10/96	-	0
PW1-002	08/28/96	-	09/10/96	-	0
PW1-003	08/29/96	-	09/10/96	-	0
PW2-001	09/04/96	-	09/10/96	-	0
PW2-002	09/05/96	-	09/10/96	-	0
PW2-003	09/06/96	-	09/16/96	-	0
PW3-001	09/10/96	-	09/16/96	-	0
PW3-002	09/11/96	-	09/16/96	-	0
PW3-003	09/12/96	-	09/20/96	-	0
NTINF	09/11/96	-	09/17/96	-	0
NIFE	09/11/96	-	09/17/96	-	0
Decon - Water	09/10/96	-	09/16/96	-	0

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection	Preparation	Analysis	Holding Time Exceedance	
	Date	Date	Date	to Extraction	to Analysis
Ammonia					
PW1-001	08/27/96	-	09/03/96	-	0
PW1-002	08/28/96	-	09/03/96	-	0
PW1-003	08/29/96	-	09/03/96	-	0
PW2-001	09/04/96	-	09/11/96	-	0
PW2-002	09/05/96	-	09/11/96	-	0
PW2-003	09/06/96	-	09/18/96	-	0
PW3-001	09/10/96	-	09/18/96	-	0
PW3-002	09/11/96	-	09/18/96	-	0
PW3-003	09/12/96	-	09/18/96	-	0
NTINF	09/11/96	-	09/18/96	-	0
NIFE	09/11/96	-	09/18/96	-	0
Decon - Water	09/10/96	-	09/18/96	-	0
TKN					
PW1-001	08/27/96	-	09/03/96	-	0
PW1-002	08/28/96	-	09/03/96	-	0
PW1-003	08/29/96	-	09/03/96	-	0
PW2-001	09/04/96	-	09/11/96	-	0
PW2-002	09/05/96	-	09/11/96	-	0
PW2-003	09/06/96	-	09/18/96	-	0
PW3-001	09/10/96	-	09/18/96	-	0
PW3-002	09/11/96	-	09/18/96	-	0
PW3-003	09/12/96	-	09/18/96	-	0
NTINF	09/11/96	-	09/18/96	-	0
NIFE	09/11/96	-	09/18/96	-	0
Decon - Water	09/10/96	-	09/18/96	-	0
Oil and Grease					
PW1-001	08/27/96	-	09/09/96	-	0
PW1-002	08/28/96	-	09/09/96	-	0
PW1-003	08/29/96	-	09/09/96	-	0
PW2-001	09/04/96	-	09/13/96	-	0
PW2-002	09/05/96	-	09/13/96	-	0
PW2-003	09/06/96	-	09/13/96	-	0
PW3-001	09/10/96	-	09/13/96	-	0
PW3-002	09/11/96	-	09/13/96	-	0
PW3-003	09/12/96	-	09/25/96	-	0
NTINF	09/11/96	-	09/25/96	-	0
NIFE	09/11/96	-	09/25/96	-	0
Decon - Water	09/10/96	-	09/13/96	-	0

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection Date	Preparation Date	Analysis Date	Holding Time Exceedance	
				to Extraction	to Analysis
Phosphorus, Total					
PW1-001	08/27/96	-	08/29/96	-	0
PW1-002	08/28/96	-	09/05/96	-	0
PW1-003	08/29/96	-	09/05/96	-	0
PW2-001	09/04/96	-	09/09/96	-	0
PW2-002	09/05/96	-	09/16/96	-	0
PW2-003	09/06/96	-	10/14/96	-	10
PW3-001	09/10/96	-	09/16/96	-	0
PW3-002	09/11/96	-	09/16/96	-	0
PW3-003	09/12/96	-	09/16/96	-	0
NTINF	09/11/96	-	09/16/96	-	0
NIFE	09/11/96	-	09/16/96	-	0
Decon - Water	09/10/96	-	09/26/96	-	0
Total Dissolved Solids					
PW1-001	08/27/96	-	08/31/96	-	0
PW1-002	08/28/96	-	08/31/96	-	0
PW1-003	08/29/96	-	09/04/96	-	0
PW2-001	09/04/96	-	09/07/96	-	0
PW2-002	09/05/96	-	09/11/96	-	0
PW2-003	09/06/96	-	09/12/96	-	0
PW3-001	09/10/96	-	09/14/96	-	0
PW3-002	09/11/96	-	09/14/96	-	0
PW3-003	09/12/96	-	09/19/96	-	0
NTINF	09/11/96	-	09/18/96	-	0
NIFE	09/11/96	-	09/18/96	-	0
Decon - Water	09/10/96	-	09/14/96	-	0

TABLE 4
HOLDING TIME SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Location ID	Collection Date	Preparation Date	Analysis Date	Holding Time Exceedance	
				to Extraction	to Analysis
Total Suspended Solids					
PW1-001	08/27/96	-	08/31/96	-	0
PW1-002	08/28/96	-	08/31/96	-	0
PW1-003	08/29/96	-	09/04/96	-	0
PW2-001	09/04/96	-	09/07/96	-	0
PW2-002	09/05/96	-	09/11/96	-	0
PW2-003	09/06/96	-	09/12/96	-	0
PW3-001	09/10/96	-	09/14/96	-	0
PW3-002	09/11/96	-	09/14/96	-	0
PW3-003	09/12/96	-	09/19/96	-	0
NTINF	09/11/96	-	09/19/96	-	1
NTFE	09/11/96	-	09/18/96	-	0
Decon - Water	09/10/96	-	09/14/96	-	0

Notes:

- Not applicable.
 BOD Biochemical Oxygen Demand.
 D Dilution.
 PCBs Polychlorinated Biphenyls.
 RE Reprep.
 TAL Target Analyte List.
 TCL Target Compound List.

TABLE 5
 SURROGATE SPIKE RECOVERIES (PERCENT)
 PUMPING TESTS
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 AUGUST - SEPTEMBER 1996

<i>Surrogate:</i> <i>Recovery Limits:</i>		<i>TOL</i> <i>(88-110)</i>	<i>BFB</i> <i>(86-115)</i>	<i>DCE</i> <i>(76-114)</i>		
<i>TCL Volatiles</i>						
PW1-001		96	94	103		
PW1-002		104	105	112		
PW1-003		93	88	86		
PW2-001		97	97	83		
PW2-002		99	91	85		
PW2-003		98	92	88		
PW3-001		95	97	92		
PW3-001 DL		107	106	100		
PW3-002		105	101	101		
PW3-002 DL		100	97	94		
PW3-003		100	100	97		
PW-003 DL		102	97	97		
NTINF		100	93	94		
NTFE		104	101	101		
Decon - Water		107	117*	97		
<i>Surrogate:</i> <i>Recovery Limits:</i>	<i>NBZ</i> <i>(35-114)</i>	<i>FBP</i> <i>(43-116)</i>	<i>TPH</i> <i>(33-141)</i>	<i>PHL</i> <i>(10-110)</i>	<i>2FP</i> <i>(21-100)</i>	<i>TBP</i> <i>(10-123)</i>
<i>TCL Semi-Volatiles</i>						
PW1-001	63	75	94	80	65	108
PW1-002	36	50	48	75	53	16
PW1-003	46	53	44	75	46	62
PW2-001	70	74	94	74	69	92
PW2-002	42	47	88	45	38	78
PW2-003	41	46	88	45	38	74
PW3-001	67	68	71	70	62	85
PW3-001 DL	56	61	67	65	55	68
PW3-002	69	71	82	77	64	95
PW3-002 DL	54	64	75	68	59	68
PW3-003	49	49	73	54	44	72
PW3-003 DL	45	44	73	51	41	73
NTINF	51	48	66	50	43	64
NTFE	70	57	46	67	58	67
Decon - Water	D	D	D	D	D	D

TABLE 5
 SURROGATE SPIKE RECOVERIES (PERCENT)
 PUMPING TESTS
 GRATWICK - RIVERSIDE PARK SITE
 NORTH TONAWANDA, NEW YORK
 AUGUST - SEPTEMBER 1996

	<i>Surrogate:</i>	<i>DCBP</i>	<i>TCMX</i>
	<i>Recovery Limits:</i>	(22-126)	(27-129)
<i>TCL Pesticides/PCBs</i>			
PW1-001		38	52
PW1-002		40	48
PW1-003		51	45
PW2-001		58	68
PW2-002		42	58
PW2-003		45	62
PW3-001		62	45
PW3-002		57	30
PW3-003		64	25*
NTINF		D	D
NIFE		D	D
Decon - Water		D	D

Notes:

* Value outside the of the QC limits.

D Dilluted Out.

DL Dilution.

Surrogates:

DCE	1,2-Dichloroethane-d4	NBZ	Nitrobenzene-d5
TOL	Toluene-d8	FBP	2-Fluorobiphenyl
BFB	Bromofluorobenzene	TPH	Terphenyl-d14
2FP	2-Fluorophenol	PHL	Phenol-d5
TBP	2,4,6-Tribromophenol	TCMX	Tetrachloro-m-xylene
DCBP	Decachlorobiphenyl		

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Analysis Date:</i>	<i>09/10/96</i>	<i>09/12/96</i>	<i>09/14/96</i>	<i>09/15/96</i>	<i>09/20/96</i>	<i>09/26/96</i>
<i>Units:</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
<i>TCL Volatiles</i>						
Chloromethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Bromomethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Vinyl chloride	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Methylene chloride	3J	5J	3J	ND 10	2J	2J
Acetone	3J	ND 10	ND 10	1J	1J	ND 10
Carbon disulfide	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,1-Dichloroethene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,1-Dichloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,2-Dichloroethene (total)	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chloroform	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,2-Dichloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
2-Butanone	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,1,1-Trichloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Carbon tetrachloride	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Bromodichloromethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,2-Dichloropropane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
cis-1,3-Dichloropropene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Trichloroethene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Dibromochloromethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,1,2-Trichloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Benzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
trans-1,3-Dichloropropene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Bromoform	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
4-Methyl-2-pentanone	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
2-Hexanone	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
1,1,2,2-Tetrachloroethane	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Toluene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Ethylbenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Styrene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Xylenes (total)	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Extraction Date:</i>	09/03/96	09/11/96	09/13/96	09/15/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)
TCL Semi-Volatiles				
Phenol	ND 10	ND 10	ND 10	ND 10
bis(2-Chloroethyl) ether	ND 10	ND 10	ND 10	ND 10
2-Chlorophenol	ND 10	ND 10	ND 10	ND 10
1,3-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10
1,4-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10
2-Methylphenol	ND 10	ND 10	ND 10	ND 10
2,2'-oxybis(1-Chloropropane)	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	ND 10	ND 10	ND 10	ND 10
N-Nitroso-di-n-propylamine	ND 10	ND 10	ND 10	ND 10
Hexachloroethane	ND 10	ND 10	ND 10	ND 10
Nitrobenzene	ND 10	ND 10	ND 10	ND 10
Isophorone	ND 10	ND 10	ND 10	ND 10
2-Nitrophenol	ND 10	ND 10	ND 10	ND 10
2,4-Dimethylphenol	ND 10	ND 10	ND 10	ND 10
bis(2-Chloroethoxy)methane	ND 10	ND 10	ND 10	ND 10
2,4-Dichlorophenol	ND 10	ND 10	ND 10	ND 10
1,2,4-Trichlorobenzene	ND 10	ND 10	ND 10	ND 10
Naphthalene	ND 10	ND 10	ND 10	ND 10
4-Chloroaniline	ND 10	ND 10	ND 10	ND 10
Hexachlorobutadiene	ND 4	ND 4	ND 4	ND 4
4-Chloro-3-methylphenol	ND 10	ND 10	ND 10	ND 10
2-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10
Hexachlorocyclopentadiene	ND 10	ND 10	ND 10	ND 10
2,4,6-Trichlorophenol	ND 10	ND 10	ND 10	ND 10
2,4,5-Trichlorophenol	ND 25	ND 25	ND 25	ND 25
2-Chloronaphthalene	ND 10	ND 10	ND 10	ND 10
2-Nitroaniline	ND 25	ND 25	ND 25	ND 25
Dimethylphthalate	ND 10	ND 10	ND 10	ND 10
Acenaphthylene	ND 10	ND 10	ND 10	ND 10
2,6-Dinitrotoluene	ND 10	ND 10	ND 10	ND 10
3-Nitroaniline	ND 25	ND 25	ND 25J	ND 25
Acenaphthene	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrophenol	ND 25	ND 25	ND 25	ND 25
4-Nitrophenol	ND 25	ND 25	ND 25	ND 25
Dibenzofuran	ND 10	ND 10	ND 10	ND 10
2,4-Dinitrotoluene	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	ND 10	ND 10	ND 10	ND 10
4-Chlorophenyl-phenyl ether	ND 10	ND 10	ND 10	ND 10
Fluorene	ND 10	ND 10	ND 10	ND 10
4-Nitroaniline	ND 25	ND 25	ND 25	ND 25
4,6-Dinitro-2-methylphenol	ND 25	ND 25	ND 25	ND 25

