REMEDIAL DESIGN

PRE-DESIGN INVESTIGATION REPORT

WORK ASSIGNMENT D004440-1

CAMP PHARSALIA SITE
PHARSALIA (T)

SITE NO. 7-09-013
CHENANGO (C), NY

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York

Alexander B. Grannis, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION

URS Corporation
77 Goodell Street
Buffalo, New York 14203

Final
December 2007

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PRE-DESIGN INVESTIGATION REPORT

REMEDIAL DESIGN PROJECT

CAMP PHARSALIA SITE

SITE # 7-09-013

TOWN OF PHARSALIA, CHENANGO COUNTY, NEW YORK

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DEPARTMENT OF ENVIRONMENTAL REMEDIATION

WORK ASSIGNMENT D004440-01

Prepared by:

URS CORPORATION

77 Goodell Street

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1.0 INTRODUCTION

This Pre-Design Investigation Report (PDIR) has been prepared to present the results of investigation activities recently completed at the Camp Pharsalia Remedial Design Project. The project is Work Assignment No. 01 under URS Corporation's (URS) Standby Contract number D004440 with the New York State Department of Environmental Conservation (NYSDEC). This PDIR has been prepared in general accordance with the Project Management Work Plan (PMWP) submitted by URS on May 5, 2006.

1.1. Site History and Background Information

The site is located within the Camp Pharsalia Incarceration Facility, an active New York State Department of Correctional Services (NYSDCS) facility, located in the Town of Pharsalia, Chenango County (Figure 1), New York. The 25-acre property is owned by the NYSDEC, but operated by NYSDCS. The inactive hazardous waste site occupies approximately 0.25 acres, in the southwest portion of the property. The site consists of a one story wood-framed former wood treatment building and surrounding grassy area (Figure 2). The site is immediately bordered by the correctional facility to the north, an old Civilian Conservation Corps Truck Trail on the east, and state-owned land on the south and west. The surrounding land is rural, and primary uses are residential and agricultural. The nearest private residence is approximately one-quarter mile northeast of the site.

Incarceration facility inmates participate in various work programs. One of the work activities formerly performed by the Camp Pharsalia inmates was a sawmill and wood treatment operation. The treatment plant was constructed for a dip tank process. The plant operated from approximately 1960 to 1977. Seasoned wood poles were staged on the east end of the treatment building. The logs were moved by an overhead hoist into the treatment building and placed in the dip tank. The top of the dip tank was at floor level. Wood was treated using a pentachlorophenol (PCP) solution consisting of approximately one part PCP, to eleven parts fuel oil.

After treatment, the poles would be raised from the dip tank and remain over the tank for approximately four hours. This would allow most of the unabsorbed product to drip back into the dip tank. The poles were then moved to one of the areas designated for the storage of treated

posts outside the treatment building. Drums of PCP were reportedly stored on the west side of the treatment building. The fuel oil used in the treatment process was stored inside the treatment building in tanks.

1.2. Remedial History

The Camp Pharsalia site is a NYSDCS facility currently under investigation by the NYSDEC due to former wood treatment operations. It is an active incarceration facility operated by the NYSDCS, and located on property under the jurisdiction of the NYSDEC. The NYSDCS provided the funding for building construction at the Camp and provides for the maintenance and security. The NYSDEC provides the work programs, technical forestry staff to supervise work, and tools and equipment required to carry out the work. The wood treatment program was developed to provide lumber and round poles for NYSDEC construction and maintenance projects. The pole treatment plants, however, are no longer in operation. Wood treatment at Camp Pharsalia was discontinued in 1977.

In October of 1997 the NYSDEC Division of Operations requested that the NYSDEC Division of Environmental Remediation (DER) perform an environmental investigation at Camp Pharsalia.

The DER completed a Preliminary Investigation (PI) at Camp Pharsalia in 1999. The PI consisted of the excavation of 13 test pits, the installation and sampling of 5 monitoring wells and the collection of 33 surface soil, 3 sediment and 25 subsurface soil samples. The investigation found PCP in the soil directly below the treatment building and the area extending to the west of the building. The soil under the building was also tested for dioxin, a common impurity in PCP, which was found to be above cleanup criteria. Based on these findings, in December of 1999, the NYSDEC listed the Camp Pharsalia site on the State's Registry of Inactive Hazardous Waste Disposal Sites. The site was designated a Class 3 site, which is defined as a site which "Does not present a significant threat to the public health or the environment - action may be deferred."

In 2001, the NYSDEC initiated a Remedial Investigation (RI)/Feasibility Study (FS) for the Camp Pharsalia site. The RI was developed to build on the information generated during the PI and to help fully delineate the extent of contamination known to exist. The results of the RI

were presented in the document Remedial Investigation Report for the Camp Pharsalia Site, dated February 26, 2003. Based on the results of the RI, a Feasibility Study Report was prepared in February 26, 2003. The FS evaluated numerous remedial options for the Camp Pharsalia site, and determined the selected remedy.

1.2.1. Summary of the Selected Remedy

In March 2003, a Record of Decision (ROD) was issued for the site. As discussed in the FS and ROD, the NYSDEC had selected Containment with Low Permeability Cover System (LPCS) as the remedy for this site. A ROD Amendment was issued on June 4, 2007 (NYSDEC 2007). The amendment modified the selected remedy from containment of waste materials on-site with the LPCS to excavation and off-site disposal of waste materials.

The primary elements of the revised remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program;
2. Demolition and off-site disposal of the former treatment building and its contents;
3. Excavation and off-site disposal of approximately 860 cubic yards of contaminated soil. Localized groundwater contamination will be extracted and shipped off-site to be treated as part of the dewatering process during soil excavation;
4. Site restoration by bringing in approved backfill, grading to insure proper drainage, placement of additional topsoil as necessary, and seeding;
5. Implementation of a groundwater monitoring program to observe the effectiveness of the remedy;
6. Development of a site management plan to provide the details of the groundwater monitoring plan;
7. Imposition of an institutional control in the form of an environmental easement that will require compliance with the approved site management plan; restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Chenango County Health

Department; and the property owner to complete and submit to the Department a periodic certification of institutional controls; and

8. The property owner will provide a periodic certification of institutional controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute violation or failure to comply with the site management plan unless otherwise approved by the Department.

1.3. Objectives

The purpose of this pre-design investigation is to collect additional site data in support of the remedial design. The specific objectives of this pre-design investigation are as follows:

- Waste characterization of soils from areas of concern for the purpose of profiling for off-site disposal and for comparing soil concentrations with land disposal restriction treatment standards.
- Collect additional data on groundwater quality and hydraulic conductivity in the areas of concern for the purpose of determining excavation dewatering design parameters and water disposal requirements.

1.4. Scope of Work

The scope of work implemented to meet the objectives listed above included the following tasks. Deviations from the scope as described in the PMWP will be discussed in subsequent subsections.

- Collection and analysis of soil samples from test trenches within the area of concern (AOC) for waste characterization parameters.

- Collection and analysis of 3 groundwater samples for waste characterization parameters from test trenches within the AOC where remediation depths are expected to be below the water table. A portion of each test trench was to be excavated to a depth of 1 to 2 feet below the water table to allow for the collection of water.
- Perform hydraulic conductivity testing by the slug test method on two existing monitoring wells. Slug testing were to be performed on wells located near the limit of treatment (i.e., PMW-01 and PMW-05).
- Additional site surveying, mapping, and location of test trenches and other investigation points developed during the pre-design investigation.

2.0 FIELD ACTIVITIES

Pre-design investigation field activities were conducted on June 22, 2007. Field activities were performed in general accordance with the Field Sampling Plan (FSP) (URS 2007a), the Quality Assurance Project Plan (QAPP) (URS 2007b), and the Health and Safety Plan (HASP) (URS 2007c) prepared for this project. The details of the field activities performed as part of this pre-design investigation are discussed in the following subsections.

2.1. Waste Characterization

The original scope of work described in the PMWP included excavation of test trenches (TT) in the AOC for the collection of samples for waste characterization purposes. Test pits were excavated within the AOC as shown on Figure 3 to the depths indicated:

- CP-TT-01 [5 feet below ground surface (bgs)]
- CP-TT-02 (6 feet bgs)
- CP-TT-03 (7 feet bgs)

Soils were screened for evidence of gross contamination. Screening methods included visual inspection for staining or the presence of non-aqueous phase liquids (NAPL) and monitoring for volatile organic compounds (VOCs) using a photoionization detector (PID). Soil descriptions and screening observations were recorded on logs completed for each test trench. Test trench logs are included in this report as Appendix A.

A total of 3 samples collected from test pits were submitted for laboratory analysis of the following waste characterization parameters:

- Target Compound List (TCL) semi-volatile organic compounds (SVOCs) plus 2,3,4,6-tetrachlorophenol by United States Environmental Protection Agency (USEPA) Method 8270C;
- Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs and PCDFs) by USEPA Method 8290;

- Resource Conservation and Recovery Act (RCRA) metals by USEPA Methods 6010B/7471A;
- Corrosivity (pH) by USEPA SW846 Method 9045C;
- Ignitability by SW846 Method 1030;
- Reactivity in accordance with SW846 Chapter 7, Section 7.3; and
- Full Toxicity Characteristic Leaching Procedure (TCLP) parameters by USEPA Methods 1311, followed by 8260B, 8270C, 8081A, 8151A, 6010B and 7470A.

Upon completion of each test trench, the excavation was backfilled with the excavated material in the reverse order of excavation.

2.2. Groundwater Sampling

In order to characterize groundwater quality for disposal purposes, groundwater samples were collected from each test trench where water was encountered. Groundwater samples were collected from CP-TT-01 and CP-TT-03. A sample was not collected from CP-TT-02 as insufficient groundwater was encountered in the excavation. Samples were submitted to the laboratory for analysis of the following parameters:

- TCL volatile organic compounds (VOCs) by USEPA Method 8260B
- TCL SVOCs plus 2,3,4,6-tetrachlorophenol by USEPA Method 8270C
- PCDDs and PCDFs by USEPA Method 8290
- Target Analyte List (TAL) metals by USEPA Methods 6010B/7470A
- Total suspended solids (TSS) by USEPA Method 160.2
- Total dissolved solids (TDS) by USEPA Method 160.1
- Oil & grease (O&G) by USEPA Method 413.1
- pH by USEPA Method 9040B
- Flashpoint by Method 1010
- Reactivity in accordance with SW846 Chapter 7, Section 7.3

2.3. Hydraulic Conductivity Testing

To evaluate groundwater hydraulic conductivity in the AOC for the purpose of estimating excavation-dewatering requirements, slug testing was performed on select existing monitoring

wells located near the AOC. The slug tests were performed on wells PMW-01 and PMW-05. Slug testing was performed in accordance with procedures presented in the SAP using a stainless steel slug and a pressure transducer to record instantaneous changes in water levels.

2.4. Surveying

Additional surveying was completed at the site by Joanne Darcy Crum, L.S. Professional Land Surveyor. Surveying activities included establishing locations for the test trenches. Survey work was referenced to the New York State Plane Coordinate System East Zone and reported in North American Datum of 1983 (NAD 83) and reported in US Survey Feet. All location points were referenced vertically to the North American Vertical Datum of 1988 (NAVD 88) and reported in US Survey Feet. Surveying figures and notes are provided in Appendix B.

2.5. Groundwater Elevation Measurements

Groundwater level measurements were collected on June 22, 2007, at six on-site monitoring wells (PMW-01, PMW-02, PMW-03, PMW-04, PMW-05, and PMW-06). Although not specifically defined in the scope of work, groundwater level measurements were collected in order to create a site potentiometric surface map.

2.6. Investigation Derived Waste Management

No investigation-derived waste was generated during the field activities.

2.7. Asbestos Sampling

Samples were collected from the treatment building for the presence of asbestos containing material (ACM). This additional out-of-scope work was performed at the request of the NYSDEC to identify any potential ACM as part of a pre-demolition survey. Representative samples were collected from the asphalt shingles and tar paper. There were no other suspected ACM identified in or on the structure.

3.0 RESULTS

3.1. Soil Investigation

The following subsections present the results of soil investigation including observations of grossly contaminated soil and the results of soil analytical testing. In accordance with the PMWP, a Data Usability Summary Report (DUSR) for analytical data has been prepared as a separate document. The DUSR presents results of the data validation and has been prepared in accordance with NYSDEC Division of Environmental Remediation Draft DER-10 *Technical Guidance for Site Investigation and Remediation, Appendix 2B- Guidance for the Development of Data Usability Summary Reports* (NYSDEC 2002).

3.1.1. Test Trench Results

During excavation of the test pits (Figure 3), observations of contamination were recorded in the test pit logs (Appendix A). Test pitting was completed along the western side of the treatment building to depths of approximately 5 to 7 feet bgs. During excavation, fill material and re-worked soils were observed from ground surface to approximately 3 feet bgs. Soils consisted of clayey silt with varying amounts of gravel, cobbles, and boulders. Contaminated soil was observed (i.e., petroleum odors, sheen on water) from a depth of approximately 1 to 6 feet bgs.

Analytical results for samples TT-01, TT-02, and TT-03 are summarized in Figure 4 and Tables 3-1 and 3-2. Per the ROD Amendment (NYSDEC 2007), the contaminants of concern for this site are PCP and 2,3,7,8-TCDD toxicity equivalence factor (TEF) and the site Standards, Criteria, and Guidance (SCG) values for soils are 0.8 milligram per kilogram (mg/kg) for PCP and 1,000 nanograms per kilogram (ng/kg) for 2,3,7,8-TCDD TEF. PCP was detected in soil samples collected from TT-01 and TT-02 and dioxins/furans were detected in all three test trench soil samples. Several other SVOCs and metals, were also detected. However, only PCP in TT-02 exceeded the site SCG (0.8 mg/kg). Table 3-1 compares the results against TAGM 4046 Recommended Soil Cleanup Objective (NYSDEC 1994) and 6NYCRR Part 375.6 (NYSDEC 2006) Soil Cleanup Objective-Unrestricted Use criterion. There are no soil cleanup objectives for dioxins/furans in either TAGM 4046 or 6NYCRR Part 375.6, therefore Table 3-1 shows the site SCG criteria for 2,3,7,8-TCDD TEF in the TAGM 4046 column.

Metals detected at concentrations exceeding TAGM 4046 criteria were arsenic and chromium, although these concentrations were below 6NYCRR Part 375.6 Unrestricted Use limits. The RI (Shaw 2003a) compared detected metal concentrations to site background concentrations from the Camp Georgetown site. The background sample data collected from Camp Georgetown was averaged and the resulting averages were used to compare to the soil data collected at the Camp Pharsalia site during this pre-design investigation. Results for arsenic, barium, lead, and selenium exceeded the Camp Georgetown site background levels, but are within Eastern USA background concentrations (listed in TAGM 4046) as shown below. The concentrations of metals found in the test trench samples most likely represent natural soil concentrations at the Camp Pharsalia site.

		Background				
		Camp Georgetown	Eastern USA	CP-TT-1	CP-TT-2	CP-TT-3
Arsenic	mg/kg	**8.04**	3-12	**9.6**	**9.9**	3.6
Barium	mg/kg	**40.82**	15-600	**85.1**	**84.5**	**87.3**
Cadmium	mg/kg	ND	0.1-1	0.35	0.34	0.27
Chromium	mg/kg	17.44	1.5-40	16.8	16.8	12.9
Lead	mg/kg	**10.42**	200-500	**20.3**	**20.6**	**22.3**
Mercury	mg/kg	0.0158	0.001-0.2	ND	ND	0.010
Selenium	mg/kg	**1.3**	0.1-3.9	**2.0**	**1.6**	**1.9**

Results from the analysis for the hazardous waste characteristics, including ignitability, corrosivity, and reactivity did not exceed hazardous waste criteria for any samples (Table 3-2).

3.2. Groundwater Investigation

This section presents the results of groundwater investigation activities including (1) groundwater sample collection from test trenches for the purpose of waste characterization evaluation, and (2) performance of slug testing to estimate hydraulic conductivities in the proposed excavation areas.

Test Trench Groundwater Sampling Results

During the collection of groundwater samples from the test trenches, the presence of an oily sheen on the water was noted in test trench TT-01. Insufficient water was available for sampling from TT-02. No sheen was observed on the water in TT-03.

A total of two samples collected from test trenches were submitted for laboratory analysis. The analytical results for these samples are summarized in Table 3-3 and Figure 5. Results presented in Table 3-3 are compared to NYSDEC TOGS (NYSDEC 1998) Class GA groundwater standards and guidance values. Discussion of the results in comparison with groundwater standards is presented below.

Detected analytes exceeding Class GA groundwater standards included SVOCs, pesticides, dioxins, and metals. PCP was detected above the class GA groundwater criterion (1 ug/L) in TT-03 (54 ug/L). SVOCs other than PCP detected above Class GA criteria included 1,1-biphenyl (14 ug/L), 2,3,4,6-tetrachlorophenol (2 ug/L), acenaphthene (43 ug/L), bis(2-ethylhexyl)phthalate (9 ug/L), fluorene (63 ug/L), and phenanthrene (120 ug/L). Alpha-chlordane (0.097 ug/L) was the only pesticide detected in the groundwater above Class GA criteria.

The class GA groundwater criterion for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) Toxicity Equivalence Factor (TEF) [0.0007 nanograms per liter (ng/L)] was exceeded in samples TT-01 and TT-03 at 4 ng/L and 0.025 ng/L, respectively.

Metals detected at concentrations exceeding the class GA groundwater standards included arsenic, beryllium, chromium, copper, iron, lead, magnesium, manganese, nickel, selenium, and thallium.

Evaluation of the excavation dewatering treatment requirements based on these results in comparison to surface water standards and guidance is included in Section 4.1.

3.2.1. Hydraulic Conductivity Testing

Slug test analyses were conducted in two onsite monitoring wells, PMW-01 and PMW-05. Values of hydraulic conductivity were obtained from both rising and falling head tests. The results indicate that the hydraulic conductivities of the water-bearing zone at the site are relatively low, in the range of 10^{-5} to 10^{-4} centimeters per second (cm/s). Slug test data and analysis are included in Appendix C.

3.2.2. Groundwater Elevations

A potentiometric surface map based on the water level measurements obtained on June 22, 2007 is provided in Figure 6. The groundwater flow in the study area is to the northwest. The water elevation measurements are provided below.

Well ID	Depth To Water (feet)
PMW-01	3.82
PMW-02	6.38
PMW-03	7.04
PMW-04	6.42
PMW-05	6.28
PMW-06	3.89

3.3. Pre-Demolition Asbestos Survey Results

The results of the pre-demolition survey for ACM indicated no ACM is present in or on the treatment building structure or contents. A copy of the pre-demolition building survey is provided in Appendix E.

4.0 DISCUSSION

The following discussion incorporates results of this pre-design investigation in the evaluation of remedial design parameters for extent of soil excavation, excavation dewatering, and soil disposal requirements.

4.1. Excavation Dewatering

The following evaluation of excavation dewatering was performed by incorporating the results from hydraulic conductivity testing and groundwater analytical testing. Information and assumptions presented in the RI and FS (Shaw 2003a and 2003b, respectively), in addition to other conservative assumptions outlined below were used for the evaluation.

4.1.1. Extraction Rates

Contaminated soil from one area of the site is to be excavated and removed. The depth of soil to be excavated extends below the existing water table at the site. Therefore, regardless of the specific excavation method chosen, it is expected that dewatering of the areas to be excavated will be required. Groundwater at the site has been detected at depths ranging from approximately 3 to 6 feet below ground surface. Based on the FS (Shaw 2003b), the depth of the soil to be excavated is from 5 to 10 feet.

The quantity of water to be pumped in order to dewater a specific area is dependent on many factors including, but not limited to, the soil formation parameters, the drawdown required, and the footprint of the excavation. Soil parameters were assumed to be consistent among the two excavation areas. Drawdown requirements range from 3 feet to 8 feet, assuming that the groundwater is depressed to one foot below the assumed bottom of the excavation. As presented in the FS, the areal extent of the excavation is approximately 1,400 to 1,800 square feet. Estimation of dewatering rates calculated for this evaluation is included in Appendix D. Depending on the size of the excavation, the assumed time frame of dewatering (1, 2, or 3 days) and the assumed properties of the water-bearing zone, extraction rates of 1 to 60 gallons per minute (gpm) were obtained. The total volume of the water that will need to be extracted from both excavations has been estimated at 7,000 to 150,000 gallons.

4.1.2. Treatment

Although estimated extraction rates range as high 60 gpm and the volume of extracted water may be as high as 150,000 gallons, the actual volume of water removed is expected to be much lower. Therefore it is proposed that the water be stored in portable storage tanks (e.g. Baker tanks). If a higher withdrawal rate is necessary, the contractor will have several options. The contractor may elect to simply excavate the areas in smaller portions, or use other methods to limit the infiltration of water. The exact means and methods for the excavation and dewatering will be up to the contractor.

4.1.3. Water Discharge

As the water collected for dewatering is from areas of contaminated soil, it is likely that the water itself will be contaminated. It is proposed the water be transported for off-site treatment and disposal.

Table 3-3 summarizes contaminants detected in water samples collected from test trenches during the June 2007 sampling event. Results in these tables are compared to Class GA groundwater standards and guidance values. In general, contaminant concentrations were relatively low and consisted of several SVOCs, a pesticide, dioxin/furans, and metals. The samples from the test trenches provide a reasonable representation of the quality of water that will be collected during dewatering. Prior to any transport, the water in the holding tanks will be sampled and analyzed for the parameters required by the treatment, storage, and disposal (TSD) facility.

4.2. Soil Disposal Requirements

As stated in the ROD, contaminated soil that would be disposed of off-site is regulated by 6NYCRR Part 371 that defines the contaminated soils as hazardous waste (i.e., hazardous waste code F032). As such, these soils would have to be disposed of in an appropriate hazardous waste landfill and may require pretreatment prior to disposal.

An evaluation of federal and state land disposal restriction (LDR) regulations was performed to determine the need for pretreatment of soils prior to placement in an appropriate landfill.

4.2.1. Regulatory Review

Pertinent federal and state regulations reviewed included the following:

- RCRA Subtitle C, Land Disposal Restrictions, 40 CFR Part 268
- NYSDEC Regulations, Land Disposal Restrictions, 6NYCRR Part 376

The findings of this evaluation as they pertain to Site contaminated soils are summarized below:

- F032 hazardous wastes are prohibited from land disposal unless the wastes meet applicable treatment standards.
- Soil and debris contaminated with F032 wastes are prohibited from land disposal unless the wastes meet the applicable LDR alternative treatment standards (ATS) for contaminated soil discussed below.
- LDR ATSs for contaminated soil state that when treatment of any constituent would result in a concentration less than 10 times the Universal Treatment Standard (UTS) for that constituent, treatment to achieve constituent concentrations less than 10 times the UTS is not required.
- In addition to treatment requirements discussed above, soils exhibiting the characteristics of ignitability, corrosivity, or reactivity must also be treated to eliminate these characteristics.

The soil results compared to ATSs for waste code F032, as described above (i.e., 10 x UTS), are presented in Table 4-1. ATSs for metals listed in Table 4-1 have been adjusted from the TCLP based values by multiplying the ATS by 20 (accounting for 20x dilution during extraction procedure) for estimating purposes. Based on evaluation of these regulations, site contaminated soil exhibiting constituent concentrations below the ATS (10 times the UTS) could

be sent for land disposal without prior treatment to reduce constituent concentrations. In addition, these soils must not exhibit the characteristics for ignitability, corrosivity, and reactivity.

The above analysis assumes that soils meet landfill requirements for liquids content. Excavated soils to be disposed of in a Subtitle C landfill must exhibit no free liquid as defined by the paint filter liquids test (Method 9095A) in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA Publication SW-846 (USEPA 1997). Soils that may contain free liquids, due to groundwater saturation, may require onsite pretreatment including temporary placement in drying beds or mixing with a non-biodegradable material such as cement kiln dust. Any treatment mixtures added prior to land filling must not be biodegradable in the landfill.

Soils determined to exceed the ATSs are prohibited from landfill placement in the United States. Any soils intended for off-site disposal that exceed these ATSs would require pre-treatment prior to landfill placement.

4.2.2. Site Waste Characterization

Based on pre-design investigation soil analysis, no soil exhibiting the hazardous waste characteristics of ignitability, corrosivity, or reactivity were identified. Therefore, no pretreatment of soils would be required to address these parameters prior to placement in a landfill.

Site soil analytical results from this pre-design investigation are compared to the ATSs for waste code F032 in Table 4-1. No compounds were identified at concentrations exceeding the ATSs. Based on these results, no soils would require pre-treatment prior to placement in an appropriate hazardous waste landfill. However, at the time of construction, results for waste characterization sampling of excavated soil planned for off-site disposal should be evaluated for compliance with these LDR ATSs.

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TABLES

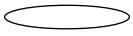
TABLE 3-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

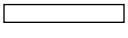
Location ID				TT-01	TT-02	TT-03
Sample ID				CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix				Soil	Soil	Soil
Depth Interval (ft)				2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled				06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**			
Semivolatile Organic Compounds						
2-Methylnaphthalene	MG/KG	36.4	-	0.12 J	1.2 J	0.67
bis(2-Ethylhexyl)phthalate	MG/KG	50	-	0.19 J		0.13 J
Fluorene	MG/KG	50	30	0.091 J		0.22 J
Pentachlorophenol	MG/KG	1 or MDL	0.8	0.13 J	40	
Phenanthrene	MG/KG	50	100	0.18 J	1.2 J	0.37 J
Pyrene	MG/KG	50	100	0.069 J	0.67 J	0.64
Total Semivolatile Organic Compounds	MG/KG	500	-	0.78	43.07	2.03
Dioxins & Furans						
1,2,3,4,6,7,8-HpCDD	NG/KG	-	-	2,800	9,200	670
1,2,3,4,6,7,8-HpCDF	NG/KG	-	-	830	790	350
1,2,3,4,7,8,9-HpCDF	NG/KG	-	-	66	79	22
1,2,3,4,7,8-HxCDD	NG/KG	-	-	19	14	14
1,2,3,4,7,8-HxCDF	NG/KG	-	-	28	15	12
1,2,3,6,7,8-HxCDD	NG/KG	-	-	92	200	33
1,2,3,6,7,8-HxCDF	NG/KG	-	-			5.2
1,2,3,7,8,9-HxCDD	NG/KG	-	-	33	32	25
1,2,3,7,8,9-HxCDF	NG/KG	-	-	11		
1,2,3,7,8-PeCDD	NG/KG	-	-	6.6		7.8
1,2,3,7,8-PeCDF	NG/KG	-	-			1.1 J
2,3,4,6,7,8-HxCDF	NG/KG	-	-	21	21	9.8

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).

Criteria (2)- 6 NYCRR Part 375.6, Remedial Program Soil Cleanup Objectives, Effective 12/14/06. Unrestricted Use.

Flags assigned during chemistry validation are shown.


Concentration Exceeds Criteria (1)


Concentration Exceeds Criteria (2)

- = No Criteria. MDL - Method Detection Limit. SB - Site Background.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

Only Detected Results Reported.

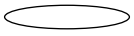
TABLE 3-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

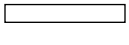
Location ID				TT-01	TT-02	TT-03
Sample ID				CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix				Soil	Soil	Soil
Depth Interval (ft)				2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled				06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**			
Dioxins & Furans						
2,3,4,7,8-PeCDF	NG/KG	-	-	8.8		1.4 J
2,3,7,8-TCDD	NG/KG	-	-			0.84 J
OCDD	NG/KG	-	-	22,000	100,000	3,900
OCDF	NG/KG	-	-	3,600	5,100	1,000
Total HpCDD	NG/KG	-	-	4,400	15,000	1,000
Total HpCDF	NG/KG	-	-	3,500	4,800	1,000
Total HxCDD	NG/KG	-	-	320	560	150
Total HxCDF	NG/KG	-	-	690	170	290
Total PeCDD	NG/KG	-	-	6.6		16
Total PeCDF	NG/KG	-	-	70	28	50
Total TCDD	NG/KG	-	-	1.2	2.3	2.6
Total TCDF	NG/KG	-	-	2.0		5.5
2,3,7,8-TCDD Toxicity Equivalence (TEF)	NG/KG	1000	-	90	240	31
Metals						
Arsenic	MG/KG	7.5 or SB	13	9.6	9.9	3.6
Barium	MG/KG	300 or SB	350	85.1	84.5	87.3
Cadmium	MG/KG	1 or SB	2.5	0.35	0.34	0.27 B
Chromium	MG/KG	10 or SB	30	16.8	16.8	12.9
Lead	MG/KG	SB	63	20.3	20.6	22.3
Mercury	MG/KG	0.1	0.18			0.010 B

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).

Criteria (2)- 6 NYCRR Part 375.6, Remedial Program Soil Cleanup Objectives, Effective 12/14/06. Unrestricted Use.

Flags assigned during chemistry validation are shown.


Concentration Exceeds Criteria (1)


Concentration Exceeds Criteria (2)

- = No Criteria. MDL - Method Detection Limit. SB - Site Background.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

Only Detected Results Reported.

TABLE 3-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID				TT-01	TT-02	TT-03
Sample ID				CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix				Soil	Soil	Soil
Depth Interval (ft)				2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled				06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**			
Metals						
Selenium	MG/KG	2 or SB	3.9	2.0	1.6	1.9

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).

Criteria (2)- 6 NYCRR Part 375.6, Remedial Program Soil Cleanup Objectives, Effective 12/14/06. Unrestricted Use.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria (1)

Concentration Exceeds Criteria (2)

- = No Criteria. MDL - Method Detection Limit. SB - Site Background.
Blank or ND - Not Detected.
J - The reported concentration is an estimated value.

Only Detected Results Reported.

TABLE 3-2
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID			TT-01	TT-02	TT-03
Sample ID			CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix			Soil	Soil	Soil
Depth Interval (ft)			2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled			06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria***			
TCLP Semivolatile Organic Compounds					
Pentachlorophenol	UG/L	100000		180 J	
TCLP Metals					
Arsenic	UG/L	5000	7.6 B		4.0 B
Barium	UG/L	100000	243 J	255 J	442 J
Cadmium	UG/L	1000	0.43 B	0.42 B	0.81 B
Lead	UG/L	5000	16.5	6.9 B	28.3
Silver	UG/L	5000	6.1 B	3.4 B	4.2 B
RCRA Characteristics					
Corrosivity (pH)	S.U.	2-12.5	7.3	9.1	6.3
Ignitability	°F	<140	145 >	145 >	145 >

*Criteria- 40CFR Part 262

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

> - The actual flashpoint has not been determined. The value shown represents the highest testing temperature.

Only Detected Results Reported.