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Extraction Date:</i>	09/03/96	09/11/96	09/13/96	09/15/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)
TCL Semi-Volatiles (cont.)				
n-Nitrosodiphenylamine	ND 10	ND 10	ND 10	ND 10
4-Bromophenyl phenyl ether	ND 10	ND 10	ND 10	ND 10
Hexachlorobenzene	ND 8	ND 8	ND 8	ND 8
Pentachlorophenol	ND 25	ND 25	ND 25	ND 25
Phenanthrene	ND 10	ND 10	ND 10	ND 10
Anthracene	ND 10	ND 10	ND 10	ND 10
Carbazole	ND 10	ND 10	ND 10	ND 10
Di-n-butyl phthalate	1J	ND 10	ND 10	1J
Fluoranthene	ND 10	ND 10	ND 10	ND 10
Pyrene	ND 10	ND 10	ND 10	ND 10
Butyl benzyl phthalate	ND 10	ND 10	ND 10	ND 10
3,3'-Dichlorobenzidine	ND 10	ND 10	ND 10	ND 10
Benzo (a) anthracene	ND 10	ND 10	ND 10	ND 10
Chrysene	ND 10	ND 10	ND 10	ND 10
bis (2-Ethylhexyl) phthalate	3J	3J	0.9J	15
Di-n-octyl phthalate	ND 10	ND 10	ND 10	ND 10
Benzo (b) fluoranthene	ND 10	ND 10	ND 10	ND 10
Benzo (k) fluoranthene	ND 10	ND 10	ND 10	ND 10
Benzo (a) pyrene	ND 10	ND 10	ND 10	ND 10
Indeno (1,2,3-cd) pyrene	ND 10	ND 10	ND 10	ND 10
Dibenzo (a,h) anthracene	ND 10	ND 10	ND 10	ND 10
Benzo (g,h,i) perylene	ND 10	ND 10	ND 10	ND 10

<i>Extraction Date:</i>	09/05/96	09/11/96	09/15/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)
TCL Pesticides/PCBs			
alpha-BHC	ND 0.050	ND 0.050	ND 0.050
beta-BHC	ND 0.050	ND 0.050	ND 0.050
delta-BHC	ND 0.050	ND 0.050	ND 0.050
gamma-BHC (Lindane)	ND 0.050	ND 0.050	ND 0.050
Heptachlor	ND 0.050	ND 0.050	ND 0.050
Aldrin	ND 0.050	ND 0.050	ND 0.050
Heptachlor epoxide	ND 0.050	ND 0.050	ND 0.050
Endosulfan I	ND 0.050	ND 0.050	ND 0.050
Dieldrin	ND 0.10	ND 0.10	ND 0.10
4,4'-DDE	ND 0.10	ND 0.10	ND 0.10
Endrin	ND 0.10	ND 0.10	ND 0.10
Endosulfan II	ND 0.10	ND 0.10	ND 0.10
4,4'-DDD	ND 0.10	ND 0.10	ND 0.10
Endosulfan sulfate	ND 0.10	ND 0.10	ND 0.10
4,4'-DDT	ND 0.10	ND 0.10	ND 0.10

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Extraction Date:</i>	09/05/96	09/11/96	09/15/96			
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)			
<i>TCL Pesticides/PCBs (cont.)</i>						
Methoxychlor	ND 0.10	ND 0.10	ND 0.10			
Endrin ketone	ND 0.10	ND 0.10	ND 0.10			
Endrin aldehyde	ND 0.10	ND 0.10	ND 0.10			
alpha-Chlordane	ND 0.050	ND 0.050	ND 0.050			
gamma-Chlordane	ND 0.050	ND 0.050	ND 0.050			
Toxaphene	ND 5.0	ND 5.0	ND 5.0			
Aroclor-1016	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1221	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1232	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1242	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1248	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1254	ND 0.10	ND 0.10	ND 0.10			
Aroclor-1260	ND 0.10	ND 0.10	ND 0.10			
<i>Digestion Date:</i>	09/05/96	09/07/96	09/16/96	09/18/96	09/19/96	09/21/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
<i>TAL Metals</i>						
Aluminum	-	ND 25	-	-	ND 43	-
Antimony	-	ND 56	-	-	ND 38	-
Arsenic	-	ND 1.1	-	-	2.4	-
Barium	-	ND 2.5	-	-	ND 1.5	-
Beryllium	-	ND 0.40	-	-	ND 0.20	-
Cadmium	-	ND 3.2	-	-	ND 3.3	-
Calcium	-	ND 29	-	-	ND 29	-
Chromium	-	ND 9.1	-	-	ND 5.2	-
Cobalt	-	ND 7.9	-	-	ND 3.9	-
Copper	-	ND 6.1	-	-	ND 5.4	-
Iron	-	58	-	-	ND 4.4	-
Lead	-	-	5.7	-	ND 0.6	-
Magnesium	-	ND 66	-	-	ND 120	-
Manganese	-	ND 2.9	-	-	ND 0.80	-
Mercury	0.24	-	-	ND 0.10	-	ND 0.10
Nickel	-	ND 12	-	-	ND 6.5	-
Potassium	-	ND 3900	-	-	ND 970	-
Selenium	-	1.8	-	-	2.2	-
Silver	-	ND 7.0	-	-	ND 6.8	-
Sodium	-	86	-	-	ND 83	-
Thallium	-	ND 1.3	-	-	ND 1.3	-
Vanadium	-	ND 7.4	-	-	ND 4.4	-
Zinc	-	ND 3.0	-	-	ND 1.6	-

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

<i>Analysis Date:</i>	08/29/96	08/31/96	09/03/96	09/04/96	09/05/96	09/07/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
<i>Wet Chemistry</i>						
BOD	-	-	ND 1	-	ND 1	-
Chloride	-	-	-	-	-	-
Cyanide, Total	-	-	-	-	-	-
Ammonia as N	-	-	ND 0.10	-	-	-
TKN	-	-	0.13	-	-	-
Oil & Grease Gravimetric	-	-	-	-	-	-
Phosphorus, Total	ND 0.050	-	-	-	ND 0.050	-
Total Dissolved Solids	-	ND 5.0	-	ND 5.0	-	ND 5.0
Total Suspended Solids	-	ND 5.0	-	ND 5.0	-	ND 5.0
<i>Analysis Date:</i>	09/09/96	09/10/96	09/11/96	09/12/96	09/13/96	09/14/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
<i>Wet Chemistry</i>						
BOD	-	-	ND 1	-	ND 1	ND 1
Chloride	ND 0.25	-	-	-	-	-
Cyanide, Total	-	ND 0.0050	-	-	-	-
Ammonia as N	-	-	ND 0.10	-	-	-
TKN	-	-	0.10	-	-	-
Oil & Grease Gravimetric	ND 5.0	-	-	-	ND 5.0	-
Phosphorus, Total	ND 0.050	-	-	-	-	-
Total Dissolved Solids	-	-	ND 5.0	ND 5.0	-	ND 5.0
Total Suspended Solids	-	-	ND 5.0	ND 5.0	-	ND 5.0
<i>Analysis Date:</i>	09/16/96	09/17/96	09/18/96	09/19/96	09/20/96	09/24/96
<i>Units:</i>	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
<i>Wet Chemistry</i>						
BOD	ND 1	-	ND 1	-	-	-
Chloride	-	ND 0.25	-	-	-	ND 0.25
Cyanide, Total	ND 0.0050	ND 0.0050	-	-	ND 0.0050	-
Ammonia as N	-	-	ND 0.10	-	-	-
TKN	-	-	ND 0.10	-	-	-
Oil & Grease Gravimetric	-	-	-	-	-	-
Phosphorus, Total	ND 0.050	-	-	-	-	-
Total Dissolved Solids	-	-	ND 5.0	ND 5.0	-	-
Total Suspended Solids	-	-	ND 5.0	ND 5.0	-	-

TABLE 6
METHOD BLANK RESULTS SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	<i>Analysis Date:</i>	<i>09/25/96</i>	<i>09/26/96</i>	<i>10/14/96</i>
	<i>Units:</i>	<i>(mg/L)</i>	<i>(mg/L)</i>	<i>(mg/L)</i>
<i>Wet Chemistry</i>				
BOD		-	-	-
Chloride		-	-	-
Cyanide, Total		-	-	-
Ammonia as N		-	-	-
TKN		-	-	-
Oil & Grease Gravimetric	ND 5.0	-	-	-
Phosphorus, Total		-	ND 0.050	ND 0.050
Total Dissolved Solids		-	-	-
Total Suspended Solids		-	-	-

Notes:

- Not analyzed.
- BOD Biochemical Oxygen Demand.
- J Estimated.
- NDx Not detected at or above x.
- TAL Target Analyte List.
- TCL Target Compound List.
- TKN Total Kjeldahl Nitrogen.

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	<i>MS/MSD</i>		<i>PW3-002</i>		
	<i>Control Limits (%)</i>	<i>RPD Control Limits</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>
<i>TCL Volatiles</i>					
Chloromethane	1-273	20	97	88	9
Bromomethane	1-242	20	92	76	19
Vinyl chloride	1-251	20	132	149	12
Chloroethane	14-230	20	138	111	21*
Methylene chloride	1-221	20	79	83	4
Acetone	14-230	20	NA	NA	NA
Carbon disulfide	14-230	20	140	107	26*
1,1-Dichloroethene	1-234	20	88	96	8
1,1-Dichloroethane	59-155	20	85	93	8
1,2-Dichloroethene (total)	54-156	20	NA	NA	NA
Chloroform	51-138	20	92	101	9
1,2-Dichloroethane	49-155	20	93	100	7
2-Butanone	14-230	20	90	99	9
1,1,1-Trichloroethane	52-162	20	76	87	13
Carbon tetrachloride	70-140	20	31*	45*	36*
Bromodichloromethane	35-155	20	71	86	19
1,2-Dichloropropane	1-210	20	89	100	11
cis-1,3-Dichloropropene	1-227	20	68	73	7
Trichloroethene	71-157	20	NA	NA	NA
Dibromochloromethane	53-149	20	64	76	17
1,1,2-Trichloroethane	52-150	20	89	96	7
Benzene	37-151	20	90	99	9
trans-1,3-Dichloropropene	17-183	20	59	55	7
Bromoform	45-169	20	51	64	22*
4-Methyl-2-pentanone	14-230	20	103	109	5
2-Hexanone	14-230	20	80	85	6
Tetrachloroethene	64-148	20	NA	NA	NA
1,1,2,2-Tetrachloroethane	46-157	20	88	102	14
Toluene	47-150	20	74	90	19
Chlorobenzene	37-160	20	86	104	18
Ethylbenzene	37-162	20	78	90	14
Styrene	37-162	20	120	126	4
Xylenes (total)	37-162	20	79	91	14

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	MS/MSD	RPD	PW3-002		
	Control		MS	MSD	RPD
	Limits				
	(%)	Control	(%)	(%)	
	Limits				
TCL Semi-Volatiles					
Phenol	12-110	42	65	56	14
bis(2-Chloroethyl) ether	12-158	50	168*	150	11
2-Chlorophenol	27-123	40	71	68	4
1,3-Dichlorobenzene	1-172	50	56	46	19
1,4-Dichlorobenzene	36-97	28	57	48	17
1,2-Dichlorobenzene	32-129	50	59	50	16
2-Methylphenol	1-180	50	65	42	43
2,2'-oxybis(1-Chloropropane)	36-166	50	64	59	8
4-Methylphenol	1-180	50	90	65	32
N-Nitroso-di-n-propylamine	41-116	38	80	74	7
Hexachloroethane	40-113	50	60	49	20
Nitrobenzene	35-180	50	67	66	1
Isophorone	21-196	50	76	70	8
2-Nitrophenol	29-182	50	71	72	1
2,4-Dimethylphenol	32-119	50	90*	83	8
bis(2-Chloroethoxy)methane	33-184	50	76	73	4
2,4-Dichlorophenol	39-135	50	76	75	1
1,2,4-Trichlorobenzene	39-98	28	55	50	9
Naphthalene	21-133	50	61	56	8
4-Chloroaniline	1-180	50	68	38	56*
Hexachlorobutadiene	24-116	50	58	50	14
4-Chloro-3-methylphenol	23-97	42	98*	89	9
2-Methylnaphthalene	21-133	50	69	62	10
Hexachlorocyclopentadiene	1-180	50	13	12	8
2,4,6-Trichlorophenol	37-144	50	88	78	12
2,4,5-Trichlorophenol	1-180	50	89	80	10
2-Chloronaphthalene	60-118	50	71	62	13
2-Nitroaniline	1-180	50	90	73	20
Dimethylphthalate	1-112	50	69	67	2
Acenaphthylene	33-145	50	77	66	15
2,6-Dinitrotoluene	50-158	50	76	69	9
3-Nitroaniline	1-180	50	67	44	41
Acenaphthene	46-118	31	78	68	13
2,4-Dinitrophenol	1-191	50	94	79	17
4-Nitrophenol	10-80	50	83*	82*	1
Dibenzofuran	33-145	50	81	70	14
2,4-Dinitrotoluene	24-96	38	73	72	1
Diethylphthalate	1-114	50	71	68	4
4-Chlorophenyl-phenyl ether	25-158	50	82	63	26
Fluorene	59-121	50	84	73	14

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	MS/MSD Control Limits (%)	RPD Control Limits	PW3-002		
			MS (%)	MSD (%)	RPD
TCL Semi-Volatiles (cont.)					
4-Nitroaniline	1-180	50	81	66	20
4,6-Dinitro-2-methylphenol	1-181	50	89	83	6
n-Nitrosodiphenylamine	1-180	50	88	65	30
4-Bromophenyl phenyl ether	53-127	50	72	63	13
Hexachlorobenzene	1-152	50	98	77	24
Pentachlorophenol	9-103	50	100	89	11
Phenanthrene	54-120	50	103	97	6
Anthracene	27-133	50	81	76	6
Carbazole	1-180	50	89	83	6
Di-n-butyl phthalate	1-118	50	83	75	10
Fluoranthene	26-137	50	85	78	8
Pyrene	26-127	31	84	80	4
Butyl benzyl phthalate	1-152	50	92	86	6
3,3'-Dichlorobenzidine	1-262	50	0*	0*	0
Benzo (a) anthracene	33-143	50	88	80	9
Chrysene	17-168	50	87	81	7
bis (2-Ethylhexyl) phthalate	8-158	50	95	87	8
Di-n-octyl phthalate	4-146	50	92	83	10
Benzo (b) fluoranthene	24-159	50	83	75	10
Benzo (k) fluoranthene	11-162	50	83	77	7
Benzo (a) pyrene	17-163	50	86	79	8
Indeno (1,2,3-cd) pyrene	1-171	50	88	84	4
Dibenz (a,h) anthracene	1-227	50	88	84	4
Benzo (g,h,i) perylene	1-219	50	92	89	3
TCL Pesticides/PCBs					
alpha-BHC	37-134	200	90	72	22
beta-BHC	17-147	200	200*	58	110
delta-BHC	19-140	200	40	42	4
gamma-BHC (Lindane)	56-127	15	38*	52*	31*
Heptachlor	50-129	20	64	52	20
Aldrin	48-133	22	86	46*	60*
Heptachlor epoxide	37-142	200	128	124	3
Endosulfan I	36-146	200	0*	0*	0
Dieldrin	57-131	18	98	100	2
4,4'-DDE	30-145	200	106	102	4
Endrin	46-150	21	108	110	1
Endosulfan II	45-153	200	28*	13*	73*
4,4'-DDD	31-141	200	116	114	1
Endosulfan sulfate	26-144	200	94	96	2