TABLE 3-3
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH GROUNDWATER SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID				TT-01	TT-03
Sample ID				CP-TT-1	CP-TT-3
Matrix				Groundwater	Groundwater
Depth Interval (ft)				-	-
Date Sampled				06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**		
Semivolatile Organic Compounds					
1,1-Biphenyl	UG/L	5	-	14 J	
2,3,4,6-Tetrachlorophenol	UG/L	1	-		2 J
2-Methylnaphthalene	UG/L	-	-	170	
Acenaphthene	UG/L	20	-	43	
bis(2-Ethylhexyl)phthalate	UG/L	5	-	9 J	1 J
Caprolactam	UG/L	-	-		3 J
Dibenzofuran	UG/L	50	-	23	
Fluoranthene	UG/L	50	-	5 J	
Fluorene	UG/L	50	-	63	
Pentachlorophenol	UG/L	1	-		54 J
Phenanthrene	UG/L	50	-	120	1 J
Pyrene	UG/L	50	-	14 J	
Pesticide Organic Compounds					
4,4'-DDE	UG/L	0.2	-	0.11 J	
alpha-Chlordane	UG/L	0.05	-	0.097 J	
Dioxins & Furans					
1,2,3,4,6,7,8-HpCDD	NG/L	-	-	110 J	0.87 J
1,2,3,4,6,7,8-HpCDF	NG/L	-	-	35 J	0.30 J
1,2,3,4,7,8,9-HpCDF	NG/L	-	-	2.8 J	0.013 J
1,2,3,4,7,8-HxCDD	NG/L	-	-	0.89 J	

Criteria (1)- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

Criteria (2)- 40CFR Part 262

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria (1)

Concentration Exceeds Criteria (2)

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

TABLE 3-3
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH GROUNDWATER SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

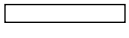
Location ID				TT-01	TT-03
Sample ID				CP-TT-1	CP-TT-3
Matrix				Groundwater	Groundwater
Depth Interval (ft)				-	-
Date Sampled				06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**		
Dioxins & Furans					
1,2,3,4,7,8-HxCDF	NG/L	-	-	1.5 J	
1,2,3,6,7,8-HxCDD	NG/L	-	-	4.5 J	0.028 J
1,2,3,6,7,8-HxCDF	NG/L	-	-	0.58 J	
1,2,3,7,8,9-HxCDD	NG/L	-	-	1.6 J	0.011 J
1,2,3,7,8,9-HxCDF	NG/L	-	-	0.60 J	
1,2,3,7,8-PeCDD	NG/L	-	-	0.40 J	
1,2,3,7,8-PeCDF	NG/L	-	-	0.32 J	
2,3,4,6,7,8-HxCDF	NG/L	-	-	1.2 J	
2,3,4,7,8-PeCDF	NG/L	-	-	0.51 J	
2,3,7,8-TCDD	NG/L	-	-	0.038 J	
OCDD	NG/L	-	-	840 J	7.8 J
OCDF	NG/L	-	-	110 J	0.92 J
Total HpCDD	NG/L	-	-	160 J	1.4 J
Total HpCDF	NG/L	-	-	150 J	0.79 J
Total HxCDD	NG/L	-	-	14 J	0.097 J
Total HxCDF	NG/L	-	-	40 J	0.15 J
Total PeCDD	NG/L	-	-	0.92 J	
Total PeCDF	NG/L	-	-	3.7 J	
Total TCDD	NG/L	-	-	0.15 J	
Total TCDF	NG/L	-	-	0.14 J	

Criteria (1)- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

Criteria (2)- 40CFR Part 262

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria (1)



Concentration Exceeds Criteria (2)

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

TABLE 3-3
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH GROUNDWATER SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID				TT-01	TT-03
Sample ID				CP-TT-1	CP-TT-3
Matrix				Groundwater	Groundwater
Depth Interval (ft)				-	-
Date Sampled				06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**		
Dioxins & Furans					
2,3,7,8-TCDD Toxicity Equivalence (TEF)	NG/L	7.00E-04	-	4.0	0.025
Metals					
Aluminum	UG/L	-	-	23,900	92,800
Arsenic	UG/L	25	-	17.4	69.0
Barium	UG/L	1000	-	319	792
Beryllium	UG/L	3	-	0.77 B	3.5 B
Calcium	UG/L	-	-	62,000	103,000
Chromium	UG/L	50	-	28.8	118
Cobalt	UG/L	-	-	20.6 B	88.8
Copper	UG/L	200	-	158	236
Iron	UG/L	300	-	41,500 J	178,000 J
Lead	UG/L	25	-	111	147
Magnesium	UG/L	35000	-	13,400	46,700
Manganese	UG/L	300	-	2,880	5,780
Mercury	UG/L	0.7	-		0.23
Nickel	UG/L	100	-	43.4	196
Potassium	UG/L	-	-	4,400 B	6,790
Selenium	UG/L	10	-	17.8	
Silver	UG/L	50	-	4.2 BJ	32.0
Sodium	UG/L	20000	-	7,440	15,000

Criteria (1)- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

Criteria (2)- 40CFR Part 262

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria (1)

Concentration Exceeds Criteria (2)

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

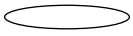
TABLE 3-3
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH GROUNDWATER SAMPLES
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID				TT-01	TT-03
Sample ID				CP-TT-1	CP-TT-3
Matrix				Groundwater	Groundwater
Depth Interval (ft)				-	-
Date Sampled				06/22/07	06/22/07
Parameter	**Units**	**Criteria (1)**	**Criteria (2)**		
Metals					
Thallium	UG/L	0.5	-	2.9 B	
Vanadium	UG/L	-	-	30.1 B	103
Zinc	UG/L	2000	-	529 J	466 J
RCRA Characteristics					
Corrosivity (pH)	S.U.	-	2-12.5	6.7	7.0
Ignitability	°F	-	<140	150 >	150 >
Miscellaneous Parameters					
Oil & Grease, Total Recoverable	MG/L	-	-	22	
Total Dissolved Solids	MG/L	-	-	240	1,500
Total Suspended Solids	MG/L	-	-	971	6,860

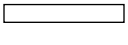
Criteria (1)- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

Criteria (2)- 40CFR Part 262

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria (1)



Concentration Exceeds Criteria (2)

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

TABLE 4-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
ALTERNATIVE TREATMENT STANDARDS
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID			TT-01	TT-02	TT-03
Sample ID			CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix			Soil	Soil	Soil
Depth Interval (ft)			2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled			06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria***			
Semivolatile Organic Compounds					
2-Methylnaphthalene	MG/KG	-	0.12 J	1.2 J	0.67
bis(2-Ethylhexyl)phthalate	MG/KG	-	0.19 J		0.13 J
Fluorene	MG/KG	34	0.091 J		0.22 J
Pentachlorophenol	MG/KG	74	0.13 J	40	
Phenanthrene	MG/KG	56	0.18 J	1.2 J	0.37 J
Pyrene	MG/KG	82	0.069 J	0.67 J	0.64
Dioxins & Furans					
1,2,3,4,6,7,8-HpCDD	NG/KG	-	2,800	9,200	670
1,2,3,4,6,7,8-HpCDF	NG/KG	-	830	790	350
1,2,3,4,7,8,9-HpCDF	NG/KG	-	66	79	22
1,2,3,4,7,8-HxCDD	NG/KG	10000	19	14	14
1,2,3,4,7,8-HxCDF	NG/KG	10000	28	15	12
1,2,3,6,7,8-HxCDD	NG/KG	10000	92	200	33
1,2,3,6,7,8-HxCDF	NG/KG	10000			5.2
1,2,3,7,8,9-HxCDD	NG/KG	10000	33	32	25
1,2,3,7,8,9-HxCDF	NG/KG	10000	11		
1,2,3,7,8-PeCDD	NG/KG	10000	6.6		7.8
1,2,3,7,8-PeCDF	NG/KG	10000			1.1 J
2,3,4,6,7,8-HxCDF	NG/KG	10000	21	21	9.8
2,3,4,7,8-PeCDF	NG/KG	10000	8.8		1.4 J
2,3,7,8-TCDD	NG/KG	10000			0.84 J
OCDD	NG/KG	-	22,000	100,000	3,900

*Criteria- Alternative Treatment Standards. 6 NYCRR Part 376 Land Disposal Restrictions, Treatment Standards for Hazardous Wastes.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

TABLE 4-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
ALTERNATIVE TREATMENT STANDARDS
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID			TT-01	TT-02	TT-03
Sample ID			CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix			Soil	Soil	Soil
Depth Interval (ft)			2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled			06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria***			
Dioxins & Furans					
OCDF	NG/KG	-	3,600	5,100	1,000
Total HpCDD	NG/KG	-	4,400	15,000	1,000
Total HpCDF	NG/KG	-	3,500	4,800	1,000
Total HxCDD	NG/KG	10000	320	560	150
Total HxCDF	NG/KG	10000	690	170	290
Total PeCDD	NG/KG	10000	6.6		16
Total PeCDF	NG/KG	10000	70	28	50
Total TCDD	NG/KG	10000	1.2	2.3	2.6
Total TCDF	NG/KG	10000	2.0		5.5
2,3,7,8-TCDD Toxicity Equivalence (TEF)	NG/KG	-	90	240	31
Metals					
Arsenic	MG/KG	1000	9.6	9.9	3.6
Barium	MG/KG	-	85.1	84.5	87.3
Cadmium	MG/KG	-	0.35	0.34	0.27 B
Chromium	MG/KG	120	16.8	16.8	12.9
Lead	MG/KG	-	20.3	20.6	22.3
Mercury	MG/KG	-			0.010 B
Selenium	MG/KG	-	2.0	1.6	1.9
TCLP Metals					
Arsenic	UG/L	50000	7.6 B		4.0 B
Barium	UG/L	-	243 J	255 J	442 J
Cadmium	UG/L	-	0.43 B	0.42 B	0.81 B

*Criteria- Alternative Treatment Standards. 6 NYCRR Part 376 Land Disposal Restrictions, Treatment Standards for Hazardous Wastes.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

- = No Criteria.

Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

TABLE 4-1
SUMMARY OF DETECTED COMPOUNDS IN TEST TRENCH SOIL SAMPLES
ALTERNATIVE TREATMENT STANDARDS
CAMP PHARSALIA PRE-DESIGN INVESTIGATION

Location ID			TT-01	TT-02	TT-03
Sample ID			CP-TT-1 (2-3)	CP-TT-2 (2-3)	CP-TT-3 (1-1.5)
Matrix			Soil	Soil	Soil
Depth Interval (ft)			2.0-3.0	2.0-3.0	1.0-1.5
Date Sampled			06/22/07	06/22/07	06/22/07
Parameter	**Units**	**Criteria***			
TCLP Metals					
Lead	UG/L	-	16.5	6.9 B	28.3
Silver	UG/L	-	6.1 B	3.4 B	4.2 B

*Criteria- Alternative Treatment Standards. 6 NYCRR Part 376 Land Disposal Restrictions, Treatment Standards for Hazardous Wastes.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

- = No Criteria.

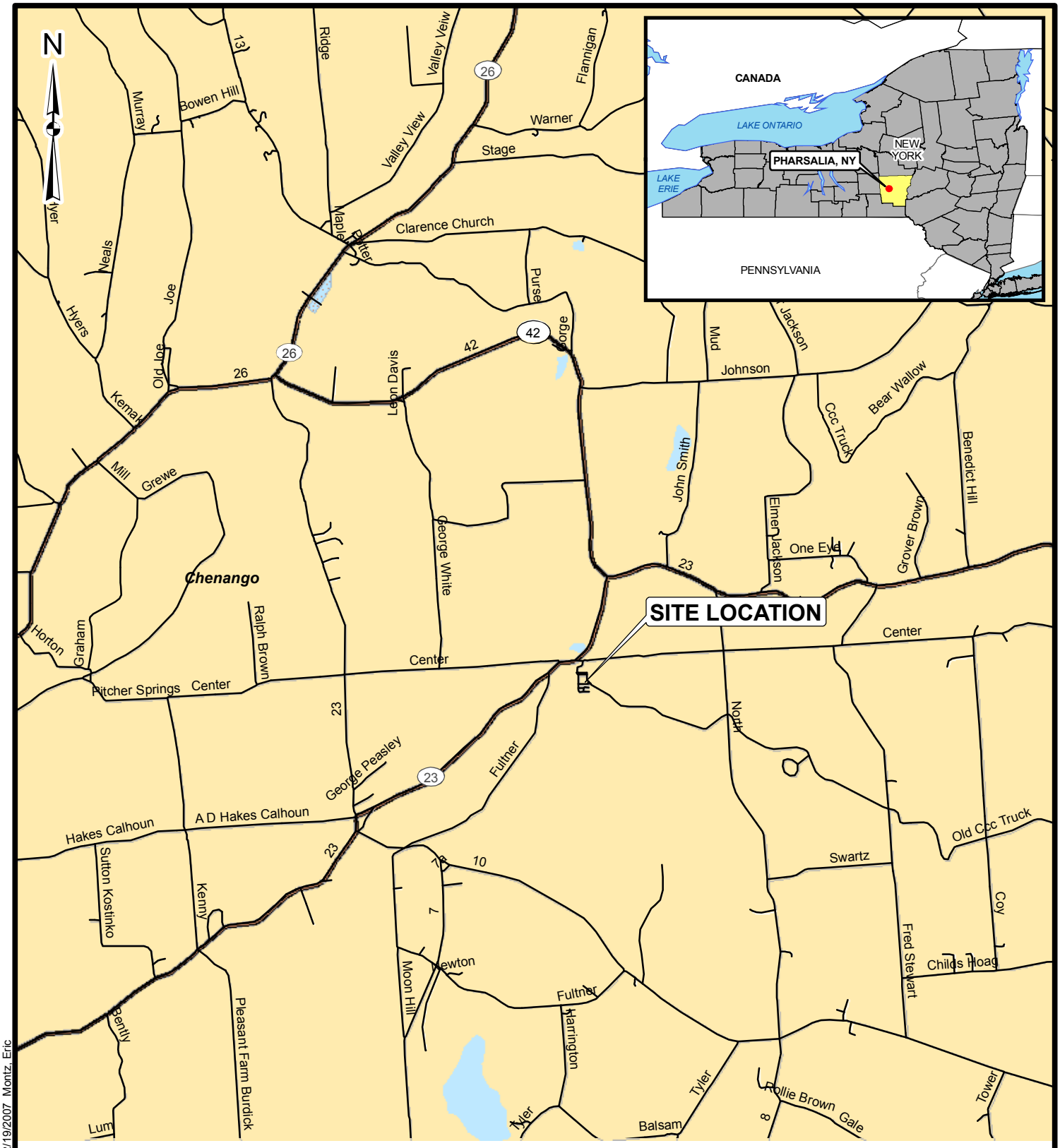
Blank or ND - Not Detected.

J - The reported concentration is an estimated value.

B (metals only) - The reported concentration is greater than the MDL but less than the CRDL.

Only Detected Results Reported.

FIGURES

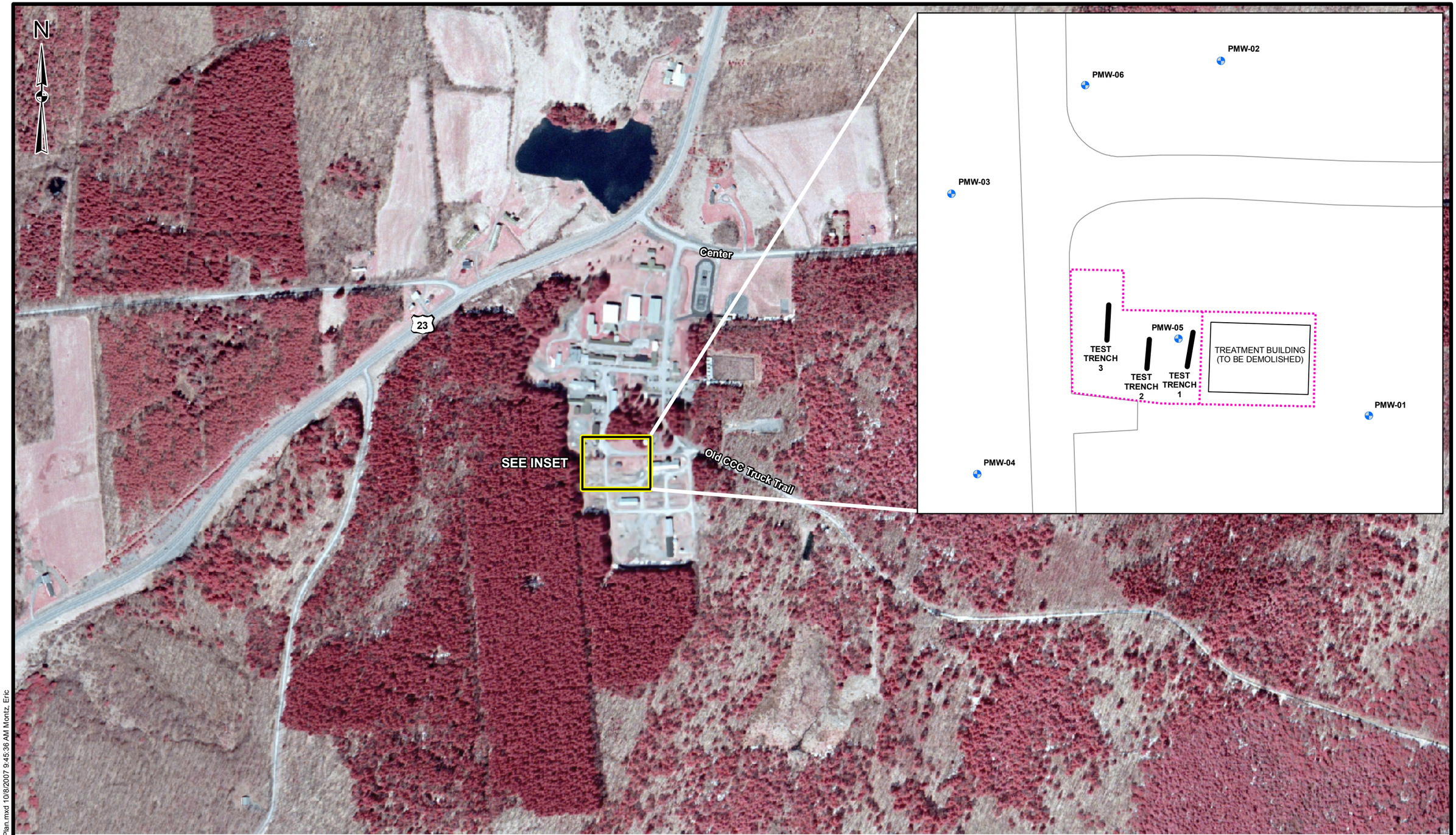


SOURCE: ArcGIS Street Maps

0 5,500 11,000 Feet

URS	CAMP PHARSALIA, NY SITE LOCATION MAP	FIGURE 1

J:\11174439.00000\DB\GIS\Site Location.mxd 12/19/2007 Montz, Eric



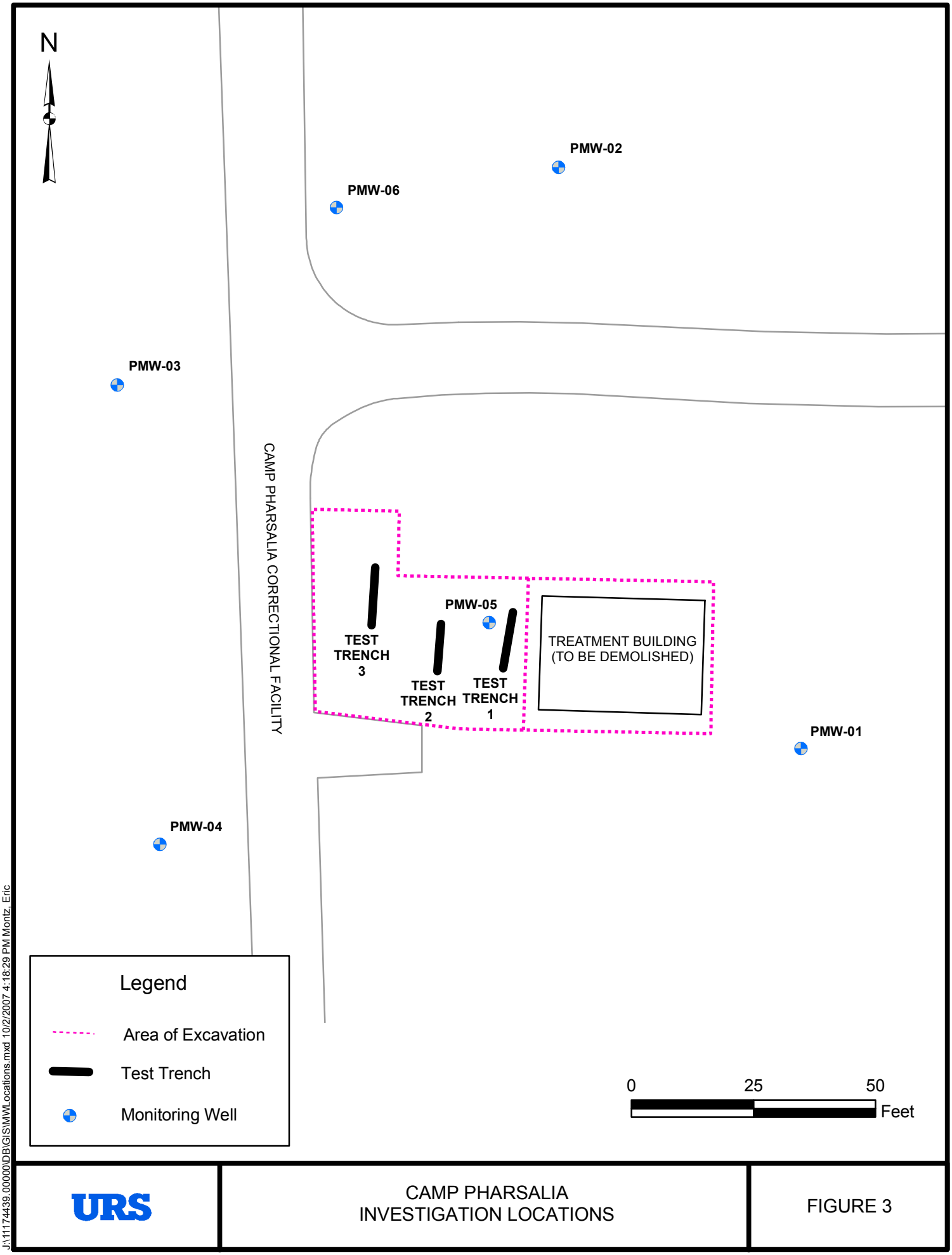
Source: 2003 Infrared, Chenango County

CAMP PHARSALIA
SITE PLAN

URS

FIGURE 2

J:\111174439.00000\DB\GIS\Site Plan.mxd 10/8/2007 9:45:36 AM Montz, Eric

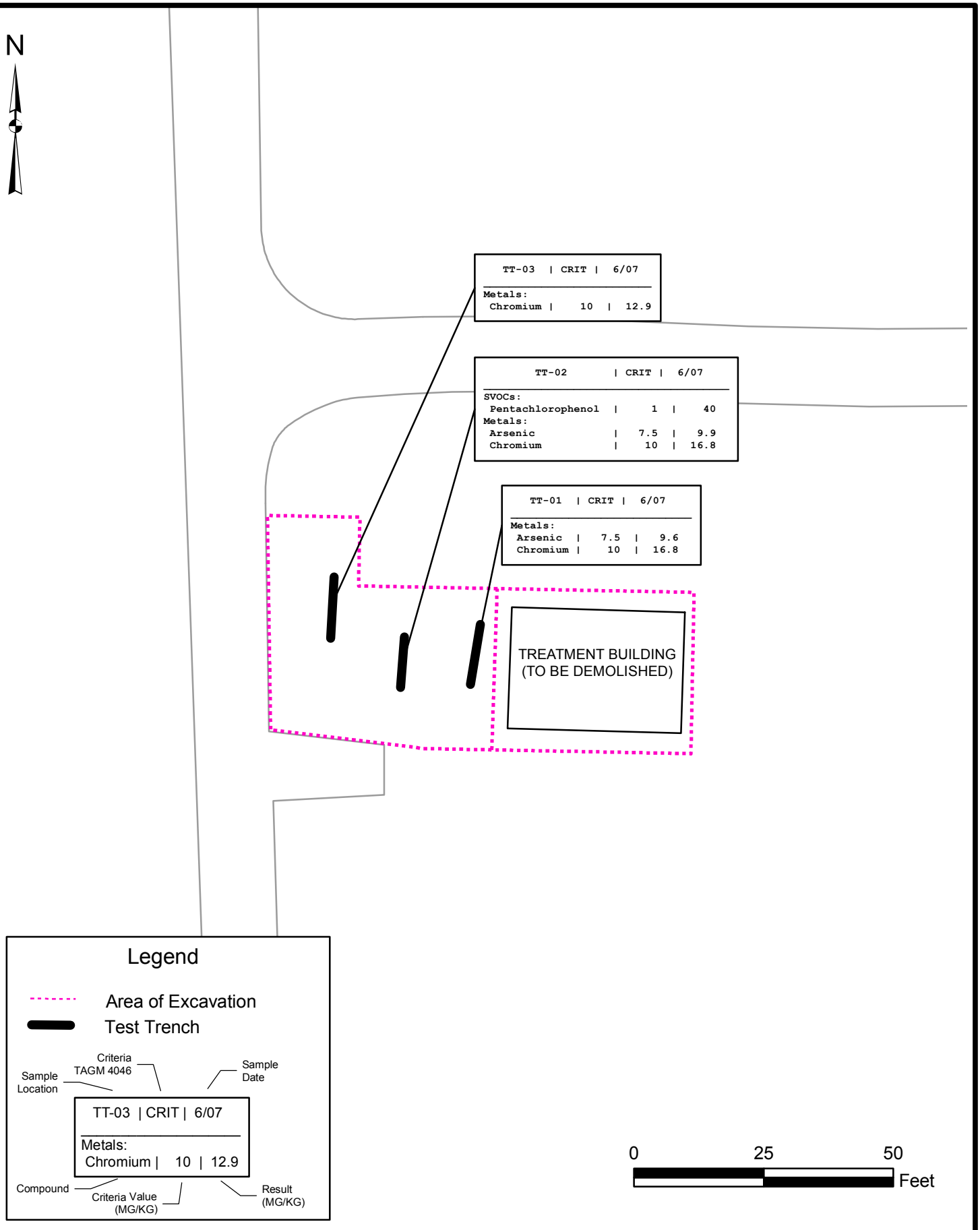


J:\11174439.00000\DB\GIS\MWLocations.mxd 10/2/2007 4:18:29 PM Montz, Eric

URS

CAMP PHARSALIA
INVESTIGATION LOCATIONS

FIGURE 3



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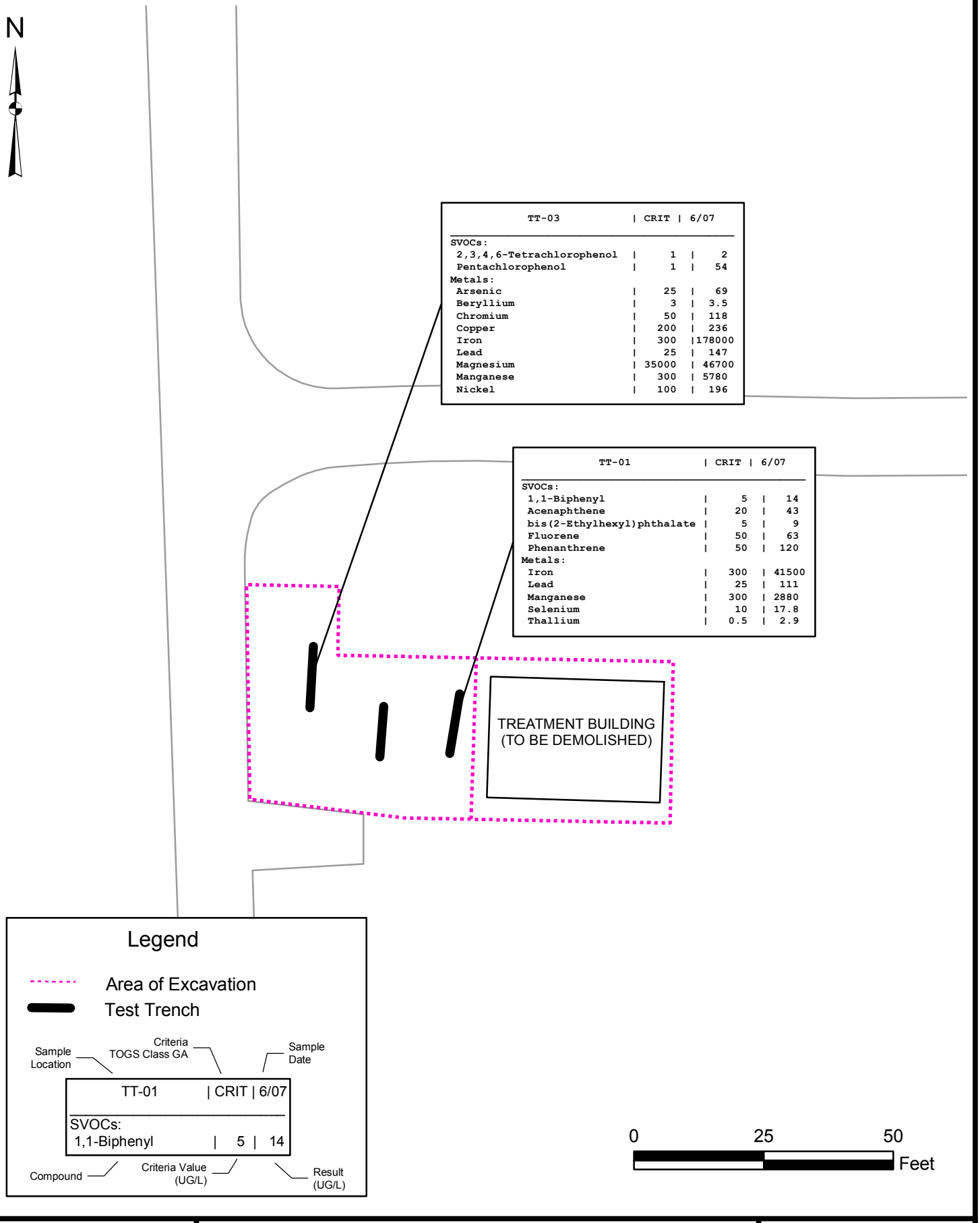
URS

CAMP PHARSALIA
SOIL ANALYTICAL RESULTS

FIGURE 4



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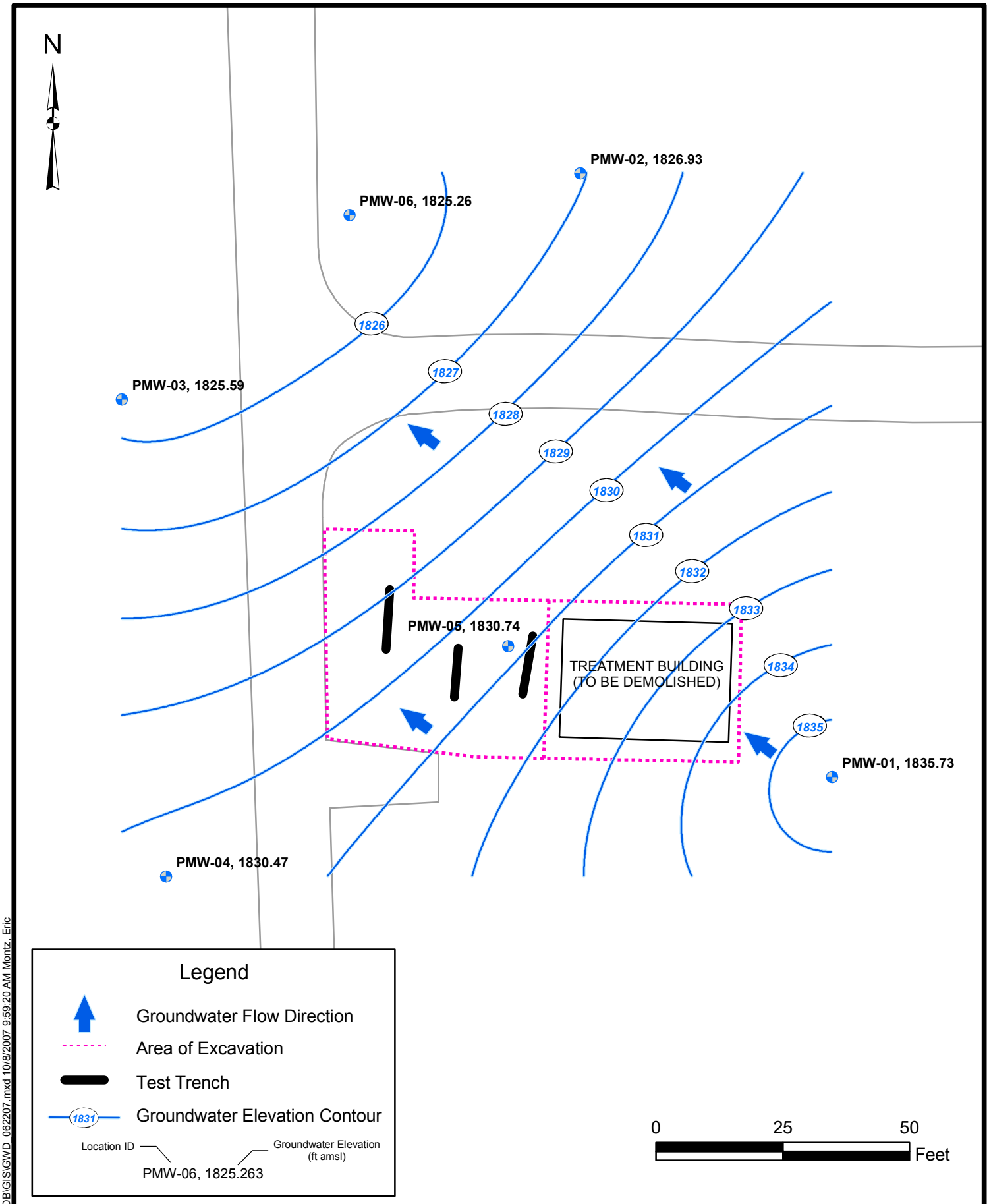
URS

CAMP PHARSALIA
GROUNDWATER ANALYTICAL RESULTS

FIGURE 5



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URS

CAMP PHARSALIA
GROUNDWATER POTENTIOMETRIC SURFACE
JUNE 2007

FIGURE 6

APPENDIX A

TEST PIT LOGS

77 Goodell Street
Buffalo, New York 14203
(716) 856-5636

TEST TRENCH LOG

PROJECT:	**Camp Pharsalia - PDI**		Sheet 1 of 1
CLIENT:	NYSDEC	**JOB NUMBER:**	11174680.00003
CONTRACTOR:	American Auger & Ditching	**LOCATION:**	Pharsalia, New York
DATE STARTED:	6/22/2007	**GROUND ELEVATION:**	1833.7895 - 1833.9000 (amsl)
DATE COMPLETED:	6/22/2007	**OPERATOR:**	Ryan Baye
TRENCH NUMBER:	**TT-01**	**GEOLOGIST:**	Rob Murphy

DEPTH (FT)	SAMPLE	DESCRIPTION
1		(0.0 to 1.0') FILL: Brown Clayey Silt and fine gravel.
2		(1.0 to 3.0') FILL: Gray Brown Clayey Silt with gravel cobble and boulder.
3		Approximate 2" diameter Pipe at 3'. Water in slightly stained bedding material drains into excavation. Mild to moderate fuel like odor noted; slight sheen on water.
4		(3.0 to 5.0') Gray Brown Clayey Silt with gravel, cobbles and boulders.
5		
6		
7		
8		
9		
10		
11		

COMMENTS: Collected one soil sample from the trench, CP-TT-1 (2-3'). No elevated PID readings were observed. Soil Sample submitted to Mitkem Laboratory for SVOCs (plus 2,3,4,6-Tetrachlorophenol and TICs), RCRA metals, Dioxins, Furans, full TCLP, ignitability, corrosivity, reactivity.
Collected one water sample, CP-TT-1, and submitted to Mitkem for analysis of TCL VOCs (plus TICs), TCL SVOCs (plus 2,3,4,6-Tetrachlorophenol and TICs), TAL Metals, Dioxins, PCBs, Pesticides, Total Suspended Solids, Total Dissolved Solids, Oil & Grease, corrosivity, reactivity, and ignitability.