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	<i>MS/MSD</i>		<i>PW3-002</i>		
	<i>Control Limits (%)</i>	<i>RPD Control Limits</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>
<i>TCL Pesticides/PCBs (cont.)</i>					
4,4'-DDT	38-138	27	106	105	1
Methoxychlor	25-160	200	129	131	1
Endrin ketone	30-147	200	78	80	2
Endrin aldehyde	30-147	200	42	73	54
alpha-Chlordane	45-119	200	100	107	7
gamma-Chlordane	45-119	200	78	84	7

	<i>MS/MSD</i>		<i>PW1-001</i>			<i>PW1-002</i>		
	<i>Control Limits (%)</i>	<i>RPD Control Limits</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>
<i>TAL Metals</i>								
Aluminum	80-120	20	113	118	4	-	-	-
Antimony	80-120	20	104	107	3	-	-	-
Arsenic	80-120	20	94	95	1	-	-	-
Barium	80-120	20	109	109	0	-	-	-
Beryllium	80-120	20	98	98	0	-	-	-
Cadmium	80-120	20	103	102	1	-	-	-
Calcium	80-120	20	NA	NA	NA	-	-	-
Chromium	80-120	20	98	97	1	-	-	-
Cobalt	80-120	20	101	100	1	-	-	-
Copper	80-120	20	96	101	5	-	-	-
Iron	80-120	20	92	124*	30*	-	-	-
Lead	80-120	20	-	-	-	87	92	6
Magnesium	80-120	20	102	104	2	-	-	-
Manganese	80-120	20	104	106	2	-	-	-
Mercury	80-120	20	104	98	6	-	-	-
Nickel	80-120	20	96	96	0	-	-	-
Potassium	80-120	20	94	96	2	-	-	-
Selenium	80-120	20	25*	27*	8	-	-	-
Silver	80-120	20	104	100	4	-	-	-
Sodium	80-120	20	102	120	16	-	-	-
Thallium	80-120	20	22*	23*	4	-	-	-
Vanadium	80-120	20	105	105	0	-	-	-
Zinc	80-120	20	99	100	1	-	-	-

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	<i>MS/MSD</i>		<i>PW2-001</i>			<i>PW3-002</i>		
	<i>Control Limits (%)</i>	<i>RPD Control Limits</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>	<i>MS (%)</i>	<i>MSD (%)</i>	<i>RPD</i>
<i>TAL Metals</i>								
Aluminum	80-120	20	-	-	-	105	104	1
Antimony	80-120	20	-	-	-	115	112	3
Arsenic	80-120	20	-	-	-	102	90	12
Barium	80-120	20	-	-	-	98	98	0
Beryllium	80-120	20	-	-	-	92	92	0
Cadmium	80-120	20	-	-	-	92	88	4
Calcium	80-120	20	-	-	-	94	97	3
Chromium	80-120	20	-	-	-	98	97	1
Cobalt	80-120	20	-	-	-	99	98	1
Copper	80-120	20	-	-	-	97	95	2
Iron	80-120	20	-	-	-	96	96	0
Lead	80-120	20	-	-	-	106	95	11
Magnesium	80-120	20	-	-	-	101	101	0
Manganese	80-120	20	-	-	-	97	96	1
Mercury	80-120	20	100	99	1	96	97	1
Nickel	80-120	20	-	-	-	96	97	1
Potassium	80-120	20	-	-	-	106	104	2
Selenium	80-120	20	-	-	-	32*	31*	3
Silver	80-120	20	-	-	-	126*	121*	4
Sodium	80-120	20	-	-	-	89	88	1
Thallium	80-120	20	-	-	-	87	87	0
Vanadium	80-120	20	-	-	-	99	98	1
Zinc	80-120	20	-	-	-	96	96	0
<i>Wet Chemistry</i>								
Chloride	75-125	20	-	-	-	-	-	-
Cyanide, Total	75-125	20	85	-	-	-	-	-
Ammonia	75-125	20	-	-	-	-	-	-
TKN	75-125	20	-	-	-	-	-	-
Oil & Grease Gravimetric	75-125	20	-	-	-	-	-	-
Phosphorus, Total	75-125	20	118	119	1	108	108	0

TABLE 7
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS SUMMARY
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	<i>MS/MSD</i>		<i>PW1-003</i>			<i>PW2-001</i>		
	<i>Control</i>	<i>RPD</i>	<i>MS</i>	<i>MSD</i>	<i>RPD</i>	<i>MS</i>	<i>MSD</i>	<i>RPD</i>
	<i>Limits</i>	<i>Control</i>						
	<i>(%)</i>	<i>Limits</i>	<i>(%)</i>	<i>(%)</i>		<i>(%)</i>	<i>(%)</i>	
<i>Wet Chemistry</i>								
Chloride	75-125	20	-	-	-	-	-	-
Cyanide, Total	75-125	20	-	-	-	-	-	-
Ammonia	75-125	20	100	102	2	94	98	4
TKN	75-125	20	-	-	-	100	100	0
Oil & Grease Gravimetric	75-125	20	-	-	-	-	-	-
Phosphorus, Total	75-125	20	-	-	-	102	102	0
	<i>MS/MSD</i>		<i>PW3-002</i>					
	<i>Control</i>	<i>RPD</i>	<i>MS</i>	<i>MSD</i>	<i>RPD</i>			
	<i>Limits</i>	<i>Control</i>						
	<i>(%)</i>	<i>Limits</i>	<i>(%)</i>	<i>(%)</i>				
<i>Wet Chemistry</i>								
Chloride	75-125	20	103	103	0			
Cyanide, Total	75-125	20	87	94	8			
Ammonia	75-125	20	97	93	4			
TKN	75-125	20	99	98	1			
Oil & Grease Gravimetric	75-125	20	104	101	3			
Phosphorus, Total	75-125	20	110	114	4			

Notes:

- Not analyzed.
- * Value outside of QC limits.
- BOD Biochemical Oxygen Demand.
- I Interference.
- MS Matrix Spike.
- MSD Matrix Spike Duplicate.
- RPD Relative Percent Difference.
- TAL Target Analyte List.
- TCL Target Compound List.
- TKN Total Kjeldhal Nitrogen.

TABLE 8

LABORATORY DUPLICATE SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

TAL Metals	PW1-001 (mg/L)			PW1-002 (mg/L)			PW1-003 (mg/L)			PW2-001 (mg/L)			PW3-002 (mg/L)		
	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD
Aluminum	480	420	13	-	-	-	-	-	-	-	-	-	120	130	8
Antimony	ND 56	ND 56	*	-	-	-	-	-	-	-	-	-	ND 38	ND 38	*
Arsenic	1.9	2.0	5	-	-	-	-	-	-	-	-	-	ND 1.1	ND 1.1	*
Barium	210	210	0	-	-	-	-	-	-	-	-	-	80	82	2
Beryllium	ND 0.40	ND 0.40	*	-	-	-	-	-	-	-	-	-	ND 0.20	ND 0.20	*
Cadmium	ND 3.2	ND 3.2	*	-	-	-	-	-	-	-	-	-	ND 3.3	ND 3.3	*
Calcium	110000	110000	0	-	-	-	-	-	-	-	-	-	150000	150000	0
Chromium	ND 9.1	ND 9.1	*	-	-	-	-	-	-	-	-	-	ND 5.2	ND 5.2	*
Cobalt	ND 7.9	ND 7.9	*	-	-	-	-	-	-	-	-	-	ND 3.9	ND 3.9	*
Copper	35	20	55	-	-	-	-	-	-	-	-	-	7.1	6.6	7
Iron	2800	2700	4	-	-	-	-	-	-	-	-	-	48	37	26
Lead	-	-	-	8.0	8.8	10	-	-	-	-	-	-	7.4	8.0	8
Magnesium	11000	11000	0	-	-	-	-	-	-	-	-	-	ND 120	ND 120	*
Manganese	150	140	7	-	-	-	-	-	-	-	-	-	1.3	1.3	0
Mercury	ND 0.10	ND 0.10	*	-	-	-	ND 0.10	ND 0.10	*	-	-	-	ND 0.10	ND 0.10	*
Nickel	ND 12	ND 12	*	-	-	-	-	-	-	-	-	-	ND 6.5	ND 6.5	*
Potassium	20000	20000	0	-	-	-	-	-	-	-	-	-	15000	15000	0
Selenium	4.4	ND 1.5	*	-	-	-	-	-	-	-	-	-	1.9	1.0	62
Silver	ND 7.0	ND 7.0	*	-	-	-	-	-	-	-	-	-	ND 6.8	ND 6.8	*
Sodium	57000	56000	2	-	-	-	-	-	-	-	-	-	110000	110000	0
Thallium	ND 1.3	ND 1.3	*	-	-	-	-	-	-	-	-	-	ND 1.3	ND 1.3	*
Vanadium	11	ND 7.4	*	-	-	-	-	-	-	-	-	-	ND 4.4	ND 4.4	*
Zinc	70	67	4	-	-	-	-	-	-	-	-	-	5.7	1.7	110

Wet Chemistry	PW1-001 (mg/L)			PW1-002 (mg/L)			PW1-003 (mg/L)			PW2-001 (mg/L)		
	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD
BOD	1	ND 1	*	-	-	-	-	-	-	18	18	0
Chloride	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	ND 0.010	ND 0.010	*	-	-	-	-	-	-	-	-	-
Ammonia (as N)	0.46	0.48	4	-	-	-	0.29	0.31	7	2.9	3.0	3
TKN	0.76	0.67	13	-	-	-	-	-	-	-	-	-
Oil & Grease Gravimetric	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	7.1	7.1	0	-	-	-	11.3	11.3	0
Phosphorus, Total	ND 0.050	ND 0.050	*	ND 0.050	ND 0.050	*	-	-	-	ND 0.050	ND 0.050	*
Total Dissolved Solids	-	-	-	-	-	-	520	540	4	-	-	-
Total Suspended Solids	-	-	-	-	-	-	6.6	7.8	17	-	-	-

TABLE 8

LABORATORY DUPLICATE SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

Wet Chemistry	PW2-002 (mg/L)			PW2-003 (mg/L)			PW3-001 (mg/L)			PW3-002 (mg/L)		
	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD	Original	Duplicate	RPD
BOD	-	-	-	13	13	0	18	19	5	28	29	4
Chloride	-	-	-	-	-	-	-	-	-	220	230	4
Cyanide, Total	-	-	-	-	-	-	-	-	-	ND 0.0050	ND 0.0050	*
Ammonia (as N)	-	-	-	-	-	-	-	-	-	5.2	5.0	4
TKN	3.2	3.3	3	-	-	-	-	-	-	5.5	5.5	0
Oil & Grease Gravimetric	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	-	-	-	-	-	-	-	-	11.2	11.2	0
Phosphorus, Total	-	-	-	-	-	-	-	-	-	ND 0.050	ND 0.050	*
Total Dissolved Solids	-	-	-	860	850	1	-	-	-	890	880	1
Total Suspended Solids	-	-	-	ND 5.0	ND 5.0	*	-	-	-	ND 5.0	ND 5.0	*

NT FE (mg/L)

Wet Chemistry	NT FE (mg/L)		
	Original	Duplicate	RPD
BOD	-	-	-
Chloride	-	-	-
Cyanide, Total	-	-	-
Ammonia (as N)	-	-	-
TKN	-	-	-
Oil & Grease Gravimetric	-	-	-
pH	-	-	-
Phosphorus, Total	-	-	-
Total Dissolved Solids	460	450	2
Total Suspended Solids	110	110	0

Notes:

- Not applicable.
- * Value could not be calculated due to one or more non-detect results.
- BOD Biochemical Oxygen Demand.
- NDx Not detected at or above x.
- RPD Relative Percent Difference.
- TAL Target Analyte List.
- TKN Total Kjeldahl Nitrogen.