77 Goodell Street
Buffalo, New York 14203
(716) 856-5636

TEST TRENCH LOG

PROJECT:	**Camp Pharsalia - PDI**		Sheet 1 of 1
CLIENT:	NYSDEC	**JOB NUMBER:**	11174680.00003
CONTRACTOR:	American Auger & Ditching	**LOCATION:**	Pharsalia, New York
DATE STARTED:	6/22/2007	**GROUND ELEVATION:**	1832.9424 - 1833.2504 (amsl)
DATE COMPLETED:	6/22/2007	**OPERATOR:**	Ryan Baye
TRENCH NUMBER:	**TT-02**	**GEOLOGIST:**	Rob Murphy

DEPTH (FT)	SAMPLE	DESCRIPTION
1		(0.0 to 0.5') FILL: Gray Brown Clayey Silt and fine gravel.
		(0.5 to 1.0') FILL: Dark Red Brown organic mulch with decay odor.
2		(1.0 to 3.0') FILL: Gray Brown Clayey Silt with gravel and cobble.
3		Rope encountered at 3.0'
4		(3.0 to 6.0') Gray Brown Clayey Silt with gravel and cobbles.
5		
6		
7		
8		
9		
10		
11		

COMMENTS: Collected one soil sample from the trench, CP-TT-2 (2-3'). Very little water seeps into excavation. No elevated PID readings were observed. Fuel like odor observed from 1-6' bgs. Soil Sample submitted to Mitkem Laboratory for SVOCs (plus 2,3,4,6-Tetrachlorophenol and TICs), RCRA metals, Dioxins, Furans, full TCLP, ignitability, corrosivity, reactivity. Insufficient water seeped into the excavation for collection of a water sample.

77 Goodell Street
Buffalo, New York 14203
(716) 856-5636

TEST TRENCH LOG

PROJECT:	**Camp Pharsalia - PDI**		Sheet 1 of 1
CLIENT:	NYSDEC	**JOB NUMBER:**	11174680.00003
CONTRACTOR:	American Auger & Ditching	**LOCATION:**	Pharsalia, New York
DATE STARTED:	6/22/2007	**GROUND ELEVATION:**	1831.7556 - 1832.6927 (amsl)
DATE COMPLETED:	6/22/2007	**OPERATOR:**	Ryan Baye
TRENCH NUMBER:	**TT-03**	**GEOLOGIST:**	Rob Murphy

DEPTH (FT)	SAMPLE	DESCRIPTION
1		(0.0 to 1.5') Fill: Gray to Dark Gray, Moist, Clayey Silt with gravel, some cobbles.
2		(1.5 to 7.0') Brown to Gray Clayey Silt with Gravel and cobbles, occasional boulder. Slight staining at 1.5'. No odors noted. Water seeps into excavation very slowly, and very slight sheen noted on water.
3		
4		
5		
6		
7		
8		
9		
10		
11		

COMMENTS: Collected one soil sample from the trench, CP-TT-3 (1-1.5'). No elevated PID readings were observed. Soil Sample submitted to Mitkem Laboratory for SVOCs (plus 2,3,4,6-Tetrachlorophenol and TICs), RCRA metals, Dioxins, Furans, full TCLP, ignitability, corrosivity, reactivity.
Collected one water sample, CP-TT-3, and submitted to Mitkem for analysis of TCL VOCs (plus TICs), TCL SVOCs (plus 2,3,4,6-Tetrachlorophenol and TICs), TAL Metals, Dioxins, PCBs, Pesticides, Total Suspended Solids, Total Dissolved Solids, Oil & Grease, corrosivity, reactivity, and ignitability.

APPENDIX B

SURVEYING FIGURES AND NOTES

Record	Northing	Easting	Elevation	ID
98	947481.2449	1045487.9734	1834.5430	14CONTROL
99	947305.0242	1045417.4323	1844.8190	14CONTROL
100	947277.6689	1045556.3025	0.0000	997MISC
101	947277.0177	1045457.5536	0.0000	997MISC
102	947246.4595	1045457.4230	0.0000	997MISC
103	947394.9313	1045429.6337	0.0000	997MISC
104	947358.9845	1045428.4979	0.0000	997MISC
105	947357.9856	1045460.3381	0.0000	997MISC
106	947467.9890	1045434.2750	0.0000	65BLDG
107	947447.1906	1045433.5787	0.0000	65BLDG
108	947446.4919	1045466.4563	0.0000	65BLDG
109	947463.2620	1045398.7934	1832.6927	99TT-3
110	947475.1237	1045399.4786	1831.7556	99TT-3
111	947453.8176	1045412.2749	1833.2504	99TT-2
112	947463.5432	1045413.0640	1832.9424	99TT-2
113	947454.4184	1045425.7930	1833.7895	99TT-1
114	947465.9376	1045427.7420	1833.9000	99TT-1
115	947512.7740	1045347.0639	1832.6297	81PMW3
116	947558.9320	1045437.6387	1833.3132	81PMW2
117	947418.7344	1045359.4700	1836.8873	81PMW4
118	947437.4720	1045487.3415	1839.5528	81PMW1
122	947420.1665	1045603.4708	0.0000	997MISC
123	947460.0696	1045602.2332	0.0000	997MISC
124	947540.4473	1045694.7065	0.0000	162
125	947571.0043	1045655.6597	0.0000	162
126	947467.2972	1045466.8984	0.0000	65BLDG
127	947540.9374	1045388.8032	1829.1535	81PMW6
128	947464.0439	1045422.9062	1837.0178	81PMW5

J:\11174439.00000\EXCEL\[Survey points.xls]PHARSALIA

HORIZONTAL DATUM: NAD83/96
N.Y.S. PLANE COORDINATE
SYSTEM , CENTRAL ZONE

VERTICAL DATUM:
NAVD88/GEOID03

125
anchor bolt in water tower

116
MW-2
EL = 1833.31

127
MW-6
EL = 1829.15

CURRENT ELEVATIONS FOR MW'S ARE TOP OF CASING NOT RISERS

124
top bolt in hydrant

115
MW-3
EL = 1832.63

112
TT - 2
EL = 1832.94

114
TT - 1
EL = 1833.90

98
Control
EL = 1834.54

110
TT - 3
EL = 1831.76

109
TT - 3
EL = 1832.69

TREATMENT PLANT

tie saw mill

111
TT - 2
EL = 1833.25

128
MW-5
EL = 1837.02

113
TT - 1
EL = 1833.79

118
MW-1
EL = 1839.55

117
MW-4
EL = 1836.89

WOOD PILE

99
Control
EL = 1844.82

100
Tack with flagging

POLE BARN

25' 0' 25' 50' 75'

Scale 1" = 25'

LEGEND

- Monitoring well
- Fire Hyrant
- Survey Control Point
- Test Trench

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY MAP IS A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.
JOANNE DARCY CRUM, L.S.

A TEST TRENCH LOCATION SURVEY FOR

URS CORPORATION-NEW YORK

URS PROJECT No. D004440-1

CAMP PHARSALIA

COUNTY OF CHENANGO STATE OF NEW YORK

SCALE 1" = 25.00' 24 JULY 2007

JOANNE DARCY CRUM, L.S. 49673
COBLESKILL, NEW YORK 12043

MAP A/34/07

APPENDIX C

SLUG TEST DATA ANALYSIS

URS **EXHIBIT 4.7-2**

CALCULATION COVER SHEET

Client: NYS DEC Project Name: CAMP GEORGETOWN/CAMP PHARSALIA SLUG TESTS

Project/Calculation Number: GEORGETOWN (111746'79.00002), PHARSALIA (11174680.00003)

Title: CAMP GEORGETOWN/CAMP PHARSALIA 2007 SLUG TESTS

Total Number of Pages (including cover sheet): 35

Total Number of Computer Runs: _____

Prepared by: ROB PUREK Date: 7/5/07

Checked by: Marek Ostrowski Date: 7/5/07

Description and Purpose:

ANALYSIS OF JUNE 2007 SLUG TEST DATA FROM CAMP GEORGETOWN, NY AND CAMP PHARSALIA, NY.

Design Basis/References/Assumptions

- ASSUME BOREHOLE RADIUS OF 4.125" FOR ALL MONITORING WELLS
- ASSUME GRAVEL PACK POROSITY OF 0.3
- SITE GEOLOGY INDICATES DISCONTINUOUS AQUIFERS/PERCHED GROUNDWATER. ASSUME BOTTOM OF SCREEN AS AQUIFER BOTTOM.

Remarks/Conclusions/Results:

SEE "SUMMARY OF RESULTS" PAGE

Calculation Approved by: _____ 10/9/07
Project Manager/Date

Revision No.:	Description of Revision:	Approved by:

Project Manager/Date

Camp Georgetown and Camp Pharsalia, NY Slug Tests
Summary of Results

Well ID	Hydraulic Conductivity [cm/sec]					
	FH	RH			N(**)	Mean (***)
Camp Georgetown Monitoring Wells						
MW-02	1.57E-05	(*)			1	1.57E-05
MW-04	3.39E-05	4.81E-06			2	1.94E-05
MW-05	(*)	2.12E-04			1	2.12E-04
MW-06	3.03E-04	3.20E-05			2	1.67E-04
MW-07	7.91E-05	7.30E-05			2	7.60E-05
MW-08	3.96E-06	3.96E-06			2	3.96E-06
Camp Pharsalia Monitoring Wells						
PMW-1	5.77E-05	7.80E-05			2	6.79E-05
PMW-5	1.27E-04	-			1	1.27E-04

Notes:

FH - Falling Head Test
RH - Rising Head Test
(*) - data not useable (see data usability sheet)
(**) - number of valid tests
(***) - geometric mean

Camp Georgetown and Camp Pharsalia, NY Slug Tests
Well Construction Details

Well ID	Formation	Screen Length		Radii			Aquifer Thickness	Depth from Aquifer Top	
		Total	Submerged	Screen (*)	Casing			to Top of Screen ^	to Bottom of Screen
					Actual	Equivalent			
		L_e	$L_{e\text{-}sub}$	r_w	r_c	$r_{c\text{-}eq}$ (**)	H	d	L_w
		[ft]	[ft]	[in]	[in]	[in]	[ft]	[ft]	[ft]
Camp Georgetown Monitoring Wells									
MW-02	Overburden	6.0	6.0	4.13	1.00	1.00	6.2	0.2	6.2
MW-04	Overburden	7.5	6.5	4.13	1.00	2.41	6.5	-1.0	6.5
MW-05	Overburden	7.5	6.1	4.13	1.00	2.41	6.1	-1.4	6.1
MW-06	Overburden	11.0	8.0	4.13	1.00	2.41	8.0	-3.0	8.0
MW-07	Overburden	7.5	7.5	4.13	1.00	1.00	7.6	0.1	7.6
MW-08	Overburden	7.3	7.0	4.13	1.00	2.41	7.0	-0.3	7.0
Camp Pharsalia Monitoring Wells									
PMW-1	Overburden	10.5	10.5	4.13	1.00	1.00	11.9	1.4	11.9
PMW-5	Overburden	8.7	7.5	4.13	1.00	2.41	7.5	-1.2	7.5

Assumed sandpack porosity: n = 0.30
Site geology indicates discontinuous aquifers/perched groundwater. Assume bottom of screen as aquifer bottom.

Notes:
(*) - assumed gravel pack radius
(**) - $r_{c\text{-}eq} = [(1 - n)\, r_c^2 + n\, r_w^2]^{1/2}$ if $L_{e\text{-}sub} < L_e$
$r_{c\text{-}eq} = r_c$ if $L_{e\text{-}sub} = L_e$
^ - Negative value indicates depth (in feet) of aquifer top below the top of screen.

Camp Georgetown and Camp Pharsalia, NY Slug Tests
Useability of Data

Well ID	Remarks	
	Falling Head Test	Rising Head Test
Camp Georgetown Monitoring Wells		
MW-02	OK	No established static level
MW-04	Recovers beyond static level	OK
MW-05	No established static level	OK
MW-06	Recovers beyond static level	OK
MW-07	OK	OK
MW-08	Slow recovery	Slow recovery
Camp Pharsalia Monitoring Wells		
PMW-1	OK	OK
PMW-5	End test early, nearby test pit influence	No test

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

BORING/ WELL NO. MW-2 Sheet 1 of 1

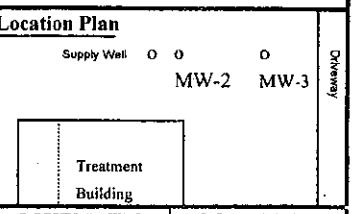
Location Description: Off north corner of Treatment Building. Near supply well.

Weather: Clearing and cool.

Date/Time Start: September 16, 1998 12:15 PM

Date/Time Finish: September 16, 1998 2:50 PM

Location Plan

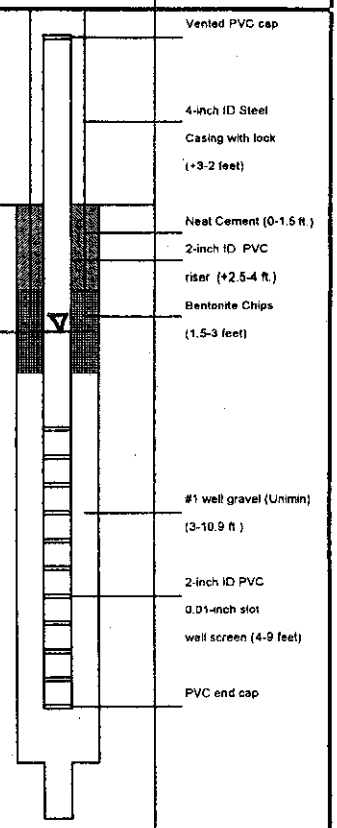


GROUNDWATER OBSERVATIONS

Water Level	9.24 ft.	6.48 ft.	8.41 ft.	
Date	9-17-98	9-23-98	10/7/98	
Time	7:40	11:16	9:45	
Meas. From	toc/pvc 1007.64	toc/pvc 1007.64	toc/pvc 1007.64	

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
					Ground elevation 1004.7 feet (amsl), top PVC elevation 1007.64 feet (amsl),
0					top steel casing 1007.96 feet (amsl).
		7	60	0.6	Brown soil (0-2") over shale fill (2"-6").
1		6			Weathered Till, Silt-very fine Sand, some-little gravel,
		9			some-little clay (clay decreased with depth), damp.
2		14			
		16	75	1.5	Weathered Till grading to unweathered till. Tan Silt, some clay, DTW 2.77'
3		19			little very fine sand, little gravel, dense, damp.
		19			
4		18			
		19	70	4.8	Tan Till, Silt-very fine Sand, some coarse rounded sand, little gravel,
5		14			little-trace clay, moist-wet.
		13			
6		18			
		20	75	4.2	Tan Till as above. Saturated. Sandier lense between clayier lenses.
7		22			
		25			
8		50/5"			
		26	80	5	Tan Till, Silt, some coarse sand and fine gravel, little-some clay, stiff, dense.
9		36			
		50/5"			
10					
		26	60	0.9	As above, damp-dry.
11		50/5"			
					Boring terminated at 10.9 feet. Hole backfilled to 9 feet.
12					
13					
14					
15					
16					
17					
18					

SCHEMATIC



COMMENTS:

Headspaces measured with Photoionization Detector were very high, likely attributed to water vapor.

Remeasured head spaces 9-17-98 with FID. Those readings displayed on this log.

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

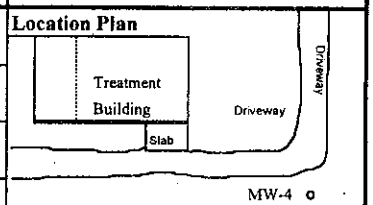
PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

BORING/ WELL NO. MW-4 Sheet 1 of 1

Location Description:
East of Treatment Building.
Between drive and woods.

Location Plan



Weather: Clear and sunny.

Date/Time Start: September 17, 1998 8:27 AM

Date/Time Finish: September 17, 1998 10:40 AM

GROUNDWATER OBSERVATIONS

Water Level	8.35 ft.	7.43 ft.	8.30	
Date	9-18-98	9-23-98	10-7-98	
Time	8:55	11:21	10:10	
Meas. From	toc/pvc 1005.34	toc/pvc 1005.34	toc/pvc 1005.34	

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL	SCHEMATIC	COMMENTS
+3							Vented PVC cap
+2							
							4-inch ID Steel
+1							Casing with lock
					Ground elevation 1002.1 feet (amsl), top PVC elevation 1005.34 feet (amsl),		(+3-2 feet)
0					top steel casing 1005.49 feet (amsl).		
		3	25	0.1	Brown silty soil grading to tan-brown soil mixed with gravel, Fill.		Neat Cement (0-1.5 ft.)
1		3					2-inch ID PVC
		4					riser (+2.5-3 feet)
2		4					Bentonite Chips
		3	40	23	Tan silty soil, moist (2-2.25 feet) over gray Silt-very fine Sand, some gravel,		(1.5-2.5 feet)
3		4			over Tan Silt, some gravel. Till?		
		7			"Petroleum" type odor. DTW 3.50'		
4		10					
		21	70	+10	Tan Till, Silt, little-some gravel, damp, increasing density with depth.		
5		17			Slight "petroleum" type odor.		
		16					#1 well gravel (Unimin)
6		20					(2.5-11.25 feet)
		12	90	4.5	Tan Till, Silt, some gravel, very little clay, wet, slight "petroleum" odor.		
7		9					2-inch ID PVC
		9					0.01-inch slot
8		13					well screen (3-10 feet)
		17	100	3.7	Tan Till as above. Moist grading to damp.		
9		24			Slight petroleum odor (weathered gasoline?).		
		32			Screened soil cuttings with FID (4 ppm). Screened breathing zone (0.0 ppm).		
10		31					PVC end cap
		22	80	3.7	As above. Dense Till, damp.		
11		37					
		50/3"					
12					Augering terminated at 10 feet. Sampling terminated at 11.25 feet.		
13							
14							
15							
16							
17							
18							

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

COMMENTS:

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

BORING/ WELL NO. MW-5 Sheet 1 of 1

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

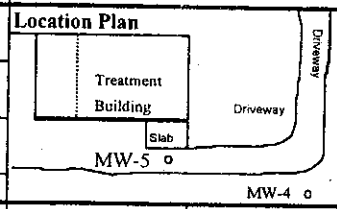
Location Description:
East of Treatment Building.
Just off concerete slab near office.

Weather: Clear and sunny.

Date/Time Start: September 17, 1998 10:48 AM

Date/Time Finish: September 17, 1998 1:10 PM

Location Plan

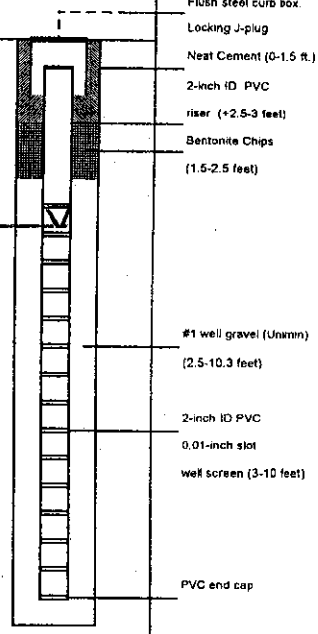


GROUNDWATER OBSERVATIONS

Water Level	3.78 ft.	4.17 ft.	5.20 ft.	
Date	9-18-98	9-23-98	10-7-98	
Time	9:00	11:25	10:35	
Meas. From	toc/pvc 1005.13	toc/pvc 1005.13	toc/pvc 1005.13	

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
					Ground elevation 1005.4 feet (amsl), top PVC elevation 1005.13 feet (amsl), top steel casing 1005.52 feet (amsl).
0					
		12	70	1.8	Tan Fill, silt, sand, and gravel, damp, no stain, no odor.
1		13			
		20			
2		10			
		6	70	8.2	Tan Till, Silt, little clay, sand, and gravel, increasing density with depth.
3		17			Cobble near bottom of sample.
		18			No odor, no stain. Wet at 2 feet, graded to dry at 4 feet.
4		20			DTW 3.93'
		20	35	2.1	Tan Till, Silt, little clay, little coarse sand and gravel, moist.
5		16			No stain, no odor.
		20			
6		19			
		12	60	1.5	Tan Till, Silt, some coarse sand and gravel, trace clay, wet.
7		11			Shale cobble in end of sampler. No stain, no odor.
		14			
8		12			
		11	40	0.2	Till as above, moist.
9		37			
		43			
10		50/4"			
		50/0"	0	NA	Sampler bouncing on bottom, on boulder.
11					Sampling terminated at 10 feet. Auger refusal at 10.3 feet.
12					
13					
14					
15					
16					
17					
18					

SCHEMATIC



COMMENTS

COMMENTS:

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

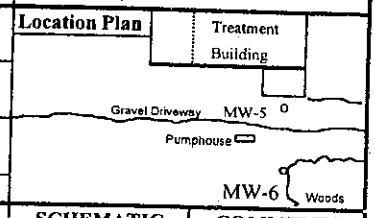
PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

BORING/ WELL NO. MW-6 Sheet 1 of 1

Location Description:
Southeast of Treatment Building.
Between former pumphouse and woods

Location Plan



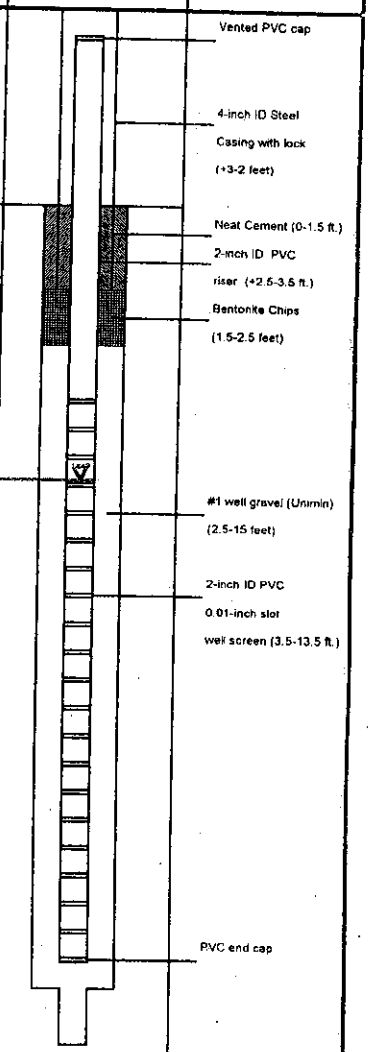
Weather: Clear and sunny.
Date/Time Start: September 17, 1998 2:09 PM
Date/Time Finish: September 17, 1998 4:40 PM

GROUNDWATER OBSERVATIONS

Water Level	6.46 ft.	6.86 ft.	7.90 ft.	
Date	9-18-98	9-23-98	10-7-98	
Time	8:50	11:20	10:55	
Meas. From	toc/pvc 1005.42	toc/pvc 1005.42	toc/pvc 1005.42	

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
0					Ground elevation 1002.2 feet (amsl), top PVC elevation 1005.42 feet (amsl), top steel casing 1005.68 feet (amsl).
		6	60	0.3	Tan silty soil grading to tan Silt, some coarse sand and gravel,
1		7			(reworked till), damp.
		9			
2		11			
		5	40	140	Tan Silt, some gravel (8-inches) over brown Silt, trace roots
3		3			(former top soil zone). Moist on top, wet on the bottom of sample.
		3			"Petroleum type odor".
4		3			
		14	80	60	Brown Silt-soil, moist-wet, grading to Tan Till, Silt, some rounded
5		16			coarse sand and gravel, little clay, dense, compact, stiff.
		19			Wet lenses near bottom of sample. DTW 5.52'
6		18			
		14	65	46	Tan Till, Silt, some coarse rounded sand and gravel, wet, soft.
7		15			
		14			
8		17			
		8	80	23	Tan Till, Silt-very fine sand, some coarse rounded sand and gravel,
9		16			moist-wet on top grading to stiff tan till, silt to some rounded coarse
		42			sand and gravel, little clay.
10		24			
		17	70	6	Tan Till as above, dense, grading to tan silt-fine sand,
11		24			trace coarse sand-fine gravel, softer/less compact than above,
		27			wet, no odor, no stain.
12		34			
		33	50	2	Dense tan Till, Silt, some coarse rounded sand and gravel,
13		50/3"			dense, moist.
14					
		32	50	0	Dense tan Till, Silt-very fine sand, some coarse sand and gravel,
15		50/6"			damp.
					Sampling terminated at 15 feet. Augered hole to 14 feet.
16					
17					
18					

SCHEMATIC



COMMENTS

COMMENTS:

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

BORING/ WELL NO. MW-7 — Sheet 1 of 1

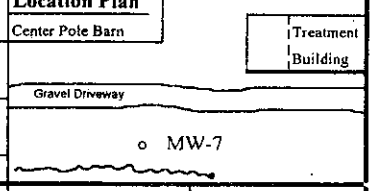
Location Description: South of southwest corner of treatment building. Southeast of center pole barn.

Weather: Clear and sunny.

Date/Time Start: September 17, 1998 4:54 PM

Date/Time Finish: September 17, 1998 6:50 PM

Location Plan

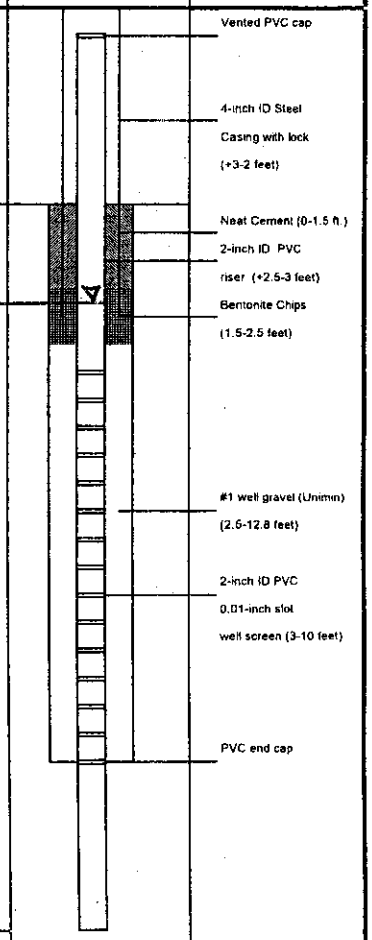


GROUNDWATER OBSERVATIONS

Water Level	6.3 ft.	6.61 ft.	7.20 ft.	
Date	9-18-98	9-23-98	10-7-98	
Time	8:45	11:42	11:00	
Meas. From	toc/pvc 1008.03	toc/pvc 1008.03	toc/pvc 1008.03	

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
					Ground elevation 1004.8 feet (amsl), top PVC elevation 1008.03 feet (amsl), top steel casing 1008.17 feet (amsl).
0					
		A	NA	NA	Rock fill, soil, weathered till. Augered from ground surface to 1.5 feet.
1		A			
		A			
2		5	30	140	Fill, tan Silt, some gravel and cobbles, damp, slight odor, moist at bottom of sample. DTW 2.30'
		4			
3		2			
		2			
4		3	60	640	Brown Silt, some coarse sand and gravel, soft, strong "gasoline type odor", wet, former topsoil zone (3.5-5 feet). Till, tan Silt, some coarse sand and gravel, (5-5.5 feet).
		2			
5		2			
		12			
6		19	60	240	Gray-tan Till, Silt, some coarse sand and gravel, mottled gray-reddish brown discoloration, damp-moist, slight odor.
		20			500-900 ppm measured in hole with FID, 0.0 ppm in breathing zone.
7		36			
		38			
8		17	70	30	Tan Till, Silt, some coarse sand and gravel, little clay, stiff, damp, slight odor. Measured head space inside augers with FID (+1000 ppm). Measured 0-2 ppm in breathing zone. Levels fluctuating with wind, also picking up rig exhaust.
		13			
9		16			
		18			
10		36	60	2	Till as above, faint odor in upper sample, no odor in bottom of sample, damp.
		24			
11		36			
		41			
12		36	50	2	Dense Till as above. Advanced augers to 10 feet and set well.
		38			
13		50/3"			
					Augering terminated at 10 feet. Sampling terminated at 12.8 feet.
14					
15					
16					
17					
18					

SCHEMATIC



COMMENTS:

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Georgetown
PROJECT NUMBER: 733109.01000

BORING/ WELL NO. MW-8 Sheet 1 of 1

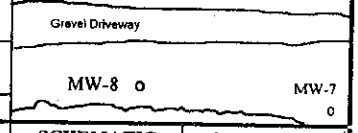
Location Description: South of southwest corner of center pole barn. Southeast of western pole barn.