TABLE 9
BLANK SPIKE/BLANK SPIKE DUPLICATE RESULTS
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

BS/BSD Control Limits (%)	TCL Semi-Volatiles	Extraction Date:			
		09/03/96 BS (%)	09/11/96 BS (%)	09/13/96 BS (%)	09/15/96 BS (%)
12-110	Phenol	74	64	64	51
12-158	bis(2-Chloroethyl) ether	72	57	57	47
27-123	2-Chlorophenol	70	61	60	45
1-172	1,3-Dichlorobenzene	64	53	38	28
36-97	1,4-Dichlorobenzene	65	53	38	28*
32-129	1,2-Dichlorobenzene	71	54	39	30*
1-180	2-Methylphenol	75	63	62	52
36-166	2,2'-oxybis(1-Chloropropane)	71	58	50	28*
1-180	4-Methylphenol	81	71	72	61
41-116	N-Nitroso-di-n-propylamine	80	67	73	64
40-113	Hexachloroethane	72	55	39*	27*
35-180	Nitrobenzene	65	62	58	49
21-196	Isophorone	72	65	66	55
29-182	2-Nitrophenol	52	60	56	53
32-119	2,4-Dimethylphenol	41	72	72	61
33-184	bis(2-Chloroethoxy)methane	73	50	19*	54
39-135	2,4-Dichlorophenol	67	63	62	55
39-98	1,2,4-Trichlorobenzene	62	52	36*	38*
21-133	Naphthalene	64	58	41	42
1-180	4-Chloroaniline	55	4*	1*	13
24-116	Hexachlorobutadiene	73	58	39	34
23-97	4-Chloro-3-methylphenol	79	75	70	67
21-133	2-Methylnaphthalene	70	61	45	50
1-180	Hexachlorocyclopentadiene	8*	23	12	29
37-144	2,4,6-Trichlorophenol	77	72	66	69
1-180	2,4,5-Trichlorophenol	78	74	66	71
60-118	2-Chloronaphthalene	69	64	52*	56*
1-180	2-Nitroaniline	76	79	34	82
1-112	Dimethylphthalate	83	84	75	77
33-145	Acenaphthylene	75	65	41	62
50-158	2,6-Dinitrotoluene	69	81	72	83
1-180	3-Nitroaniline	62	5*	0*	36
46-118	Acenaphthene	76	69	60	63
1-191	2,4-Dinitrophenol	16	71	46	83

TABLE 9
BLANK SPIKE/BLANK SPIKE DUPLICATE RESULTS
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

BS/BSD Control Limits (%)	Extraction Date:	09/03/96		09/11/96		09/13/96		09/15/96	
		BS (%)	(%)	BS (%)	(%)	BS (%)	(%)	BS (%)	(%)
TCL Semi-Volatiles (cont.)									
4-Nitrophenol		86*		94*		77		82*	
Dibenzofuran		79		73		65		66	
2,4-Dinitrotoluene		77		86		74		83	
Diethylphthalate		88		88		74		79	
4-Chlorophenyl-phenyl ether		79		75		66		68	
Fluorene		83		77		68		70	
4-Nitroaniline		82		27		1*		64	
4,6-Dinitro-2-methylphenol		46		94		78		96	
n-Nitrosodiphenylamine		78		42		17		58	
4-Bromophenyl phenyl ether		73		71		62		66	
Hexachlorobenzene		87		86		73		73	
Pentachlorophenol		66		74		66		81	
Phenanthrene		84		87		71		80	
Anthracene		80		84		70		78	
Carbazole		97		86		38		95	
Di-n-butyl phthalate		91		93		76		83	
Fluoranthene		87		91		75		79	
Pyrene		86		88		74		87	
Butyl benzyl phthalate		92		93		81		105	
3,3'-Dichlorobenzidine		55		3*		0*		1*	
Benzo (a) anthracene		83		87		74		84	
Chrysene		85		90		76		85	
bis (2-Ethylhexyl) phthalate		90		92		79		84	
Di-n-octyl phthalate		88		91		85		116	
Benzo (b) fluoranthene		83		84		79		90	
Benzo (k) fluoranthene		82		86		78		86	
Benzo (a) pyrene		81		80		72		90	
Indeno (1,2,3-cd) pyrene		85		89		84		90	
Dibenz (a,h) anthracene		85		89		85		89	
Benzo (g,h,i) perylene		87		91		87		88	

TABLE 9
BLANK SPIKE/BLANK SPIKE DUPLICATE RESULTS
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

BS/BSID Control Limits	TCL Pesticides/PCBs	Extraction Date:			
		09/05/96 BS (%)	09/11/96 BS (%)	09/15/96 BS (%)	
37-134	alpha-BHC	84	90	92	
17-147	beta-BHC	90	110	100	
19-140	delta-BHC	42	42	46	
56-127	gamma-BHC (Lindane)	84	88	94	
50-129	Heptachlor	72	82	104	
48-133	Aldrin	60	70	82	
37-142	Heptachlor epoxide	88	94	102	
36-146	Endosulfan I	92	100	104	
57-131	Dieldrin	86	86	98	
30-145	4,4'-DDE	94	100	112	
46-150	Endrin	96	102	110	
45-153	Endosulfan II	102	106	116	
31-141	4,4'-DDD	100	104	116	
26-144	Endosulfan sulfate	94	96	104	
38-138	4,4'-DDT	96	100	108	
25-160	Methoxychlor	113	113	131	
30-147	Endrin ketone	96	100	80	
30-147	Endrin aldehyde	110	112	140	
45-119	alpha-Chlordane	86	94	102	
45-119	gamma-Chlordane	88	90	102	
50-114	Aroclor-1016	83	76	102	
8-127	Aroclor-1260	82	83	95	
BS/BSID Control Limits	TAL Metals	Extraction Date:			
		09/06/96 BS (%)	09/07/96 BS (%)	09/16/96 BS (%)	09/18/96 BS (%)
80-120	Aluminum	-	108	-	-
80-120	Antimony	-	103	-	-
80-120	Arsenic	-	102	-	-
80-120	Barium	-	105	-	-
80-120	Beryllium	-	99	-	-
80-120	Cadmium	-	106	-	-
80-120	Calcium	-	101	-	-
80-120	Chromium	-	100	-	-
80-120	Cobalt	-	100	-	-
80-120	Copper	-	101	-	-
80-120	Iron	-	101	-	-
80-120	Lead	-	-	117	-
80-120	Magnesium	-	97	-	-
80-120	Manganese	-	102	-	-
80-120	Mercury	108	-	-	100
					119

TABLE 9

**BLANK SPIKE/BLANK SPIKE DUPLICATE RESULTS
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996**

BS/BSD Control Limits	Extraction Date:		09/06/96		09/07/96		09/16/96		09/18/96		09/19/96		09/21/96		
	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	
TAL Metals (cont.)															
Nickel	80-120	-	-	-	98	-	-	-	-	-	99	-	-	-	
Potassium	80-120	-	-	-	94	-	-	-	-	-	100	-	-	-	
Selenium	80-120	-	-	-	104	-	-	-	-	-	114	-	-	-	
Silver	80-120	-	-	-	103	-	-	-	-	-	104	-	-	-	
Sodium	80-120	-	-	-	103	-	-	-	-	-	101	-	-	-	
Thallium	80-120	-	-	-	100	-	-	-	-	-	97	-	-	-	
Vanadium	80-120	-	-	-	102	-	-	-	-	-	102	-	-	-	
Zinc	80-120	-	-	-	98	-	-	-	-	-	97	-	-	-	
Analysis Date:															
		08/29/96		08/31/96		09/03/96		09/04/96		09/05/96		09/07/96		09/07/96	
		BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)
Wet Chemistry															
BOD	80-120	-	-	-	-	-	-	92	93	1	-	103	106	3	-
Chloride	80-120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	80-120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	80-120	-	-	-	-	-	-	106	102	4	-	-	-	-	-
TKN	80-120	-	-	-	-	-	-	103	105	2	-	-	-	-	-
Oil & Grease Gravimetric	80-120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, Total	80-120	102	99	3	-	-	-	-	-	-	101	100	1	-	-
Total Dissolved Solids	80-120	-	-	-	96	106	10	-	-	-	-	-	-	96	100
Total Suspended Solids	80-120	-	-	-	102	97	5	-	-	-	103	103	0	-	99
Analysis Date:															
		09/09/96		09/10/96		09/11/96		09/12/96		09/13/96		09/14/96		09/14/96	
		BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)	BS (%)	BSD (%)
Wet Chemistry															
BOD	80-120	-	-	-	-	-	-	98	96	2	-	92	93	1	-
Chloride	80-120	101	101	0	-	-	-	-	-	-	-	-	-	-	-
Cyanide, Total	80-120	-	-	-	96	92	4	-	-	-	-	-	-	-	-
Ammonia	80-120	-	-	-	-	-	-	102	97	5	-	-	-	-	-
TKN	80-120	-	-	-	-	-	-	97	100	3	-	-	-	-	-
Oil & Grease Gravimetric	80-120	92	-	-	-	-	-	-	-	-	-	92	-	-	-
Phosphorus, Total	80-120	99	98	1	-	-	-	100	99	1	104	106	2	-	-
Total Dissolved Solids	80-120	-	-	-	-	-	-	105	104	1	102	102	0	-	100
Total Suspended Solids	80-120	-	-	-	-	-	-	-	-	-	-	-	-	-	101

TABLE 9

BLANK SPIKE/BLANK SPIKE DUPLICATE RESULTS
PUMPING TESTS
GRATWICK-RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

BS/BSD Control Limits (%)	Wet Chemistry	Analysis Date: 09/16/96			09/17/96			09/18/96			09/19/96			09/20/96			09/24/96		
		BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)
80-120	BOD	98	96	2	-	-	-	92	93	1	95	94	1	-	-	-	-	-	-
80-120	Chloride	-	-	-	99	100	1	-	-	-	-	-	-	-	-	-	97	97	0
80-120	Cyanide, Total	90	92	2	98	91	7	-	-	-	-	-	-	-	-	-	-	-	-
80-120	Ammonia	-	-	-	-	-	-	103	98	5	-	-	-	91	90	1	-	-	-
80-120	TKN	-	-	-	-	-	-	103	100	3	-	-	-	-	-	-	-	-	-
80-120	Oil & Grease Gravimetric	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80-120	Phosphorus, Total	98	98	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80-120	Total Dissolved Solids	-	-	-	-	-	-	99	101	2	101	102	1	-	-	-	-	-	-
80-120	Total Suspended Solids	-	-	-	-	-	-	98	100	2	102	103	1	-	-	-	-	-	-

BS/BSD Control Limits (%)	Wet Chemistry	Analysis Date: 09/25/96			09/26/96			10/14/96		
		BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)	BS (%)	BSD (%)	RPD (%)
80-120	BOD	-	-	-	-	-	-	-	-	-
80-120	Chloride	-	-	-	-	-	-	-	-	-
80-120	Cyanide, Total	-	-	-	-	-	-	-	-	-
80-120	Ammonia	-	-	-	-	-	-	-	-	-
80-120	TKN	101	-	-	-	-	-	-	-	-
80-120	Oil & Grease Gravimetric	-	-	-	-	-	-	-	-	-
80-120	Phosphorus, Total	-	-	-	-	-	-	-	-	-
80-120	Total Dissolved Solids	-	-	-	101	97	4	102	-	-
80-120	Total Suspended Solids	-	-	-	-	-	-	-	-	-

Notes:

- Not applicable.
- * Values outside of QC limits.
- BOD Biochemical Oxygen Nitrogen.
- BS Blank Spike.
- BSD Blank Spike Duplicate.
- RPD Relative Percent Difference.
- TAL Target Analyte List.
- TCL Target Compound List.
- TKN Total Kjeldahl Nitrogen.

TABLE 10
TRIP BLANK SUMMARY
PUMPING TESTS
GRATWICK - RIVERSIDE PARK SITE
NORTH TONAWANDA, NEW YORK
AUGUST - SEPTEMBER 1996

	Collection Date:	09/05/96	09/06/96
	Units:	(mg/L)	(mg/L)
<i>TCL Volatiles</i>			
Chloromethane		ND 10	ND 10
Bromomethane		ND 10	ND 10
Vinyl chloride		ND 10	ND 10
Chloroethane		ND 10	ND 10
Methylene chloride		3J	2J
Acetone		ND 10	ND 10
Carbon disulfide		ND 10	ND 10
1,1-Dichloroethene		ND 10	ND 10
1,1-Dichloroethane		ND 10	ND 10
1,2-Dichloroethene (total)		ND 10	ND 10
Chloroform		ND 10	ND 10
1,2-Dichloroethane		ND 10	ND 10
2-Butanone		ND 10	ND 10
1,1,1-Trichloroethane		ND 10	ND 10
Carbon tetrachloride		ND 10	ND 10
Bromodichloromethane		ND 10	ND 10
1,2-Dichloropropane		ND 10	ND 10
cis-1,3-Dichloropropene		ND 10	ND 10
Trichloroethene		ND 10	ND 10
Dibromochloromethane		ND 10	ND 10
1,1,2-Trichloroethane		ND 10	ND 10
Benzene		ND 10	ND 10
trans-1,3-Dichloropropene		ND 10	ND 10
Bromoform		ND 10	ND 10
4-Methyl-2-pentanone		ND 10	ND 10
2-Hexanone		ND 10	ND 10
Tetrachloroethene		ND 10	ND 10
1,1,2,2-Tetrachloroethane		ND 10	ND 10
Toluene		ND 10	ND 10
Chlorobenzene		ND 10	ND 10
Ethylbenzene		ND 10	ND 10
Styrene		ND 10	ND 10
Xylenes (total)		ND 10	ND 10

Notes:

NDx Not detected at or above x.

TCL Target Compound List.

ATTACHMENT K-1

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY RECORD

CRA CONESTOGA-ROVERS & ASSOCIATES 2055 Niagara Falls Blvd. Suite Three Niagara Falls, NY 14304 (716)297-6150		SHIPPED TO (Laboratory Name): Western 308 Walsh Road Ligonier, PA 19354		REFERENCE NUMBER: 7987	
SAMPLER'S SIGNATURE: _____ PRINTED NAME: <u>Cory G. H</u>		CONTAINERS 13		REMARKS	
SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	PARAMETERS
1	8/24/96	15:00	PW-003	water	1. W. MIB 2. T. W. A 3. T. L. W. A 4. T. L. W. A 5. T. L. W. A 6. T. L. W. A 7. T. L. W. A 8. T. L. W. A 9. T. L. W. A 10. T. L. W. A 11. T. L. W. A 12. T. L. W. A 13. T. L. W. A 14. T. L. W. A 15. T. L. W. A 16. T. L. W. A 17. T. L. W. A 18. T. L. W. A 19. T. L. W. A 20. T. L. W. A 21. T. L. W. A 22. T. L. W. A 23. T. L. W. A 24. T. L. W. A 25. T. L. W. A 26. T. L. W. A 27. T. L. W. A 28. T. L. W. A 29. T. L. W. A 30. T. L. W. A 31. T. L. W. A 32. T. L. W. A 33. T. L. W. A 34. T. L. W. A 35. T. L. W. A 36. T. L. W. A 37. T. L. W. A 38. T. L. W. A 39. T. L. W. A 40. T. L. W. A 41. T. L. W. A 42. T. L. W. A 43. T. L. W. A 44. T. L. W. A 45. T. L. W. A 46. T. L. W. A 47. T. L. W. A 48. T. L. W. A 49. T. L. W. A 50. T. L. W. A 51. T. L. W. A 52. T. L. W. A 53. T. L. W. A 54. T. L. W. A 55. T. L. W. A 56. T. L. W. A 57. T. L. W. A 58. T. L. W. A 59. T. L. W. A 60. T. L. W. A 61. T. L. W. A 62. T. L. W. A 63. T. L. W. A 64. T. L. W. A 65. T. L. W. A 66. T. L. W. A 67. T. L. W. A 68. T. L. W. A 69. T. L. W. A 70. T. L. W. A 71. T. L. W. A 72. T. L. W. A 73. T. L. W. A 74. T. L. W. A 75. T. L. W. A 76. T. L. W. A 77. T. L. W. A 78. T. L. W. A 79. T. L. W. A 80. T. L. W. A 81. T. L. W. A 82. T. L. W. A 83. T. L. W. A 84. T. L. W. A 85. T. L. W. A 86. T. L. W. A 87. T. L. W. A 88. T. L. W. A 89. T. L. W. A 90. T. L. W. A 91. T. L. W. A 92. T. L. W. A 93. T. L. W. A 94. T. L. W. A 95. T. L. W. A 96. T. L. W. A 97. T. L. W. A 98. T. L. W. A 99. T. L. W. A 100. T. L. W. A
TOTAL NUMBER OF CONTAINERS			HEALTH/CHEMICAL HAZARDS		

RELINQUISHED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00		RECEIVED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00	
RELINQUISHED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00		RECEIVED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00	
RELINQUISHED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00		RECEIVED BY: <u>[Signature]</u> DATE: 8/24/96 TIME: 15:00	

METHOD OF SHIPMENT: Ex-1 WAY BILL No. _____

SAMPLE TEAM: 6. G. H	RECEIVED FOR LABORATORY BY: _____ DATE: _____ TIME: _____

White - Fully Executed Copy
 Yellow - Receiving Laboratory Copy
 Pink - Shipper Copy
 Goldenrod - Sampler Copy

Nº NF-3126

[illegible]

WAY BILL No.

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

1001 (D) OCT 31/94(NF) REV.1 (F-05)

CRA

CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SAMPLER'S
SIGNATURE: [Signature]

PRINTED
NAME: Bryan Folke

SEQ.
No.

DATE

TIME

SAMPLE No.

SAMPLE
TYPE

9/6/96

10:30

PW 2-003

Trip Blank

CONTAINERS

PARAMETERS

TEL

CS

Phosphorus

TEL

TEL

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REMARKS

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CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SAMPLER'S SIGNATURE:  PRINTED NAME: _____

PRINTED	NAME:	2012	FOULKE	OF

SHIPPED TO (Laboratory Name):

Weston
208 Welsh Pool Rd
Lionville PA 19353

REFERENCE NUMBER:

[illegible]

METHOD OF SHIPMENT:

১৫২

WAY BILL No.

White
Yellow
pink
Goldenrod

SAMPLE TEAM:
B. Feltke

RECEIVED FOR LABORATORY BY:

Nº NF-1438

DATE: TIME:

[illegible]

White	-Fully Executed Copy	SAMPLE TEAM:
Yellow	-Receiving Laboratory Copy	<u>S. Fante</u>
Pink	-Shipper Copy	
Goldenrod	-Sampler Copy	

Nº NF-1437

DATE: _____ TIME: _____

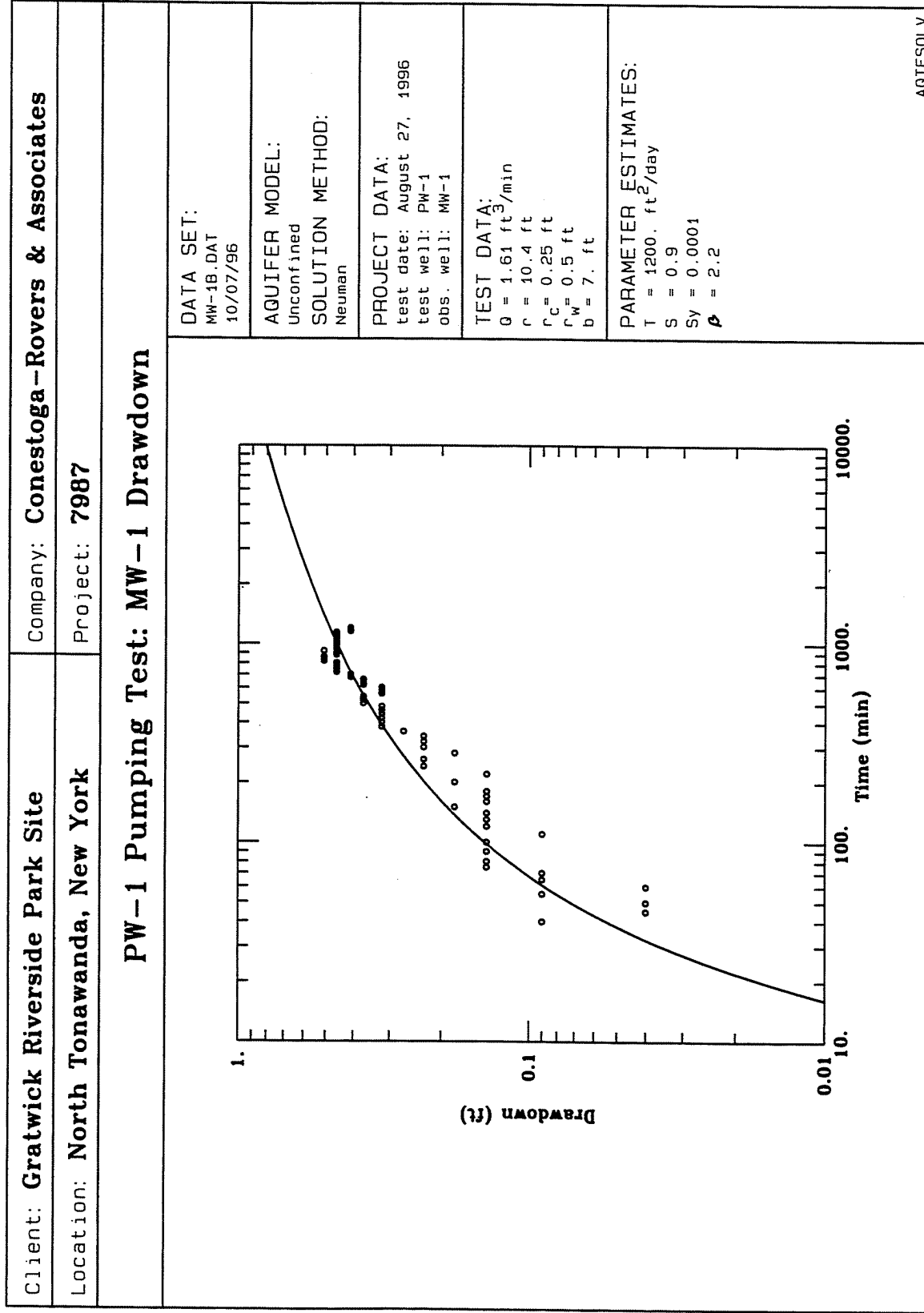
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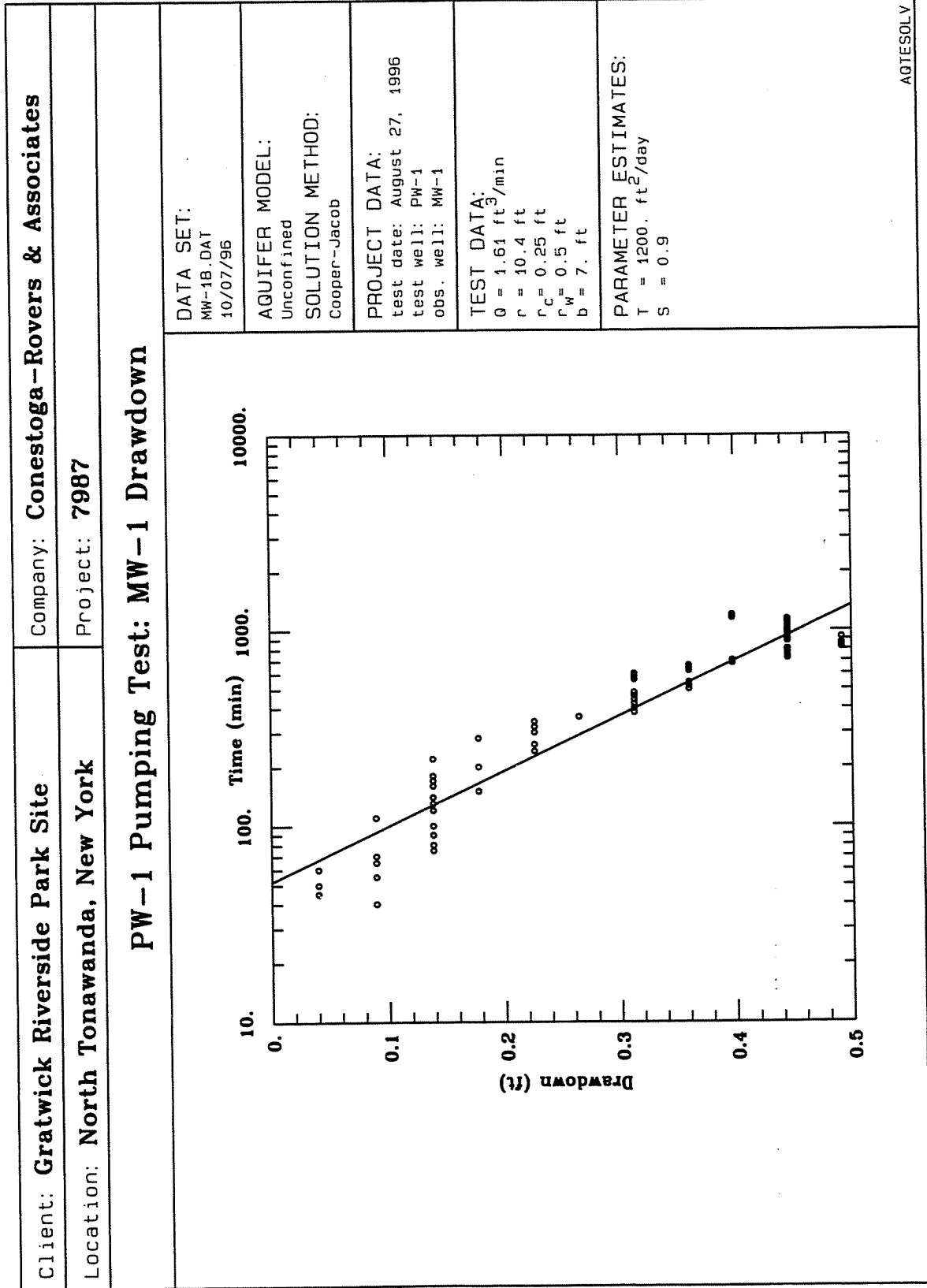
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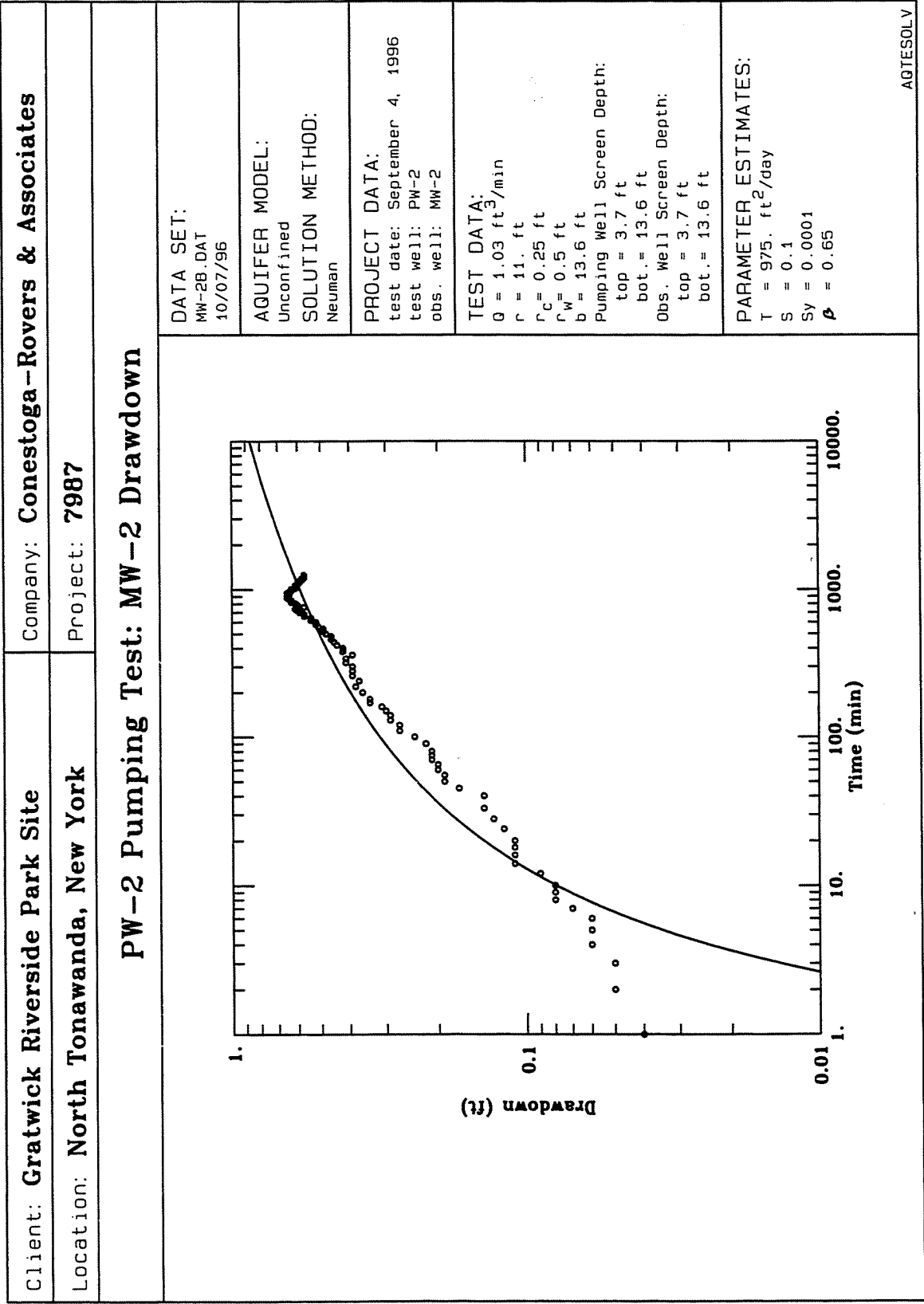