Weather: Clear and sunny.

Date/Time Start: September 18, 1998 8:15 AM

Date/Time Finish: September 18, 1998 10:30 AM

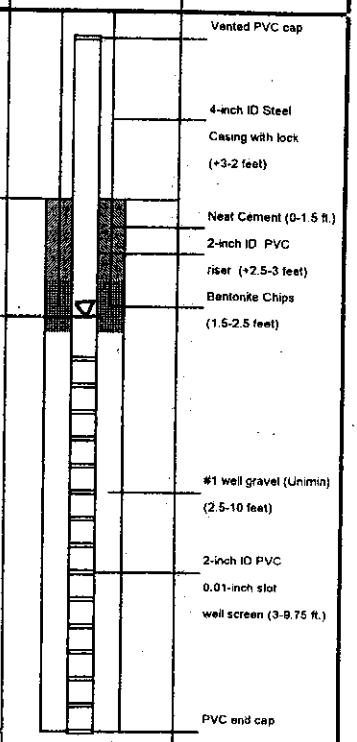
Location Plan



GROUNDWATER OBSERVATIONS				
Water Level	11.71 ft.	11.40 ft.		
Date	9-23-98	10-7-98		
Time	11:38	11:15		
Meas. From	toc/pvc 1009.64	toc/pvc 1009.64		

Sample Depth	Sample I.D.	SPT	% Rec.	FID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
					Ground elevation 1006.4 feet (amsl), top PVC elevation 1009.64 feet (amsl), top steel casing 1009.77 feet (amsl).
0					
		14	50		Brown silty top soil (1-inch) over Fill, gravel, some silt and sand,
1		8			bottom of sample was silt-very fine sand, with roots and trace wood,
		7			soft, slight swampy odor, wet.
2		4			
		2	70		Tan-gray Till, weathered, wet at top grading to more compact dense DTW 2.75'
3		12			till, damp to moist, no odor.
		74			
4		38			
		35	70		Tan Till, Silt, some coarse sand and gravel, moist, no odor.
5		25			
		19			
6		20			
		12	80		Tan Till, Silt, some coarse sand and gravel, little clay, moist, no odor.
7		28			
		38			
8		50/4"			
		17	90		Tan Till, Silt, some coarse sand and gravel. Some lenses
9		17			with little clay, some lenses with a trace of clay. No odor.
		24			
10		42			
					Boring terminated at 10 feet.
11					
12					
13					
14					
15					
16					
17					
18					

SCHEMATIC



COMMENTS:

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Paul Mandigo
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

BORING/ WELL NO. P MW-1 **Sheet** 1 of 1

PROJECT NAME: Camp Pharsalia
PROJECT NUMBER: 733108.01000

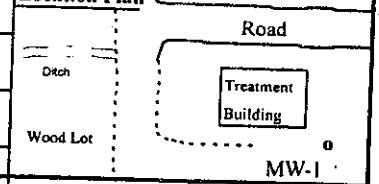
Location Description: Southeast of treatment building.

Weather: Sunny, cold, windy.

Date/Time Start: September 24, 1998 3:45 PM

Date/Time Finish: September 24, 1998 5:55 PM

Location Plan

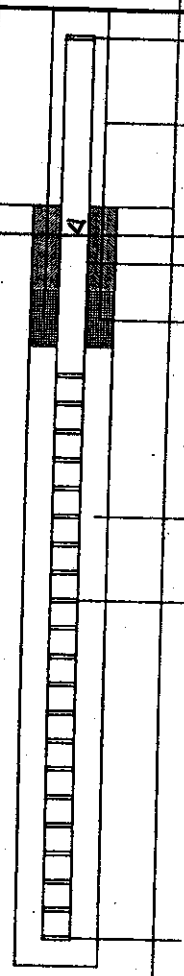


GROUNDWATER OBSERVATIONS

Water Level	4.38 ft.	4.87	4.48	3.10
Date	9-25-98	10/1/98	10/2/98	10/13/98
Time	8:30	8:09	8:08	
Meas. From	toc/pvc 998.15	toc/pvc 998.15	toc/pvc 998.15	toc/pvc 998.15

Sample Depth	Sample I.D.	SPT	% Rec.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
					Ground elevation 995.4 feet (amsl), top PVC elevation 998.15 feet (amsl), top steel casing 998.33 feet (amsl).
0					
		9	65	1.3	Brown top soil, moist, (0-5 inches) over tan Fill, silt, sand, and gravel, damp. DTW 1.07
1		14			
		21			
2		26			
		16	70	6.8	Till, tan Silt-sand, little coarse sand and fine gravel (shale pieces in gravel), trace clay, moist.
3		16			
		15			
4		10			
		6	75	1.8	Tan Till, Silt, little coarse rounded sand-gravel, little clay, moist, no odor.
5		9			
		19			
6		21			
		27	60	8.7	As above. Moist to wet, no odor, no stain.
7		23			
		20			
8		19			
		23	90	5.9	As above, moist to wet, no odor, no stain.
9		50/3"			
		RB/A			
10		A			
		17	50	48	Dense Till, tan, Silt, little-some rounded coarse sand and gravel, damp-moist.
11		27			
		33			
12		50			
		42	100	19	Dense Till as above grading to dense tan-gray till, silt, trace coarse sand and gravel.
13		54/6"			
		A			
14					Well boring terminated at 13.5 feet.
15					
16					
17					
18					

SCHEMATIC



COMMENTS

COMMENTS:
Soil descriptions are from adjacent deeper test boring MW-1 boring.

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

Contractor: Applied Earth Tech.
Driller: Kevin Hawkins
Inspector: Dillman
Rig Type: CME-55

PARSONS ENGINEERING SCIENCE, INC.
DRILLING RECORD

PROJECT NAME: Camp Pharsalia
PROJECT NUMBER: 733108.01000

Weather: Cold, windy, partly cloudy, high 40s-low 50s

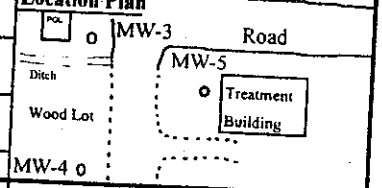
Date/Time Start: October 1, 1998 2:05 PM

Date/Time Finish: October 1, 1998 6:30 PM

BORING/ WELL NO. P MW-5 **Sheet** 1 of 1

Location Description: West of the treatment building, in wood lot area west of gravel road.

Location Plan

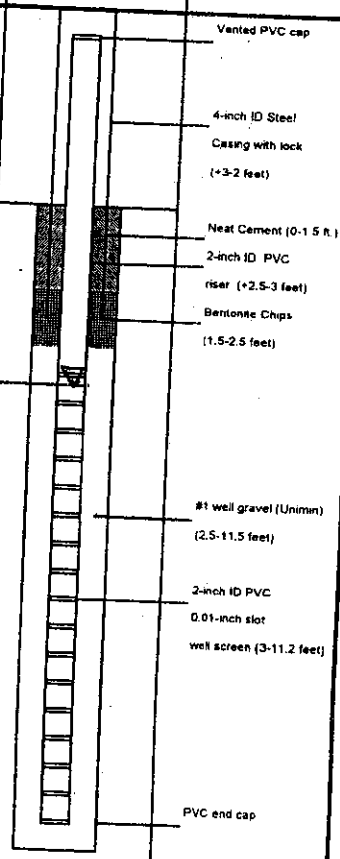


GROUNDWATER OBSERVATIONS

Water Level	7.59	5.65		
Date	10/2/98	10/13/98		
Time	8:26			
Meas. From	toc/pvc 995.56	toc/pvc 995.56		

Sample Depth	Sample I.D.	SPT	% Rec.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL
+3					
+2					
+1					
0					Ground elevation 992.6 feet (amsl), top PVC elevation 995.56 feet (amsl), top steel casing 995.81 feet (amsl).
		7	45	140	Brown silty soil (0-3-inches) over gray very fine sand, trace gravel, moist.
1		7			"petroleum" type odor in gray material.
		8			
2		24			
		32	40	290	
3		37			Tan Till, some coarse sand-very fine gravel, trace clay, trace cobble,
		22			gray streaking (staining). "Petroleum" moving through gray streaks?
4		17			DTW 3.70'
		22	40	300	
5		30			Till as above, little clay, gray streaking, "petroleum" odor, moist.
		21			
6		26			
		25	75	290	
7		27			Dense Till as above, moist-wet, "petroleum" odor, slight sheen, gray staining,
		49			
8		28			
		25	0	NA	
9		23			Rock in sampler, no recovery. Oily sheen, sampler wet, "petroleum" odor.
		28			
10		31			
		20	80	8.5	
11		50/3"			Tan dense Till, Silt, some coarse sand and gravel, little clay, damp,
		A			slight "petroleum" odor.
12					Sampling terminated at 10.8 feet. Auger refusal at 11.5 feet.
13					
14					
15					
16					
17					
18					

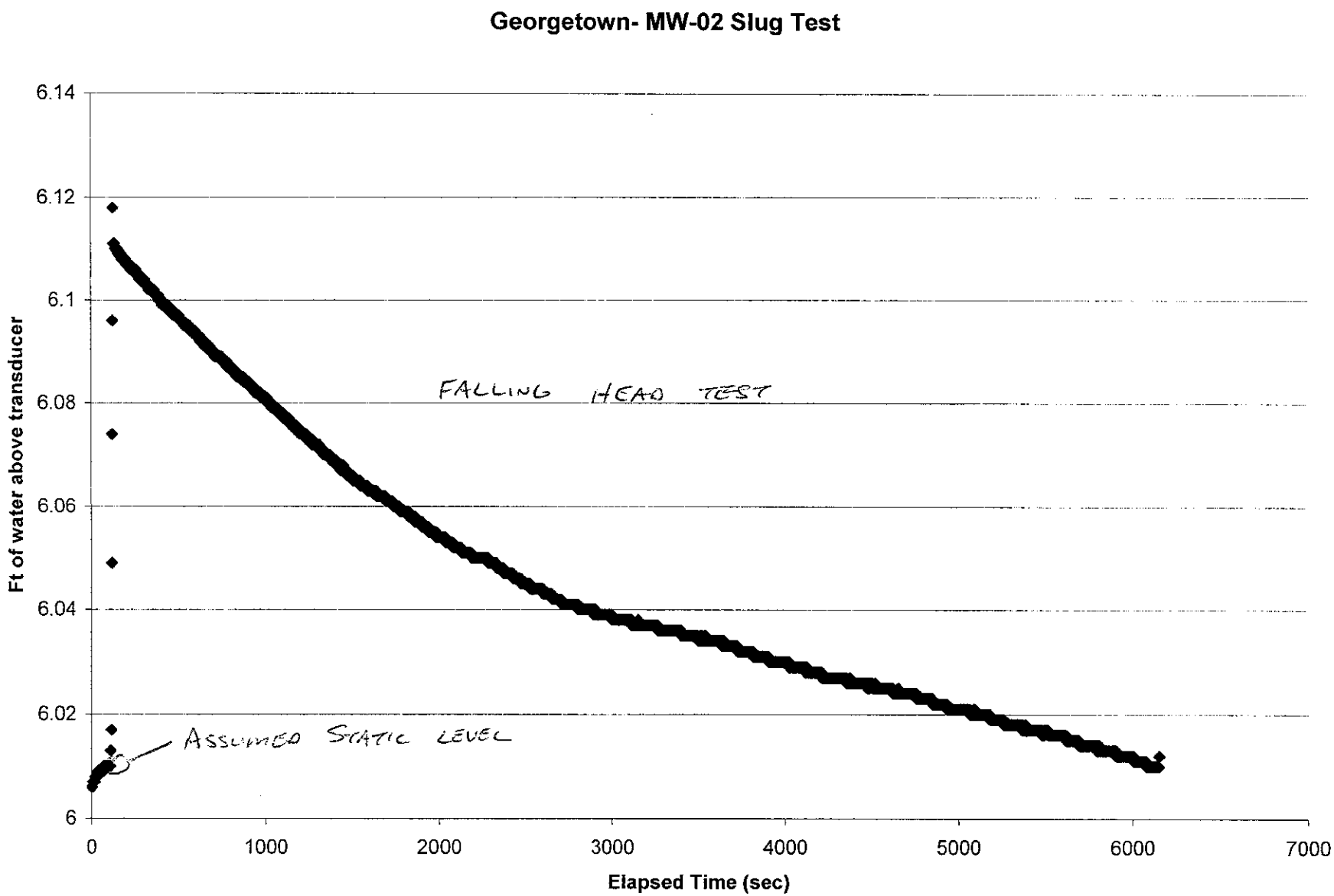
SCHEMATIC

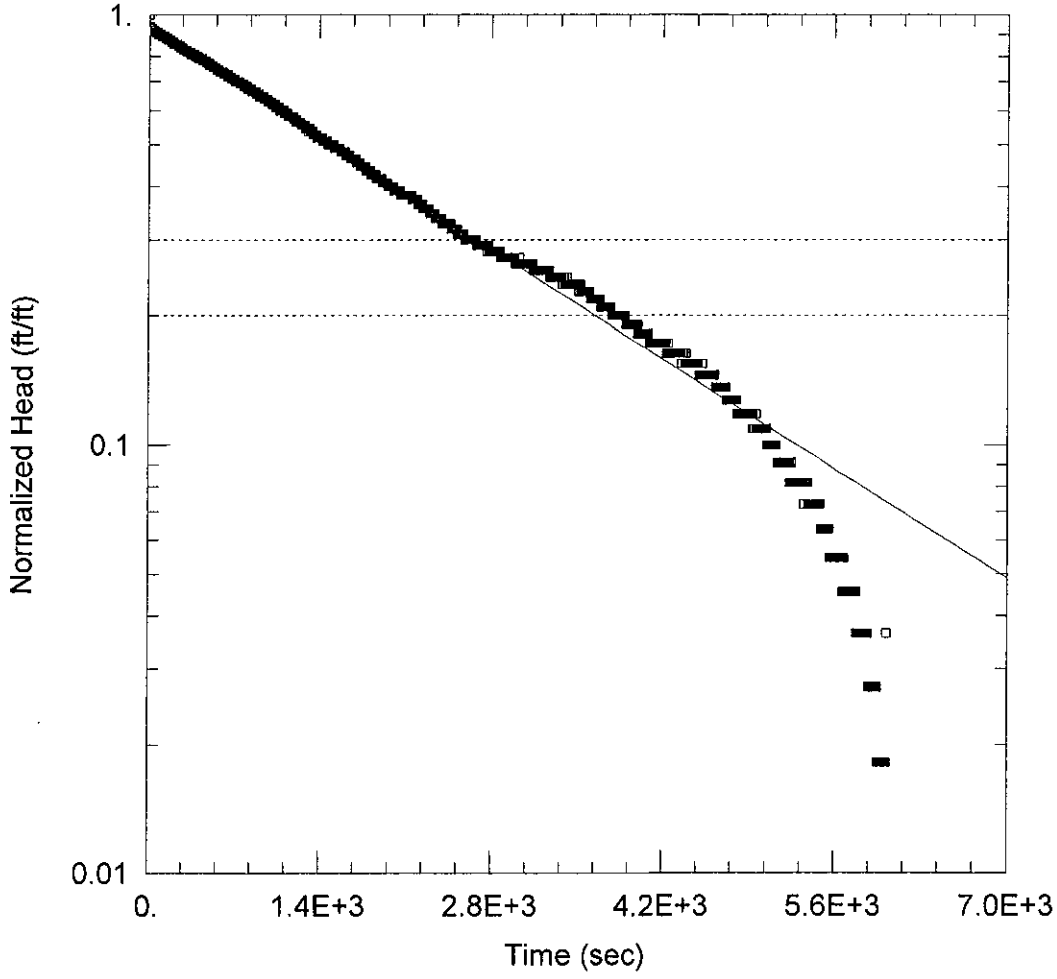


COMMENTS

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
C = CORED

COMMENTS:


Georgetown- MW-02 Slug Test
6.14
6.12
6.1
6.08
6.06
6.04
6.02
6
Ft of water above transducer
FALLING HEAD TEST
ASSUMED STATIC LEVEL
0
1000
2000
3000
4000
5000
6000
7000
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-02 FH.aqt
Date: 07/05/07 Time: 10:21:49

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-02
Test Date: 6/19/07

AQUIFER DATA

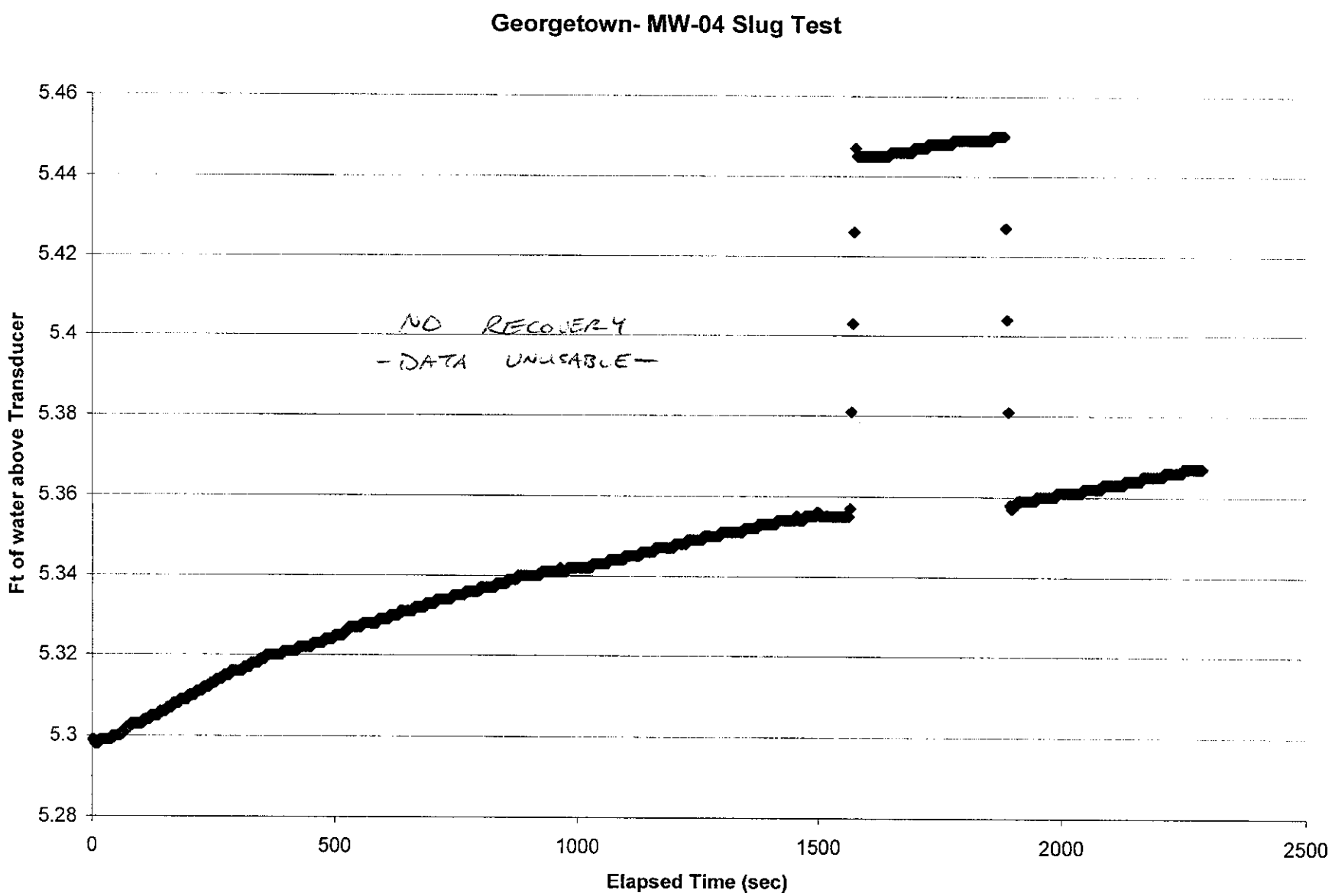
Saturated Thickness: 6.2 ft
Anisotropy Ratio (Kz/Kr): 1.

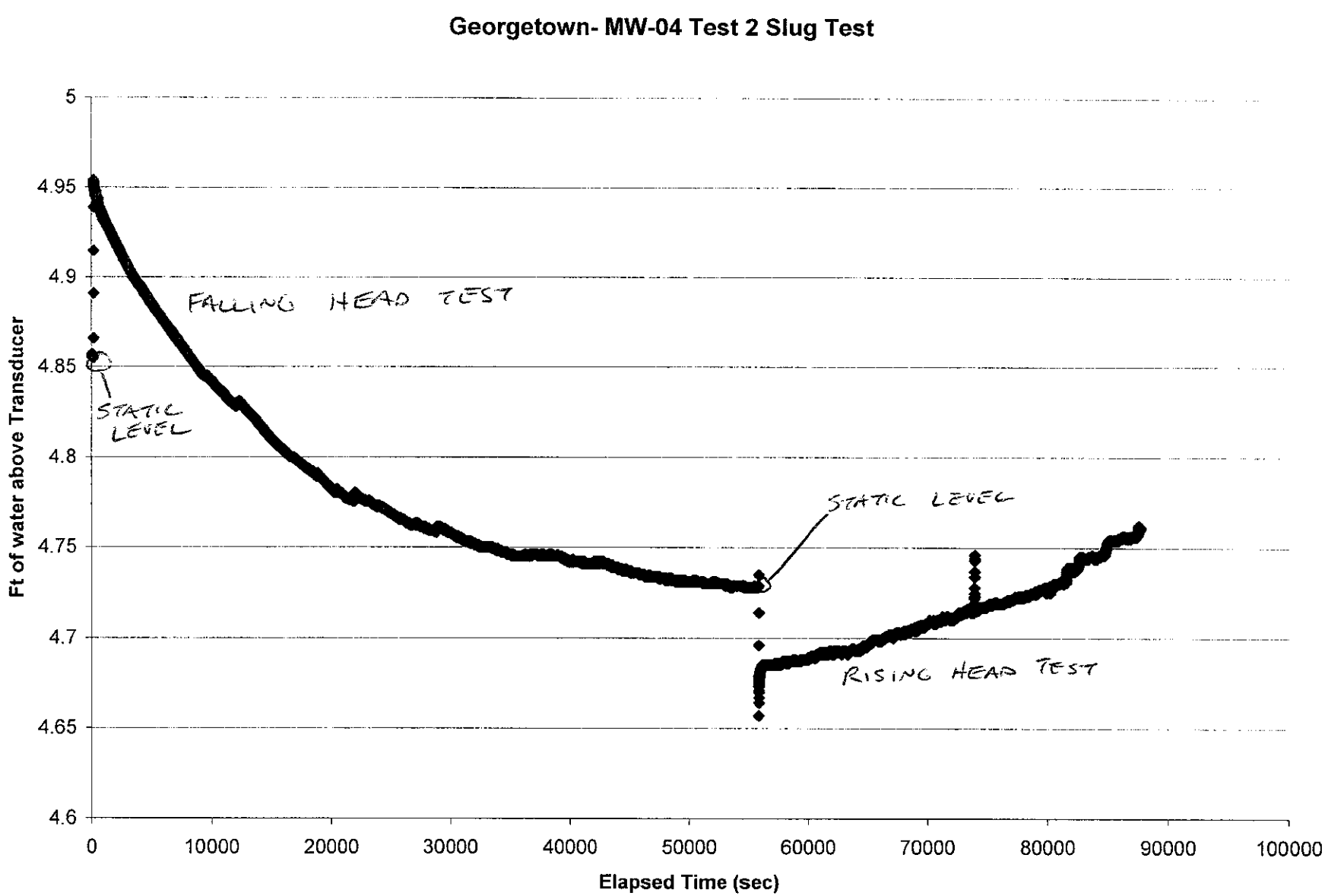
WELL DATA (MW-02 FH)

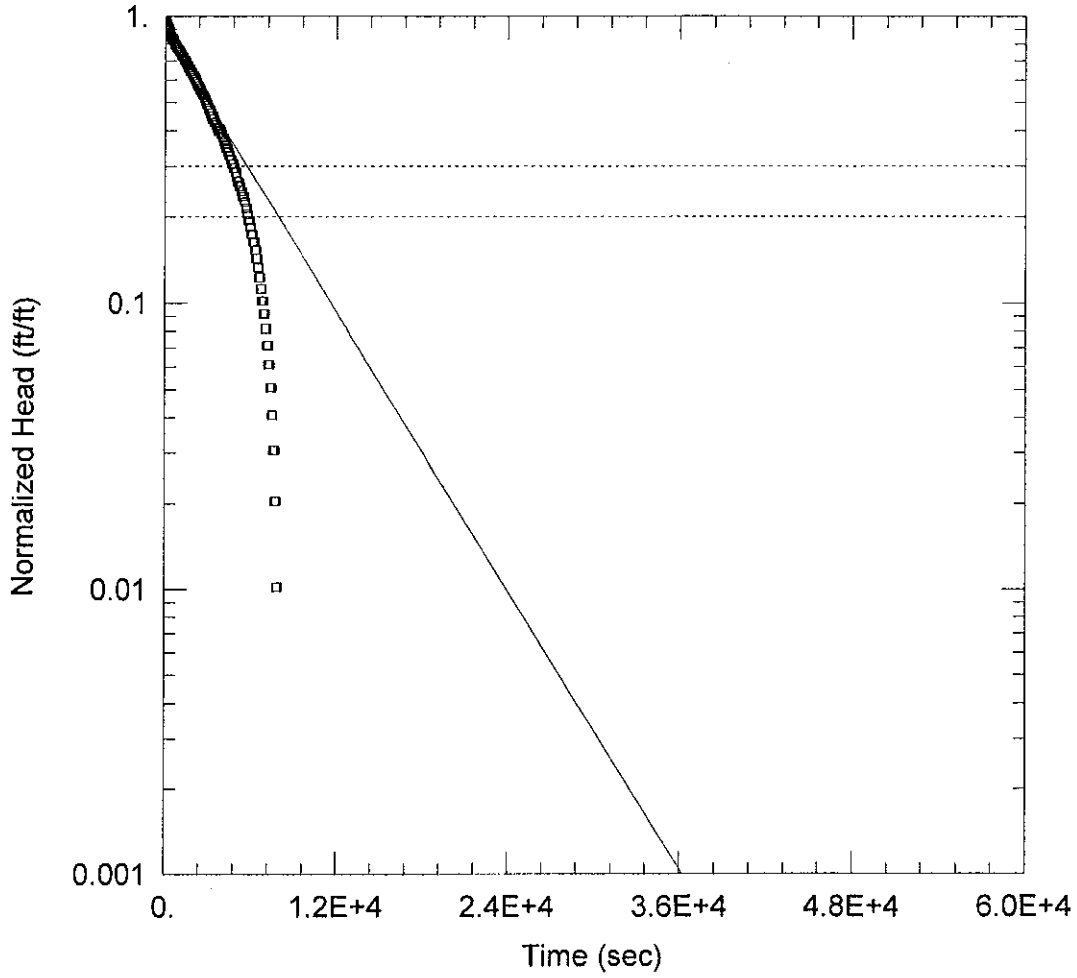
Initial Displacement: 1. ft
Total Well Penetration Depth: 6.23 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.23 ft
Screen Length: 6. ft
Wellbore Radius: 0.3441 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.572E-5 cm/sec
y0 = 0.9222 ft


Georgetown- MW-04 Slug Test
Ft of water above Transducer
5.46
5.44
5.42
5.4
5.38
5.36
5.34
5.32
5.3
5.28
NO RECOVERY
- DATA UNUSABLE -
0
500
1000
1500
2000
2500
Elapsed Time (sec)


Georgetown- MW-04 Test 2 Slug Test
Ft of water above Transducer
5
4.95
4.9
4.85
4.8
4.75
4.7
4.65
4.6
FALLING HEAD TEST
STATIC LEVEL
STATIC LEVEL
RISING HEAD TEST
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-04 FH.aqt
Date: 07/05/07 Time: 10:21:47

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-04
Test Date: 6/20/07

AQUIFER DATA

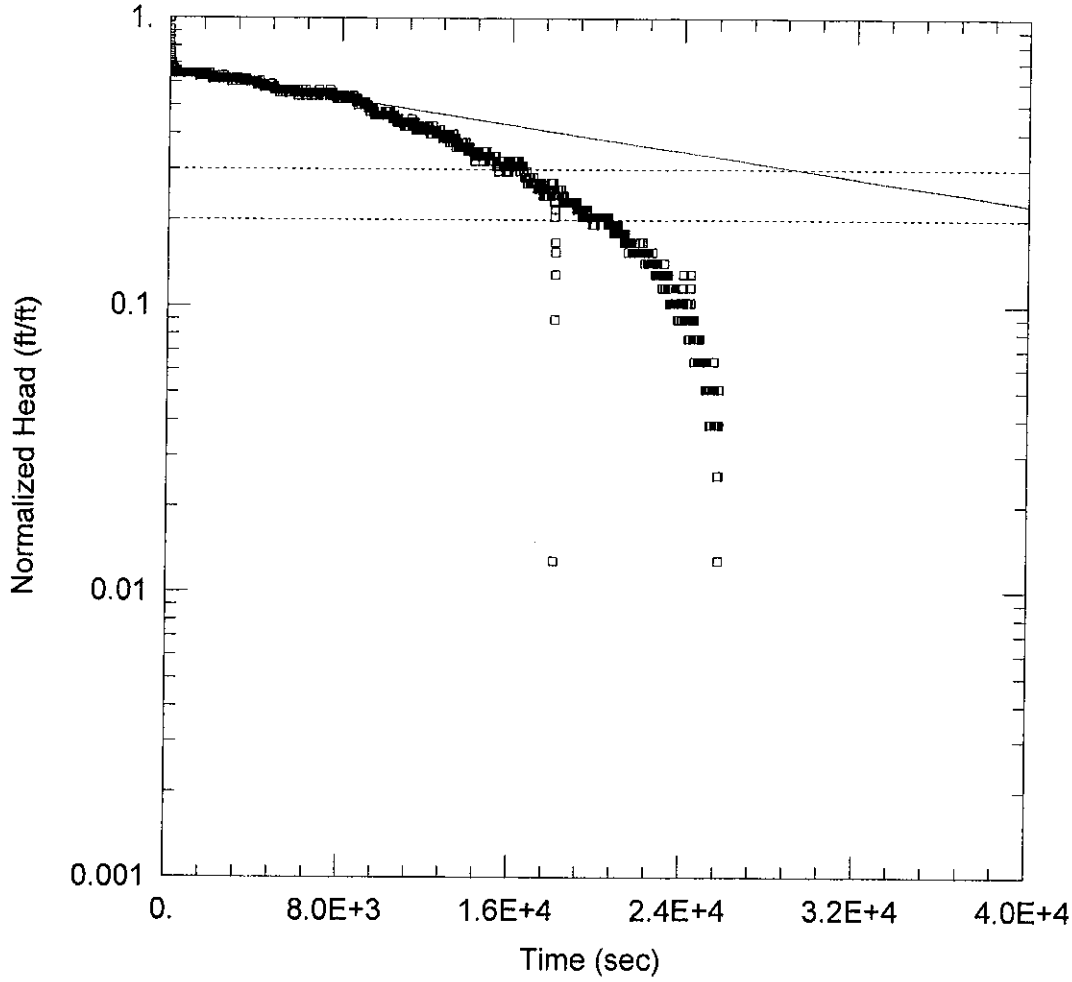
Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-04 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 6.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 7.5 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.389E-5 cm/sec
y0 = 0.8818 ft



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-04 RH.aqt
Date: 07/05/07 Time: 10:21:40

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-04
Test Date: 6/20/07

AQUIFER DATA

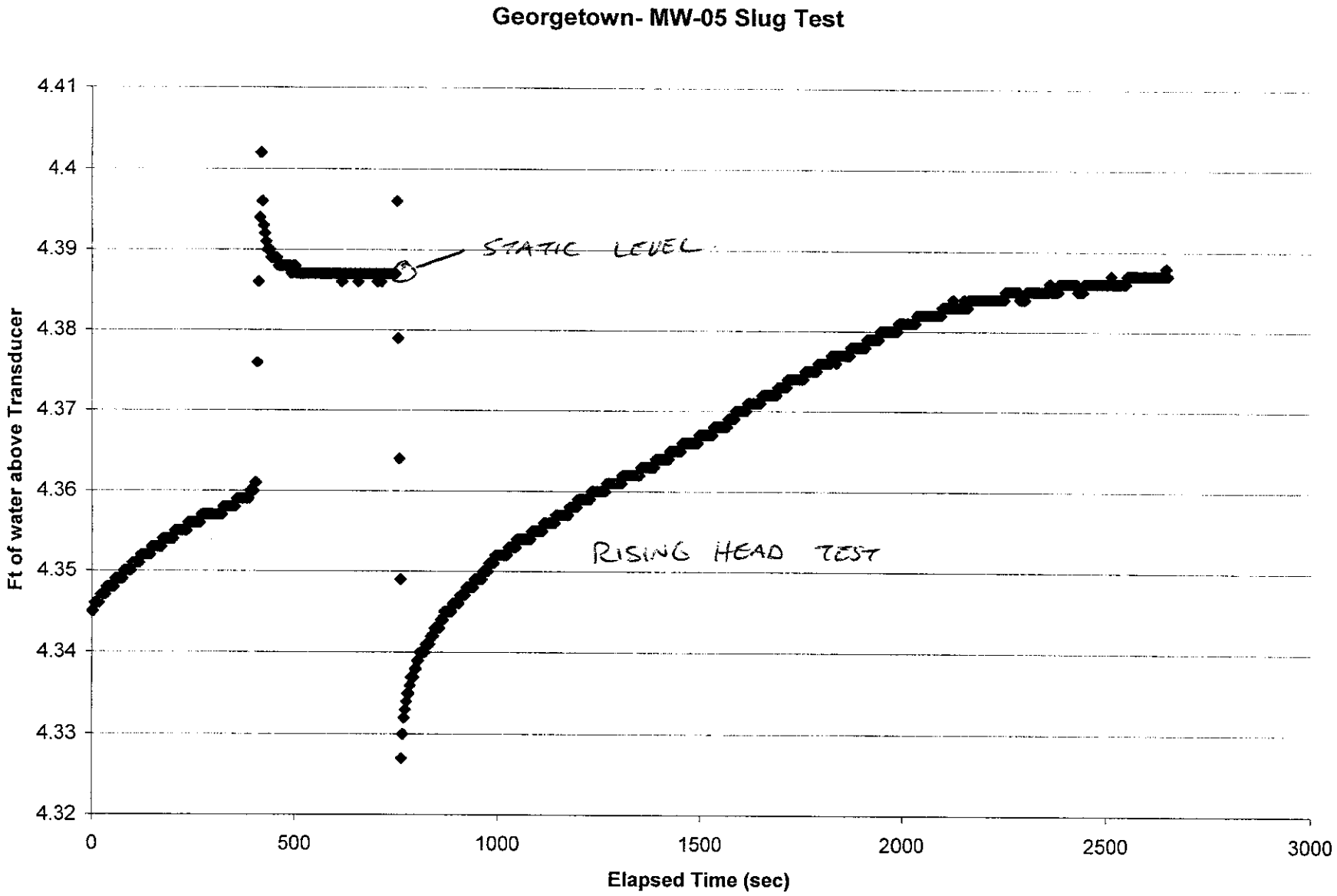
Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

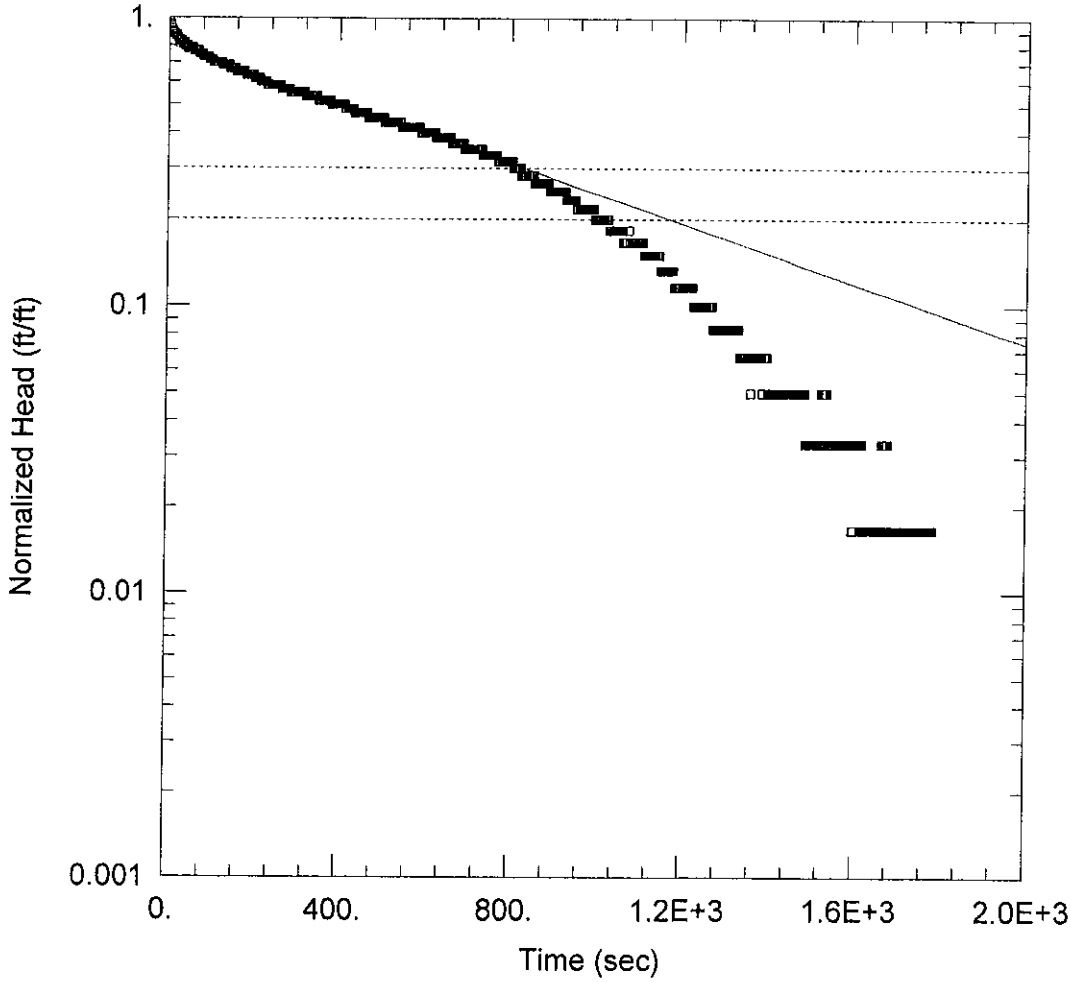
WELL DATA (MW-04 RH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 6.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 7.5 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.813E-6 cm/sec
y0 = 0.653 ft


Georgetown- MW-05 Slug Test
Ft of water above Transducer
4.41
4.4
4.39
4.38
4.37
4.36
4.35
4.34
4.33
4.32
STATIC LEVEL
RISING HEAD TEST
0
500
1000
1500
2000
2500
3000
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-05 RH.aqt
Date: 07/05/07 Time: 10:21:38

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-05
Test Date: 6/19/07

AQUIFER DATA

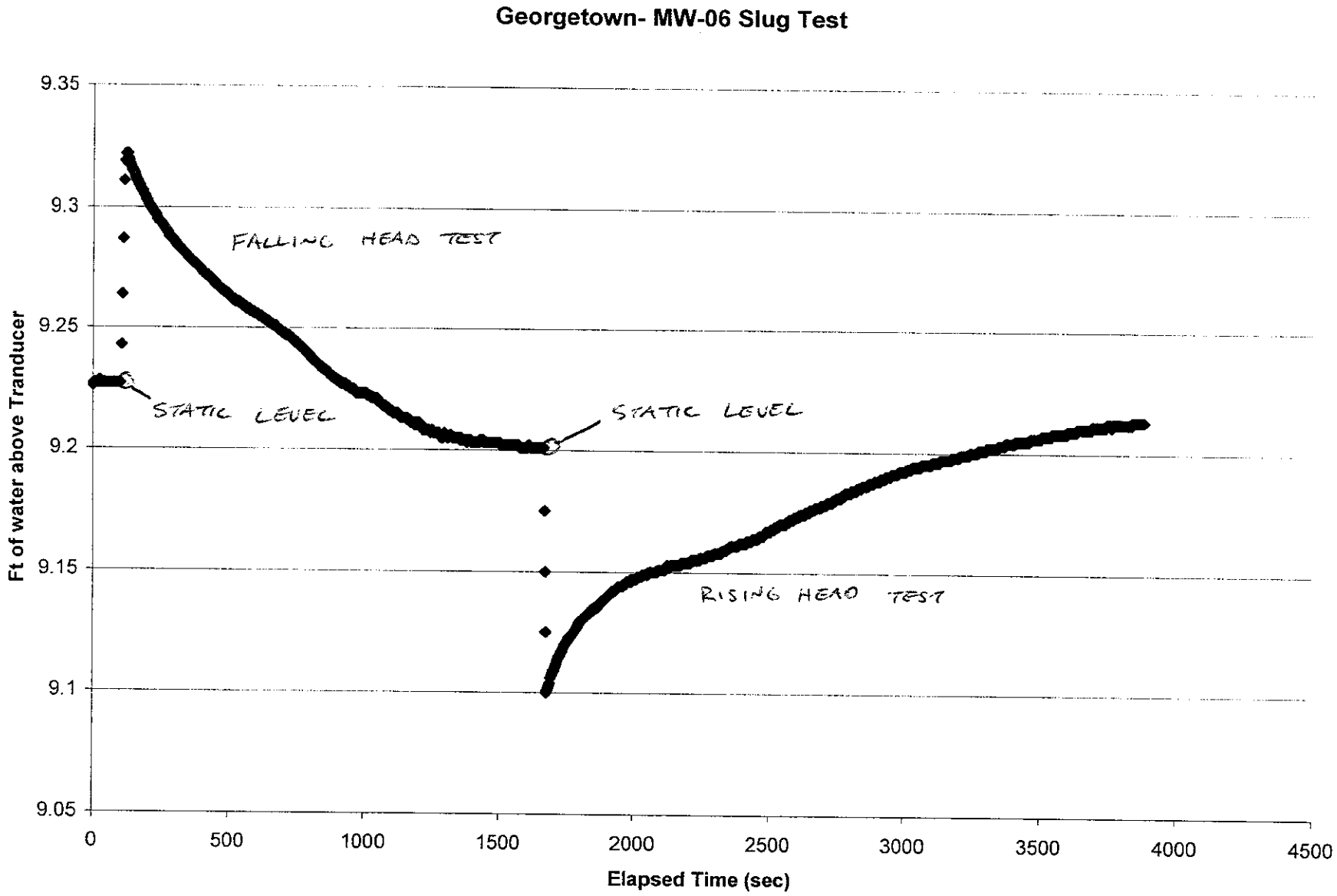
Saturated Thickness: 6.1 ft
Anisotropy Ratio (Kz/Kr): 1.

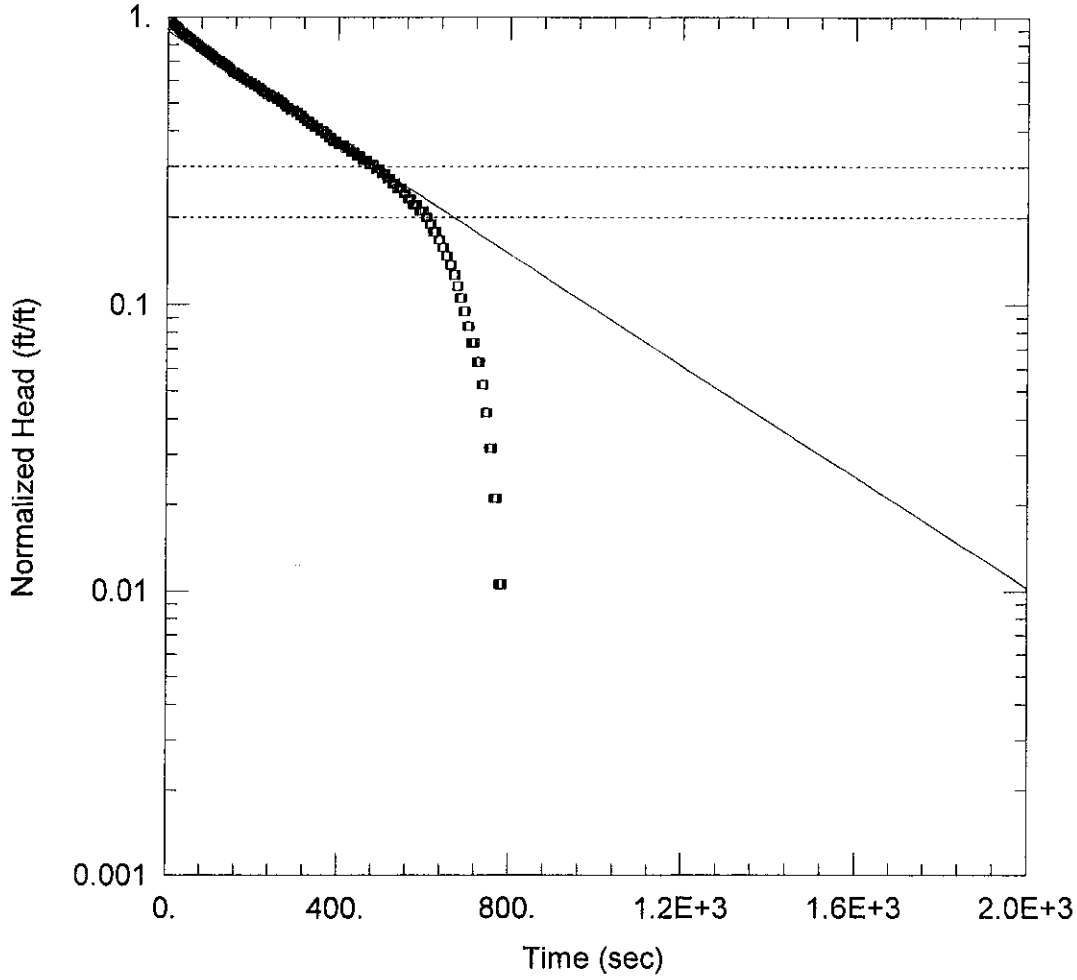
WELL DATA (MW-05 RH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 6.1 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.07 ft
Screen Length: 7.5 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002121 cm/sec
y0 = 0.8071 ft


Georgetown- MW-06 Slug Test
9.35
9.3
9.25
9.2
9.15
9.1
9.05
Ft of water above Tranducer
FALLING HEAD TEST
STATIC LEVEL
STATIC LEVEL
RISING HEAD TEST
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-06 FH.aqt
Date: 07/05/07 Time: 10:21:35

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-06
Test Date: 6/19/07

AQUIFER DATA

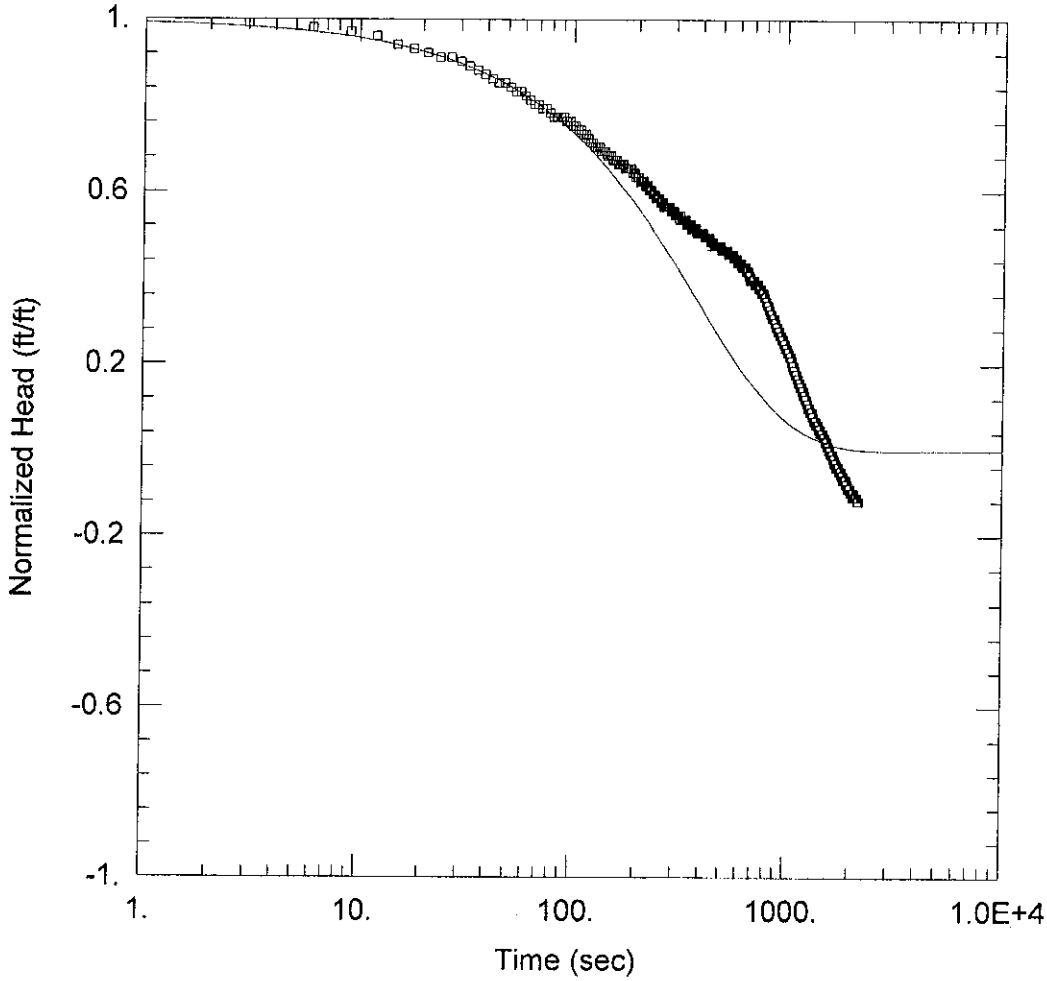
Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-06 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.98 ft
Screen Length: 11. ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0003025 cm/sec
y0 = 0.893 ft



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-06 RH.aqt
Date: 07/06/07 Time: 11:34:25

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-06
Test Date: 6/19/07

AQUIFER DATA

Saturated Thickness: 8. ft

WELL DATA (MW-06 RH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.98 ft
Screen Length: 11. ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

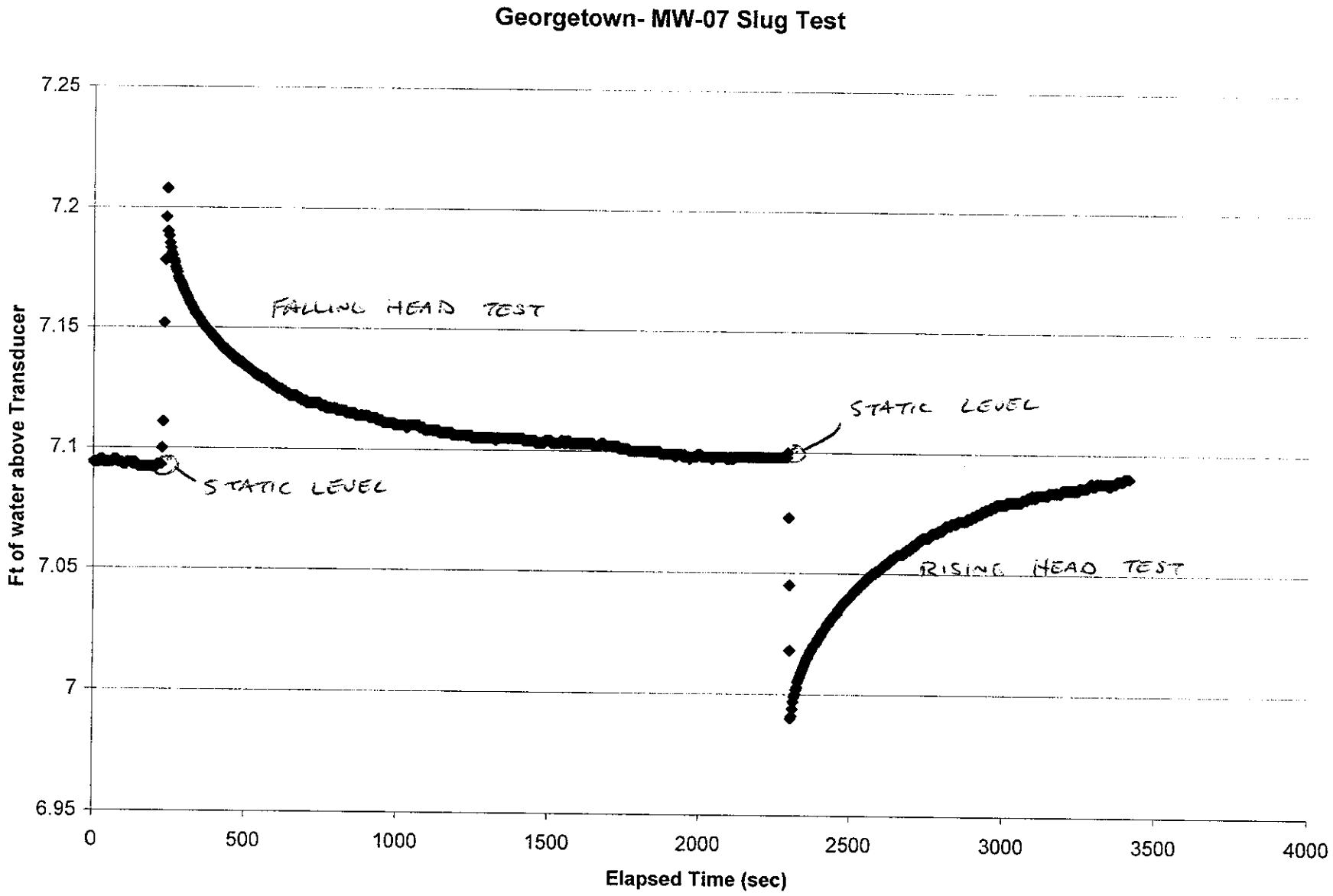
Aquifer Model: Unconfined

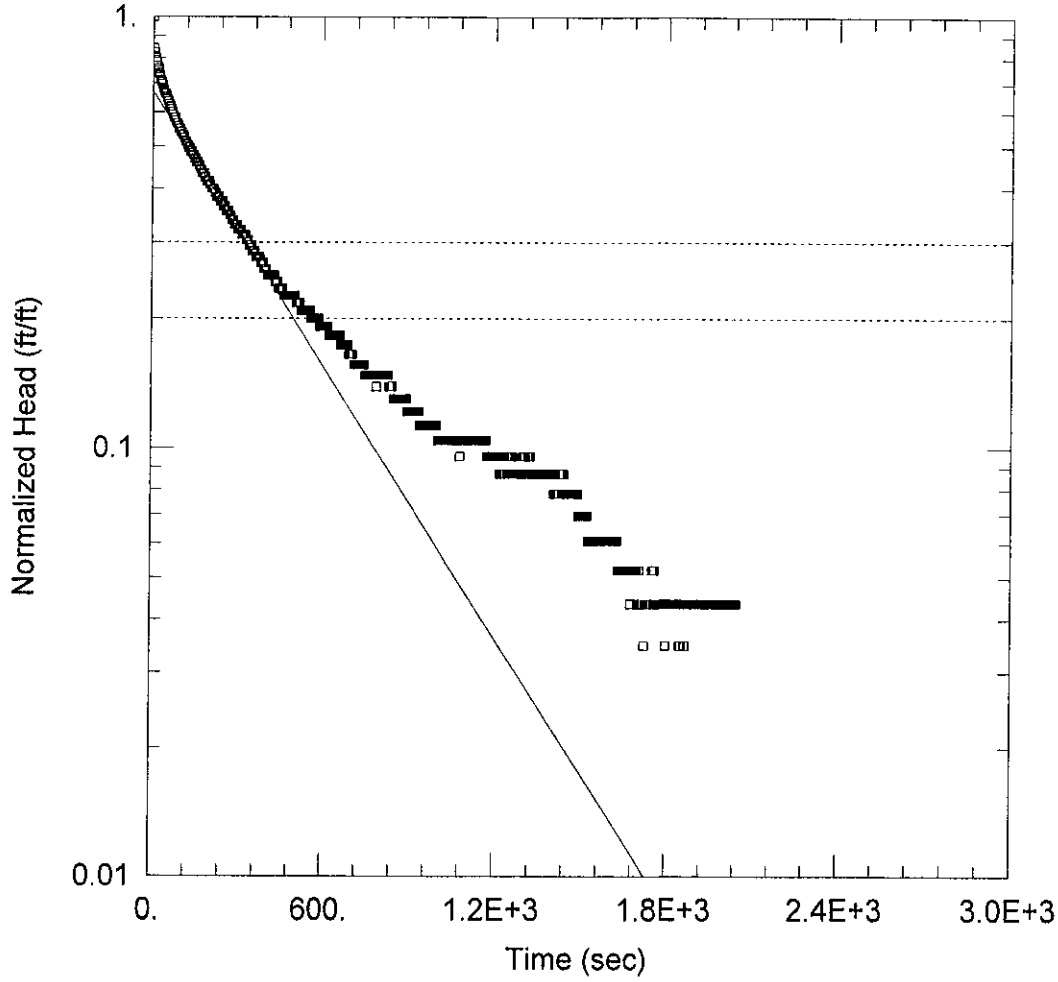
Solution Method: KGS Model

Kr = 3.201E-5 cm/sec

Ss = 3.635E-6 ft^{-1}

Kz/Kr = 1


Georgetown- MW-07 Slug Test
7.25
7.2
7.15
7.1
7.05
7
6.95
Ft of water above Transducer
FALLING HEAD TEST
STATIC LEVEL
STATIC LEVEL
RISING HEAD TEST
0
500
1000
1500
2000
2500
3000
3500
4000
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-07 FH.aqt
Date: 07/05/07 Time: 10:21:30

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-07
Test Date: 6/19/07

AQUIFER DATA

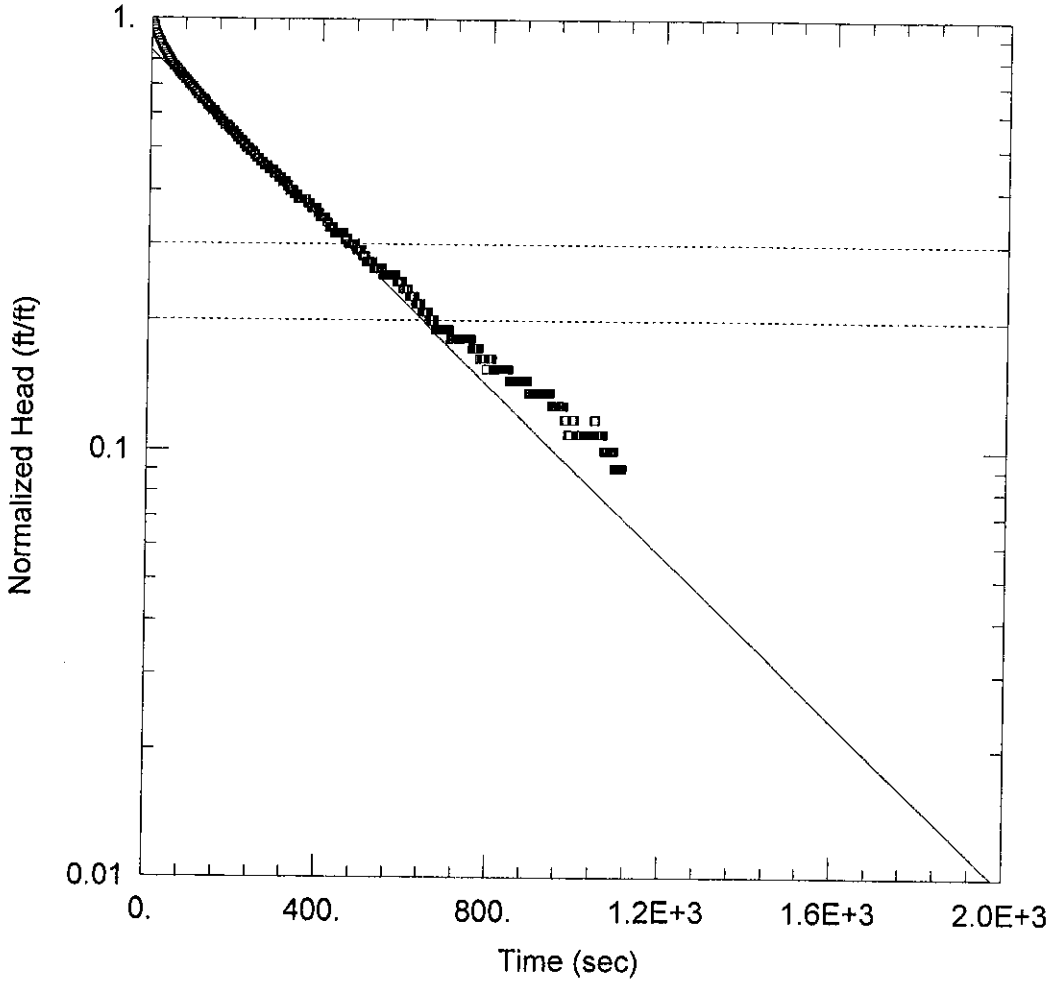
Saturated Thickness: 7.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-07 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 7.64 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.64 ft
Screen Length: 7.5 ft
Wellbore Radius: 0.3441 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.907E-5 cm/sec
y0 = 0.6705 ft



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-07 RH.aqt
Date: 07/05/07 Time: 10:21:26

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-07
Test Date: 6/19/07

AQUIFER DATA

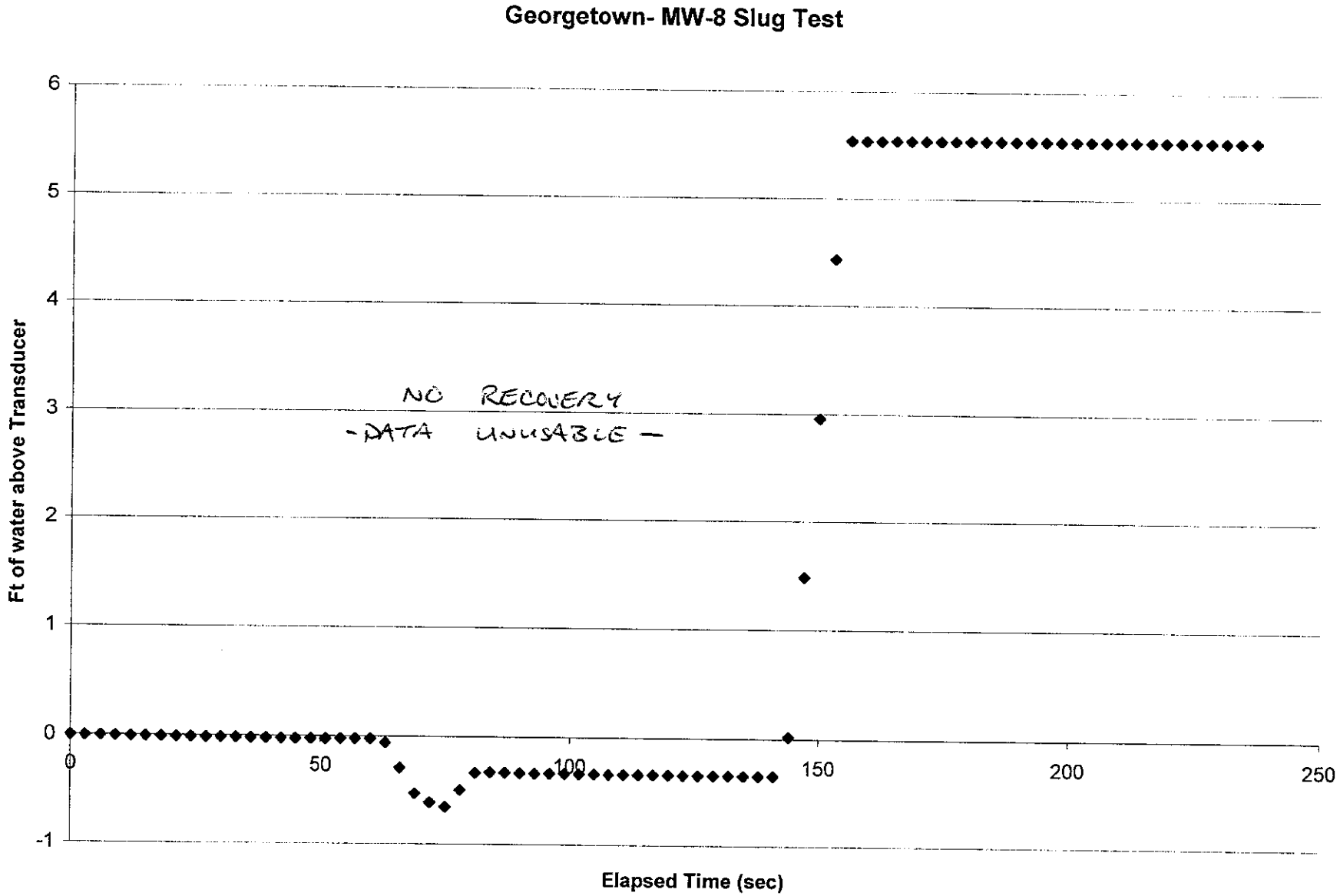
Saturated Thickness: 7.64 ft
Anisotropy Ratio (Kz/Kr): 1.