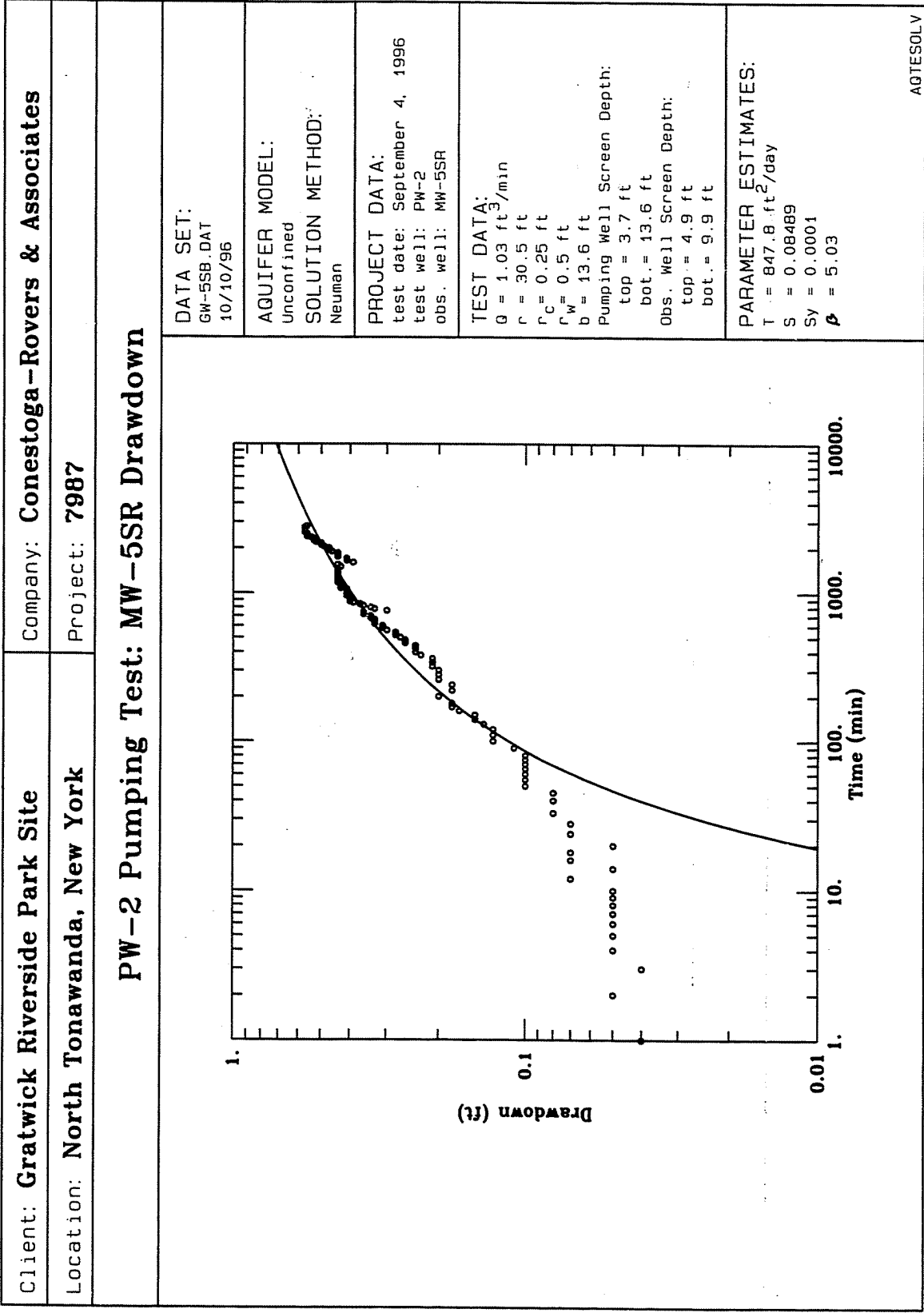
APPENDIX L

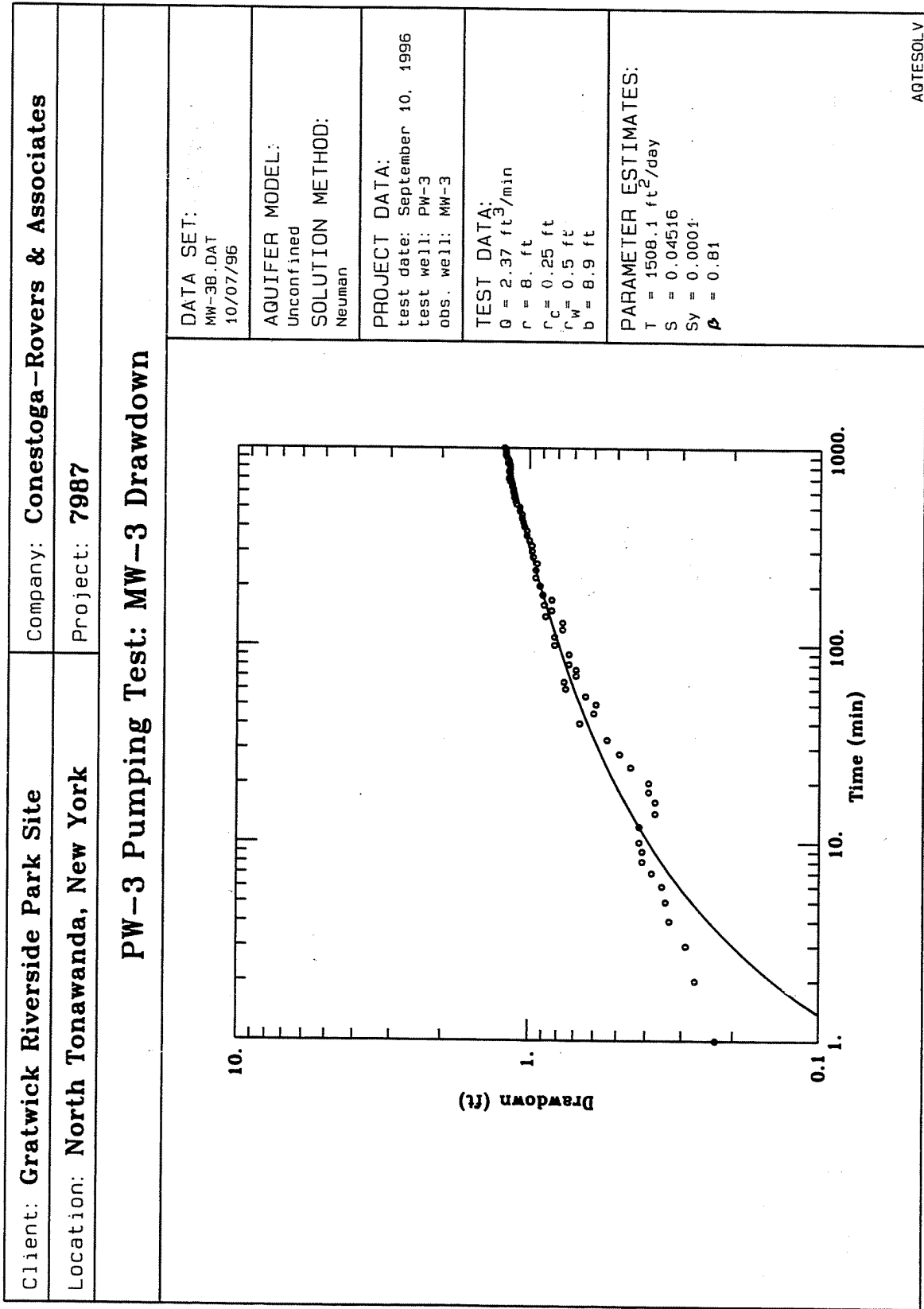
HYDROGEOLOGIC PARAMETER ESTIMATES 48-HOUR PUMPING TESTS

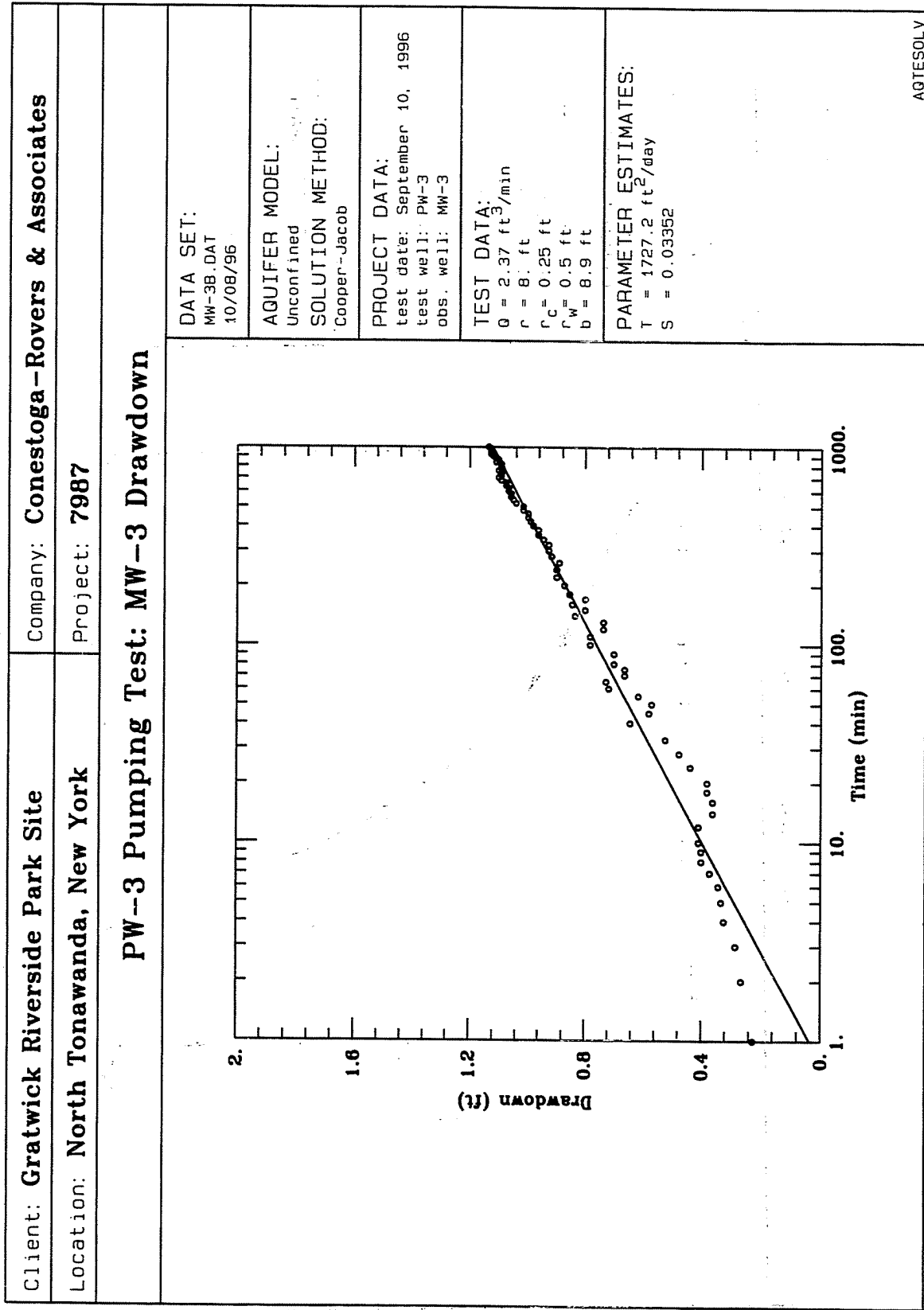


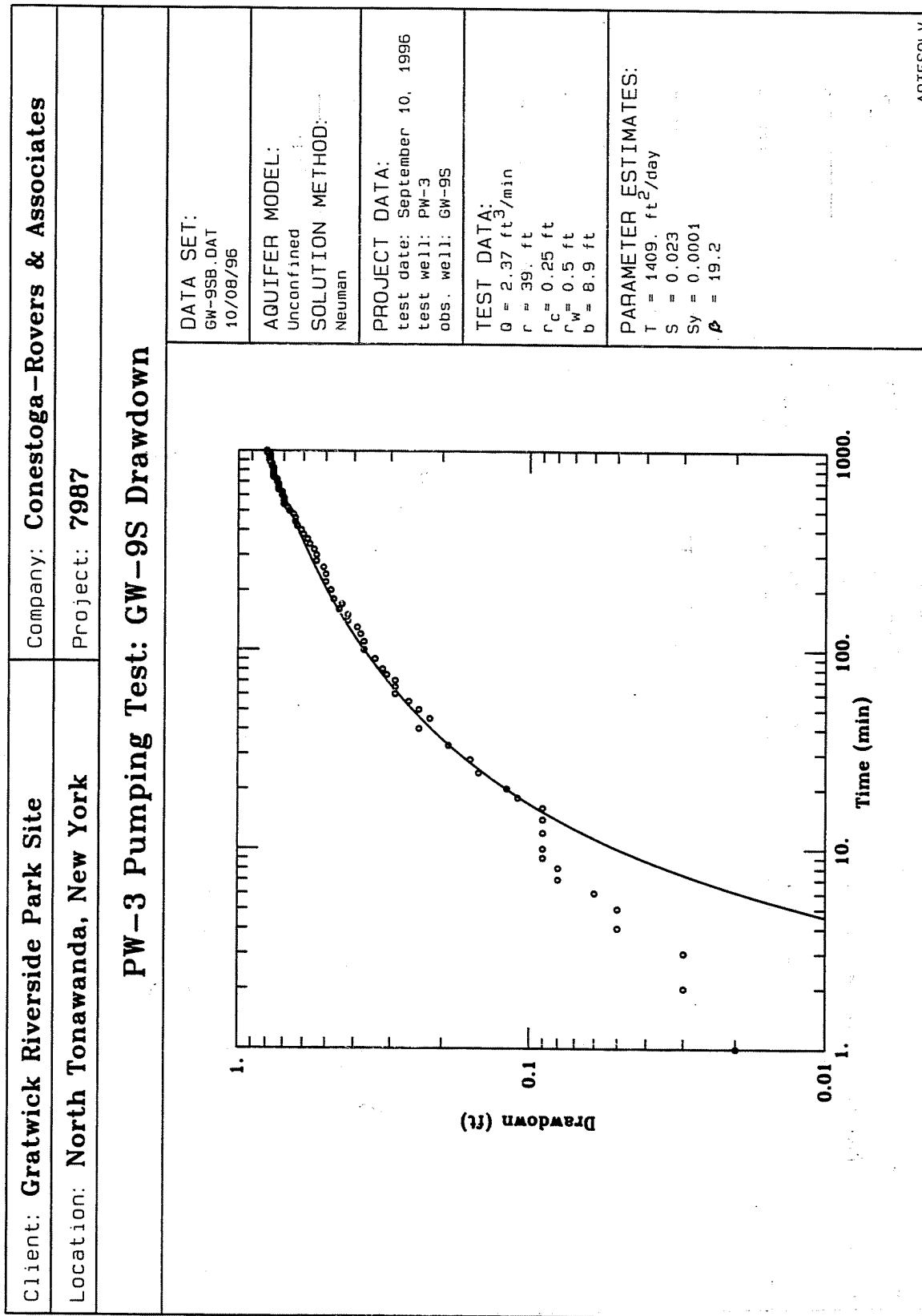


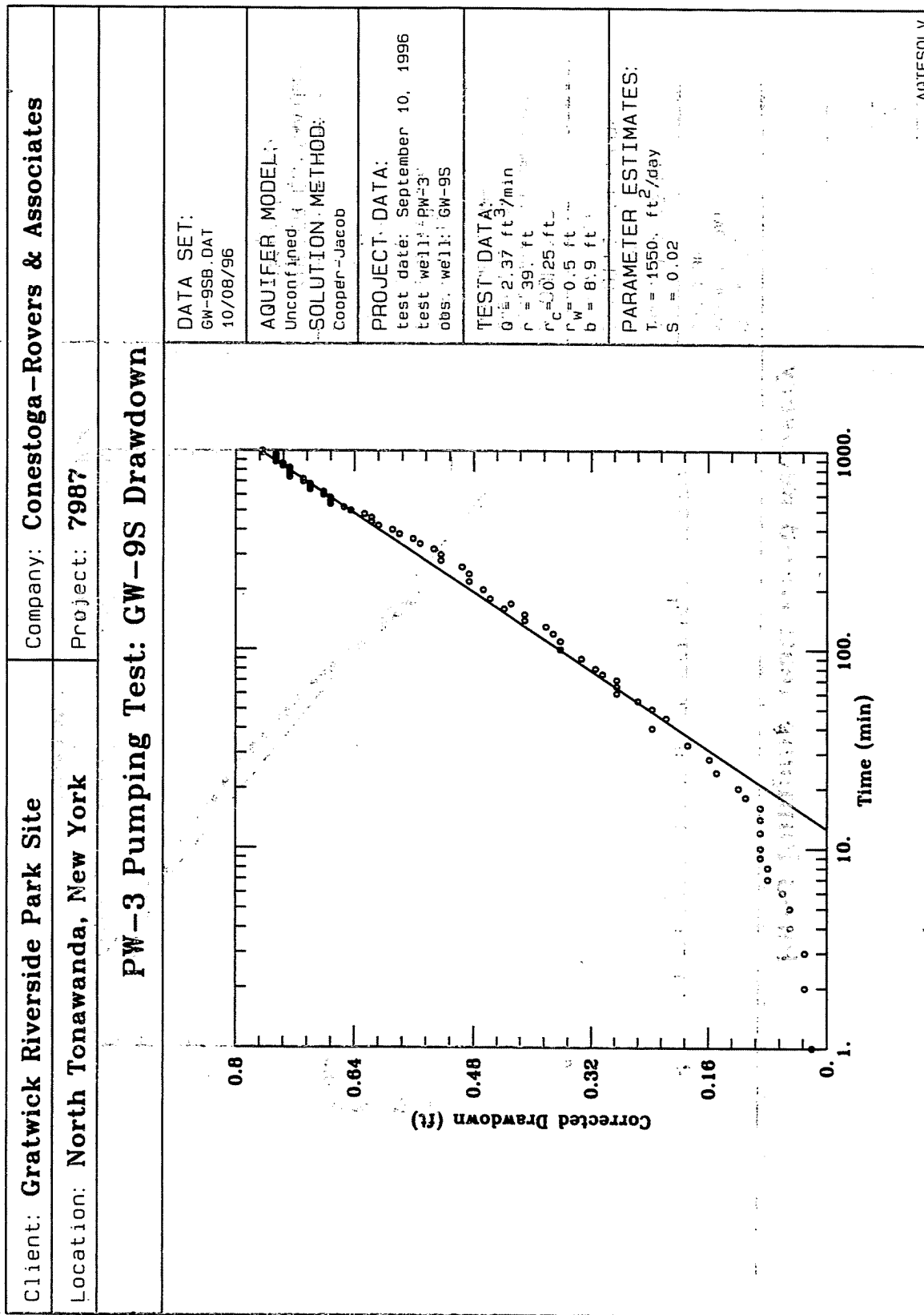


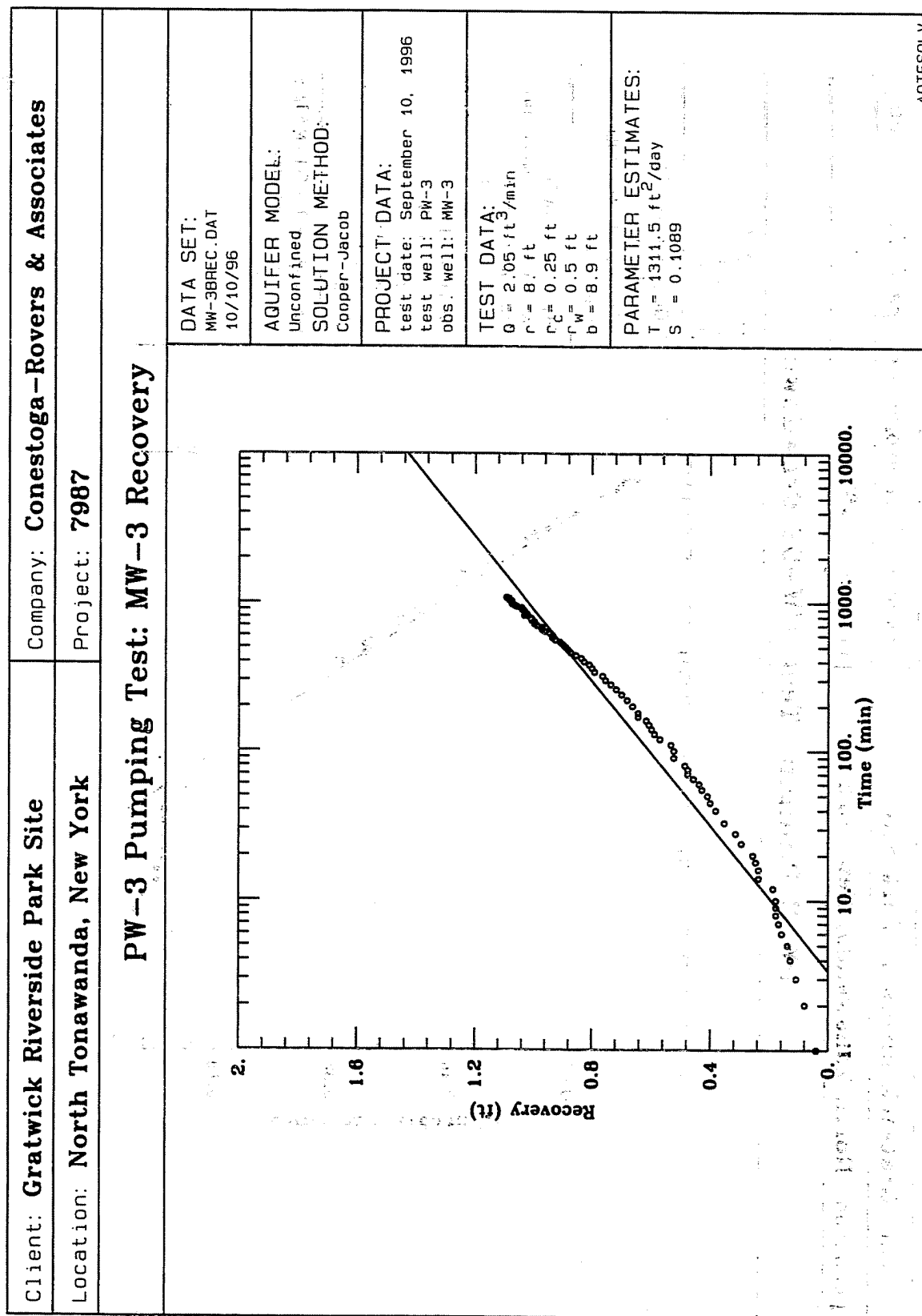




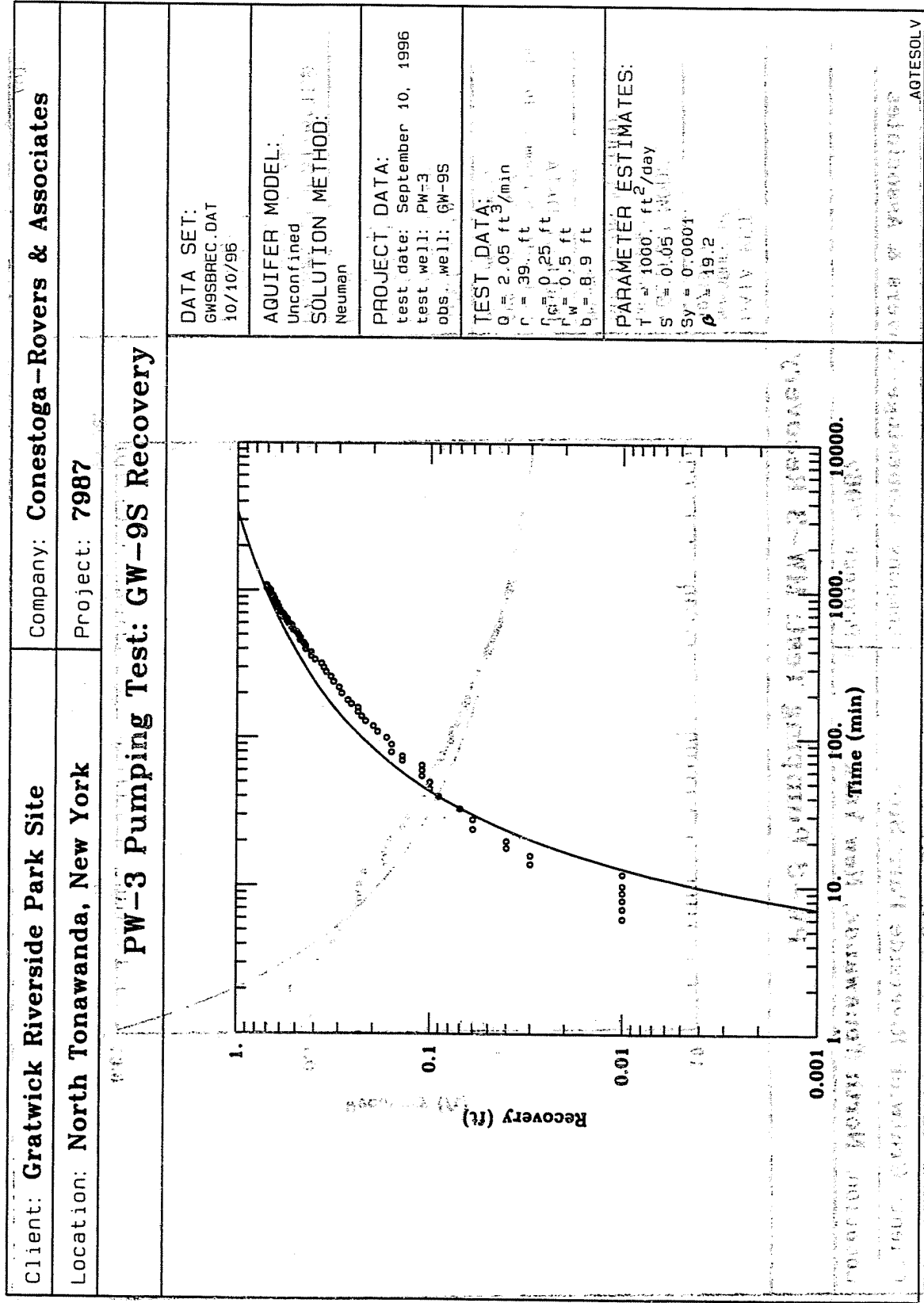


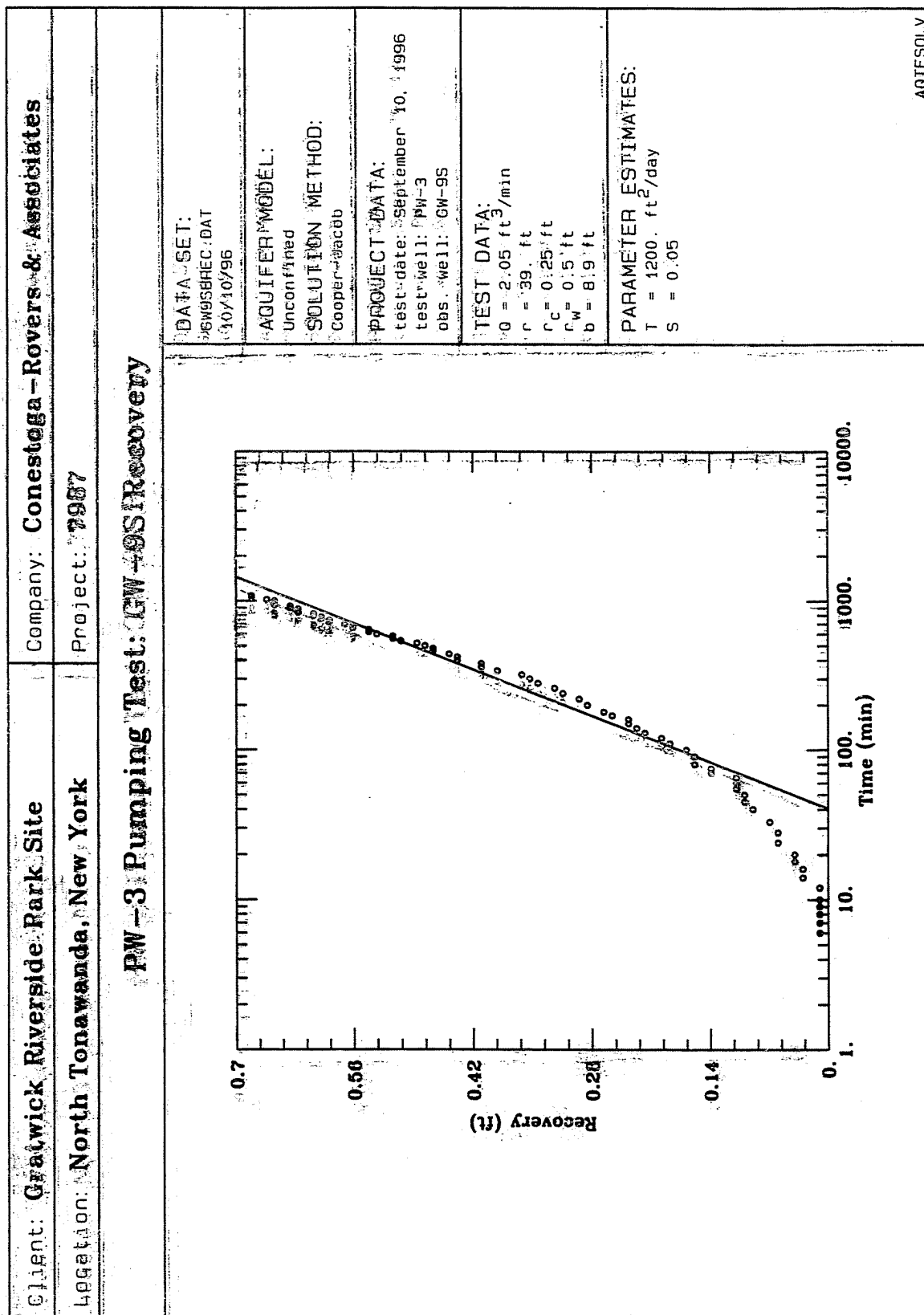


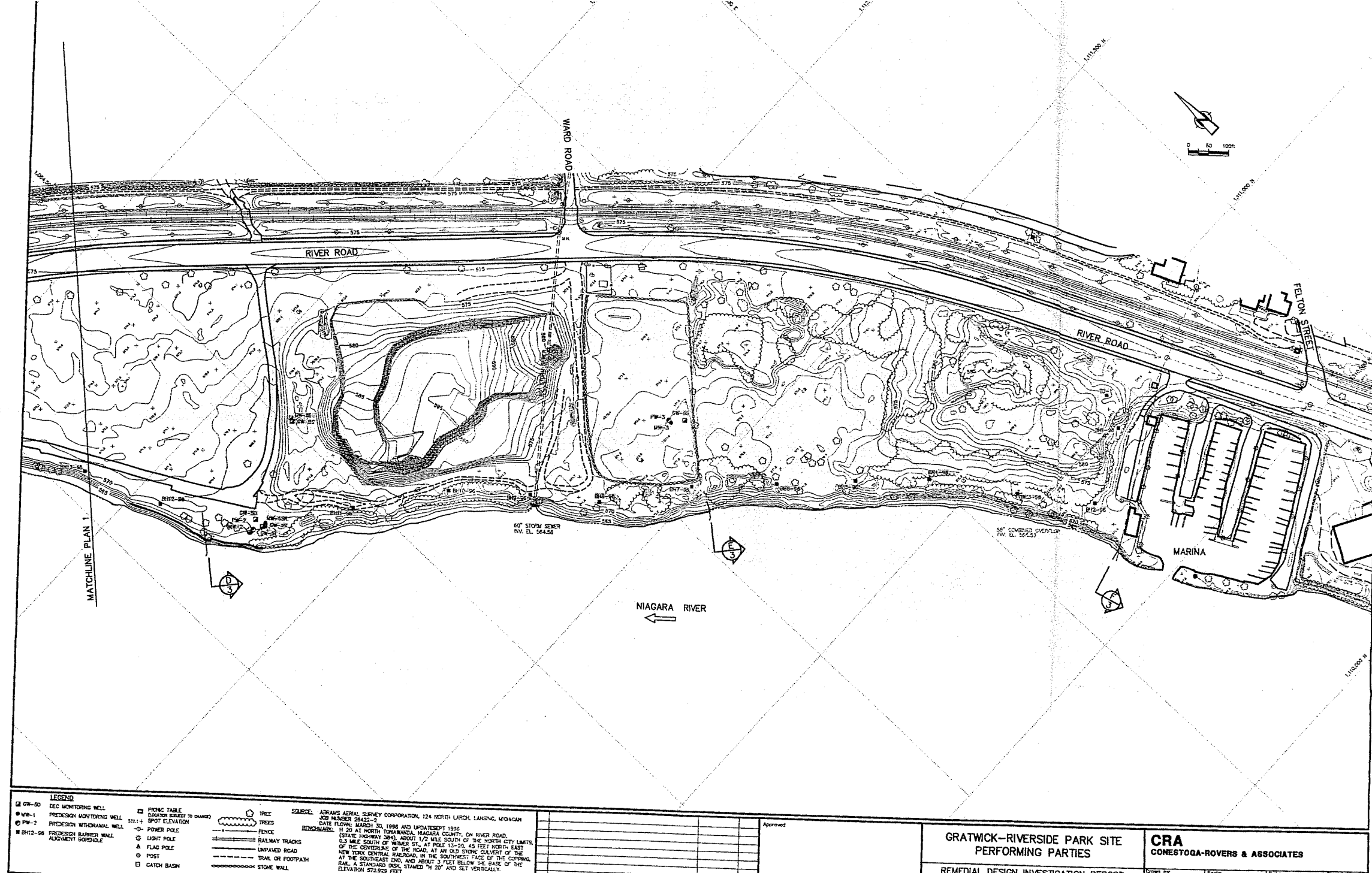