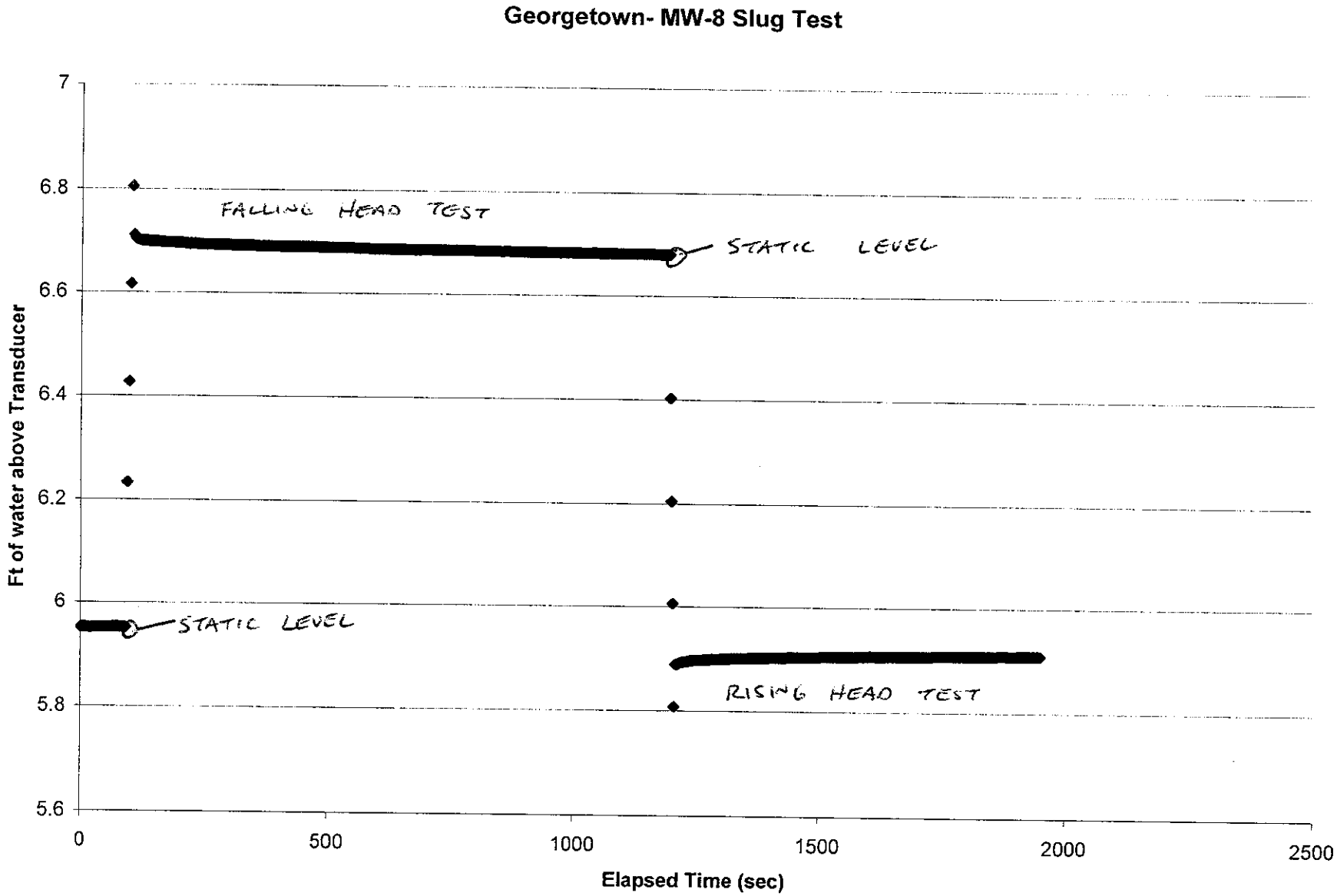
WELL DATA (MW-07 RH)

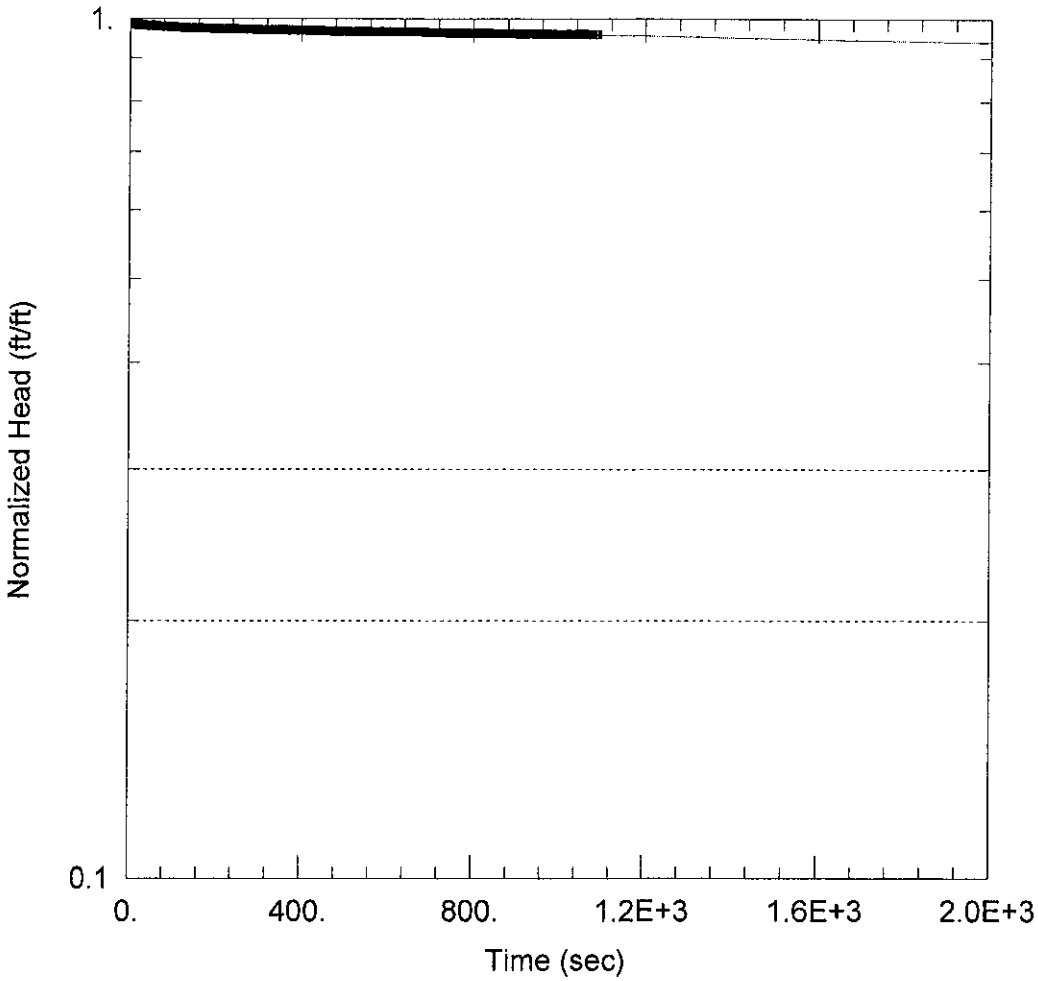
Initial Displacement: 1. ft
Total Well Penetration Depth: 7.64 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.64 ft
Screen Length: 7.5 ft
Wellbore Radius: 0.3441 ft

SOLUTION

Aquifer Model: Unconfined
K = 7.302E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.842 ft


Georgetown- MW-8 Slug Test
Ft of water above Transducer
6
5
4
3
2
1
0
-1
0
50
100
150
200
250
Elapsed Time (sec)
NO RECOVERY
- DATA UNUSABLE -


Georgetown- MW-8 Slug Test
Ft of water above Transducer
7
6.8
6.6
6.4
6.2
6
5.8
5.6
FALLING HEAD TEST
STATIC LEVEL
STATIC LEVEL
RISING HEAD TEST
0
500
1000
1500
2000
2500
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-08 FH.aqt
Date: 07/05/07 Time: 10:21:23

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-08
Test Date: 6/19/07

AQUIFER DATA

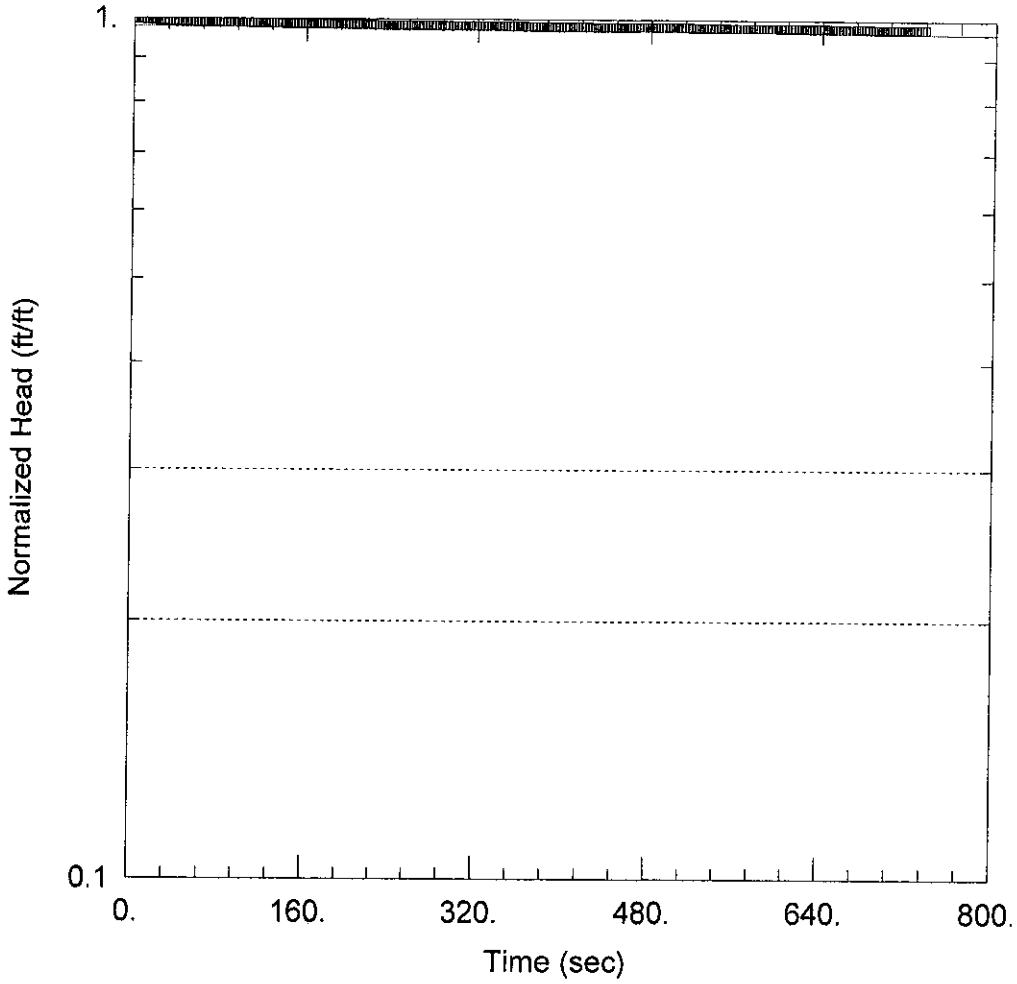
Saturated Thickness: 7. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-08 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7. ft
Screen Length: 7.3 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.961E-6 cm/sec
y0 = 0.9794 ft



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\MW-08 RH.aqt
Date: 07/05/07 Time: 10:21:20

PROJECT INFORMATION

Company: URS Corporation
Project: 11174679.00003
Location: Camp Georgetown
Test Well: MW-08
Test Date: 6/19/07

AQUIFER DATA

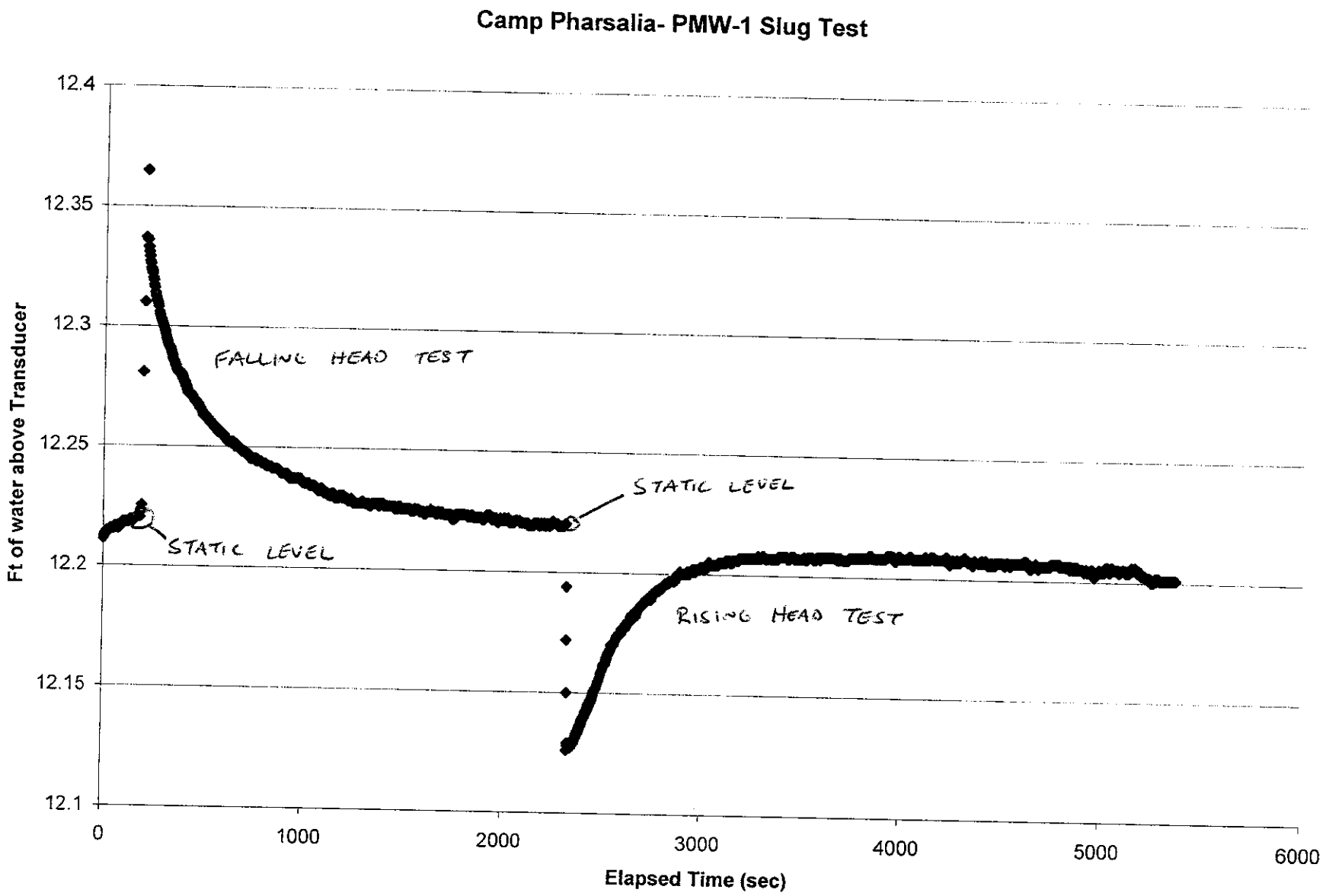
Saturated Thickness: 7. ft
Anisotropy Ratio (Kz/Kr): 1.

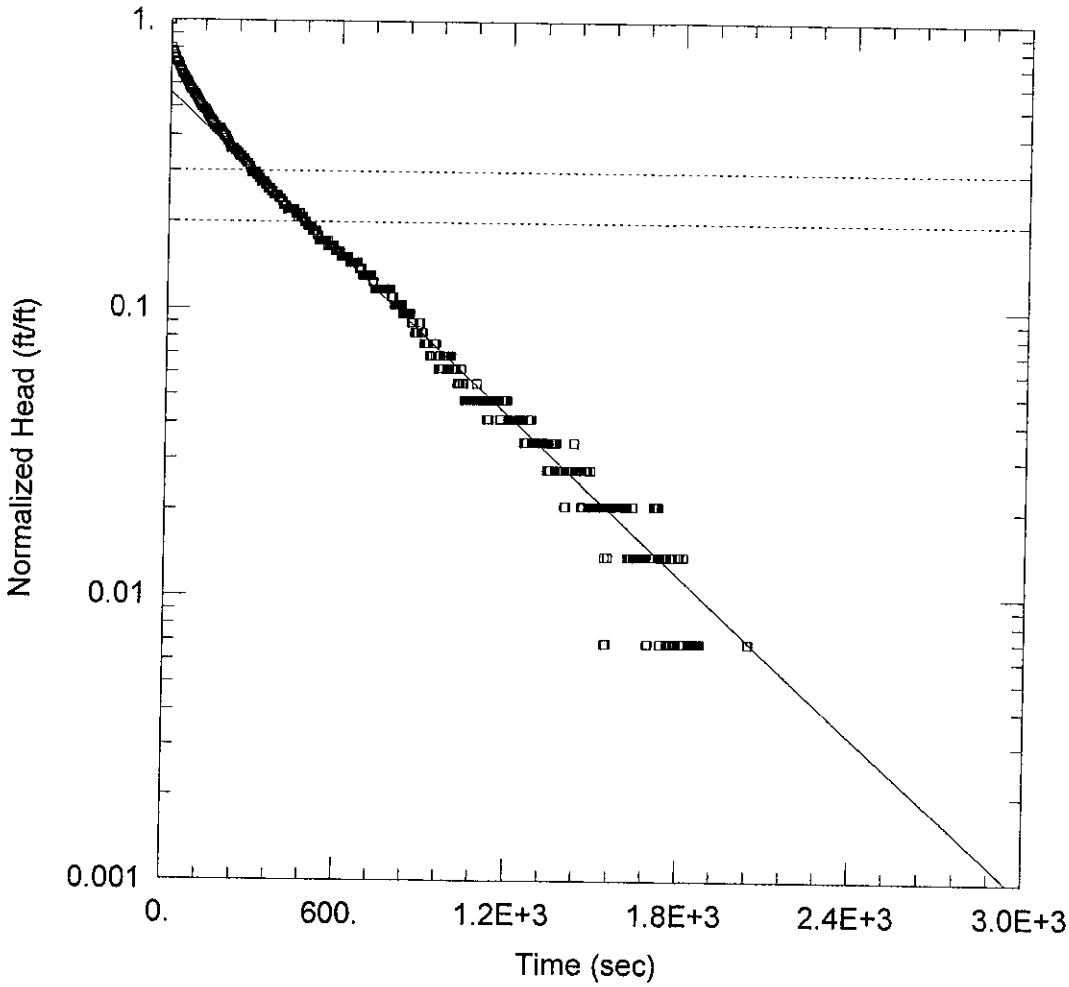
WELL DATA (MW-08 RH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7. ft
Screen Length: 7.3 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.961E-6 cm/sec
y0 = 0.9794 ft


Camp Pharsalia- PMW-1 Slug Test
12.4
12.35
12.3
12.25
12.2
12.15
12.1
Ft of water above Transducer
FALLING HEAD TEST
STATIC LEVEL
STATIC LEVEL
RISING HEAD TEST
0
1000
2000
3000
4000
5000
6000
Elapsed Time (sec)



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\PMW-1 FH.aqt
Date: 07/05/07 Time: 10:21:17

PROJECT INFORMATION

Company: URS Corporation
Project: 11174680.00003
Location: Camp Pharsalia
Test Well: PMW-1
Test Date: 6/22/07

AQUIFER DATA

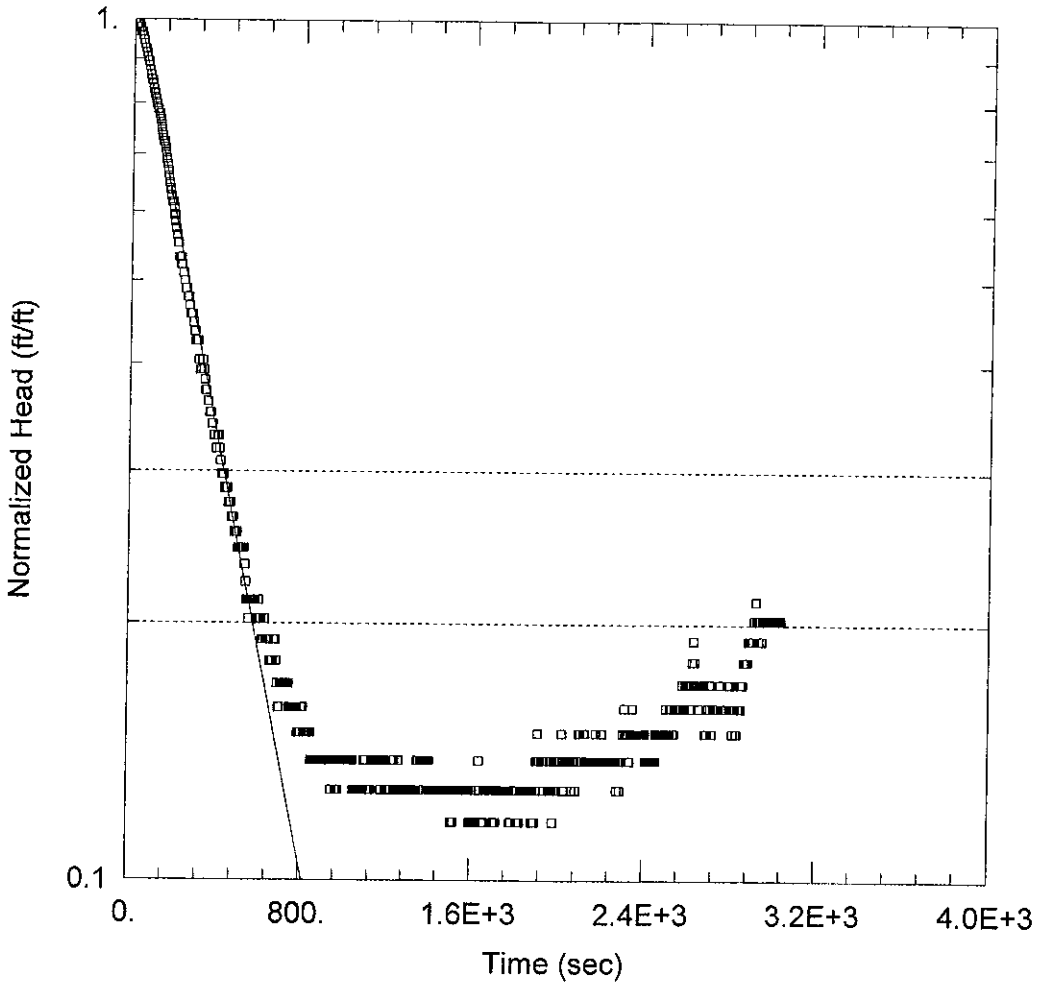
Saturated Thickness: 11.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PMW-1 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 11.93 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 11.93 ft
Screen Length: 10.5 ft
Wellbore Radius: 0.3441 ft

SOLUTION

Aquifer Model: Unconfined
K = 5.773E-5 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.5635 ft



WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\PMW-1 RH.aqt
Date: 07/05/07 Time: 10:21:14

PROJECT INFORMATION

Company: URS Corporation
Project: 11174680.00003
Location: Camp Pharsalia
Test Well: PMW-1
Test Date: 6/22/07

AQUIFER DATA

Saturated Thickness: 11.9 ft Anisotropy Ratio (Kz/Kr): 1.

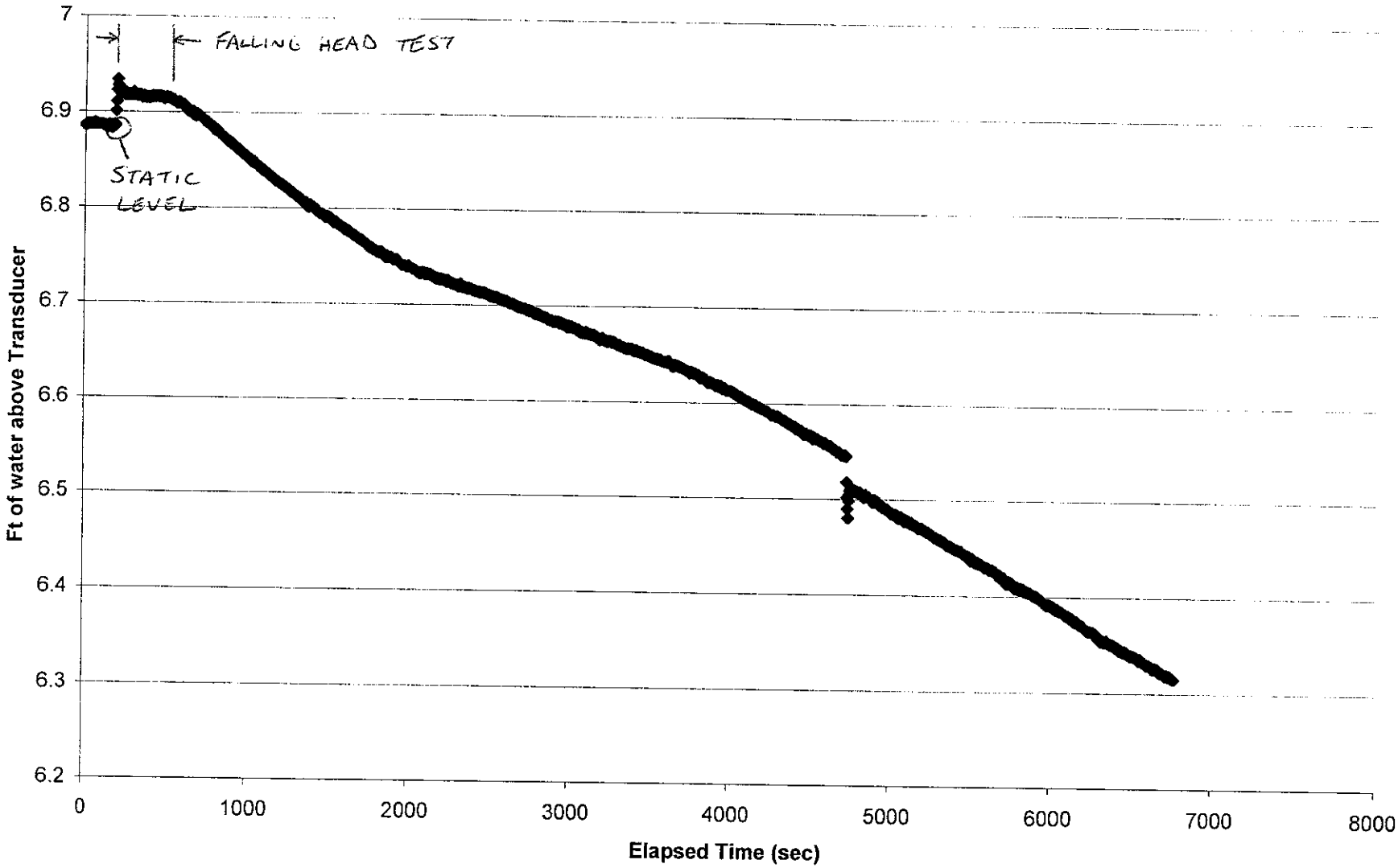
WELL DATA (PMW-1 RH)

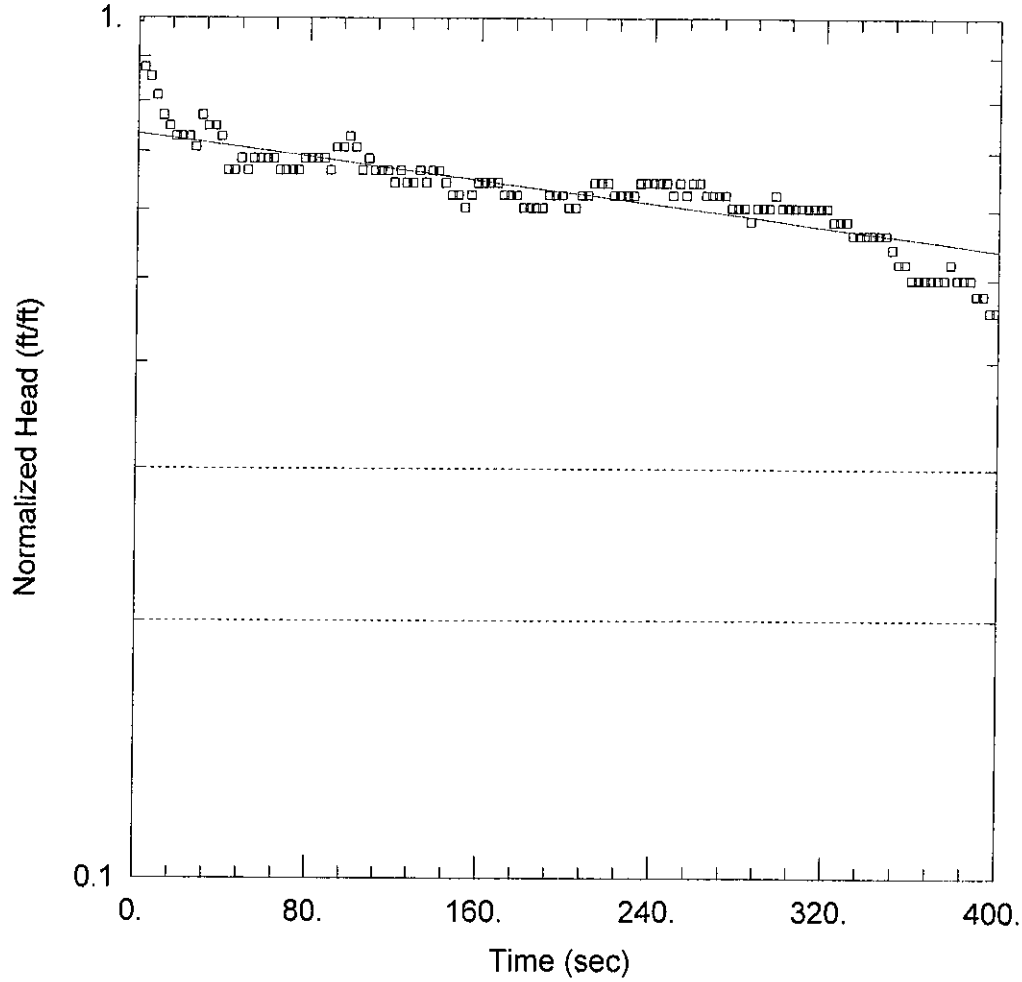
Initial Displacement: 1. ft
Total Well Penetration Depth: 11.93 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 11.93 ft
Screen Length: 10.5 ft
Wellbore Radius: 0.3441 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.802E-5 cm/sec
y0 = 1.079 ft

Camp Pharsalia- PMW-5 Slug Test





WELL TEST ANALYSIS

Data Set: M:\Georgetown & Pharsalia Slug Tests\Processed Data\PMW-5 FH.aqt
Date: 07/05/07 Time: 10:21:51

PROJECT INFORMATION

Company: URS Corporation
Project: 11174680.00003
Location: Camp Pharsalia
Test Well: PMW-5
Test Date: 6/22/07

AQUIFER DATA

Saturated Thickness: 7.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PMW-5 FH)

Initial Displacement: 1. ft
Total Well Penetration Depth: 7.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.5 ft
Screen Length: 8.7 ft
Wellbore Radius: 0.3441 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0001272 cm/sec
y0 = 0.7347 ft

APPENDIX D

CALCULATION – DEWATERING RATES DURING EXCAVATION

URS
77 Goodell Street
Buffalo, New York 14203
(716) 856-5636

CALCULATION COVER SHEET

Client: *NYSDEC* Project Name: *Camp Pharsalia*

Project / Calculation Number: *111 74 679*

Title: *Dewatering Rates During Excavation*

Total number of pages (including cover sheet): *19 (18 + cover)*

Total number of computer runs: *0*

Prepared by: Marek Ostrowski Date: 9/11/2007

Checked by: [signature] Date: 9/11/07

Description and Purpose: *To estimate gound water extraction rates and volumes required to dewater the excavated areas.*

Design bases / references / assumptions: *Method of infinite-extent strip aquifer with instanteneous drawdown was used. Saturated thickness 13 feet, hydraulic conductivity $7*10^{-5}$ cm/s to $2*10^{-4}$ cm/s. Storativity 3 to 25%. Dewatering to be accomplish in one, two or three days. Calculated rates and volumes include water flowing into the excavation from the aquifer, as well as water stored in either the excavated soil or the the open excavation pit.*

Remarks / conclusions: *Total volume of water that would have to be removed per excavation (includes water from storage and inflow) ranges between approximately 3,000 and 100,000 gallons. Extraction rates per excavation range between apeoximately 1 and 60 gpm. These ranges reflect the size and depth of different excavations, as well as assumptions made about the process of dewatering and aquifer parameters. The estimated range of volumes of water that would have to be removed from all excavations is approximately 7,000 to 150,000 gallons.*

Calculation Approved by: [signature] 10/9/07
Project Manager / Date

Revision No:	Description of Revisions	Approved by:

Project Manager / Date

1. PURPOSE

The purpose of this calculation is to estimate the ground water extraction rates required to dewater excavated areas.

2. METHODOLOGY

It is proposed that soils within two areas at the Camp Pharsalia site be excavated and removed. Ground water table at the site has been observed between approximately 2 and 6 feet below ground surface. The anticipated depths of the excavations are between 5 and 10 feet. Therefore, depending on the water table conditions prevailing during the work, the excavations may require dewatering for the purpose of exposing the excavation bottom in order to take confirmatory soil samples.

Terms used in calculations:

A_{excav} - surface area of excavation, [ft^2]
L - length of pit, [ft]
Q - 2-dimensional flow into the excavation from both sides, [ft^2/d]
Q_w - 3-dimensional flow into the excavation from both sides, [ft^3/d]
S - aquifer storativity, [-]
S_0 - drawdown in the pit, [ft]
T - aquifer transmissivity, [ft^2/d]
t - time, [d]
V_{stored} - volume of water stored inside the excavation, [ft^3]
V_{inflow} - volume of water that will flow into the excavation during dewatering period, [ft^3]
θ - time when excavation is maintained in dry condition, [d]

Dewatering can be accomplished in numerous ways. The method that will be used by the contractor is not known at this point. The approach taken in this calculation is to treat each excavation as an open pit. It is assumed that ground water residing in the volume of excavated soil is removed from the pit instantaneously, and then the pit is maintained dry for a given period of time by removing the inflow of ground water reaching the excavation from the surrounding aquifer. The method of extracting water is not specified.

Two sources of water have to be considered: the water stored in the pit, and water flowing into the pit from the aquifer. The volume of stored water is calculated as follows:

$$V_{stored} = A_{excav}\ s_0\ S$$

Time-history of the flow into the pit from the aquifer is approximated as the flow into a trench placed in an infinite aquifer, where the initial level was lowered instantaneously (reference 1, equation 3a):

$$Q = 2\ s_0\ (T\ S\ /\ \pi)^{1/2}\ /\ t^{1/2}$$

$$Q_w = Q\ L = 2\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}\ /\ t^{1/2}$$

The volume of water removed from the excavation during the time when the pit is maintained in dry condition is:

$$V_{inflow} = {}_0\int^{\theta} Q_w(t)\,dt = {}_0\int^{\theta} [2\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}\ /\ t^{1/2}]\,dt$$

$$V_{inflow} = [2\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ {}_0\int^{\theta} [1/t^{1/2}]\,dt$$

$$V_{inflow} = [2\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ [2\ t^{1/2}]_0^{\theta}$$

$$V_{inflow} = [4\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ [\theta^{1/2} - 0^{1/2}]$$

$$V_{inflow} = [4\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ \theta^{1/2}$$

The total volume of water removed is the sum of the stored volume and the inflow volume:

$$V_{total} = V_{stored} + V_{inflow}$$

The average extraction rate as a function of the time period in which the pit is maintained in dry conditions is:

$$Q_{avg} = V_{total}\ /\ \theta$$

This rate includes both the removal of the stored water and the removal of ground water flowing into the excavation during the dewatering period.

3. PARAMETERS

Transmissivity - T

The site is located above till deposits. The top 13 feet of the till, where the excavation will take place, consists of dense silty or clayey material with sand and gravel lenses (reference 2, Section 3.1.2). Water is thought to exist mostly in a perched form (Section 3.1.4 of reference 2). Water table is found at depths of 3 to 6 feet (reference 2, Section 3.1.4). The thickness of the water-bearing zone is assumed to be from the highest water table (3 ft bgs) to the bottom of the sand/gravel lenses in the till (13 ft bgs):

$$H_0 = 13 - 3 = 10 \text{ ft}$$

The area-average hydraulic conductivity of the water-bearing zone is not known. There have been only two slug at the site - results indicate values between $7*10^{-5}$ cm/s and $2*10^{-4}$ cm/s (see page 8 of this calculation package, summary of results from the July 5, 2007 analysis of slug tests). The high and low values of transmissivity $T = H_0 K$ are:

$$T_{low} = 10 \text{ ft} * 7*10^{-5} \text{ cm/s} = 10 \text{ ft} * 0.198 \text{ ft/d} = 2.0 \text{ ft}^2/\text{d}$$

$$T_{low} = 10 \text{ ft} * 2*10^{-4} \text{ cm/s} = 10 \text{ ft} * 0.57 \text{ ft/d} = 5.7 \text{ ft}^2/\text{d}$$

Storativity - S

It is not clear whether the bulk of the flow takes place through the sandy/gravelly silt lenses, or through the silty matrix. Therefore, the nature of the system - confined or unconfined - is difficult to determine. Conservatively, it is assumed that the system is unconfined, and the flow takes place through the entire saturated thickness. The release of water from storage is governed by the specific yield. Specific yield of silt and clay varies between approximately 3% and 25% (reference 3, Figure 5-4).

$$S_{low} = 0.03$$

$$S_{high} = 0.25$$

Drawdown inside excavation - s_0

Water level has been observed between approximately 3 and 6 ft below ground (reference 2, Section 3.1.4). Use the 3-ft depth for this calculation. Depths of excavation areas are from Figure 8 of reference 4. It is assumed that the water table following dewatering is to be maintained at one foot below the excavation bottom. From that:

$$S_0 = (\text{Depth of Excavation} + 1) - 3$$

Area	Depth of Excav. [ft] [Depth]	Drawdown [ft] [s_0]
A	5.0	3.0
B	10.0	8.0

Size of excavation - A_{excav}, L

Excavation areas are taken from Figure 8 of reference 4. On the figure, both volumes (in cubic yards) and depths of excavations are shown. Lengths of excavation are equal to half of the excavation perimeter (this is because the formula for the flow rate already accounts for the flow from both sides of the trench).

$$A_{excav} = (\text{Volume in CY}) * 27 / \text{Depth}$$

Area	Depth [ft]	Volume [cy]	A_{excav} [ft^2]	L [ft]
A	5.0	360	1,944	100
B	10.0	500	1,350	70

Dewatering time period - θ

Assume that the excavation has to be dewatered in one to three days. Calculations of the total extraction rate will be performed for dewatering times of 1, 2 and 3 days.

θ = 1, 2 and 3 d

4. CALCULATIONS AND RESULTS

Summary of parameters:

$T = 2.0$ to 5.7 ft^2/d

$S = 0.03$ to 0.25

$\theta = 1$, 2 and 3 d

Area	s_0 [ft]	A_{excav} [ft^2]	L [ft]
A	3	1,944	100
B	8	1,350	70

For each excavation, two cases were considered. The case that will produce the lowest extraction rate is the case of the lowest transmissivity and lowest specific yield. The highest extraction rate will be produced by the highest transmissivity and highest specific yield. In addition, for the high flow case it is assumed that the pit is empty of soil and filled with water, such as in the case where the finished excavation was allowed to fill with water. This corresponds to the case where $S = 1$ in the formula for V_{stored} (note: not in the formula for V_{flow}).

Case 1 - low flow

$T = 2.0$ ft^2/d

$S = 0.03$

$V_{stored} = A_{excav}\ s_0\ S$

Case 2 - high flow

$T = 5.7$ ft^2/d

$S = 0.25$

$V_{stored} = A_{excav}\ s_0$

Calculations were performed in a spreadsheet table (see page 9 of this calculation package for Case 1, and page 10 for Case 2). Estimated flow rates are summarized below. These are time-averaged low and high flow rates for different dewatering periods, rounded to the nearest 1 gpm, with flows of less than 1 gpm rounded to 1 gpm.

Area	Flow rate [in gpm] for dewatering period of: 1 day	2 days	3 days
A	2 - 35	1 - 18	1 - 13
B	3 - 64	2 - 34	2 - 23

These flows should be interpreted as extraction rates required to lower the water table from its original level to the bottom of the excavation in 1, 2 or 3 days. Estimated flows are in the range of approximately 1 to 60 gpm per excavation.

Total volume of water to be removed from an excavation ranges between approximately 3,000 gallons (Case 1, Area A, 1 day) and 100,000 gallons (Case 2, Area B, 3 days).

These ranges reflect the size and depth of each excavation, as well as assumptions made about the process of dewatering and the parameters of the aquifer.

The total volume of water to be removed from all excavations is estimated at between approximately 7,000 gallons (Case 1, 1 day) and 150,000 gallons (Case 2, 3 days).

5. REFERENCES

1. Non-Steady Type Curves for Strip Aquifers with Constant Drawdown
H. Onder
Journal of Irrigation and Drainage Engineering, 1994

2. Remedial Investigation Report for the Camp Pharsalia Site
Shaw Environmental and Infrastructure Engineering of New York, P.C., April 8, 2003, revision February 26, 2003

3. Hydraulics of Groundwater
J. Bear
McGraw-Hill, 1979

4. Feasibility Study Report, Camp Pharsalia
Shaw Environmental, Inc., February 26, 2006

Camp Georgetown and Camp Pharsalia, NY Slug Tests
Summary of Results

Well ID	Hydraulic Conductivity [cm/sec]					
	FH	RH			N(**)	Mean (***)
Camp Georgetown Monitoring Wells						
MW-02	1.57E-05	(*)			1	1.57E-05
MW-04	3.39E-05	4.81E-06			2	1.94E-05
MW-05	(*)	2.12E-04			1	2.12E-04
MW-06	3.03E-04	3.20E-05			2	1.67E-04
MW-07	7.91E-05	7.30E-05			2	7.60E-05
MW-08	3.96E-06	3.96E-06			2	3.96E-06
Camp Pharsalia Monitoring Wells						
PMW-1	5.77E-05	7.80E-05			2	6.79E-05
PMW-5	1.27E-04	-			1	1.27E-04

Notes:

FH - Falling Head Test
RH - Rising Head Test
(*) - data not useable (see data usability sheet)
(**) - number of valid tests
(***) - geometric mean

SUMMARY OF SLUG TEST RESULTS From "CAMP GEORGETOWN / CAMP PHARSALIA 2007 SLUG TESTS", July 5, 2007

Spreadsheet claculates time-averaged extraction rate reqired to lower water level inside an excavation of area "A_{excav}" by "s_0", and maintain it there during time period "θ". The average rate is asumed to be equal to the sum of the volume of stored water removed initially from the excavation "V_{stored}" and volume of water during the dewatering period "V_{flow}", divided by the length of the dewatering period "θ". Note: removal of stored water is conducted at the same time as the excavation - water is stored in soil porosity.

Flow/volume from inflow:

$$V_{stored} = A_{excav}\ s_0\ S$$

$$V_{inflow} = [4\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ \theta^{1/2}$$

$$V_{total} = V_{stored} + V_{inflow}$$

$$Q_{avg} = V_{total}\ /\ \theta$$

From H.Onder, Non-Steady Flow Type Curves for Strip Aquifers with Constant Drawdown, Journal of Irrigation and Drainage Engineering, Vol. 120, No. 4, July/August 1994

Aquifer:

thickness	H_0 =	10 ft
conductivity	K =	7E-05 cm/s
transmissivity	T =	2.0 ft²/d
storativity	S =	0.03

Dewatering times: θ = 1 2 3 d

~ 3,000 gall

Calculate required flow rate:

Area	Surface Area A_{excav}	Length L	Drawdown s_0	Storage Volume V_{stored}	θ[d] =	Inflow Volume 1 V_{inflow}	2 V_{inflow}	3 V_{inflow}	θ[d] =	Total Volume 1 V_{total}	2 V_{total}	3 V_{total}
	[ft²]	[ft]	[ft]	[ft³]		[ft³]	[ft³]	[ft³]		[ft³]	[ft³]	[ft³]
A	1,944	100	3	175		165	234	286		340	408	461
B	1,350	70	8	324		308	436	534		632	760	858
Sum for all excavations =				499		473	669	820		972	1,168	1,319

~ 1,000 gall

Area	Surface Area A_{excav}	Length L	Drawdown s_0	θ[d] =	Time-Averaged Extraction Rate 1 Q_{avg}	2 Q_{avg}	3 Q_{avg}	θ[d] =	Time-Averaged Extraction Rate 1 Q_{avg}	2 Q_{avg}	3 Q_{avg}
	[ft²]	[ft]	[ft]		[ft³/d]	[ft³/d]	[ft³/d]		[gpm]	[gpm]	[gpm]
A	1,944	100	3		340	204	154		1.8	1.1	0.8
B	1,350	70	8		632	380	286		3.3	2.0	1.5
Sum for all excavations =					972	584	440		5	3	2

Case 1

Low Flow

Spreadsheet claculates time-averaged extraction rate reqired to lower water level inside an excavation of area "A_{excav}" by "s_0", and maintain it there during time period "θ". The average rate is asumed to be equal to the sum of the volume of stored water removed initially from the excavation "V_{stored}" and volume of water during the dewatering period "V_{flow}", divided by the length of the dewatering period "θ". Note: removal of stored water is conducted after completeing the excavation - water is stored in open pit.

Flow/volume from inflow:

$$V_{stored} = A_{excav}\ s_0$$

$$V_{inflow} = [4\ s_0\ L\ (T\ S\ /\ \pi)^{1/2}]\ \theta^{1/2}$$

$$V_{total} = V_{stored} + V_{inflow}$$

$$Q_{avg} = V_{total}\ /\ \theta$$

From H.Onder, Non-Steady Flow Type Curves for Strip Aquifers with Constant Drawdown, Journal of Irrigation and Drainage Engineering, Vol. 120, No. 4, July/August 1994

Aquifer:

thickness	H_0 =	10 ft
conductivity	K =	2E-04 cm/s
transmissivity	T =	5.7 ft²/d
storativity	S =	0.25

~100,000 gall

Dewatering times: θ = 1 2 3 d

Calculate required flow rate:

Area	Surface Area A_{excav}	Length L	Drawd. s_0	Storage Volume V_{stored}		Inflow Volume θ[d]= 1 V_{inflow}	2 V_{inflow}	3 V_{inflow}		Total Volume θ[d]= 1 V_{total}	2 V_{total}	3 V_{total}
	[ft²]	[ft]	[ft]	[ft³]		[ft³]	[ft³]	[ft³]		[ft³]	[ft³]	[ft³]
A	1,944	100	3	5,832		806	1,140	1,396		6,638	6,972	7,228
B	1,350	70	8	10,800		1,504	2,127	2,605		12,304	12,927	13,405
Sum for all excavations =				16,632		2,310	3,267	4,001		18,942	19,899	20,633

~150,000 gall

Area	Surface Area A_{excav}	Length L	Drawd. s_0		Time-Averaged Extraction Rate θ[d]= 1 Q_{avg}	2 Q_{avg}	3 Q_{avg}		Time-Averaged Extraction Rate θ[d]= 1 Q_{avg}	2 Q_{avg}	3 Q_{avg}
	[ft²]	[ft]	[ft]		[ft³/d]	[ft³/d]	[ft³/d]		[gpm]	[gpm]	[gpm]
A	1,944	100	3		6,638	3,486	2,409		34.5	18.1	12.5
B	1,350	70	8		12,304	6,464	4,468		63.9	33.6	23.2
Sum for all excavations =					18,942	9,949	6,878		98	52	36

Case 2

High Flow

NON-STEADY-FLOW TYPE CURVES FOR STRIP AQUIFERS WITH CONSTANT DRAWDOWN

By Halil Onder[1]

ABSTRACT: A type-curve method to determine aquifer parameters from a constant-drawdown test at a drain in a finite strip aquifer is described. An available solution in the form of complementary error functions to one-dimensional, nonsteady flow toward a drain, under constant drawdown condition in a strip aquifer bounded on the other side by an impervious formation, is used to define a drain function. Values of the drain function are calculated by using a polynomial approximation for the complementary error function and are tabulated, and a corresponding family of type curves is constructed for selected values of dimensionless distance along the width of the strip aquifer. The method is demonstrated through an application. The proposed match-point procedure may be used to determine the aquifer parameters from observed drawdown values in an observation well in the strip aquifer and discharge data measured in the drain during constant drawdown canal pumping tests.

Reference 1

INTRODUCTION

Determination of aquifer parameters from observed water levels by type-curve matching methods is the most commonly used technique for aquifer identification. Two drain functions with associated type curves, for one-dimensional (1D), nonsteady flow in a semiinfinite nonleaky aquifer under constant drawdown and constant discharge conditions, respectively, are described by Lohman (1972). Solutions and type curves for leaky semiinfinite aquifers under similar conditions are given by Vandenberg (1977a,b; 1978) and by Motz (1990a,b; 1991). Other works involving type-curve matching methods for 1D flow include Gustafson (1977), Sen (1986), and Motz (1992).

Rorabaugh (1960) used water levels in estimating aquifer constants in a finite aquifer. Although he presented dimensionless graphs for drawdowns, he did not elaborate his analysis to develop a type-curve matching technique. Using an available solution for 1D, nonsteady flow towards a drain, under constant drawdown condition in a strip aquifer, a drain function may be defined and a corresponding family of type curves may be constructed.

THEORETICAL BACKGROUND

One-dimensional (1D) nonsteady horizontal flow toward a drain under step drawdown conditions from a strip aquifer is shown in Fig. 1. The aquifer is homogeneous, isotropic, and of finite areal extent (bounded on one side by the drain and by an impermeable boundary on the other). The drain completely penetrates the aquifer. The aquifer is bound above and below by impermeable formations.

The solution to this problem is available from the analogous problem in heat flow [Carslaw and Jaeger (1978); see page 97, equation (9)] and it has

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Note. Discussion open until January 1, 1995. To extend the closing date one month, a written request must be filed with the ASCE Manager of Journals. The manuscript for this paper was submitted for review and possible publication on April 5, 1993. This paper is part of the ***Journal of Irrigation and Drainage Engineering***, Vol. 120, No. 4, July/August, 1994. ©ASCE, ISSN 0733-9437/94/0004-0732/$2.00 + $.25 per page. Paper No. 5935.

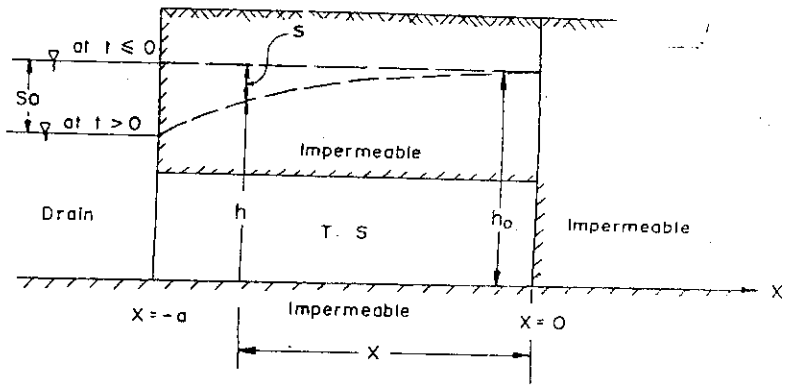

FIG. 1. 1D Flow in Finite Aquifer with Constant Drawdown in Drain

been used in the analysis of ground-water flow (Pinder et al. 1969). It may be written as

$$s = s_0 \sum_{n=0}^{\infty} (-1)^n \left[\operatorname{erfc} \frac{(2n+1)a + x}{2\sqrt{\nu t}} + \operatorname{erfc} \frac{(2n+1)a - x}{2\sqrt{\nu t}} \right] \quad (1)$$

where s = draw down; s_0 = constant draw down at $x = -a$; x = distance from the drain; t = time; $\nu = T/S$ = hydraulic diffusivity in which T = transmissivity; S = storage coefficient; a = width of finite strip aquifer along x axis; n = a positive integer; and erfc( ) = complementary error function.

The time dependent discharge Q of the aquifer from both sides of the drain, per unit length, resulting from a step drawdown in the stage, at $x = -a$, is [Carslaw and Jaeger (1978); see page 97, equations 12 and 13)]

$$Q = \frac{4Ts_0}{a} \sum_{n=0}^{\infty} \exp \left[-\frac{(2n+1)^2 \pi^2 \nu t}{4a^2} \right] \quad (2a)$$

or

$$Q = \frac{2Ts_0}{\sqrt{\pi \nu t}} \left[1 + 2 \sum_{n=1}^{\infty} (-1)^n e^{-(n^2 a^2)/(\nu t)} \right] \quad (2b)$$

For very small values of time, the exponentials in (2b) may be replaced by zero, then it becomes

$$Q = \frac{2Ts_0}{\sqrt{\pi \nu t}} = \frac{2s_0}{\sqrt{\pi t}} \sqrt{TS} \quad (3a)$$

Obviously, when the time is small, such that the flow behavior in the aquifer has not been affected by the no-flow boundary at $x = 0$ yet; the discharge formula is the same as the one for the semiinfinite aquifer case [see, for example, Lohman (1972); page 43, equation (120); and Rorabaugh (1964); equation 4]. Eq. (2a), when t is sufficiently large, may be approximated by taking only the first term in the series (Rorabaugh 1964)

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REMEDIAL INVESTIGATION REPORT FOR THE CAMP PHARSALIA SITE SOUTH PLYMOUTH, NEW YORK

NYSDEC Site No.: 7-09-013

February 26, 2003

Submitted to:

Mr. Robert Thompson
New York State Department of Environmental Conservation
Bureau of Eastern Remedial Action
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Albany, New York 12233-7015

Prepared by:

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Reference 2

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Shaw Environmental, Inc.

Tanjia Maynard
Project Manager

Reviewed By:
Shaw Environmental, Inc.

David Stoll
Senior Project Manager

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3.0 INVESTIGATION RESULTS

The results from the remedial investigation are presented in the following sections. A description of the site's physical characteristics, the nature and extent of chemical impacts and the results from the exposure assessments are provided.

3.1 Physical Characteristics

3.1.1 Regional Geology

The Northern part of Chenango County is located on a plateau known as the Appalachian Uplands. The plateau is mature and eroded, and is dissected by a series of valleys that are several hundred feet deep. The major valleys on the plateau have a north-south orientation. The high plateau is characterized by large, rounded, bedrock controlled hills and ridges with nearly level hilltops at a similar elevation reflecting the nearly horizontal character of the underlying bedrock. Because of stream dissection and deepening of valleys by glacial scour, the plateau uplands have a rugged, rolling appearance. The rounded shoulders of the hills and steep lower valley sides are also indications of glacial modification.

Regional bedrock consists of an Upper Devonian Formation which includes Tully Limestone, Ithaca Siltstone and Sandstone and Geneseo Shales. The bedrock lies nearly flat, exhibiting a slight regional dip to the south of about 50 feet per mile.

3.1.2 Site Specific Geology

Observations of the site specific subsurface conditions were made during the Preliminary Investigation and this remedial investigation. In general, the upper four feet of overburden consists of brown topsoil with gravel, sand fill with gravel and cobbles or silty clay with gravel and shale fragments. This surface layer is likely fill material placed as a base for buildings and staging treated and untreated lumber. Beneath the fill is glacial lodgement till consisting of clay, sand, silt, and shale cobbles and boulders with clay and sand lenses. The till varies in color including grey, tan, red-brown, and brown. The lodgement till continues to depths of at least 30 feet (which was the vertical extent of both investigations). The till is very dense, as evidenced by the very difficult drilling conditions and high blow counts encountered during monitoring well installations. Observations during drilling and review of boring logs confirms that the upper 13 feet of the till unit contains numerous discontinuous lenses of more permeable sands and fine

gravel that may or may not be interconnected through fractures within the till. A Geologic Cross Section Map is presented as **Figure 5.**

A drinking water well (well #1) was installed in 1981, approximately 250 feet northeast of the treatment plant, to a total depth of 300 feet below ground surface (bgs). Soft shale bedrock was encountered at approximately 134 feet bgs. Clay seams were present between 107 feet and 134 feet bgs. Soft grey sandstone with clay lenses were present from approximately 134 to 140 feet bgs. From 140 to 300 feet the bedrock consisted of a grey shale unit interbedded with thin layers of grey sandstone. Two other drinking water wells also exist on site. Well #2 is located approximately 210 feet north-northeast of the treatment plant and well #3 is located 700-1000 feet north-northeast of the treatment plant. Well #3 was installed after June 2001. All three drinking water wells are located at the correctional facility.

3.1.3 Regional Hydrogeology

Camp Pharsalia is located approximately 1 mile east of Brakel Creek which is presumed to be the nearest discharge zone for Deer Pond. Regionally, groundwater would be anticipated to flow toward Brakel Creek, which eventually discharges into the Otselic River. Shallow groundwater in the area of the site is typically found in coarser grained glacially derived sediments or as perched water over deposits of fine grained sediments of lower permeability.

3.1.4 Site Specific Hydrogeology

Depth to groundwater was observed between approximately three (3) (PMW-1) and six (6) feet bgs (PMW-3) across the investigated area during the December 6, 2001 groundwater sampling event. Depth to groundwater was observed between approximately 2.5 (PMW-6A) and 6 (PMW-3) across the investigated area during the November 2002 sampling event. Groundwater contour maps for the December 2001 and November 2002 sampling events are included as **Figures 6A** and **6B.** Based on groundwater elevations and evaluation of topographic maps, groundwater flow appears to be in a north-northwesterly direction.

Recharge of the water table is likely provided by precipitation infiltrating areas of the property. Shallow groundwater likely exists as isolated "perched pockets" in permeable sandy lenses found within the till. Precipitation accumulates in these pockets and likely slowly disperses into the regional groundwater flow regime.

Groundwater recovery rates during the sampling event indicate that the hydraulic conductivity for the till unit is relatively low.

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Tokyo
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Reference 3

JACOB BEAR

Department of Civil Engineering
Technion—Israel Institute of Technology
Haifa
Israel

Hydraulics of Groundwater

from the volume of pore space between the two positions of the phreatic surface. The storativity of a phreatic aquifer is, therefore, sometimes referred to as *specific yield*, S_y; it gives the yield of an aquifer per unit area and unit drop of the water table (see further discussion in Sec. 6-1).

Recalling that actually the water table is an approximate concept, we understand that water is actually being drained from the entire column of soil up to the ground surface. Bear (1972, p. 485) shows that when the soil is homogeneous and the fluctuating water table is sufficiently deep, the above definition for specific yield still holds (see Sec. 6-1).

One should be careful not to identify the specific yield with the porosity of a phreatic aquifer. As water is being drained from the interstices of the soil, the drainage is never a complete one. A certain amount of water is retained in the soil against gravity by capillary forces. After drainage has stopped, the volume of water retained in an aquifer per unit (horizontal) area and unit drop of the water table is called *specific retention*, S_r. Thus

$$S_y + S_r = n \tag{5-12}$$

For this reason S_y ($< n$) is sometimes called *effective porosity*. Here, again, one should note that we have been referring to the approximate concept of a water table. However, for a homogeneous soil and a sufficiently deep water table, the above definition for S_r holds (see Sec. 6-1).

Figure 5-4 shows the relationships between S_y, S_r, and particle size.

When drainage occurs, it takes time for the water to flow, partly under unsaturated flow conditions, out of the soil volume between two positions of a water table, at t and at $t + \Delta t$. This is especially true if the lowering of the water table is rapid. Under such conditions, the specific yield becomes time dependent, gradually approaching its ultimate value (Fig. 5-5). When the water level is rising or falling slowly, the changes in moisture distribution have time to adjust continuously and the time lag vanishes. This phenomenon of time dependency of the

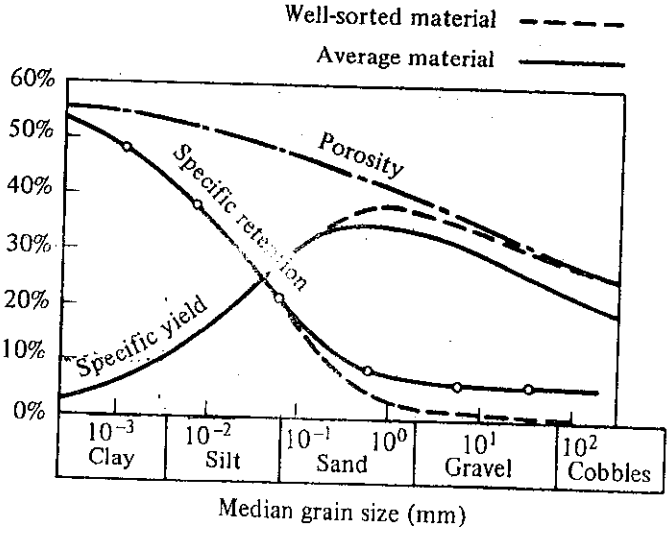

Figure 5-4 Relationship between specific yield and grain size *(from Conkling et. al., 1934, as modified by Davis and DeWiest, 1966).*

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FEASIBILITY STUDY REPORT
CAMP PHARSALIA
SOUTH PLYMOUTH, NEW YORK

Shaw Project No. 830271

February 26, 2003

Reference 4

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HEIDE-MARIE DUDEK
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LICENSED PROFESSIONAL ENGINEER

Heide Marie Dudek, P.E.
Project Engineer

2/27/03

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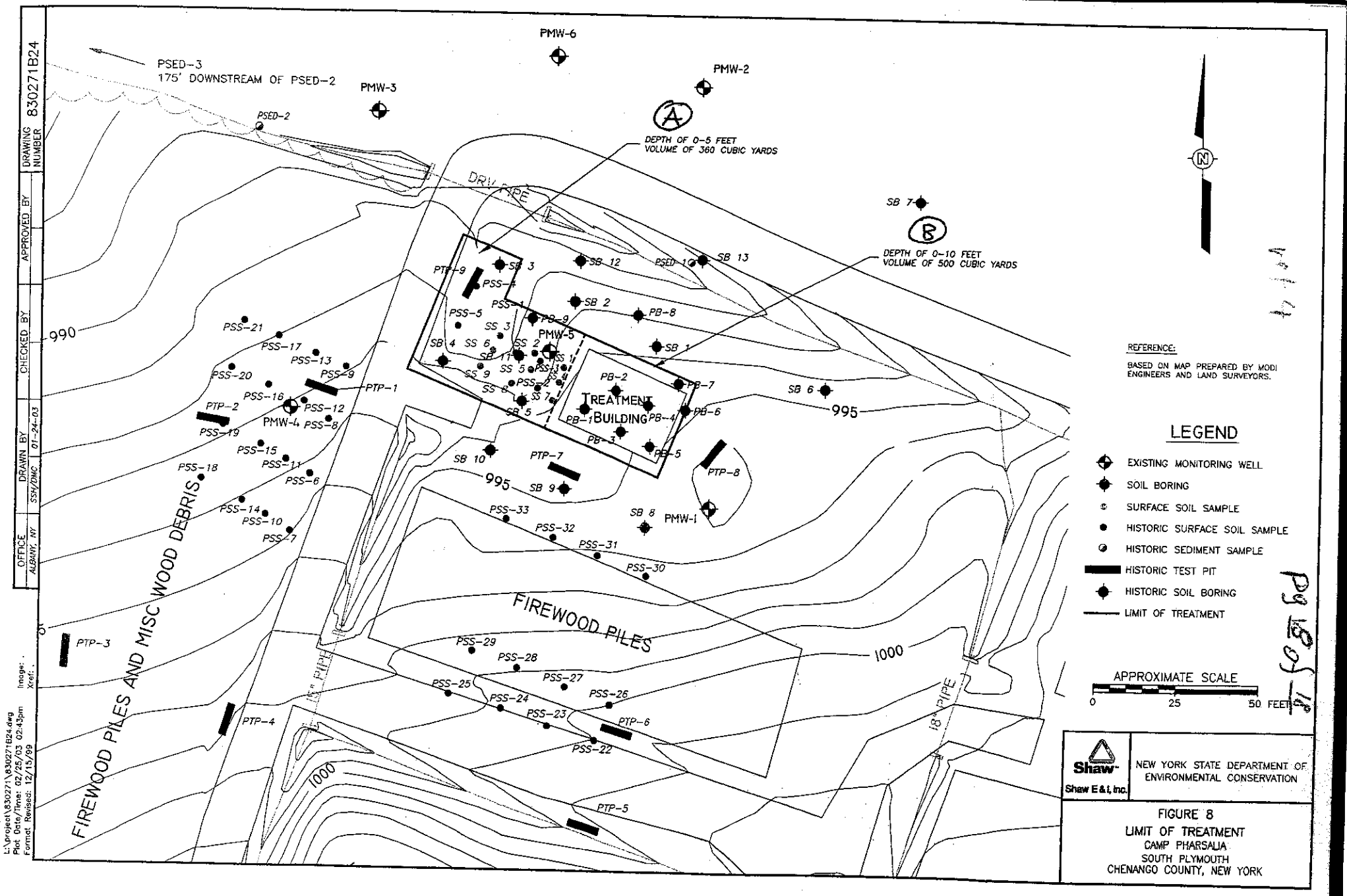
PMW-6
PMW-2
PMW-3
PSED-3
175' DOWNSTREAM OF PSED-2
PSED-2
A
DEPTH OF 0-5 FEET
VOLUME OF 360 CUBIC YARDS
B
DEPTH OF 0-10 FEET
VOLUME OF 500 CUBIC YARDS
DRY PIPE
SB 7
SB 13
SB 12
PSED-1
SB 3
SB 2
PB-8
PB-9
PMW-5
SB 1
SB 6
PB-7
PB-2
PB-1
TREATMENT BUILDING
PB-4
PB-6
PB-3
PB-5
SB 10
PTP-7
SB 9
PTP-8
SB 8
PMW-1
PMW-4
PTP-1
PTP-2
PTP-3
PTP-4
PTP-5
PTP-6
PTP-9
990
995
1000
FIREWOOD PILES AND MISC WOOD DEBRIS
FIREWOOD PILES
18" PIPE
REFERENCE:
BASED ON MAP PREPARED BY MODI ENGINEERS AND LAND SURVEYORS.
LEGEND
EXISTING MONITORING WELL
SOIL BORING
SURFACE SOIL SAMPLE
HISTORIC SURFACE SOIL SAMPLE
HISTORIC SEDIMENT SAMPLE
HISTORIC TEST PIT
HISTORIC SOIL BORING
LIMIT OF TREATMENT
APPROXIMATE SCALE
0
25
50 FEET
N
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FIGURE 8
LIMIT OF TREATMENT
CAMP PHARSALIA
SOUTH PLYMOUTH
CHENANGO COUNTY, NEW YORK
OFFICE ALBANY, NY
DRAWN BY SSH/DMC 01-24-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 830271B24
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Plot Date/Time: 02/25/03 02:43pm
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APPENDIX E

PRE-DEMOLITION BUILDING SURVEY

PRE-DEMOLITION BUILDING SURVEY
FOR ASBESTOS CONTAINING MATERIALS
CAMP PHARSALIA SITE
SITE #7-09-013
TOWN OF PHARSALIA, CHENANGO COUNTY, NEW YORK

Prepared For:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DEPARTMENT OF ENVIRONMENTAL REMEDIATION

WORK ASSIGNMENT D004440-01

Prepared By:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NEW YORK 14203

OCTOBER 2007

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FIGURES

(Following Text)

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Appendix A	URS Certifications
Appendix B	Laboratory Certifications
Appendix C	Analytical Results/Chain-of-Custody
Appendix D	Photographs

1.0 INTRODUCTION

URS Corporation (URS) was retained by New York State Department of Environmental Conservation (NYSDEC) to perform a pre-demolition building survey for asbestos-containing materials (ACM) and lead-containing materials at the Treatment Building property (facility) located at Camp Pharsalia, 496 Center Road, South Plymouth, New York. As part of the remediation of Camp Pharsalia, the Treatment Building is to be demolished. This work was performed under URS' NYSDEC Standby Contract Number D004440 Work Assignment Number 01. The pre-demolition building survey was performed as an add-on to the scope of work presented in the Camp Pharsalia Remedial Design Project Management Work Plan (URS May 2006).

1.1 Purpose and Scope

The purpose of this report is to: (1) present and summarize results of the pre-demolition survey; and (2) inventory and quantify thermal insulation and building materials that contain asbestos of both the interior and exterior of the building.

The ACM survey was performed in accordance with applicable guidelines provided in New York State (NYS) Industrial Code Rule No. 56, the United States Environmental Protection Agency (USEPA) under Asbestos Hazard Emergency Response Act (AHERA), and in accordance with United States Occupational Safety and Health Administration (OSHA) requirements.

The scope services for the ACM survey included the following tasks:

- Review of all available site/facility plans and past ACM studies at the facility
- Conduct visual inspections to identify suspect ACM inside and outside of the building.

- Collect discrete physical samples of each type of suspected ACM (e.g., floor tiles, mastic, pipeline insulation, window glazing, roofing, flashing, plaster, ceiling tiles, thermal insulation, transite panels, cove base molding, etc.)
- Document each sample location and the locations where ACM was identified
- Laboratory analysis of all samples to determine asbestos type and content
- Delineate the locations and estimate quantities of ACM in the building
- Prepare a summary report

1.2 Background

The treatment building, located at Camp Pharsalia, 496 Center Road in the Town of Pharsalia, Chenango County, New York is presently vacant. URS personnel performed the asbestos surveys on September 5, 2007.

1.3 Consultant's License and Certification

URS personnel conducting the ACM survey have completed the New York State mandated asbestos training and hold a current license and certification. Copies of the license and certification are contained in Appendix A.

1.4 Laboratory Accreditation

EMSL Analytical, Inc. of Depew, New York (EMSL) performed the laboratory analysis of the samples. The laboratory is approved by the New York State Department of Health (NYSDOH) Wadsworth Center's Environmental Laboratory Approval Program (ELAP) and is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to analyze bulk samples for asbestos. Copies of the laboratory's certifications are presented in Appendix B.

2.0 FIELD ACTIVITIES

A thorough visual inspection of the interior and exterior of the building was performed on September 5, 2007 to identify suspected ACM. In addition, the presence of any suspected lead-containing material (e.g., paint, caulking) was included in the visual inspection. No suspected lead-containing material was identified during the inspection.

2.1 Asbestos-Containing Material Survey

The visual inspection of the interior and exterior of the building identified suspected ACM. Suspected ACM observed included asphalt shingles and tar paper.

Following the visual inspection, a total of 6 bulk samples of suspected ACM were collected for analysis (see Section 3 for types of analysis performed). Representative bulk samples were collected from each type of material using an asbestos core sampler and other miscellaneous sampling tools. Each sample was placed in a sample bag marked with the sample identification number. Following the collection of the bulk sample, the sampled surface was sealed as not to allow ACM from becoming airborne. The samples were submitted to the laboratory under proper chain of custody. The chain-of-custody forms are contained in Appendix C. A discussion of the sampling performed in each area is presented in the following section.

2.1.1 Camp Pharsalia Treatment Building – Ground Floor

The ground floor area of the treatment building was visually inspected for ACM. No suspect material was identified during the visual inspection. Therefore, no samples were collected. The area inspected is shown on Figure 1.

2.1.2 Camp Pharsalia Treatment Building - Roof

The roof was visually inspected for ACM. Possible asbestos-containing materials included, green asphalt shingles and black tar paper. Six bulk samples (CP-201-1 through CP-201-6) were collected from the locations shown on Figure 2.

3.0 ANALYTICAL RESULTS

3.1 Asbestos-Containing Material

Two sets of three (six total) bulk samples were delivered to EMSL under chain-of-custody for analysis. One set of samples were representative of the asphalt shingles. The second set of samples were representative of the tar paper.

One asphalt shingle sample (CP-201-1) and one tar paper sample (CP-201-4) were to be initially analyzed. Pending the results of the first analyses, the remainder of the samples would undergo analysis, if necessary. The bulk samples were analyzed for asbestos using Polarized Light Microscopy (PLM). Both bulk samples analyzed were considered Non-Friable Organically Bound (NOB) materials (e.g., asphalt shingles and tar paper). Therefore the remaining 4 samples did not require analysis. The PLM analysis produced a negative result on the NOB bulk samples, therefore the samples were also analyzed using Transmission Electron Microscopy (TEM). Of the 2 NOB bulk samples analyzed, all were “no asbestos detected”, therefore the remaining four samples did not require analysis. Under New York State Department of Labor regulations, a material is considered to be asbestos-containing if the percentage of asbestos is greater than 1 percent (1%) by weight. The analytical results can be found in Appendix C.

4.0 ASBESTOS INVENTORY

Based on the analytical results, no asbestos containing material was identified. Therefore, re-inspection, delineation, and estimation of quantities of ACM were not needed.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the analytical results no asbestos containing material was identified.

5.2 Recommendations

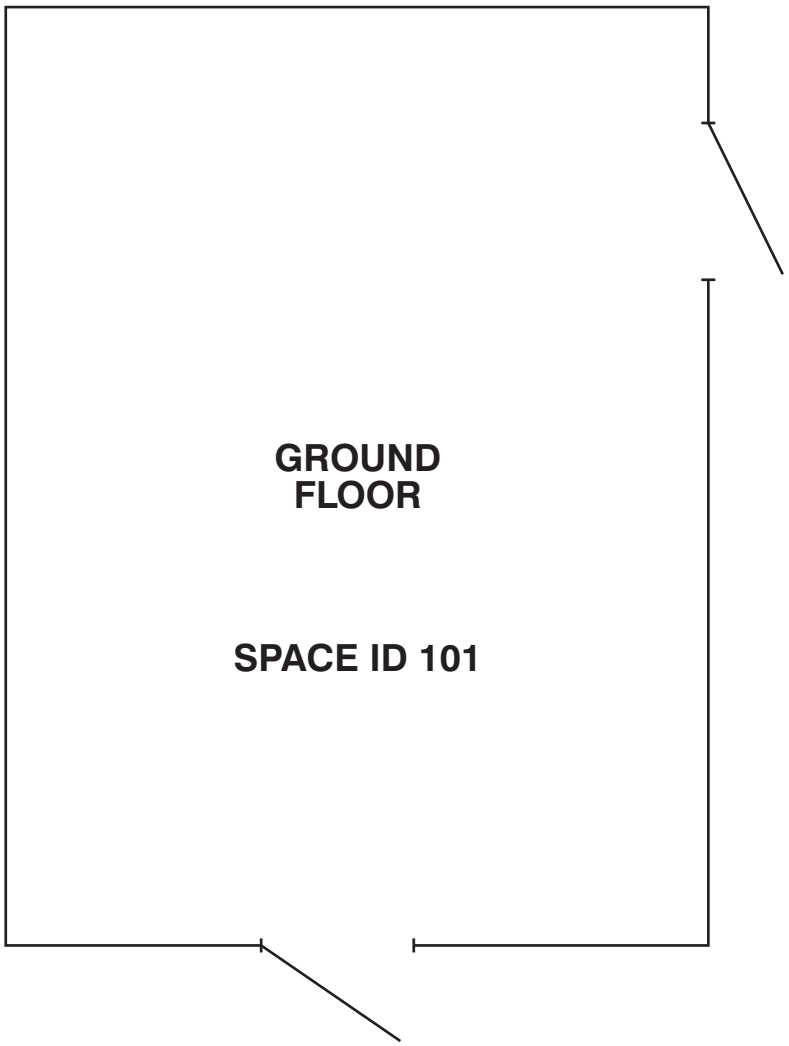
Based on the analytical results URS recommends that if any suspect material is encountered during demolition activities that was not identified and/or sampled during the pre-demolition survey, the suspect material be sampled and analyzed or treated as ACM. All suspect materials that have **not** been identified, sampled, and confirmed to be non ACM materials in this pre-demolition survey are to be identified as ACM that will be impacted by demolition activities and must be removed by a licensed asbestos abatement contractor in accordance with NYS Industrial Code Rule No. 56 and all applicable OSHA and USEPA NESHAP regulations.

6.0 LIMITATIONS

URS conducted this pre-demolition asbestos survey as an additional task, which was not included in the scope of work as presented in the Camp Pharsalia Remedial Design Project Management Work Plan (URS May 2006). URS has endeavored to investigate the existing conditions at the facilities using general accepted asbestos survey methods and procedures. Regardless of the thoroughness of a survey, it is possible that some areas containing asbestos were inaccessible to the surveyor. This report presents general descriptions of various construction materials and the general locations where these materials were encountered. Intrusive sampling was not conducted for this survey; therefore, buried, covered, or inaccessible areas may contain asbestos not found during this survey. Buried materials may become visible during construction activities. If suspect materials that were not previously sampled are uncovered during construction activities, they should be tested prior to further disturbance of the area. Materials for which sampling and analysis has not been completed to determine asbestos content should be treated as ACM until analysis is completed.

The conclusions presented in this report are professional opinions based on the data described in this report. They are intended only for the purpose, the location, and the project indicated. Changes in applicable standards may occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control. Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

FIGURES



LEGEND
No Suspect Material Identified

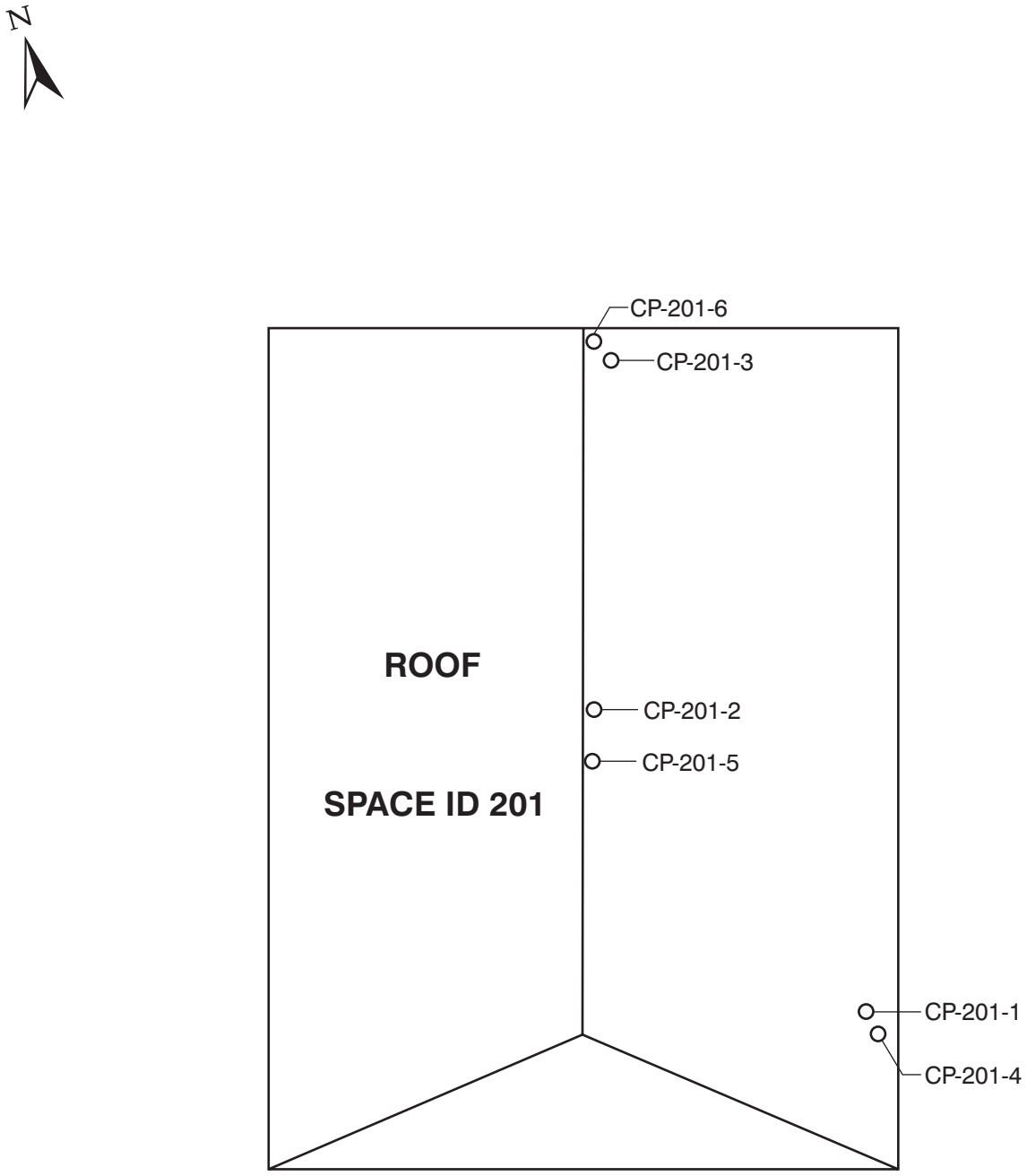
NOT TO SCALE

URS

CAMP PHARSALIA
TREATMENT BUILDING GROUND FLOOR LEVEL
ASBESTOS BULK SAMPLE LOCATIONS

FIGURE 1

AG19836-11174680-091407-GCM



LEGEND
○ - Asbestos Bulk Sample Location

NOT TO SCALE

URS	CAMP PHARSALIA TREATMENT BUILDING ROOF LEVEL ASBESTOS BULK SAMPLE LOCATIONS	FIGURE 2

AG19837-11174680-091407-GCM

APPENDIX A

URS CERTIFICATIONS

STATE OF NEW YORK - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
License and Certificate Unit
BUILDING 12, STATE CAMPUS
ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

RESTRICTED LICENSE
Asbestos Removal Not Permitted

Contractor: URS CORPORATION-NEW YORK
5 PENN PLAZA
15TH FLOOR
NEW YORK, NY 10001

LICENSE NUMBER: 95-0274
DATE OF ISSUE: 3/15/2007
EXPIRATION DATE: 3/31/2008

Duly Authorized Representative: KURTIS W. STOKES

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

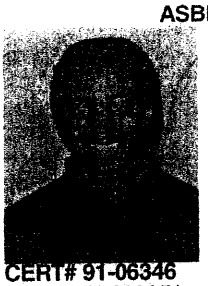
This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

SH 432 (6-03)

Maureen Cox, Director
FOR THE COMMISSIONER OF LABOR

STATE OF NEW YORK - DEPARTMENT OF LABOR

ASBESTOS CERTIFICATE



DAVID D COFIELD JR.
CLASS(EXPIRES)
C ATEC(11/07) C INSP(11/07)
H PM (11/07) I PD (11/07)

CERT# 91-06346
DMV# 407190051
MUST BE CARRIED ON ASBESTOS PROJECTS

EYES BRO
HAIR BLK
HGT 5' 07"

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 290A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

APPENDIX B

LABORATORY CERTIFICATIONS

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2008
Issued April 01, 2007
Revised April 24, 2007

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. KENNETH NAJUCH
EMSL ANALYTICAL INC
490 ROWLEY ROAD
DEPEW, NY 14043

NY Lab Id No: 11606
EPA Lab Code: NY01278

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Miscellaneous

Asbestos	EPA 100.1
	EPA 100.2

Serial No.: 33578

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2008
Issued April 01, 2007

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. KENNETH NAJUCH
EMSL ANALYTICAL INC
490 ROWLEY ROAD
DEPEW, NY 14043

NY Lab Id No: 11606
EPA Lab Code: NY01278

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Miscellaneous Air

Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
Fibers	NIOSH 7400 A RULES

Serial No.: 33020

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 486-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2008
Issued April 01, 2007

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. KENNETH NAJUCH
EMSL ANALYTICAL INC
490 ROWLEY ROAD
DEPEW, NY 14043

NY Lab Id No: 11606
EPA Lab Code: NY01278

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	EPA 600/M4/82/020
	Item 198.1 of Manual
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	ITEM 198.4 OF MANUAL

Serial No.: 33019

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200056-0

EMSL Analytical, Inc.

Depew, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2007-07-01 through 2008-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMSL Analytical, Inc.
490 Rowley Road
Depew, NY 14043
Mr. Kenneth J. Najuch
Phone: 716-651-0030 Fax: 716-651-0394
E-Mail: knajuch@emsl.com
URL: http://www.emsl.com/

BULK ASBESTOS FIBER ANALYSIS (PLM) **NVLAP LAB CODE 200056-0**

NVLAP Code	*Designation / Description*
18/A01	EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

2007-07-01 through 2008-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200056-0

EMSL Analytical, Inc.

Depew, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

AIRBORNE ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2007-07-01 through 2008-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMSL Analytical, Inc.
490 Rowley Road
Depew, NY 14043
Mr. Kenneth J. Najuch
Phone: 716-651-0030 Fax: 716-651-0394
E-Mail: knajuch@emsl.com
URL: http://www.emsl.com/

AIRBORNE ASBESTOS FIBER ANALYSIS (TEM) NVLAP LAB CODE 200056-0

NVLAP Code	*Designation / Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

2007-07-01 through 2008-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

APPENDIX C

ANALYTICAL RESULTS/CHAIN-OF-CUSTODY

EMSL Analytical, Inc.
490 Rowley Road, Depew, NY 14043
Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **David Cofield Jr.**
URS Corporation
77 Goodell Street
Buffalo, NY 14203

Fax: (716) 856-2545 Phone: (716) 856-5636
Project: **11174680.00003 / 3191 Crumb Hill Road**

Customer ID: URSG50
Customer PO:
Received: 09/07/07 8:00 AM
EMSL Order: 140704898

EMSL Proj:
Analysis Date: 9/18/2007
Report Date: 9/29/2007

Asbestos Analysis of Non-Friable Organically Bound Materials by PLM via the NY State ELAP 198.6 Method

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
CP-201-1 *140704898-0001*	green asphalt shingles	Green	100.0	None	Inconclusive: No Asbestos Detected
CP-201-4 *140704898-0004*	black tar paper	Black	100.0	None	Inconclusive: No Asbestos Detected

Analyst(s)
Brian Walczak (2)

Rhonda McGee

Rhonda McGee, Laboratory Manager
or other approved signatory

*Polarized Light Microscopy (PLM) is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative Transmission Electron Microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. The test results contained within this report meet the requirements of NELAC unless otherwise noted.EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except infull, without written approval by EMSL. The above test report relates onlyto the items tested. EMSL bears no responsibility for sample collectionactivities or analytical method imitations. Unless otherwise noted, the results in this report have not been blank corrected.Samples received in good condition unless otherwise noted.

ACCREDITATIONS: NVLAP #200056-0 and NY STATE ELAP #11606

NYS198-2

THIS IS THE LAST PAGE OF THE REPORT.

EMSL Analytical, Inc.
490 Rowley Road, Depew, NY 14043
Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **David Cofield Jr.**
URS Corporation
77 Goodell Street
Buffalo, NY 14203

Fax: (716) 856-2545 Phone: (716) 856-5636
Project: **11174680.00003 / 3191 Crumb Hill Road**

Customer ID: URSG50
Customer PO:
Received: 09/07/07 8:00 AM
EMSL Order: 140704898

EMSL Proj:
Analysis Date: 9/28/2007
Report Date: 9/29/2007

Asbestos Analysis of Non-Friable Organically Bound materials by Transmission Electron Microscopy via NYS ELAP Method 198.4

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES	% TOTAL ASBESTOS
CP-201-1 *140704898-0001*	green asphalt shingles	Green	100.0	None	No Asbestos Detected	
CP-201-4 *140704898-0004*	black tar paper	Black	100.0	None	No Asbestos Detected	

Analyst(s)

Ken Najuch (2)

Rhonda McGee

Rhonda McGee, Laboratory Manager
or other approved signatory

NYTNOB-2

THIS IS THE LAST PAGE OF THE REPORT.

ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

140704898

Client: NYSDEC
Project: Camp Pharsalia, NY 13072
Building/Location: 3191Crumb Hill Road
Contact: David Cofield Jr. (716) 856-5636 Ext.1330
Fax Results to: David Cofield Jr. (716) 856-2545
Mail Report and Invoices to: _____
URS Corporation 77 Goodelle Street Buffalo, NY 14203

Page 1 of 1
Date: 9/5/07
Project Number: 11474480.00003
Turnaround Requested: _____ RUSH
_____ 24 Hour
_____ 48 Hour
X 3-5 Day 6-10 Day
as per phone call @ 9/6/07

Sample Number	Material Description	Sample Location	Laboratory Results PLM	TEM
CP-201-1	Green Asphalt Shingles	201 S.E. corner ROOF	ND	ND
CP-201-2	" " "	201 Central AREA ROOF	Don't	read
CP-201-3	" " "	201 NE. CORNER ROOF	Don't	anal
CP-201-4	Black Tar paper	201 S.E. CORNEL ROOF	ND	ND
CP-201-5	" " "	201 Central AREA ROOF	Don't	anal
CP-201-6	" " "	201 N.E. CORNER ROOF	Don't	anal
CP-				
CP-				
CP-				

Sampled By: DAVID COFIELD JR Date: 9/5/07 Time: _____
Received By: DAVID Date: 9/7/07 Time: 8 AM
Reliquished By: DAVID COFIELD JR Date: 9/6/07 Time: _____
Received By: _____ Date: _____ Time: _____

Comments: Please Read PLM sample to the First Positive if negative read (1) TEM (N

APPENDIX D

PHOTOGRAPHS

PHOTOS
CAMP PHARSALIA TREATMENT BUILDING
496 CENTER ROAD
SOUTH PLYMOUTH, NEW YORK