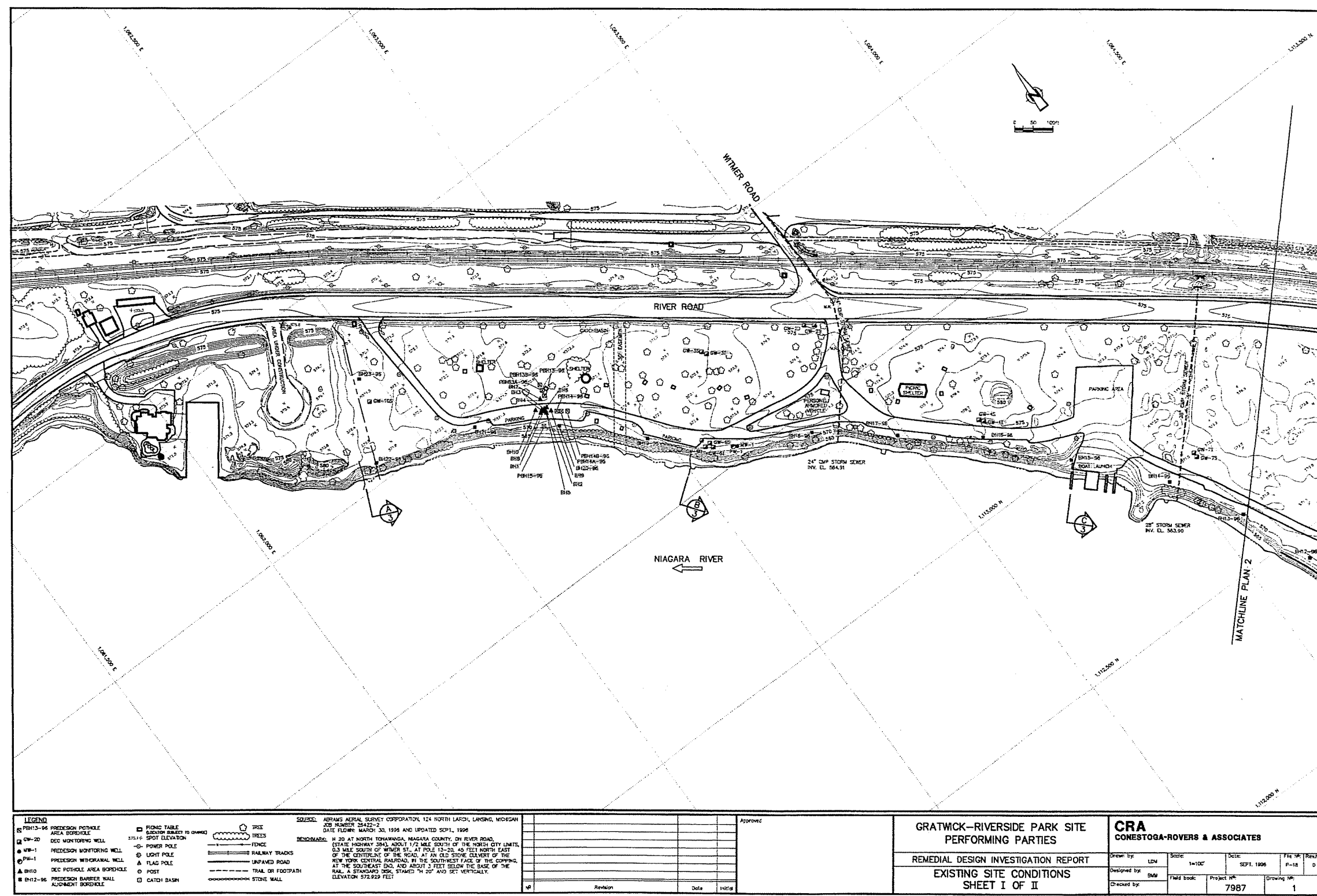


Client: Gratwick Riverside Park Site	Company: Conestoga-Rovers & Associates
Location: North Tonawanda, New York	Project: 7987
PW-3 Pumping Test: MW-3 Recovery	
DATA SET: MW-3BREC.DAT 10/10/96 AQUIFER MODEL: Unconfined SOLUTION METHOD: Neuman PROJECT DATA: test date: September 10, 1996 test well: PW-3 ops. well: MW-3 TEST DATA: Q = 2.05 ft³/min r = 8. ft r_c = 0.25 ft r_w = 0.5 ft b = 18.9 ft PARAMETER ESTIMATES: T = 1225.2 ft²/day S = 0.1089 Sy = 0.0001 β = 0.181	
AGTESOLV	









GRAWMICK-RIVERSIDE PARK SITE PREFORMING PARTIES CRA CONESTOGA-ROVERS & ASSOCIATES		REMEDIAL DESIGN INVESTIGATION REPORT A THRU F NIAGARA RIVER SECTIONS		Checked by: Designed by: Drawn by: Scale: Date: Project No.: Drawing No.: File No.: Date: Scale: Project No.: Drawing No.: File No.: Date:	Revision: Date: Initials:	Approved:

