

CCR RULE COMPLIANCE

ASH FILTER PONDS LINER CERTIFICATION REPORT

Prepared for:



GenOn Northeast Management Company
Conemaugh Generating Station
New Florence, Pennsylvania

Prepared by:



CB&I Environmental & Infrastructure, Inc.
Pittsburgh, Pennsylvania 15235

August 2016

Table of Contents

1.0	Introduction	1
2.0	Field Investigation	3
2.1	Historical Information/Basis for Field Investigation	3
2.2	August 2015 Field Investigation	3
3.0	Geotechnical Laboratory Testing Results	6
3.1	Natural Moisture Content.....	6
3.2	Soil Classification	6
3.3	Unit Weight.....	7
3.4	Hydraulic Conductivity.....	7
4.0	Conclusions	8
5.0	Professional Engineer Certification	9
6.0	References	10

Table 1 – Summary of Geotechnical Testing Results

Figure 1 – Pond “B” Boring Locations

Figure 2 – Pond “B” Liner System Cross-Sections

Attachment A – “As-Built” Reference Drawing No. D-782-008

Attachment B – Boring Logs

Attachment C – Photographs

Attachment D – Geotechnical Laboratory Report

1.0 Introduction

On December 19, 2014, the administrator of the United States Environmental Protection Agency signed the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities final rule (the Rule). The Rule was published in the Federal Register on April 17, 2015, became effective on October 19, 2015, and is contained within amended portions of Title 40, Part 257 of the Code of Federal Regulations (CFR). The Rule establishes a comprehensive set of requirements for the disposal/management of CCR in landfills and surface impoundments at coal-fired power plants under Subtitle D of the Resource Conservation and Recovery Act. These requirements include compliance with location restrictions, design criteria, operating criteria, groundwater monitoring and corrective action criteria, and closure and post-closure care aspects. The design criteria include requirements for documenting the presence of an appropriate liner system in new/expanded CCR landfills and in new/existing CCR surface impoundments. Specific to existing surface impoundments, §257.71(a)(1)(i-iii) of the Rule obligates the owner/operator of such CCR units to document (no later than October 17, 2016) whether or not the unit was constructed with a liner system that satisfies one of the following:

- A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec);
- A composite liner that meets the requirements of §257.70(b); or
- An alternative composite liner that meets the requirements of §257.70(c).

Per §257.71(b) of the Rule, documentation generated in this regard must be certified by a registered professional engineer. In addition to being placed in the facility's operating record, this documentation must be noticed to the State Director per §257.106(f)(3) and posted on the publicly accessible website per §257.107(f)(3).

The Conemaugh Generating Station, which is operated by GenOn Northeast Management Company (a subsidiary of NRG Energy, Inc. [NRG]), is a coal-fired power plant located in New Florence, Pennsylvania. At the Station, four Ash Filter Ponds (Ponds "A", "B", "C", and "D" [see Figure 1]) are utilized as part of bottom ash management operations, receiving ash transport water via gravity flow from the adjacent hydrobins. The Ponds facilitate settling of ash particles from the transport water, and are periodically cleaned out to remove the accumulated bottom ash, which is then taken to the Station's on-site CCR landfill for disposal. Having been deemed as existing CCR surface impoundments, the Ponds are thus subject to the requirements of §257.71 of the Rule pertaining to liner system design criteria.

Accordingly, NRG engaged the services of CB&I Environmental & Infrastructure, Inc. (CB&I) to conduct a review of available design/construction information for the Ponds, and for the development and implementation of a field investigation program to visually examine the liner system and gather samples for geotechnical testing. These efforts were undertaken during August through September 2015, with the field investigation component focused on Pond “B”, which had been taken out of service for maintenance and afforded the ability to bring the necessary personnel, resources, and equipment into the “empty” footprint of the pond.

This Report has been prepared to summarize the activities performed as part of the Pond “B” liner system investigation, and to provide documentation required by the Rule, including certification of the findings by a professional engineer. Beyond this introductory section, Section 2.0 provides a description of the field investigation, Section 3.0 details the results of the geotechnical laboratory testing program, and Section 4.0 presents overall conclusions. Section 5.0 contains the professional engineer certification, and Section 6.0 lists the references that were consulted during performance of the work.

2.0 *Field Investigation*

2.1 *Historical Information/Basis for Field Investigation*

From review of available historical information, design modifications to the ponds were approved by the Pennsylvania Department of Environmental Resources (PADER) with issuance of Water Quality Management Permit No. 3283201 on November 5, 1984. These modifications included installation of an upgraded liner system in each of Ponds #1, #2, and #3 (presently designated as Ponds “A”, “B”, and “C”), along with the new construction of Pond #4 (presently designated as Pond “D”) also to include this same upgraded liner system. Design and subsequent as-built drawings (see “As-Built” Reference Drawing D-782-008 in Attachment A) further elaborated on this upgraded liner system, which was shown to consist (from top to bottom) of a 2.5-foot thick protective bottom ash layer; a 1.5-foot thick layer of American Association of State Highway and Transportation Officials (AASHTO) No. 8 coarse aggregate for pond dewatering; 1.5 feet of impervious fill in which the pond dewatering pipes are located and imbedded with AASHTO No. 8 coarse aggregate; and 2 feet of soil liner comprised of a 0.67-foot (8-inch) bentonite-amended compacted soil layer underlain by an additional 1.33 feet (16 inches) of compacted soil. The total liner system thickness was designed to be 7.5 feet, of which the thickness of the compacted soil component was to be 2 feet. The upgraded liner system on the interior slopes of the Ponds was represented by 2 feet of bentonite-amended soil overlain by a 1.5-foot thick layer of AASHTO R-3 riprap as a protective rock lining. The construction of Pond #4 (Pond “D”) and the liner system retro-fit for Pond #3 (Pond “C”) were completed during the latter half of 1985, followed by completion of the liner system retro-fits in Ponds #1 and #2 (Ponds “A” and “B”) in 1986.

Taking the above into consideration, CB&I developed a field investigation/testing program intended to confirm that the liner system in Pond “B” had been constructed as designed, specifically evaluating the compacted soil layer in terms of satisfying the CCR Rule’s criteria for thickness (2 feet) and hydraulic conductivity (no greater than 1×10^{-7} cm/sec). Moreover, the findings from the Pond “B” investigation were intended for extrapolation over the remaining ponds to provide a collective demonstration of compliance for the remaining Ponds “A”, “C”, and “D”.

2.2 *August 2015 Field Investigation*

As part of an August 27, 2015 walk-over, preliminary boring/sampling locations were marked within the Pond “B” footprint, and identified as borings GT-1 through GT-5 (see Figure 1). Borings GT-1, GT-2, and GT-3 were located across the base of the pond, with borings GT-4 and GT-5 located on the southern and northern interior slopes, respectively. Following clearance of

the locations, CB&I's field geologist and a drilling crew (with a geotechnical drilling rig) from Terra Testing, Inc. of Washington, Pennsylvania mobilized to the Station on August 31, 2015.

Before drilling at any of the identified boring locations, a pilot test boring (TB-1, also shown on Figure 1) was advanced through the base of the pond, and continuous split-barrel samples were collected in order to confirm the components of the liner system as discussed above. Split-barrel samples were collected over the entire depth of TB-1 using the standard penetration test (SPT) in accordance with American Society for Testing and Materials (ASTM) Method D 1586. The SPT consists of raising and dropping a 140-pound hammer 30 inches and counting the number of blows required to advance the split-barrel sampler three successive 6-inch intervals. The number of blows required to drive the split-barrel sampler through the second and third 6-inch intervals is designated as the Penetration Resistance. The Penetration Resistance is a qualitative measure of the in-place consistency of cohesive soils or the in-place relative density of granular soils. Soils collected from each split-barrel sample were logged by CB&I's geologist to note color, grain size and density/consistency. The samples did serve to confirm the various layers of the liner system (aligning with those from the design drawings and spanning over an approximate 7.5-foot depth), with the consistency of the bottom-most soil layer (identified as a two-foot thick clay layer) being classified as medium-stiff to stiff, suggesting that the material was compacted when it was originally placed. A copy of the boring log for TB-1 is included in Attachment B. Upon completion, TB-1 was backfilled by R&L Development Company with materials to match the component layers encountered within the boring. Hydrated bentonite (CETCO® 30-50 mesh granular) was utilized to replace the impervious fill and clay liner layers.

Using the information derived from TB-1, efforts were then directed to drilling of borings GT-1, GT-2, and GT-3 located along the base of the pond in an east-west transect. At each boring location, a hollow-stem auger was advanced to a depth of 5.5 feet below ground surface (corresponding to the top of the clay layer), at which point a Shelby tube was pushed through the entire two-foot thickness of the clay layer from a depth of 5.5 feet to 7.5 feet below ground surface. Shelby tube samples were collected in accordance with ASTM Method D 1587. Drilling of borings GT-4 and GT-5 (located on the interior slopes) utilized similar protocols, with clearing/augering through the rip-rap protective cover down to a depth of 1.5 feet below ground surface (corresponding to the top of the clay layer on the side slopes), followed by Shelby tube sampling down to 3.5 feet below ground surface to encompass the two-foot thick clay layer. A copy of the boring logs for GT-1 thru GT-5 are included in Attachment B. Upon completion, each boring was backfilled with materials to match the component layers encountered. As intended, the Shelby tube sampling provided for the collection of relatively undisturbed samples of the clay liner that were then subjected to laboratory testing for determination of physical properties, including in-situ hydraulic conductivity, unit weight, natural moisture content, and grain-size distribution.

From the boring logs, two cross-sections were developed to depict the liner system components encountered, and are shown on Figure 2. Cross-section A-A' is an east-west profile of Pond "B" through borings GT-1, GT-2, and GT-3, while Cross-section B-B' is a north-south profile through borings GT-2, GT-4, and GT-5. Both of these cross-sections again provide confirmation that the layers encountered during the drilling match those depicted on the original design drawings. Photographs taken during performance of the field investigation program are contained in Attachment C.

3.0 Geotechnical Laboratory Testing Results

The Shelby tube samples collected during the Pond “B” investigation were hand-delivered to Geotechnics, Inc. of East Pittsburgh, Pennsylvania for laboratory analyses. The laboratory testing program was performed using standard ASTM methods and consisted of the following analyses:

- Natural moisture content (ASTM Method D 2216)
- Classification tests to determine the routine index properties of the soils, including grain-size distribution (sieve and hydrometer analysis, ASTM Method D 422), and Atterberg Limits (ASTM Method D 4318)
- Unit weight (ASTM Method D 7263)
- Hydraulic conductivity (ASTM Method D 5084)

Analytical results from the laboratory testing program are summarized on Table 1, with the complete laboratory report (prepared by Geotechnics) contained in Attachment D. As shown on Table 1, analyses were performed on Shelby tube samples collected from each of the borings, but the intervals tested were varied in order to determine the geotechnical properties throughout the entire thickness of the two-foot clay layer, and to identify any potentially significant differences in characteristics. The results of the above-listed analyses are discussed in the following sections.

3.1 Natural Moisture Content

The natural moisture content of the soil comprising the liner for Pond “B” varied from 14.1 to 19.3 percent, and offers information relative to soil plasticity and compaction. Since the natural moisture contents were all below the values reported for the liquid limit tests (Table 1), this provides indication that the soil materials behave as a plastic solid. The natural moisture content values are also reasonable (neither excessively wet nor dry) with respect to the recognized moisture content of clayey soil that is purposely placed and compacted as fill.

3.2 Soil Classification

The soil samples were assigned designations in accordance with the Unified Soil Classification System (USCS). As shown in Table 1, five of the six samples are designated as clay of low plasticity (USCS symbol CL), with the remaining sample being designated as a clayey sand (USCS symbol SC) due to a slightly increased percentage of coarse-grained materials.

3.3 Unit Weight

As-received unit weights ranged from 129.9 to 140.2 pounds per cubic foot (pcf), as bracketed by the samples collected from the upper and lower eight inches of the clay liner in boring GT-1.

3.4 Hydraulic Conductivity

The hydraulic conductivities of the soil samples ranged from 1.6×10^{-8} to 4.1×10^{-8} cm/sec, with all values meeting the Rule criteria of being no greater than 1×10^{-7} cm/sec.

4.0 *Conclusions*

The geotechnical investigation/testing program performed on the Pond “B” liner was conducted using field protocols and ASTM methods which are recognized and generally accepted engineering practice. The program included drilling a pilot boring (TB-1) to confirm the as-designed/as-built liner system, and subsequent drilling of five additional borings (GT-1 through GT-5) from which undisturbed Shelby tube samples of the soil liner (clay layer) were collected. Laboratory evaluation of each sample provided the results necessary for comparing the in-situ hydraulic conductivity of the soil liner with the requirements of the Rule.

Based on the field observations and the results of the laboratory testing, the soil comprising the Pond “B” liner is represented by two feet of compacted sandy clay/clayey sand. The in-situ hydraulic conductivity of these materials was measured and found to range from 1.6×10^{-8} to 4.1×10^{-8} cm/sec. Collectively, these findings demonstrate that the Pond “B” compacted soil liner (clay layer) fully meets the requirements of §257.71(a)(1)(i) of the Rule with regard to thickness (two feet) and hydraulic conductivity (no greater than 1×10^{-7} cm/sec).

5.0 Professional Engineer Certification

I attest to being familiar with the design standards per §257.71 of the Rule, and have personally visited and examined the Conemaugh Station Ash Filter Ponds, and further provided guidance to appropriately qualified personnel who conducted the Pond “B” Liner Investigation Program. Based on the findings/data presented herein and the performance of the program in accordance with sound/acceptable engineering practices, I hereby certify per §257.71(b) of the Rule that Pond “B” maintains a liner system compliant with the design criteria outlined in §257.71(a)(1)(i). Additionally, and based on my review/understanding of the consistent nature of construction of the remaining Ash Filter Ponds (Ponds “A”, “C”, and “D”), the results of the Pond “B” investigation provide ample justification to render this same certification on the liner systems of Ponds “A”, “C”, and “D”.

Name of Professional Engineer: Laurel C. Lopez

Company: CB&I Environmental & Infrastructure, Inc.

Signature: 

Date: 8/12/16

PE Registration State: Pennsylvania

PE Registration Number: PE-055673-E

Professional Engineer Seal:



6.0 *References*

“Addition of Ash Filter Pond No. 4 Plan and Sections – Drawing No. D-782-018 (Rev. B),” Gilbert Associates, Inc., April 6, 1984.

“Industrial Waste Application 3823201, Wastewater Treatment System Improvements, Conemaugh Generating Station,” Pennsylvania Electric Company, April 12, 1984.

“Wastewater Filter Pond Additions and Modifications, Conemaugh Station,” letter correspondence from F.L. Straw (Pennsylvania Electric Company) to J.F. Wagner (Gilbert Associates, Inc.), August 21, 1984.

“Addition of 4th Ash Filter Pond Plan, Sections, and Details – Drawing No. D-782-008 (Rev. 10),” Gilbert Associates, Inc., October 10, 1995.

Table 1

Summary of Geotechnical Testing Results

Table 1
Conemaugh Generating Station
Pond "B" Liner Investigation
Summary of Geotechnical Testing Results

Boring No.	Location	Sample Depth (ft)	Interval Analyzed	Natural Moisture Content (%)	% Gravel	% Sand	% Silt and Clay	Liquid Limit	Plastic Limit	Plastic Index	USCS ⁽¹⁾ Description	USCS Symbol	Hydraulic Conductivity (cm/sec)	Unit Wet Weight (pcf)
GT-1	Base	5.5-7.5	Upper 8"	18.4	7.69	20.54	71.76	41	17	24	Lean clay w/ sand	CL	2.6 x 10 ⁻⁸	129.9
GT-1	Base	5.5-7.5	Lower 8"	14.9	11.68	26.77	61.55	37	18	19	Sandy lean clay	CL	2.5 x 10 ⁻⁸	140.2
GT-2	Base	5.5-7.5	Lower 8"	15.7	15.61	24.17	60.22	46	16	30	Sandy lean clay w/ gravel	CL	1.8 x 10 ⁻⁸	135.6
GT-3	Base	5.5-7.5	Middle 16"	14.1	6.80	25.73	67.47	39	19	20	Sandy lean clay	CL	1.6 x 10 ⁻⁸	133.1
GT-4	Slope	1.5-3.5	Upper 8"	19.3	21.72	38.85	39.43	38	20	18	Clayey sand w/ gravel	SC	4.1 x 10 ⁻⁸	132.2
GT-5	Slope	1.5-3.5	Lower 8"	18.2	19.48	24.62	55.90	39	20	19	Sandy lean clay w/ gravel	CL	3.9 x 10 ⁻⁸	133.6

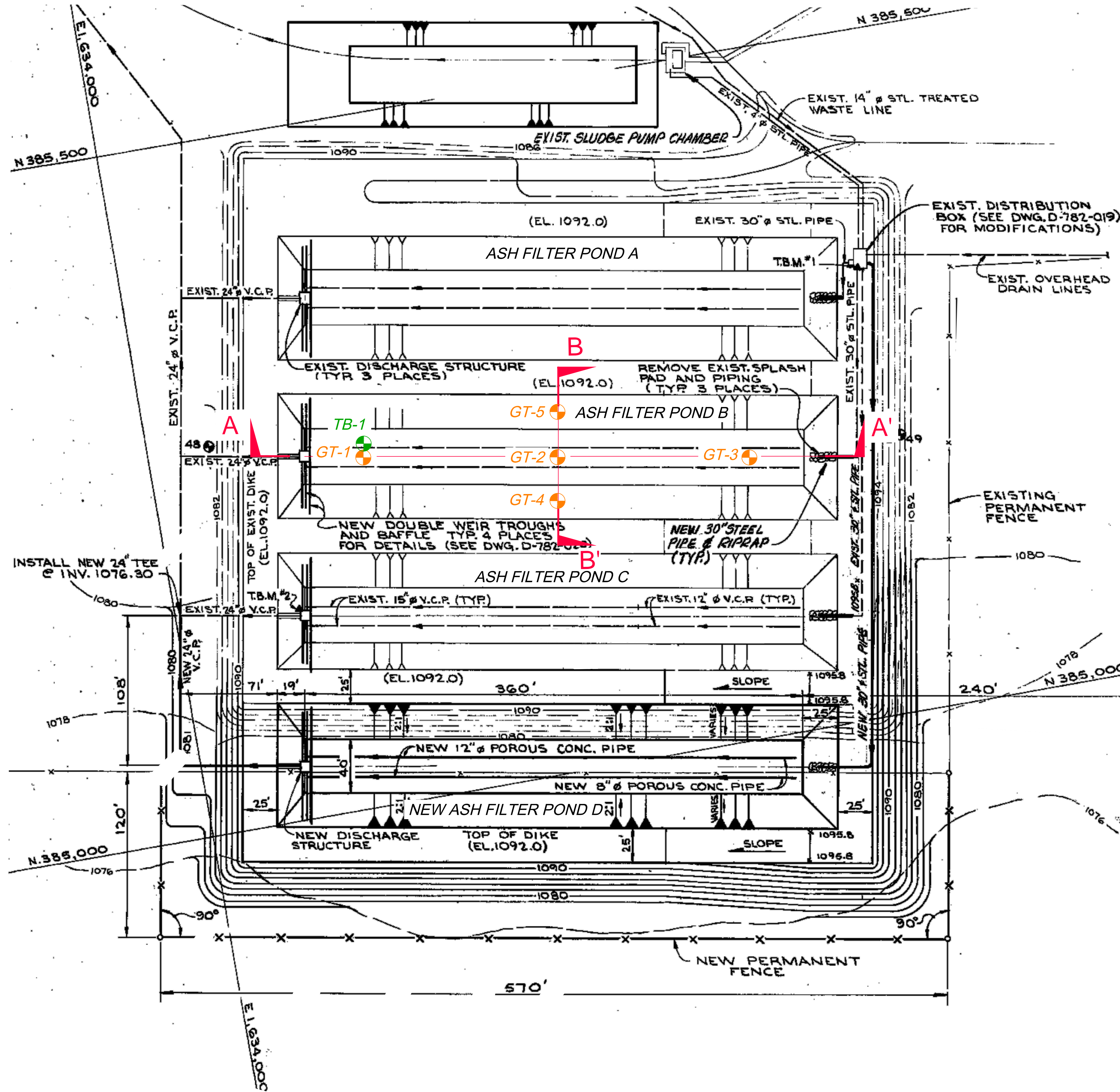
⁽¹⁾ USCS = Unified Soil Classification System.

cm/sec = centimeters per second

pcf = pounds per cubic foot

Figures

REFERENCE:
ADAPTED FROM DRAWING NO. D-782-018 (REV. B),
GILBERT ASSOCIATES, INC., APRIL 6, 1984.



LEGEND:

- TB-1 PILOT BORING
- GT-5 GEOTECHNICAL TEST BORING

NOTE:

FOR CROSS-SECTIONS A-A' AND B-B', SEE FIGURE 2.



REV	DESCRIPTION / ISSUE	DATE	APPROVED

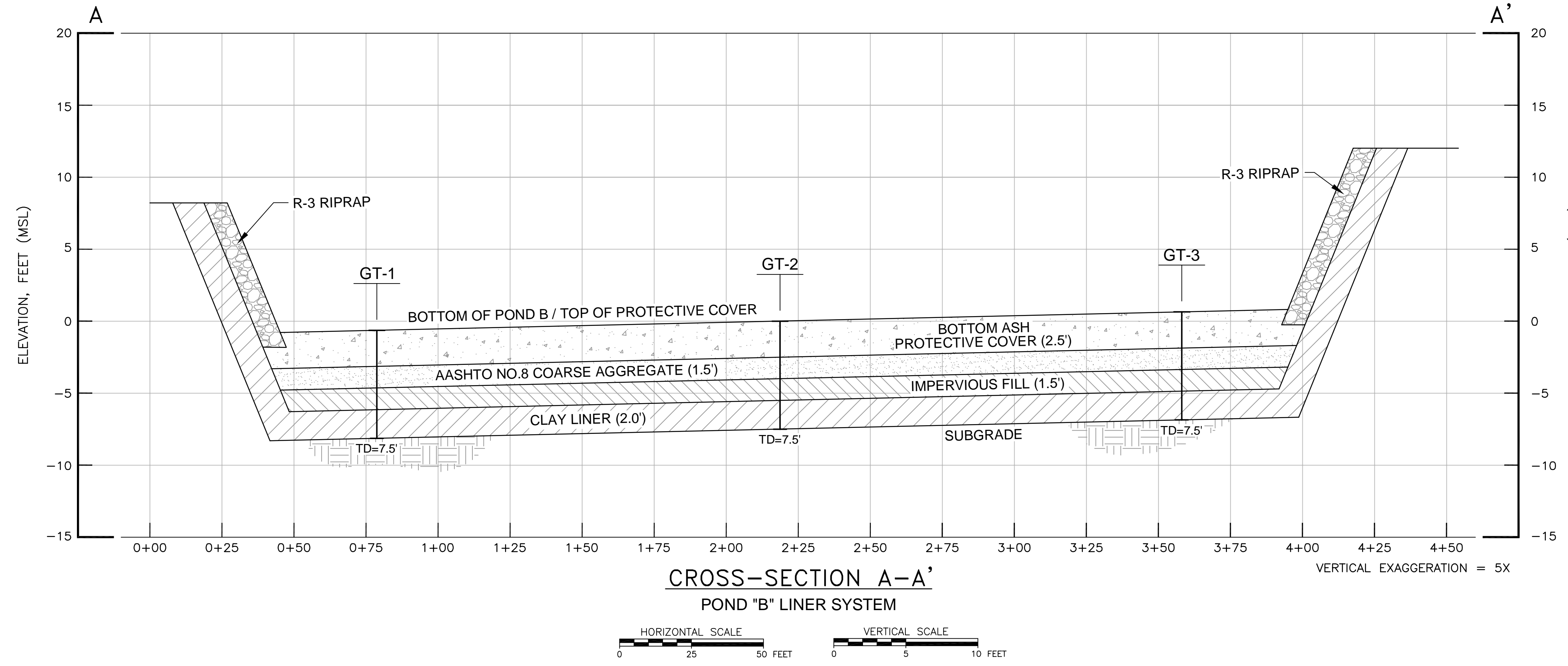
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		<p>DESIGNED BY: JAK</p> <p>DRAWN BY: AKR</p> <p>CHECKED BY: DJS</p> <p>APPROVED BY: JAK</p>	
<p>FIGURE 1 POND "B" BORING LOCATIONS CCR LINER INVESTIGATION CONEMAUGH GENERATING STATION</p>		DATE:	9/14/15
		SCALE:	AS SHOWN
DRAWING NO.	1009144001-E10	SHEET NO.	--

OFFICE
Pittsburgh, PA
DRAWING NUMBER
1009144001-E11

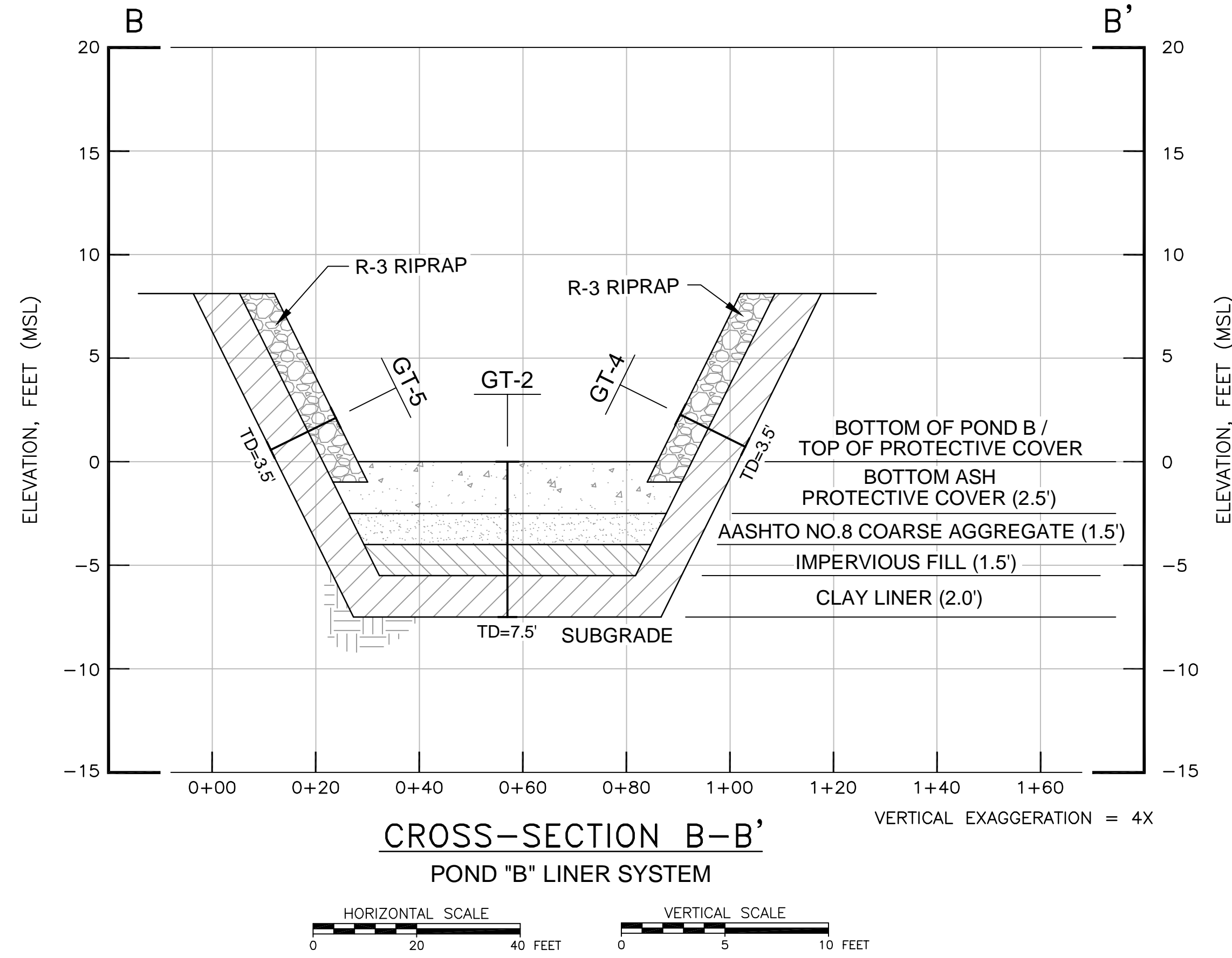
VERIFY SCALE
0 1"

Xref:
image

File: O:\PROJECT\1009144001\1009144001-E11.dwg
Plot Date/Time: Jun 22, 2016 - 10:10am
Plotted By: gregjones





CROSS-SECTION A-A'
POND "B" LINER SYSTEM



CROSS-SECTION B-B'
POND "B" LINER SYSTEM

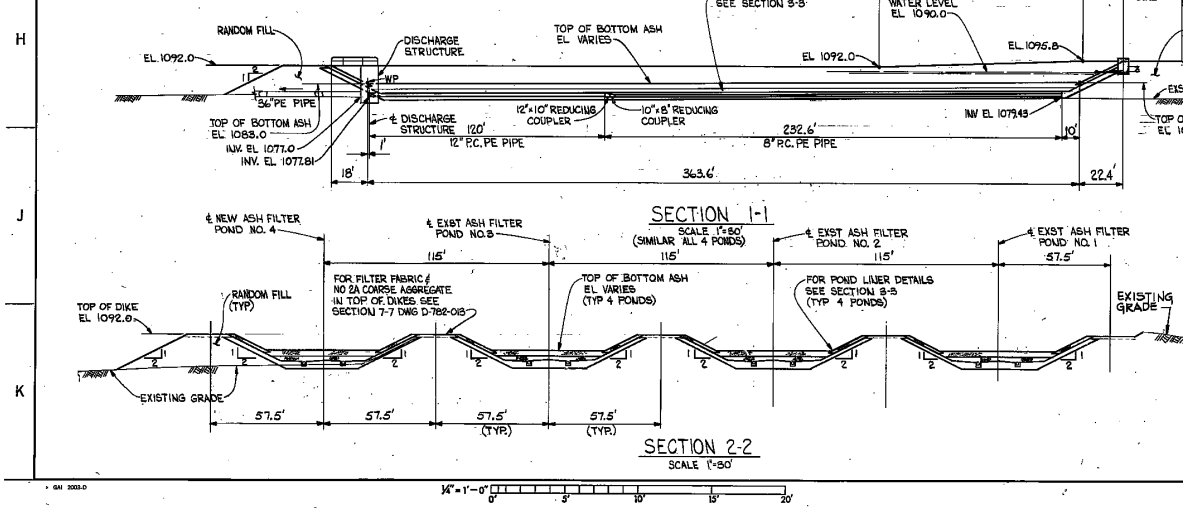
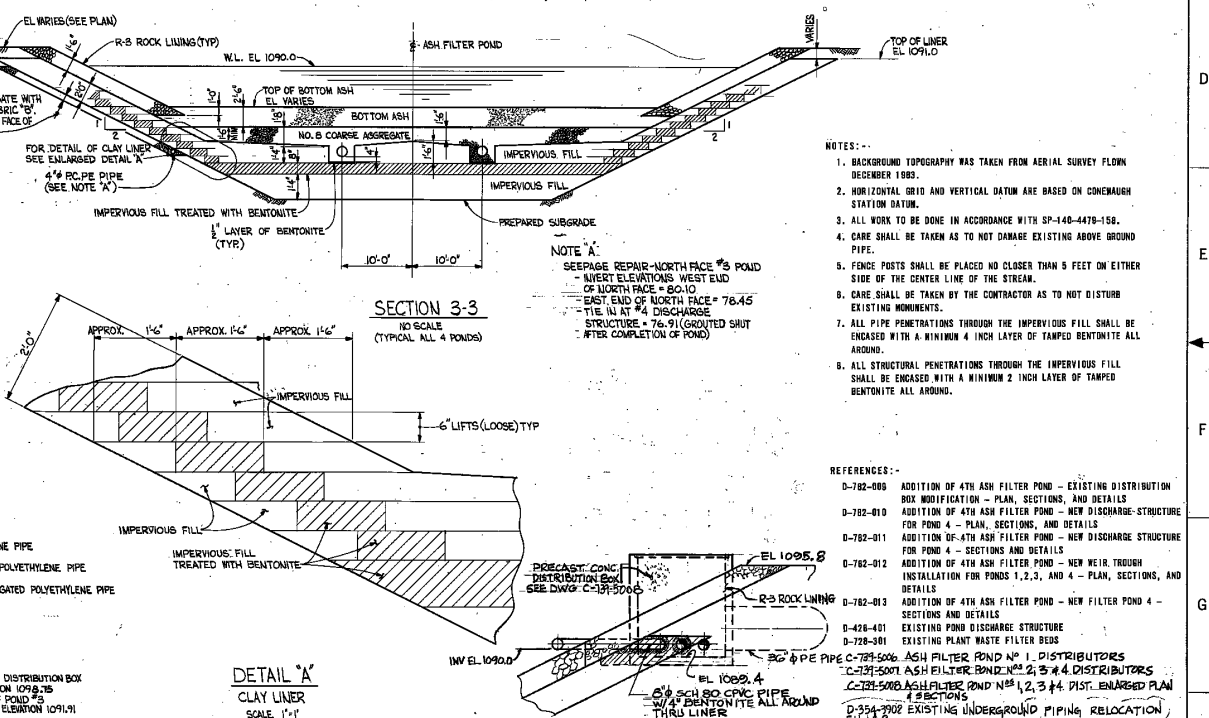
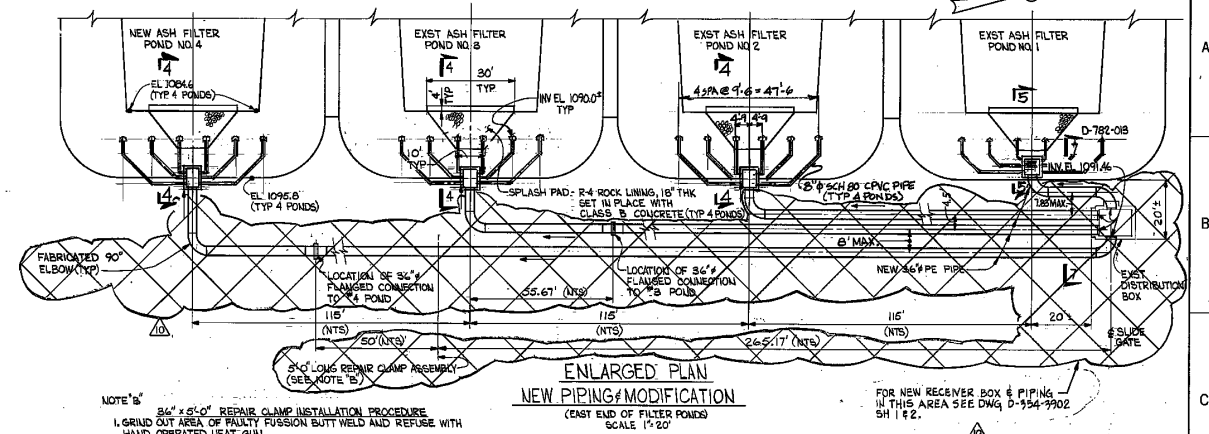
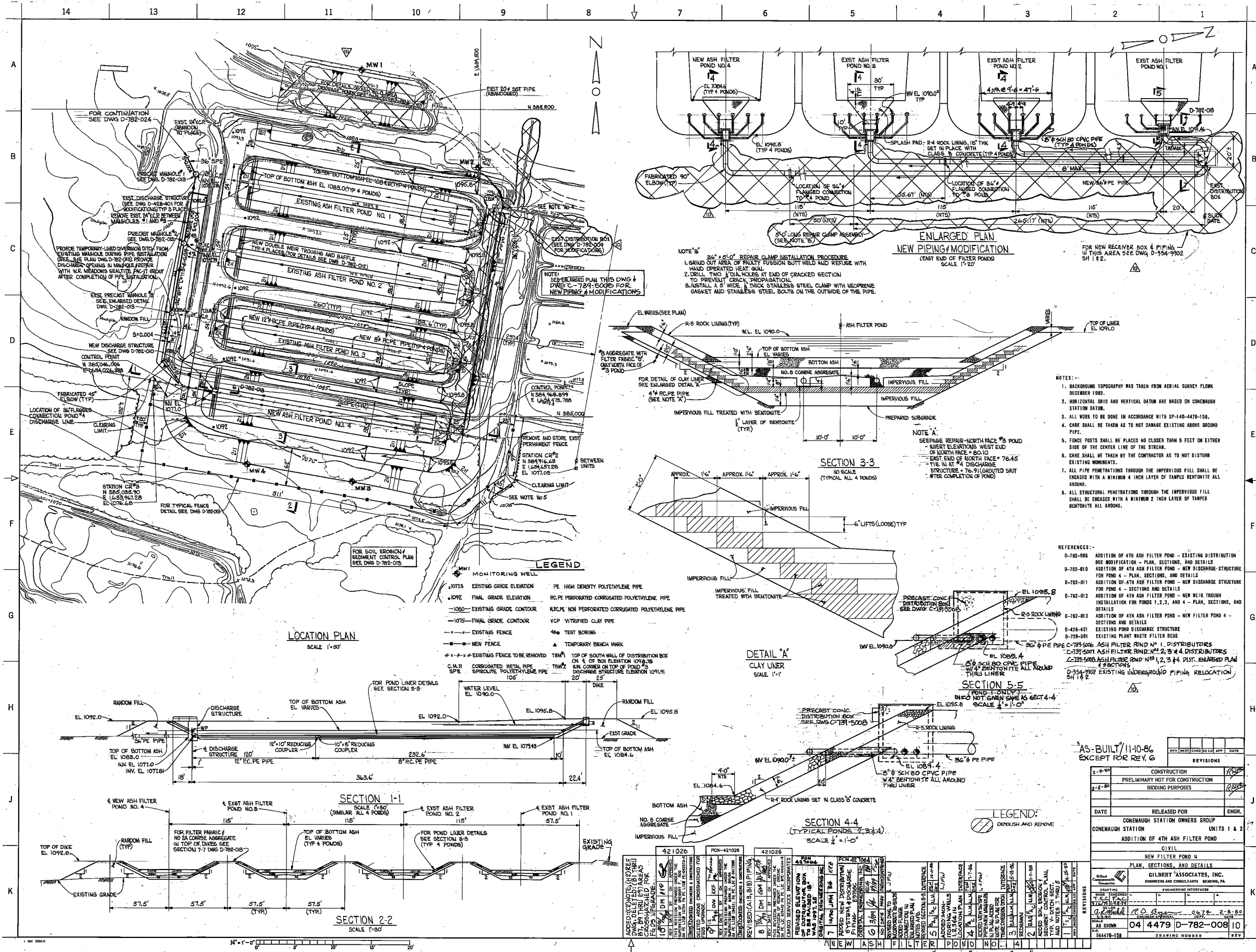
- NOTES:
1. FOR LOCATION OF CROSS-SECTIONS A-A' AND B-B', SEE FIGURE 1.
 2. THE POND BASE ELEVATIONS ARE REFERENCED TO AN ARBITRARY DATUM WITH 0 FEET MSL BEING THE ELEVATION OF THE TOP OF THE BOTTOM ASH PROTECTIVE COVER AS CORRELATED TO BORING GT-2.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

		500 Penn Center Boulevard Monroeville, PA 15146-2792	
DESIGNED BY: JAK			
DRAWN BY: ELS	FIGURE 2 POND "B" CROSS-SECTIONS A-A' AND B-B' CCR LINER EVALUATION CONEMAUGH GENERATING STATION		
CHECKED BY: DJS	APPROVED BY: JAK	DATE: 3/16/16	SHEET NO. --
	SCALE: AS SHOWN	DRAWING NO. 1009144001-E11	

Attachment A

"As-Built" Reference Drawing No. D-782-008



REFERENCES:

- D-782-009 ADDITION OF 4TH ASH FILTER POND - EXISTING DISTRIBUTION BOX MODIFICATION - PLAN, SECTIONS, AND DETAILS
- D-782-010 ADDITION OF 4TH ASH FILTER POND - NEW DISCHARGE STRUCTURE FOR POND 4 - PLAN, SECTIONS, AND DETAILS
- D-782-011 ADDITION OF 4TH ASH FILTER POND - NEW DISCHARGE STRUCTURE FOR POND 4 - SECTIONS AND DETAILS
- D-782-012 ADDITION OF 4TH ASH FILTER POND - NEW WEIR THROUGH INSTALLATION FOR PONDS 1, 2, 3, AND 4 - PLAN, SECTIONS, AND DETAILS
- D-782-013 ADDITION OF 4TH ASH FILTER POND - NEW FILTER POND 4 - SECTIONS AND DETAILS
- D-428-401 EXISTING POND DISCHARGE STRUCTURE
- D-728-301 EXISTING PLANT WASTE FILTER BEDS

**AS-BUILT/11-0-86
EXCEPT FOR REV. 6**

NO.	DATE	DESCRIPTION	BY	CHKD	APP.	DATE
1	11-0-86	CONSTRUCTION				
2	2-8-86	PRELIMINARY NOT FOR CONSTRUCTION BIDDING PURPOSES				
3						
4						
5						
6						

REVISIONS

DATE RELEASED FOR ENGR.

CONEAUGH STATION OWNERS GROUP
CONEAUGH STATION UNITS 1 & 2
ADDITION OF 4TH ASH FILTER POND

CIVIL
NEW FILTER POND 4
PLAN, SECTIONS, AND DETAILS

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.
ENGINEERING INTERFACES

AS SHOWN 04 4479 D-782-008 10
DRAWING NUMBER

NO.	DATE	DESCRIPTION	BY	CHKD	APP.	DATE
1	11-0-86	CONSTRUCTION				
2	2-8-86	PRELIMINARY NOT FOR CONSTRUCTION BIDDING PURPOSES				
3						
4						
5						
6						

Attachment B

Boring Logs



Drilling Log

Soil Boring **TB-1**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 7.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0			3			(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
2			10		GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
4			6		CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
6			3		CL	(5.5-7.5 feet) CLAY, moist (Liner)
8			5			
10			8			

CB&I Rev: 8/20/13 CONEMAUGH_POND B.GPJ IT_CORP.GDT 6/22/16



Drilling Log

Soil Boring **GT-1**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 7.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted Excavator
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
2					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
4					CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
6		100%			CL	(5.5-7.5 feet) CLAY, moist (Liner)
8						
10						

CB&I Rev: 8/20/13 CONEMAUGH_POND B.GPJ IT_CORP.GDT 6/22/16



Drilling Log

Soil Boring **GT-2**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 7.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted Excavator
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
2					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
4					CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
6		100%			CL	(5.5-7.5 feet) CLAY, moist (Liner)
8						
10						

CB&I Rev: 8/20/13 CONEMAUGH_POND B.GPJ IT_CORP.GDT 6/22/16



Drilling Log

Soil Boring **GT-3**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 7.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted Excavator
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Auger from 0' to 5.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-2.5 feet) Dark gray fine sand to 1/4-inch BOTTOM ASH (Protective Cover Layer)
2					GM	(2.5-4 feet) AASHTO #8- silty rounded PEBBLES (Underdrain Layer)
4					CL	(4-5.5 feet) Orange-brown, firm, plastic CLAY, moist (Impervious Fill)
6		100%			CL	(5.5-7.5 feet) CLAY, moist (Liner)
8						
10						

CB&I Rev: 8/20/13 CONEMAUGH_POND B.GPJ IT_CORP.GDT 6/22/16



Drilling Log

Soil Boring **GT-4**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 3.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted Excavator
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
Auger from 0' to 1.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-1.5 feet) R-3 Rock Lining (Protective Cover)
2		100%			CL	(1.5-3.5 feet) CLAY, moist (Liner)
4						
6						
8						
10						

CB&I Rev: 8/20/13 CONEMAUGH_POND B.GPJ IT_CORP.GDT 6/22/16



Drilling Log

Soil Boring **GT-5**

Page: 1 of 1

Project Conemaugh Pond B Owner NRG
 Location Conemaugh, PA Proj. No. 1009144001
 Surface Elev. _____ Total Hole Depth 3.5 ft. North _____ East _____
 Top of Casing NA Water Level Initial NA Static NA Diameter _____
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material Backfilled Rig/Core Track Mounted Excavator
 Drill Co. Terra Testing Method _____
 Driller _____ Log By R. Malec Date 8/31/15 Permit # NA
 Checked By _____ License No. _____

COMMENTS
Auger from 0' to 1.5'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						(0-1.5 feet) R-3 Rock Lining (Protective Cover)
2		100%			CL	(1.5-3.5 feet) CLAY, moist (Liner)
4						
6						
8						
10						

Attachment C

Photographs



Project: Conemaugh Pond "B" Liner Investigation
Photographers: David J. Shott/Ronald T. Malec

Project No. 100914401

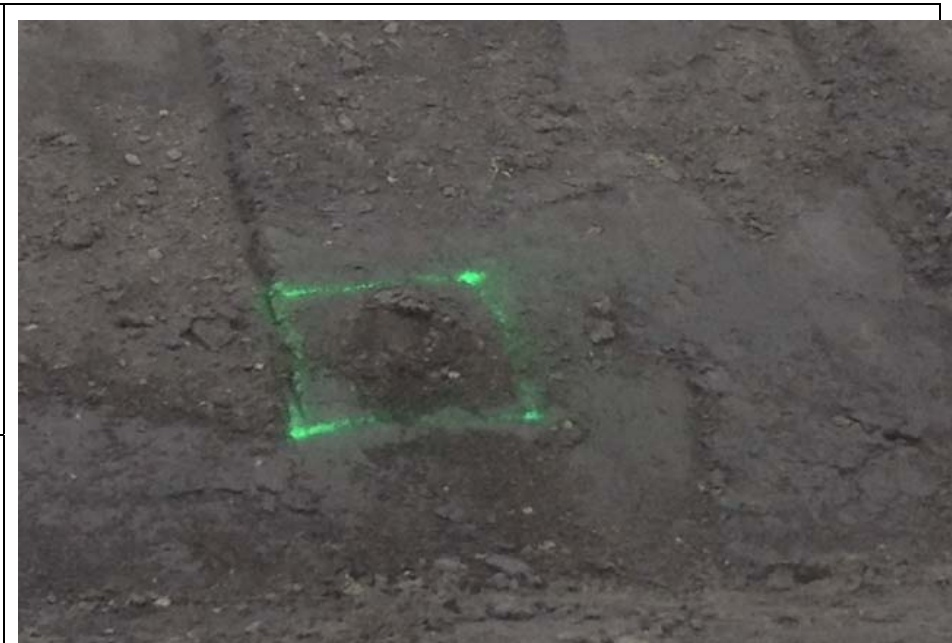
<p>Photograph No. 1</p> <p>Date: August 27, 2015</p> <p>Location of Photograph: At western end, looking east across Pond "B"</p>	
<p>Description: Initial walk-around of Pond "B" footprint for preliminary selection of boring locations</p>	

<p>Photograph No. 2</p> <p>Date: August 27, 2015</p> <p>Location of Photograph: Northern interior slope of Pond "B"</p>	
<p>Description: Close-up view of protective rip-rap layer on side slope</p>	



Project: Conemaugh Pond "B" Liner Investigation
Photographers: David J. Shott/Ronald T. Malec

Project No. 100914401

<p>Photograph No. 3</p> <p>Date: August 27, 2015</p> <p>Location of Photograph: Toe of southern interior slope of Pond "B"</p>	
<p>Description of Photograph: Preliminary markings for proposed location of Boring GT-4</p>	

<p>Photograph No. 4</p> <p>Date: August 31, 2015</p> <p>Location of Photograph: Western perimeter road adjacent to Pond "B"</p>	
<p>Description of Photograph: Drilling in progress at initial pilot test Boring TB-1</p>	



Project: *Conemaugh Pond "B" Liner Investigation*
Photographers: *David J. Shott/Ronald T. Malec*

Project No. *100914401*

<p>Photograph No. 5</p> <p>Date: August 31, 2015</p> <p>Location of Photograph: At southwestern corner of Pond "B" and looking northeast</p>	A photograph showing a yellow tracked drilling rig on a dark, gravelly slope. In the background, there are large industrial structures, including a blue building and several large tan cylindrical tanks. A person is visible near the rig. A wooden stake is in the foreground.
<p>Description of Photograph: Drilling in progress at Boring GT-5 on northern interior slope</p>	

Attachment D

Geotechnical Laboratory Report



September 14, 2015

Project No. 2015-471-001

James Kilburg
CB&I
2790 Mosside Blvd.
Monroeville, PA 15146

Transmittal
Laboratory Test Results
NRG Conemaugh

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

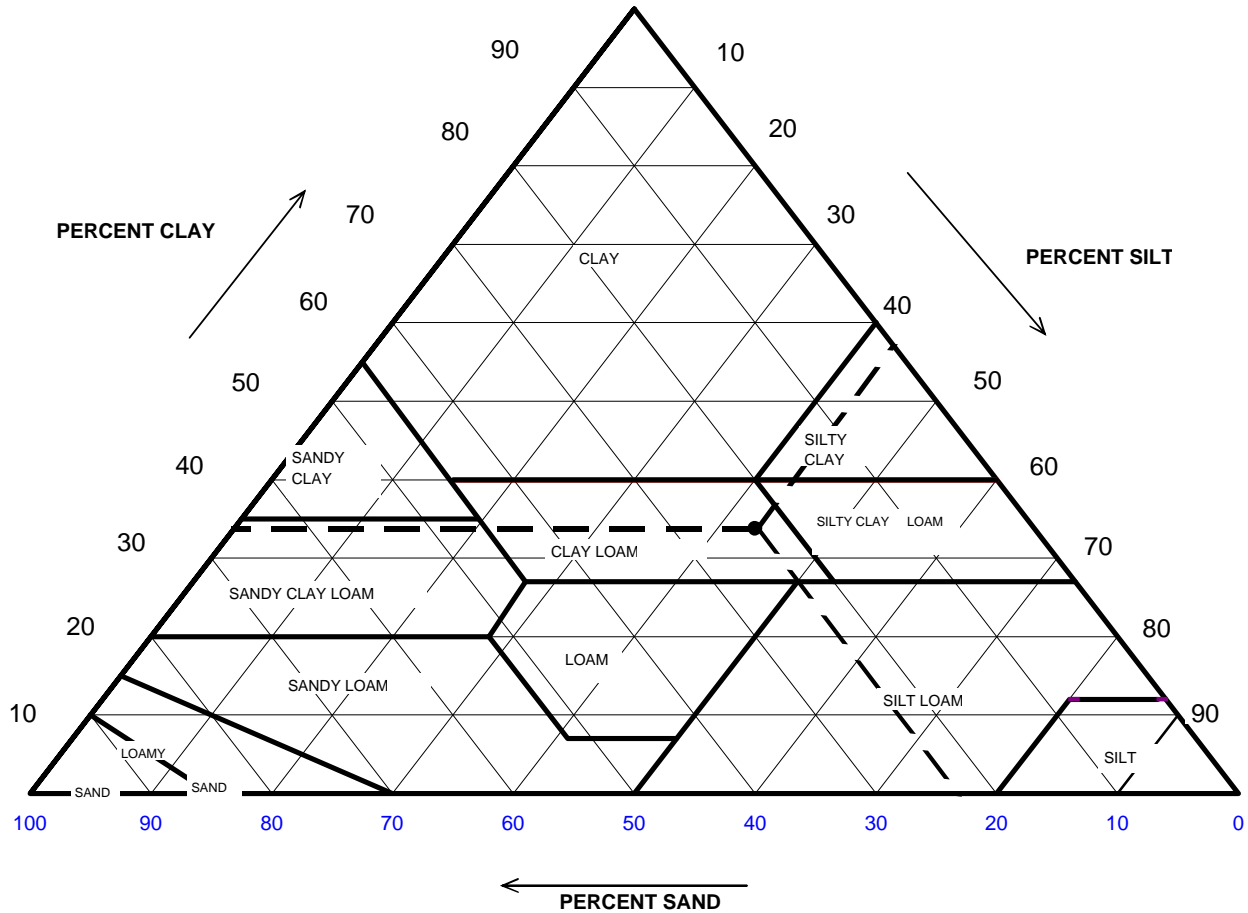


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	7.69
#4 To #200	<i>Sand</i>	20.54
Finer Than #200	<i>Silt & Clay</i>	71.76
USCS Symbol: <i>CL, TESTED</i>		
USCS Classification: <i>LEAN CLAY WITH SAND</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	87.06	Gravel	12.94	0.00
0.05	66.96	Sand	20.09	23.08
0.002	29.42	Silt	37.54	43.12
		Clay	29.42	33.80
		USDA Classification:	CLAY LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1723	Tare No.	NA
Weight of Tare & Wet Sample (g)	789.60	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	673.30	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	83.12	Weight of Tare (g)	NA
Weight of Water (g)	116.30	Weight of Water (g)	NA
Weight of Dry Sample (g)	590.18	Weight of Dry Sample (g)	NA
Moisture Content (%)	19.7	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	590.18
Dry Weight of -3/4" Sample (g)	166.64	Weight of - #200 Material (g)	423.54
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	166.64
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained	Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)	(%)	(%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	0.00	0.00	0.00	100.00	100.00
1/2"	12.5	12.26	2.08	2.08	97.92	97.92
3/8"	9.50	16.96	2.87	4.95	95.05	95.05
#4	4.75	16.19	2.74	7.69	92.31	92.31
#10	2.00	30.98	5.25	12.94	87.06	87.06
#20	0.85	25.11	4.25	17.20	82.80	82.80
#40	0.425	15.47	2.62	19.82	80.18	80.18
#60	0.250	12.67	2.15	21.97	78.03	78.03
#140	0.106	22.58	3.83	25.79	74.21	74.21
#200	0.075	14.42	2.44	28.24	71.76	71.76
Pan	-	423.54	71.76	100.00	-	-

Tested By **RAL** Date **9/10/15** Checked By **KC** Date **9/14/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	52.0	24.1	5.61	46.4	82.0	0.01281	0.0252	58.9
5	48.5	24.1	5.61	42.9	75.8	0.01281	0.0165	54.4
15	44.5	24.1	5.61	38.9	68.8	0.01281	0.0099	49.4
30	41.0	24.1	5.61	35.4	62.6	0.01281	0.0072	44.9
60	38.0	23.9	5.68	32.3	57.1	0.01284	0.0053	41.0
250	31.0	23.6	5.79	25.2	44.6	0.01288	0.0027	32.0
1440	25.5	23.7	5.75	19.7	34.9	0.01287	0.0012	25.1

Soil Specimen Data	Other Corrections
Tare No. 659	
Weight of Tare & Dry Material (g) 156.59	a - Factor 0.99
Weight of Tare (g) 95.60	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 71.76
Weight of Dry Material (g) 56.0	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of tube
 Sample No.: GT-1
 Soil Description: BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

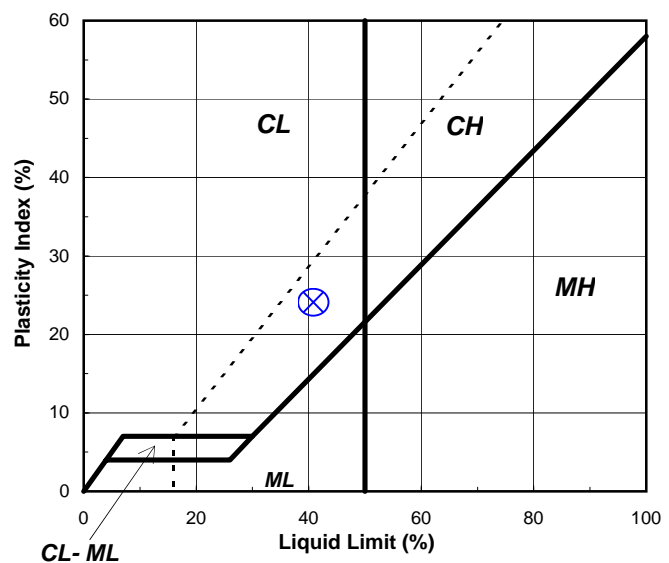
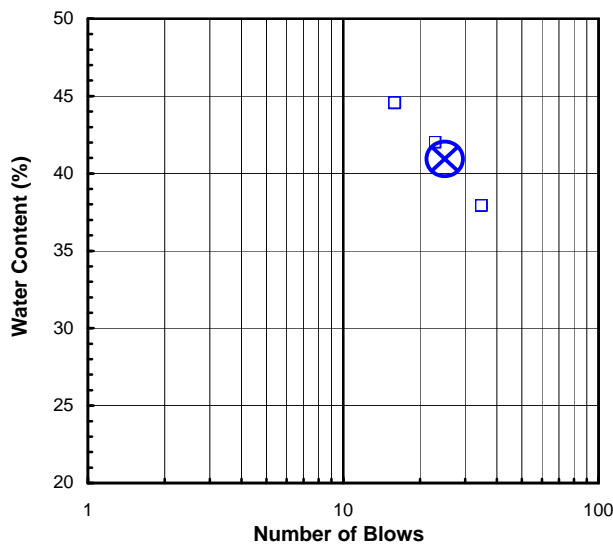
Liquid Limit Test	1	2	3	M U L T I P O I N T
Tare Number:	197	212	246	
Wt. of Tare & Wet Sample (g):	37.73	39.65	37.59	
Wt. of Tare & Dry Sample (g):	31.48	33.63	32.07	
Weight of Tare (g):	17.44	19.29	17.50	
Weight of Water (g):	6.3	6.0	5.5	
Weight of Dry Sample (g):	14.0	14.3	14.6	
Moisture Content (%):	44.5	42.0	37.9	
Number of Blows:	16	23	35	

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	238	449		Liquid Limit (%): 41
Wt. of Tare & Wet Sample (g):	26.33	29.42		Plastic Limit (%): 17
Wt. of Tare & Dry Sample (g):	25.43	28.53		Plasticity Index (%): 24
Weight of Tare (g):	20.18	23.29		USCS Symbol: CL
Weight of Water (g):	0.9	0.9		
Weight of Dry Sample (g):	5.3	5.2		
Moisture Content (%):	17.1	17.0	0.2	

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By RAL Date 9/8/15 Checked By KC Date 9/9/15

PERMEABILITY TEST

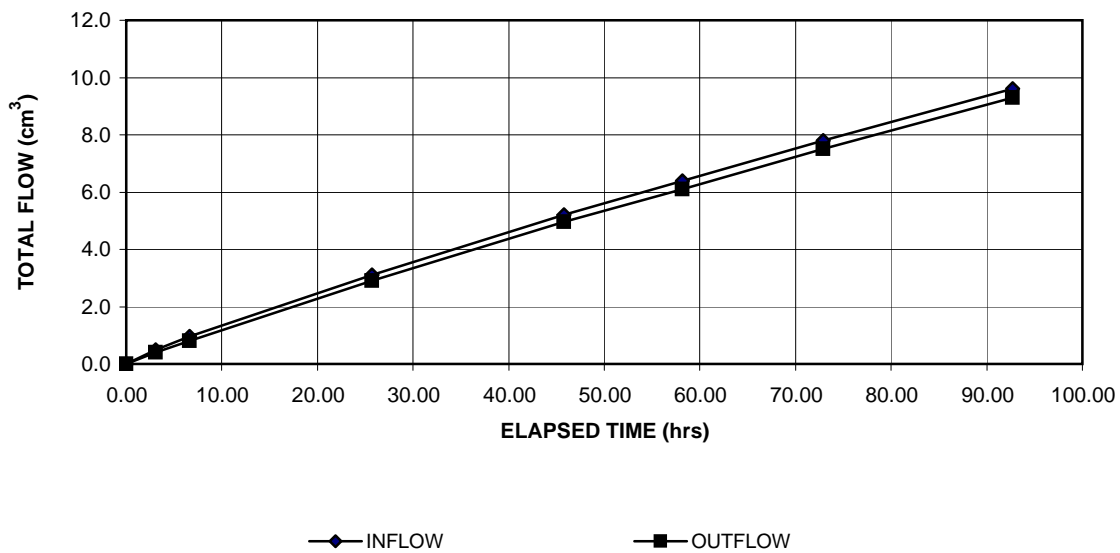
ASTM D 5084-10



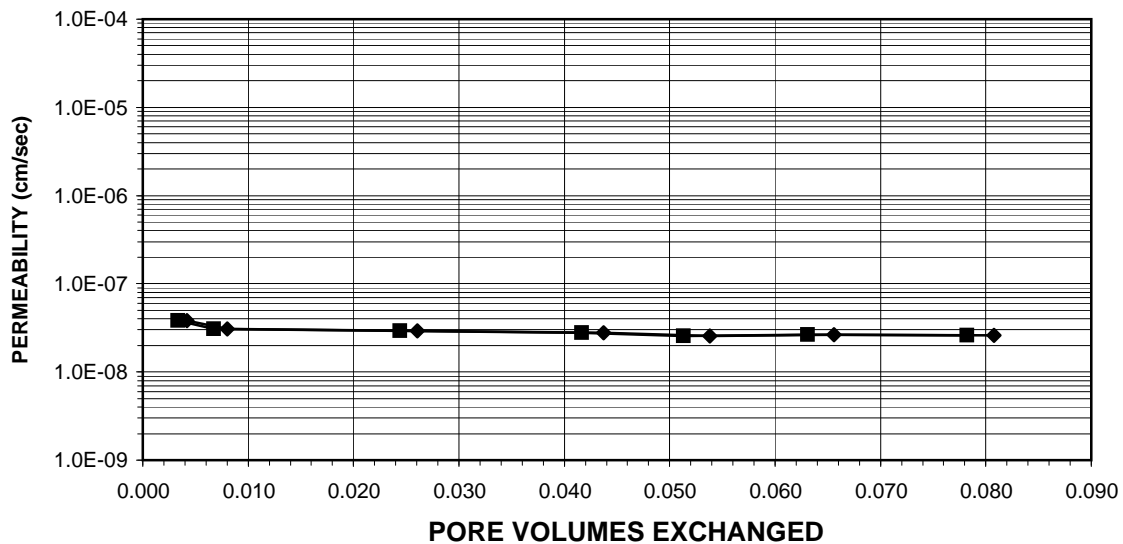
Client: CB&I	Boring No.: Pond B
Client Project: NRG Conemaugh	Depth (ft): Upper 8" of Tube
Project No.: 2015-471-001	Sample No.: GT-1
Lab ID No.: 2015-471-001-001	

AVERAGE PERMEABILITY = 2.6E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-001

Boring No.: Pond B
Depth (ft): Upper 8" of Tube
Sample No.: GT-1

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown Clay trace to some sand

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	913	1723
Weight of Tare & Wet Sample (g)	306.91	789.60
Weight of Tare & Dry Sample (g)	276.44	673.30
Weight of Tare (g)	110.49	83.12
Weight of Water (g)	30.47	116.30
Weight of Dry Sample (g)	165.95	590.18
Moisture Content (%)	18.4	19.7

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	931.19	NA
Weight of Tube (g)	225.39	NA
Weight of Wet Sample (g)	705.80	713.82
Length 1 (in)	3.188	3.234
Length 2 (in)	3.193	3.204
Length 3 (in)	3.180	3.201
Top Diameter (in)	2.867	2.862
Middle Diameter (in)	2.882	2.856
Bottom Diameter (in)	2.877	2.881
Average Length (in)	3.19	3.21
Average Area (in ²)	6.49	6.45
Sample Volume (cm ³)	339.12	339.75
Unit Wet Weight (g/cm ³)	2.08	2.10
Unit Wet Weight (pcf)	129.9	131.2
Unit Dry Weight (pcf)	109.8	109.6
Unit Dry Weight (g/cm ³)	1.76	1.76
Void Ratio, e	0.54	0.54
Porosity, n	0.35	0.35
Pore Volume (cm ³)	118.3	118.9
Total Weight of Sample After Test (g)		706.7

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
 Client Project: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID No.: 2015-471-001-001

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-1

Pressure Heads (Constant)

Top Cap (psi) 67.5
 Bottom Cap (psi) 70.0
 Cell (psi) 75.0
 Total Pressure Head (cm) 175.8
 Hydraulic Gradient 21.54

Final Sample Dimensions

Sample Length (cm), L 8.16
 Sample Diameter (cm) 7.28
 Sample Area (cm²), A 41.63
 Inflow Burette Area (cm²), a-in 0.861
 Outflow Burette Area (cm²), a-out 0.851
 B Parameter (%) 96

AVERAGE PERMEABILITY = 2.6E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 2.6E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/4/15	10	46	0.000	0.0	0.0	201.3	0	22.1	NA
9/4/15	13	49	3.050	0.5	0.4	200.3	0	22.0	3.8E-08
9/4/15	17	25	6.650	1.0	0.8	199.3	0	22.0	3.1E-08
9/5/15	12	30	25.733	3.1	2.9	194.4	0	22.0	2.9E-08
9/6/15	8	33	45.783	5.2	5.0	189.5	0	22.0	2.8E-08
9/6/15	20	54	58.133	6.4	6.1	186.8	0	22.8	2.6E-08
9/7/15	11	40	72.900	7.8	7.5	183.5	0	22.0	2.6E-08
9/8/15	7	30	92.733	9.6	9.3	179.3	1	22.0	2.6E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

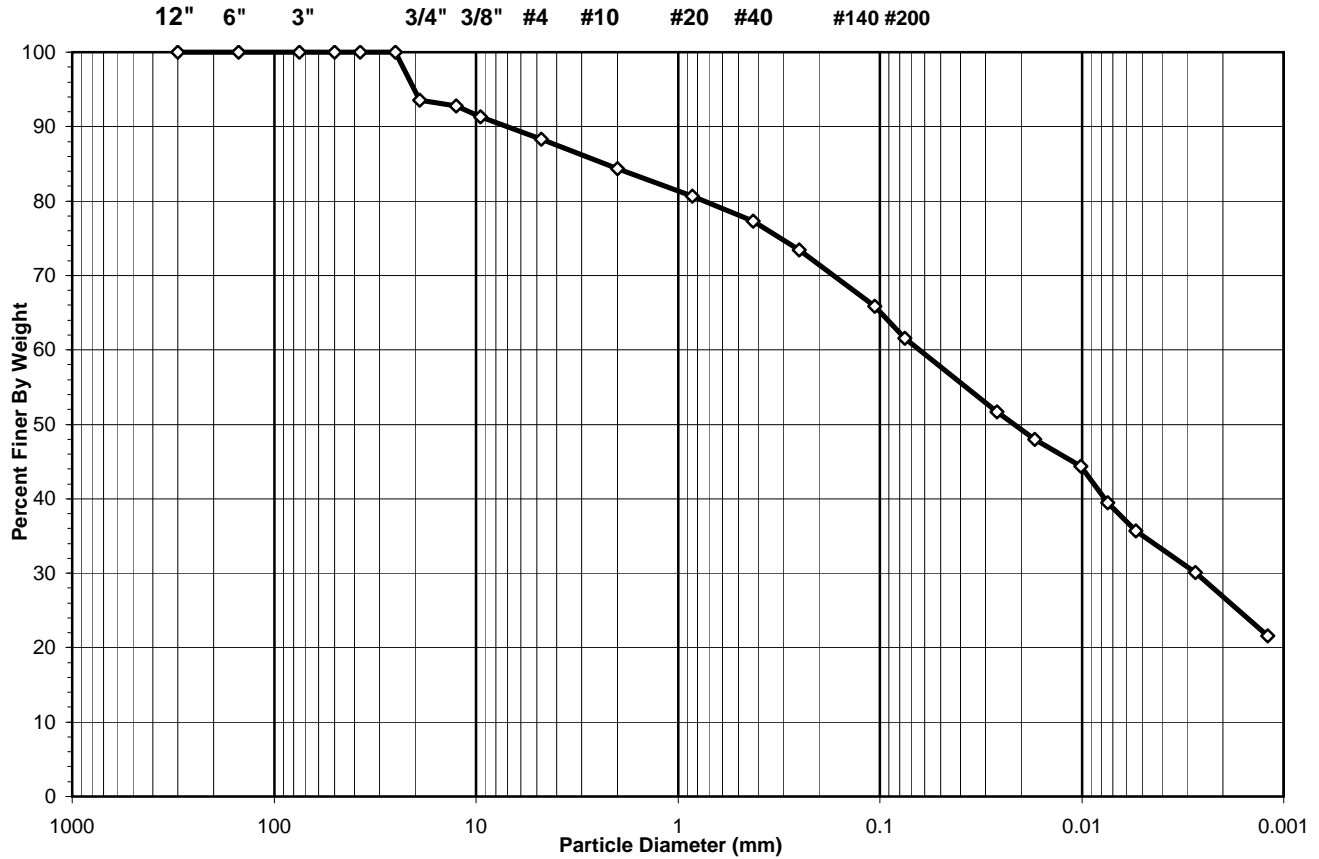
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

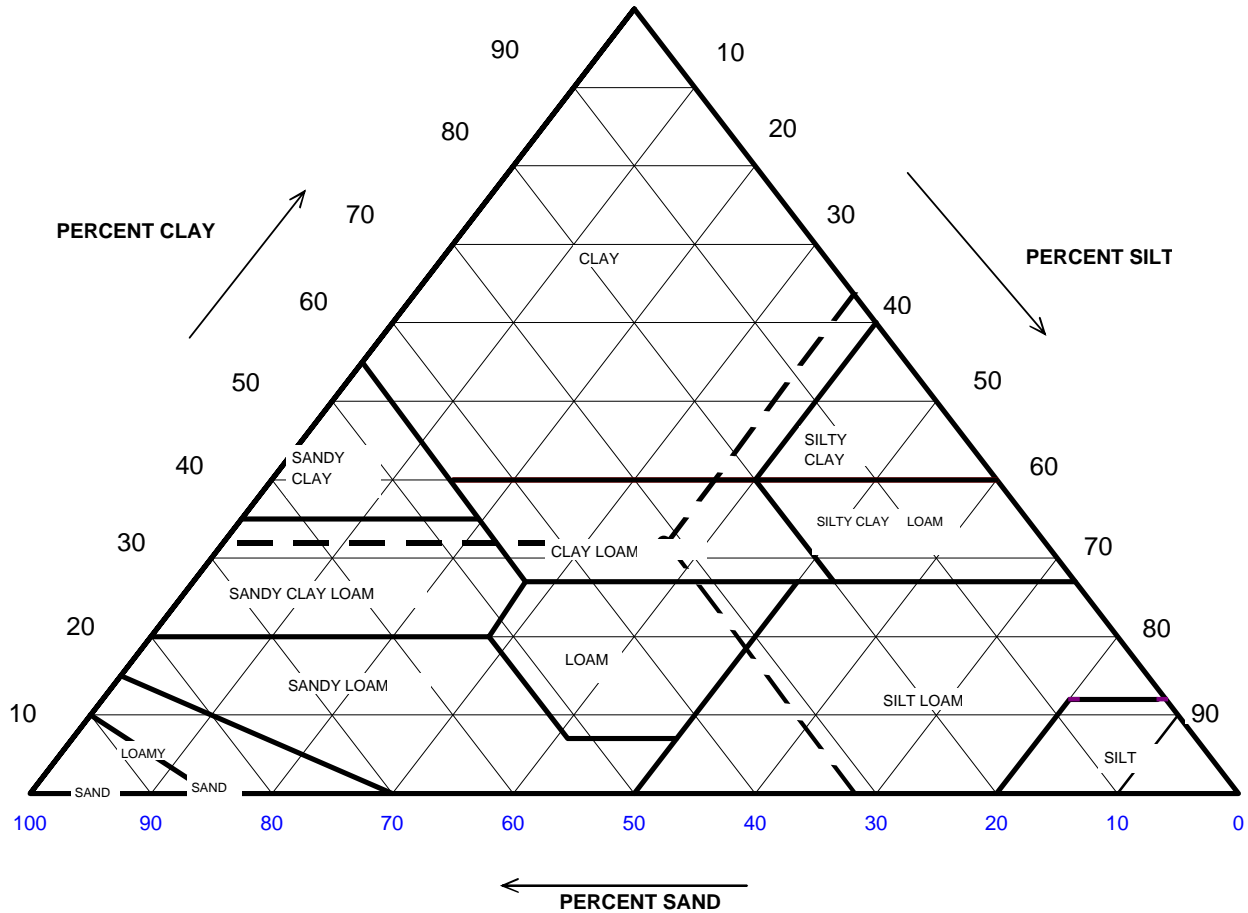


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	11.68
#4 To #200	<i>Sand</i>	26.77
Finer Than #200	<i>Silt & Clay</i>	61.55
USCS Symbol: <i>CL, TESTED</i>		
USCS Classification: <i>SANDY LEAN CLAY</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	84.33	Gravel	15.67	0.00
0.05	57.72	Sand	26.62	31.56
0.002	26.89	Silt	30.83	36.56
		Clay	26.89	31.88
		USDA Classification:	CLAY LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1741	Tare No.	NA
Weight of Tare & Wet Sample (g)	827.67	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	735.30	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	83.03	Weight of Tare (g)	NA
Weight of Water (g)	92.37	Weight of Water (g)	NA
Weight of Dry Sample (g)	652.27	Weight of Dry Sample (g)	NA
Moisture Content (%)	14.2	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	652.27
Dry Weight of -3/4" Sample (g)	208.98	Weight of - #200 Material (g)	401.45
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	250.82
Dry Weight of +3/4" Sample (g)	41.84		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained		Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)		(%)	(%)
12"	300	0.00	0.00	0.00		100.00	100.00
6"	150	0.00	0.00	0.00		100.00	100.00
3"	75	0.00	0.00	0.00		100.00	100.00
2"	50	0.00	0.00	0.00		100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00		100.00	100.00
1"	25.0	0.00	0.00	0.00		100.00	100.00
3/4"	19.0	41.84	6.41	6.41		93.59	93.59
1/2"	12.5	5.55	0.85	7.27		92.73	92.73
3/8"	9.50	9.45	1.45	8.71		91.29	91.29
#4	4.75	19.34	2.97	11.68		88.32	88.32
#10	2.00	26.02	3.99	15.67		84.33	84.33
#20	0.85	23.78	3.65	19.31		80.69	80.69
#40	0.425	21.99	3.37	22.69		77.31	77.31
#60	0.250	25.21	3.86	26.55		73.45	73.45
#140	0.106	49.62	7.61	34.16		65.84	65.84
#200	0.075	28.02	4.30	38.45		61.55	61.55
Pan	-	401.45	61.55	100.00		-	-

Tested By **RAL** Date **9/10/15** Checked By **KC** Date **9/14/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-1
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	48.0	24.1	5.61	42.4	83.9	0.01281	0.0263	51.6
5	45.0	24.1	5.61	39.4	78.0	0.01281	0.0171	48.0
15	42.0	24.1	5.61	36.4	72.0	0.01281	0.0101	44.3
30	38.0	24.1	5.61	32.4	64.1	0.01281	0.0074	39.5
60	35.0	23.9	5.68	29.3	58.0	0.01284	0.0054	35.7
250	30.5	23.6	5.79	24.7	48.9	0.01288	0.0027	30.1
1440	23.5	23.7	5.75	17.7	35.1	0.01287	0.0012	21.6

Soil Specimen Data	Other Corrections
Tare No. 520	
Weight of Tare & Dry Material (g) 146.30	a - Factor 0.99
Weight of Tare (g) 91.28	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 61.55
Weight of Dry Material (g) 50.0	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of tube
 Sample No.: GT-1
 Soil Description: BROWN LEAN CLAY

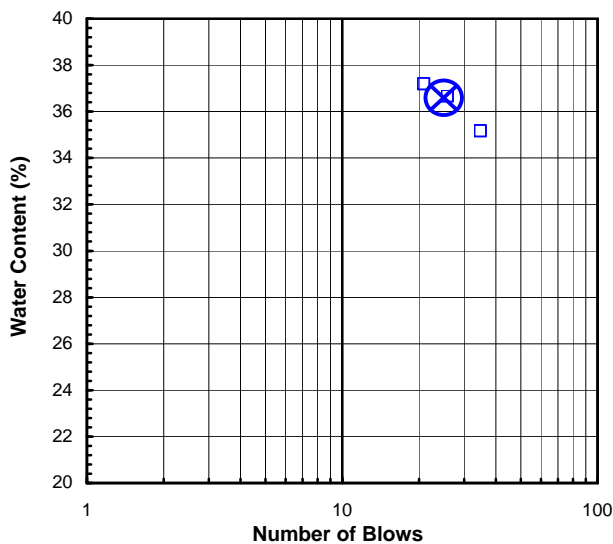
Note: The USCS symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried) sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	1	2	3	M U L T I P O I N T
Tare Number:	166	196	209	
Wt. of Tare & Wet Sample (g):	38.82	38.66	40.24	
Wt. of Tare & Dry Sample (g):	33.50	33.04	34.57	
Weight of Tare (g):	18.36	17.70	19.31	
Weight of Water (g):	5.3	5.6	5.7	
Weight of Dry Sample (g):	15.1	15.3	15.3	
Moisture Content (%):	35.1	36.6	37.2	
Number of Blows:	35	26	21	

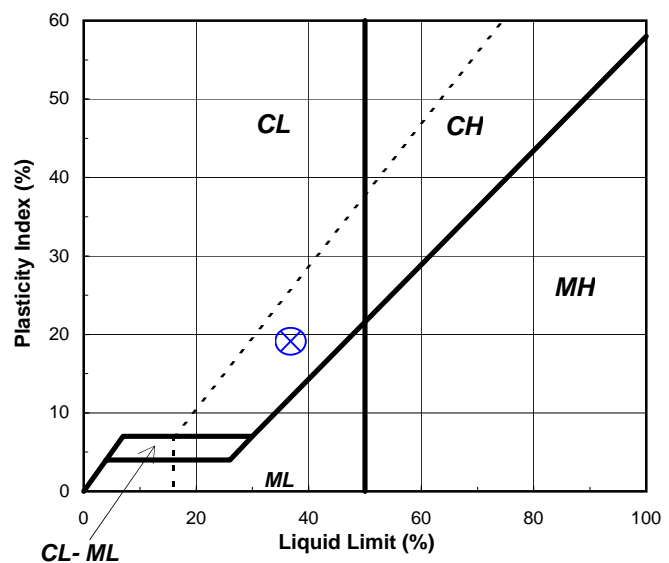
Plastic Limit Test	1	2	Range	Test Results
Tare Number:	154	185		Liquid Limit (%): 37
Wt. of Tare & Wet Sample (g):	26.05	25.48		Plastic Limit (%): 18
Wt. of Tare & Dry Sample (g):	25.07	24.54		Plasticity Index (%): 19
Weight of Tare (g):	19.78	19.41		USCS Symbol: CL
Weight of Water (g):	1.0	0.9		
Weight of Dry Sample (g):	5.3	5.1		
Moisture Content (%):	18.5	18.3	0.2	

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve



Plasticity Chart



Tested By JP Date 9/8/15 Checked By KC Date 9/10/15

PERMEABILITY TEST

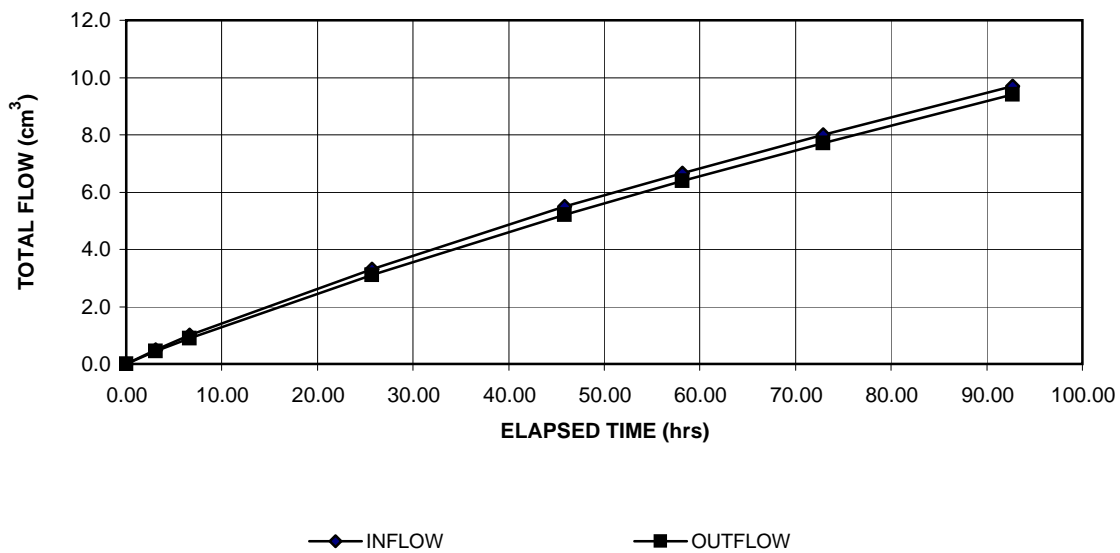
ASTM D 5084-10



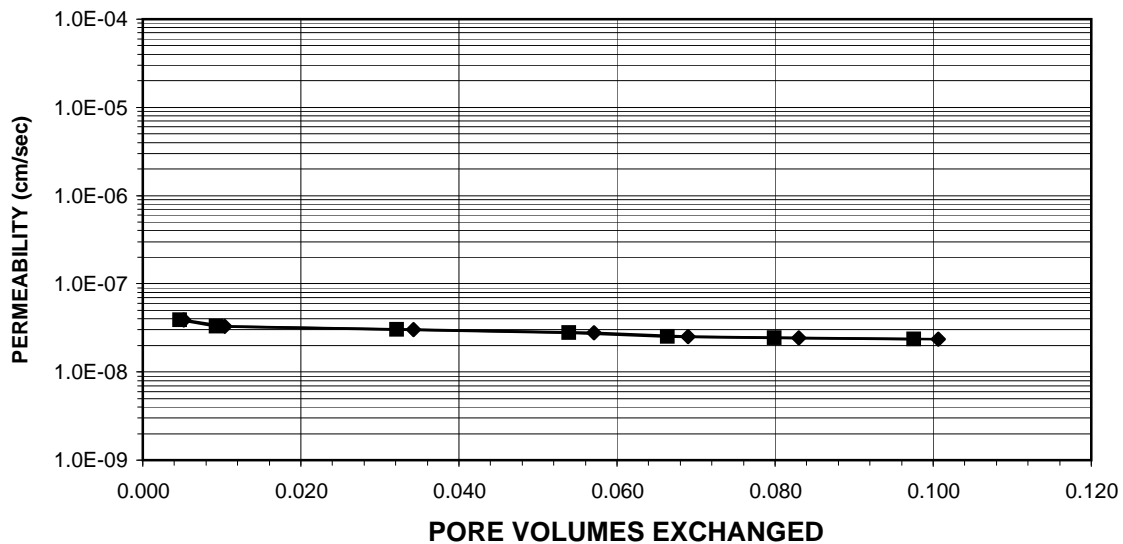
Client: CB&I	Boring No.: Pond B
Client Project: NRG Conemaugh	Depth (ft): Lower 8" of Tube
Project No.: 2015-471-001	Sample No.: GT-1
Lab ID No.: 2015-471-001-002	

AVERAGE PERMEABILITY = 2.5E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.5E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-002

Boring No.: Pond B
Depth (ft): Lower 8" of Tube
Sample No.: GT-1

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown and Gray Sandy Clay

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	554	1741
Weight of Tare & Wet Sample (g)	378.02	827.67
Weight of Tare & Dry Sample (g)	339.54	735.30
Weight of Tare (g)	80.94	83.03
Weight of Water (g)	38.48	92.37
Weight of Dry Sample (g)	258.60	652.27
Moisture Content (%)	14.9	14.2

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	736.23	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	736.23	731.62
Length 1 (in)	3.084	3.106
Length 2 (in)	3.150	3.131
Length 3 (in)	3.127	3.170
Top Diameter (in)	2.855	2.874
Middle Diameter (in)	2.857	2.876
Bottom Diameter (in)	2.860	2.877
Average Length (in)	3.12	3.14
Average Area (in ²)	6.41	6.49
Sample Volume (cm ³)	327.88	333.73
Unit Wet Weight (g/cm ³)	2.25	2.19
Unit Wet Weight (pcf)	140.2	136.8
Unit Dry Weight (pcf)	122.0	119.9
Unit Dry Weight (g/cm ³)	1.95	1.92
Void Ratio, e	0.38	0.41
Porosity, n	0.28	0.29
Pore Volume (cm ³)	90.5	96.4
Total Weight of Sample After Test (g)		745.1

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
 Client Project: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID No.: 2015-471-001-002

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-1

Pressure Heads (Constant)

Top Cap (psi) 67.5
 Bottom Cap (psi) 70.0
 Cell (psi) 75.0
 Total Pressure Head (cm) 175.8
 Hydraulic Gradient 22.07

Final Sample Dimensions

Sample Length (cm), L 7.96
 Sample Diameter (cm) 7.30
 Sample Area (cm²), A 41.90
 Inflow Burette Area (cm²), a-in 0.866
 Outflow Burette Area (cm²), a-out 0.855
 B Parameter (%) 96

AVERAGE PERMEABILITY = 2.5E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 2.5E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/4/15	10	46	0.000	0.0	0.0	201.1	0	22.1	NA
9/4/15	13	49	3.050	0.5	0.4	200.0	0	22.0	3.9E-08
9/4/15	17	25	6.650	1.0	0.9	198.9	0	22.0	3.3E-08
9/5/15	12	30	25.733	3.3	3.1	193.7	0	22.0	3.0E-08
9/6/15	8	35	45.817	5.5	5.2	188.8	0	22.0	2.8E-08
9/6/15	20	54	58.133	6.7	6.4	186.1	0	22.8	2.5E-08
9/7/15	11	40	72.900	8.0	7.7	183.0	0	22.0	2.4E-08
9/8/15	7	30	92.733	9.7	9.4	179.1	1	22.0	2.4E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-003

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-2
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

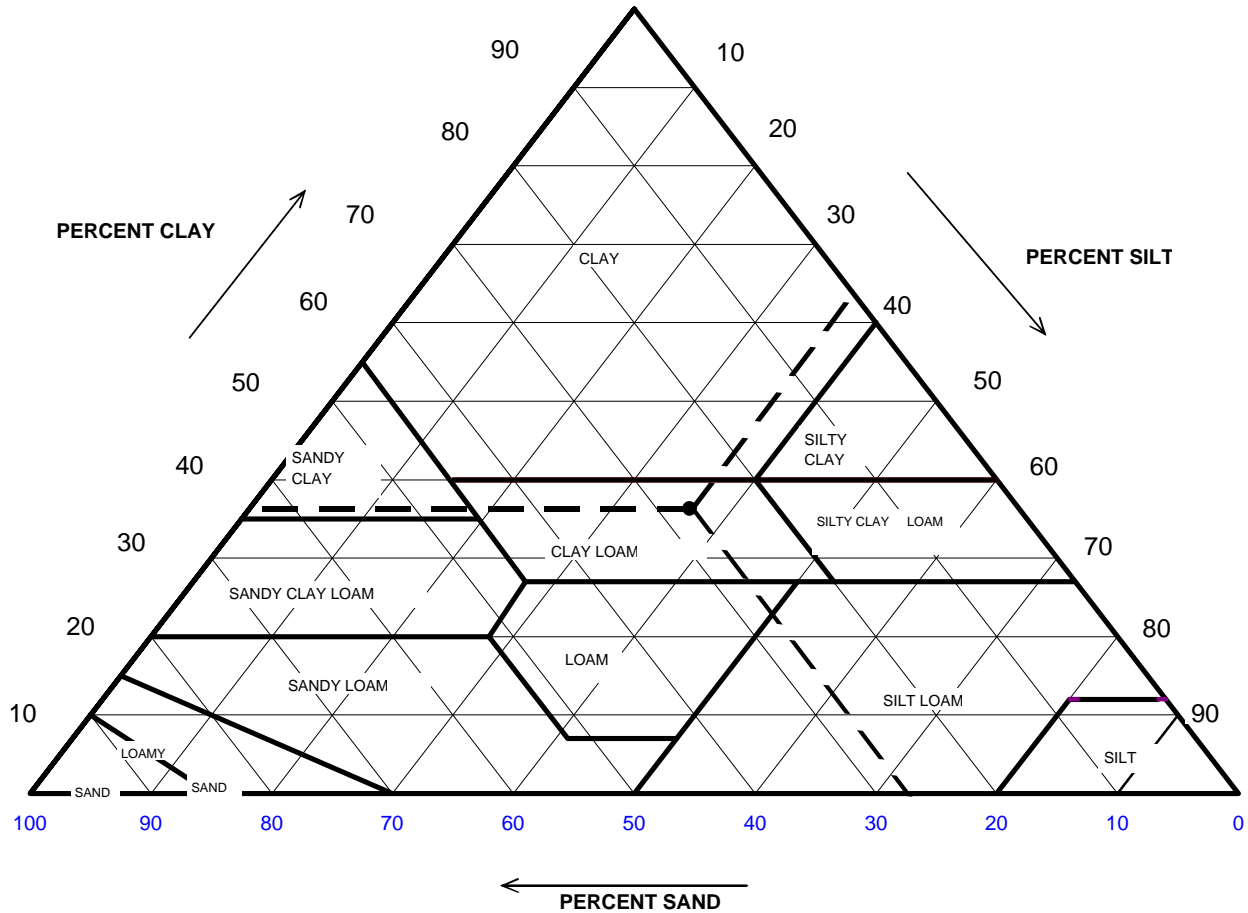


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	15.61
#4 To #200	<i>Sand</i>	24.17
Finer Than #200	<i>Silt & Clay</i>	60.22
USCS Symbol: <i>CL, TESTED</i>		
USCS Classification: <i>SANDY LEAN CLAY WITH GRAVEL</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-003

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-2
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	79.53	Gravel	20.47	0.00
0.05	57.87	Sand	21.67	27.24
0.002	28.86	Silt	29.01	36.48
		Clay	28.86	36.28
		USDA Classification:	CLAY LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-003

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-2
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	516	Tare No.	NA
Weight of Tare & Wet Sample (g)	820.84	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	729.80	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	90.06	Weight of Tare (g)	NA
Weight of Water (g)	91.04	Weight of Water (g)	NA
Weight of Dry Sample (g)	639.74	Weight of Dry Sample (g)	NA
Moisture Content (%)	14.2	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	639.74
Dry Weight of -3/4" Sample (g)	211.24	Weight of - #200 Material (g)	385.28
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	254.46
Dry Weight of +3/4" Sample (g)	43.22		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained	Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)	(%)	(%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	31.14	4.87	4.87	95.13	95.13
3/4"	19.0	12.08	1.89	6.76	93.24	93.24
1/2"	12.5	20.60	3.22	9.98	90.02	90.02
3/8"	9.50	8.87	1.39	11.36	88.64	88.64
#4	4.75	27.16	4.25	15.61	84.39	84.39
#10	2.00	31.08	4.86	20.47	79.53	79.53
#20	0.85	28.43	4.44	24.91	75.09	75.09
#40	0.425	18.49	2.89	27.80	72.20	72.20
#60	0.250	18.41	2.88	30.68	69.32	69.32
#140	0.106	37.15	5.81	36.49	63.51	63.51
#200	0.075	21.05	3.29	39.78	60.22	60.22
Pan	-	385.28	60.22	100.00	-	-

Tested By **RAL** Date **9/8/15** Checked By **KC** Date **9/11/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-003

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-2
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	43.5	23.7	5.75	37.7	90.3	0.01287	0.0275	54.4
5	41.0	23.7	5.75	35.2	84.4	0.01287	0.0178	50.8
15	39.0	23.7	5.75	33.2	79.6	0.01287	0.0105	47.9
30	36.0	23.7	5.75	30.2	72.4	0.01287	0.0076	43.6
61	33.0	24	5.64	27.4	65.5	0.01282	0.0054	39.4
250	28.0	24	5.64	22.4	53.5	0.01282	0.0028	32.2
1440	22.0	24.1	5.61	16.4	39.2	0.01281	0.0012	23.6

Soil Specimen Data	Other Corrections
Tare No. 2324	
Weight of Tare & Dry Material (g) 144.12	a - Factor 0.99
Weight of Tare (g) 97.75	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 60.22
Weight of Dry Material (g) 41.4	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

Tested By TO Date 9/9/15 Checked By KC Date 9/11/15

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-003

Boring No.: Pond B
 Depth (ft): Upper 8" of tube
 Sample No.: GT-2
 Soil Description: BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

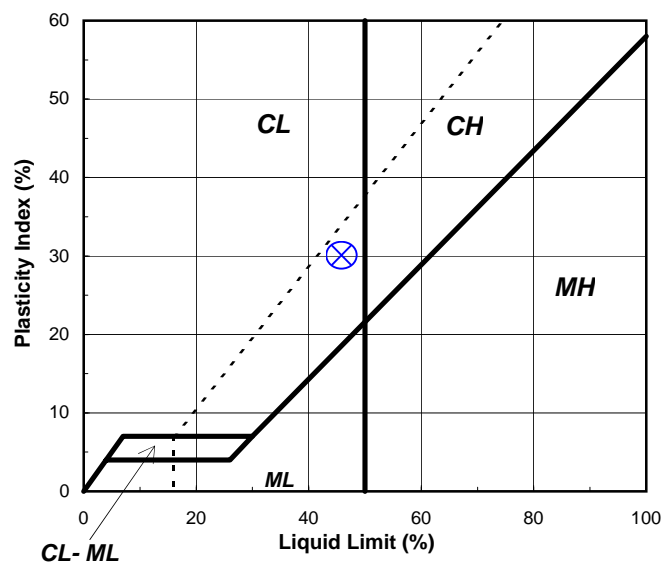
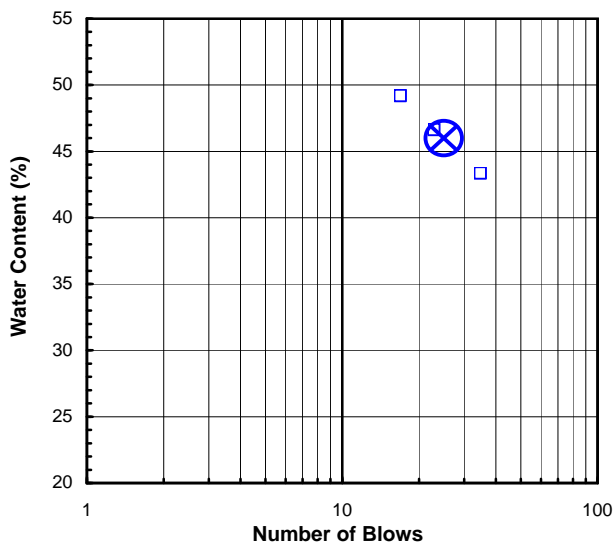
Liquid Limit Test	1	2	3	
Tare Number:	206	199	243	M U L T I P O I N T
Wt. of Tare & Wet Sample (g):	39.17	39.19	38.90	
Wt. of Tare & Dry Sample (g):	32.33	32.58	32.85	
Weight of Tare (g):	18.41	18.39	18.88	
Weight of Water (g):	6.8	6.6	6.1	
Weight of Dry Sample (g):	13.9	14.2	14.0	
Moisture Content (%):	49.1	46.6	43.3	
Number of Blows:	17	23	35	

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	135	1276		Liquid Limit (%): 46 Plastic Limit (%): 16 Plasticity Index (%): 30 USCS Symbol: CL
Wt. of Tare & Wet Sample (g):	25.52	20.11		
Wt. of Tare & Dry Sample (g):	24.68	19.26		
Weight of Tare (g):	19.41	13.85		
Weight of Water (g):	0.8	0.8		
Weight of Dry Sample (g):	5.3	5.4		
Moisture Content (%):	15.9	15.7	0.2	

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By RAL Date 9/8/15 Checked By KC Date 9/9/15

PERMEABILITY TEST

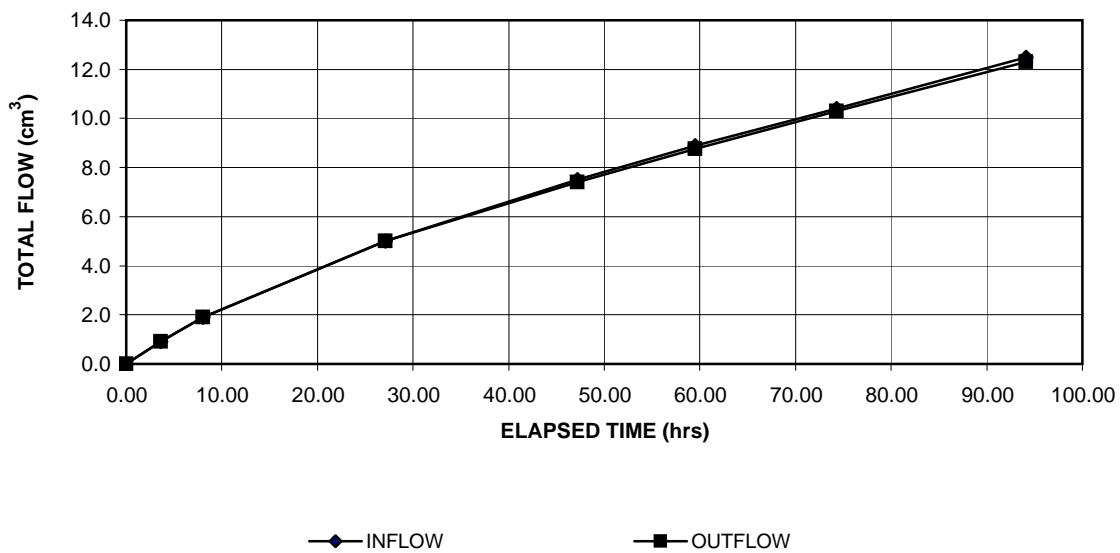
ASTM D 5084-10



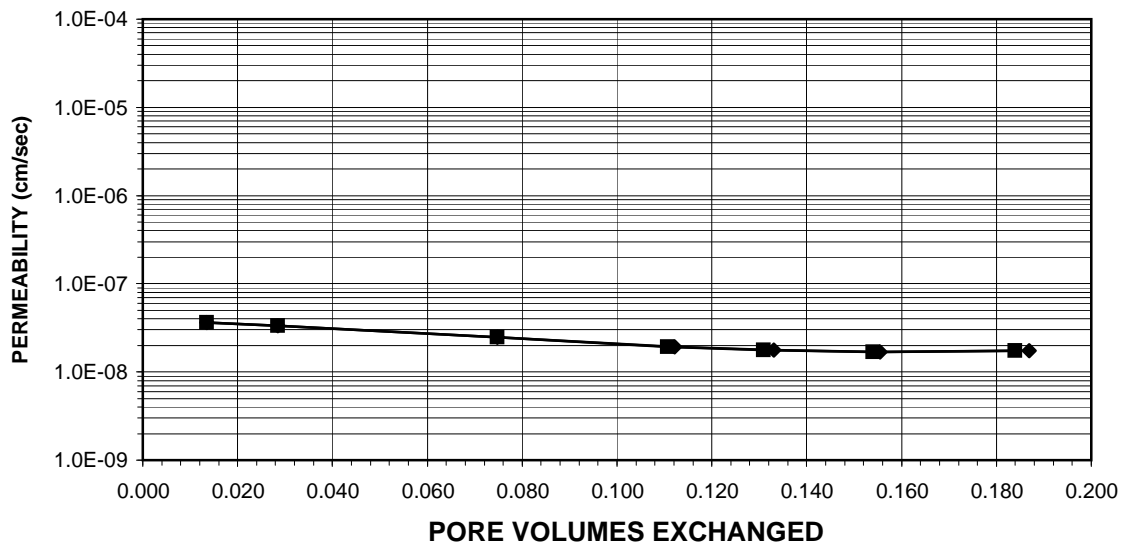
Client:	CB&I	Boring No.: Pond B
Client Project:	NRG Conemaugh	Depth (ft): Botom 8" of tube
Project No.:	2015-471-001	Sample No.: GT-2
Lab ID No.:	2015-471-001-003	

AVERAGE PERMEABILITY = 1.8E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-003

Boring No.: Pond B
Depth (ft): Botom 8" of tube
Sample No.: GT-2

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown Sandy Clay

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	905	1692
Weight of Tare & Wet Sample (g)	388.44	481.74
Weight of Tare & Dry Sample (g)	350.59	426.90
Weight of Tare (g)	110.00	82.48
Weight of Water (g)	37.85	54.84
Weight of Dry Sample (g)	240.59	344.42
Moisture Content (%)	15.7	15.9

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	392.20	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	392.20	392.84
Length 1 (in)	1.723	1.817
Length 2 (in)	1.755	1.834
Length 3 (in)	1.711	1.802
Top Diameter (in)	2.848	2.863
Middle Diameter (in)	2.845	2.876
Bottom Diameter (in)	2.851	2.864
Average Length (in)	1.73	1.82
Average Area (in ²)	6.37	6.46
Sample Volume (cm ³)	180.56	192.38
Unit Wet Weight (g/cm ³)	2.17	2.04
Unit Wet Weight (pcf)	135.6	127.5
Unit Dry Weight (pcf)	117.2	110.0
Unit Dry Weight (g/cm ³)	1.88	1.76
Void Ratio, e	0.44	0.53
Porosity, n	0.30	0.35
Pore Volume (cm ³)	55.1	66.9
Total Weight of Sample After Test (g)		399.4

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/9/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-003

Boring No.: Pond B
Depth (ft): Botom 8" of tube
Sample No.: GT-2

Pressure Heads (Constant)

Top Cap (psi)	67.5
Bottom Cap (psi)	70.0
Cell (psi)	75.0
Total Pressure Head (cm)	175.8
Hydraulic Gradient	38.07

Final Sample Dimensions

Sample Length (cm), L	4.62
Sample Diameter (cm)	7.28
Sample Area (cm ²), A	41.67
Inflow Burette Area (cm ²), a-in	0.860
Outflow Burette Area (cm ²), a-out	0.857
B Parameter (%)	95

AVERAGE PERMEABILITY = 1.8E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 1.8E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/4/15	9	22	0.000	0.0	0.0	201.4	0	22.1	NA
9/4/15	12	59	3.617	0.9	0.9	199.4	0	22.0	3.6E-08
9/4/15	17	25	8.050	1.9	1.9	197.0	0	22.0	3.3E-08
9/5/15	12	30	27.133	5.0	5.0	189.8	0	22.0	2.5E-08
9/6/15	8	35	47.217	7.5	7.4	184.1	0	22.0	1.9E-08
9/6/15	20	54	59.533	8.9	8.8	180.9	0	22.8	1.8E-08
9/7/15	11	40	74.300	10.4	10.3	177.4	0	22.0	1.7E-08
9/8/15	7	30	94.133	12.5	12.3	172.6	1	22.0	1.7E-08

Tested By: TRE

Date: 9/3/15

Checked By: KC

Date: 9/9/15

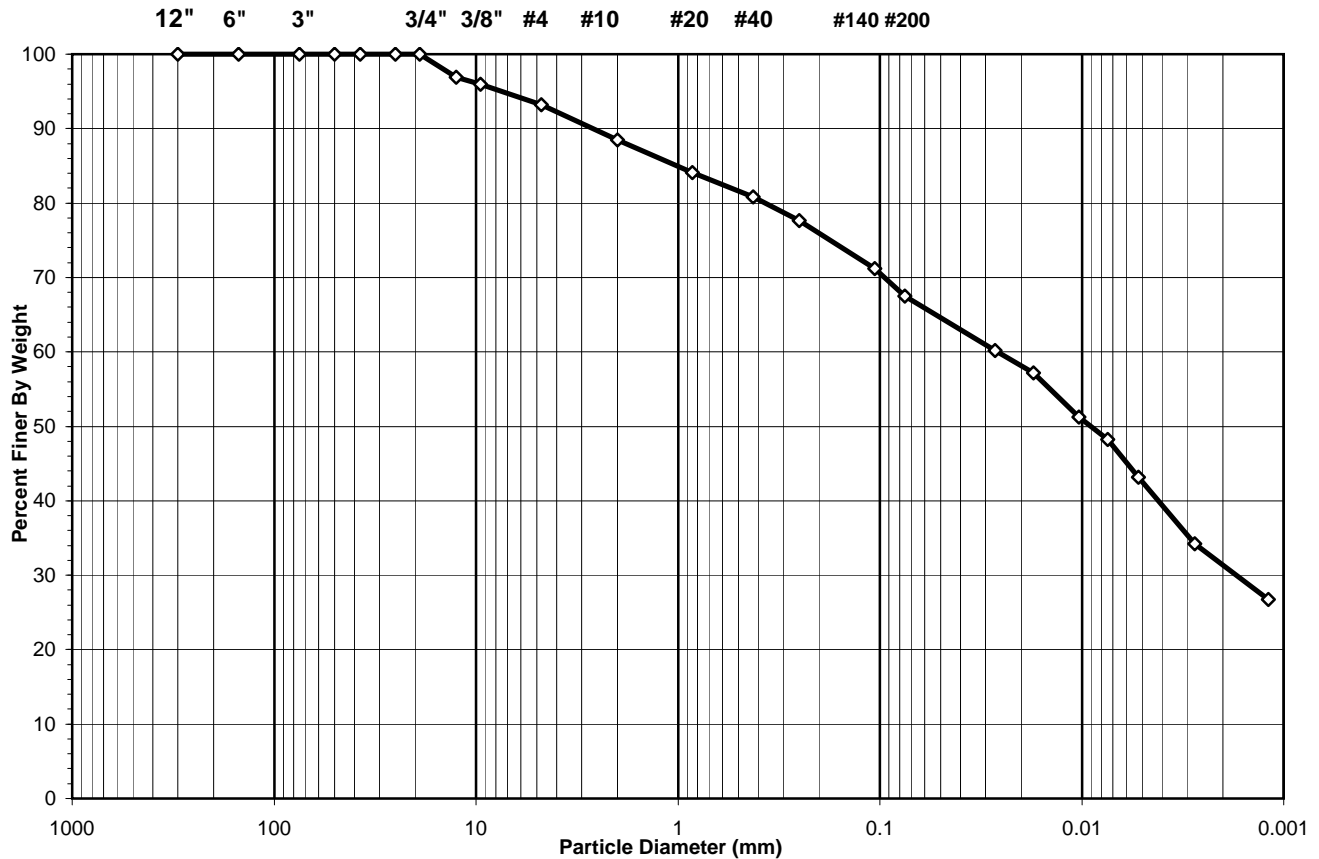
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of Tube
 Sample No.: GT-3
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

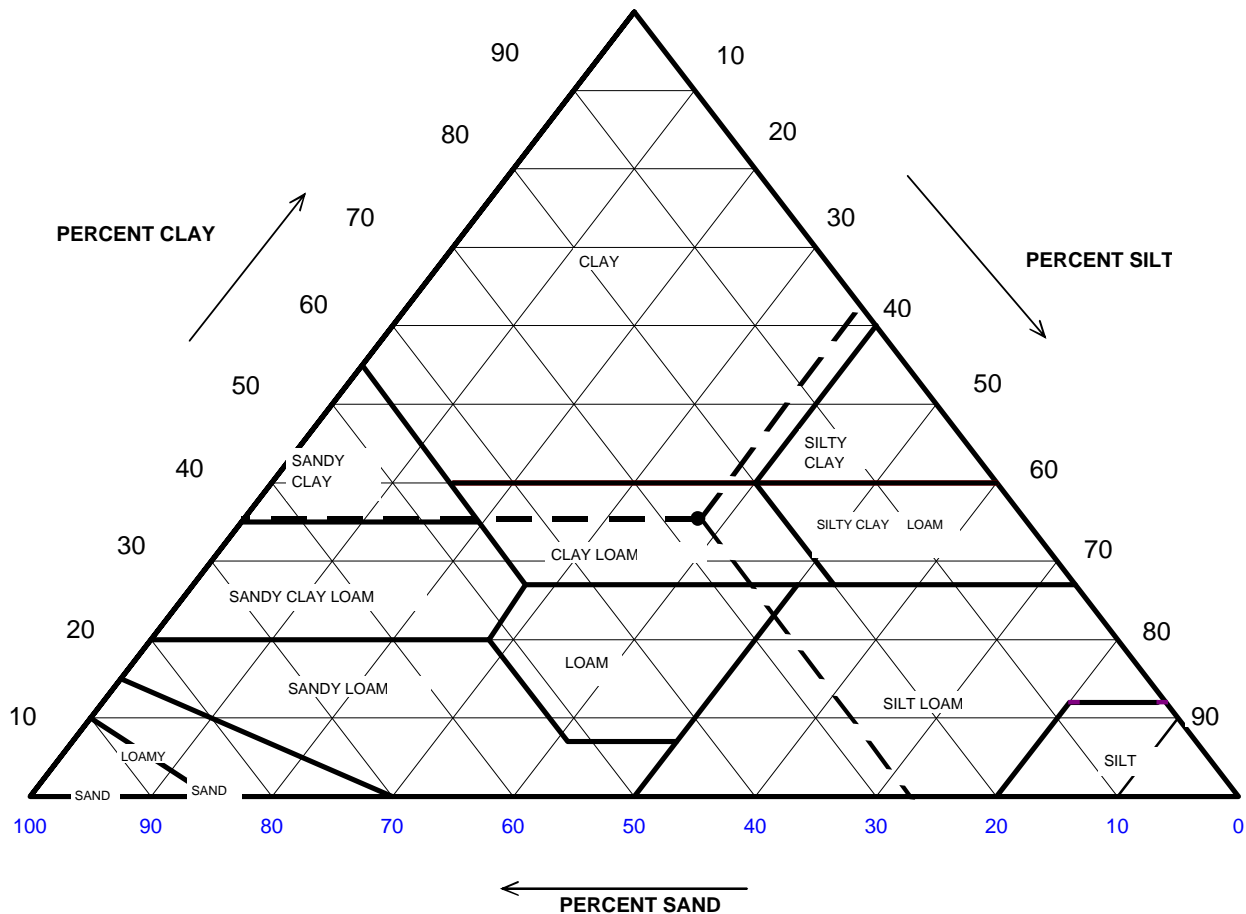


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	6.80
#4 To #200	<i>Sand</i>	25.73
Finer Than #200	<i>Silt & Clay</i>	67.47
USCS Symbol: <i>CL, TESTED</i>		
USCS Classification: <i>SANDY LEAN CLAY</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of Tube
 Sample No.: GT-3
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	88.48	Gravel	11.52	0.00
0.05	64.59	Sand	23.89	27.00
0.002	31.33	Silt	33.26	37.59
		Clay	31.33	35.40
		USDA Classification:	CLAY LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of Tube
 Sample No.: GT-3
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	672	Tare No.	NA
Weight of Tare & Wet Sample (g)	483.71	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	433.00	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	96.31	Weight of Tare (g)	NA
Weight of Water (g)	50.71	Weight of Water (g)	NA
Weight of Dry Sample (g)	336.69	Weight of Dry Sample (g)	NA
Moisture Content (%)	15.1	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	336.69
Dry Weight of -3/4" Sample (g)	109.51	Weight of - #200 Material (g)	227.18
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	109.51
Dry Weight of +3/4" Sample (g)	0.00		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained	Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)	(%)	(%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	0.00	0.00	0.00	100.00	100.00
1/2"	12.5	10.47	3.11	3.11	96.89	96.89
3/8"	9.50	3.20	0.95	4.06	95.94	95.94
#4	4.75	9.21	2.74	6.80	93.20	93.20
#10	2.00	15.89	4.72	11.52	88.48	88.48
#20	0.85	14.68	4.36	15.88	84.12	84.12
#40	0.425	11.03	3.28	19.15	80.85	80.85
#60	0.250	10.68	3.17	22.32	77.68	77.68
#140	0.106	21.76	6.46	28.79	71.21	71.21
#200	0.075	12.59	3.74	32.53	67.47	67.47
Pan	-	227.18	67.47	100.00	-	-

Tested By **RAL** Date **9/8/15** Checked By **KC** Date **9/11/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of Tube
 Sample No.: GT-3
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	46.0	23.7	5.75	40.2	89.2	0.01287	0.0269	60.2
5	44.0	23.7	5.75	38.2	84.8	0.01287	0.0173	57.2
15	40.0	23.7	5.75	34.2	75.9	0.01287	0.0104	51.2
30	38.0	23.7	5.75	32.2	71.5	0.01287	0.0075	48.2
64	34.5	24	5.64	28.9	64.0	0.01282	0.0052	43.2
250	28.5	24	5.64	22.9	50.7	0.01282	0.0028	34.2
1440	23.5	24.1	5.61	17.9	39.7	0.01281	0.0012	26.8

Soil Specimen Data	Other Corrections
Tare No. 1681	
Weight of Tare & Dry Material (g) 147.78	a - Factor 0.99
Weight of Tare (g) 98.11	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 67.47
Weight of Dry Material (g) 44.7	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

Tested By TO Date 9/9/15 Checked By KC Date 9/11/15

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of tube
 Sample No.: GT-3
 Soil Description: BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

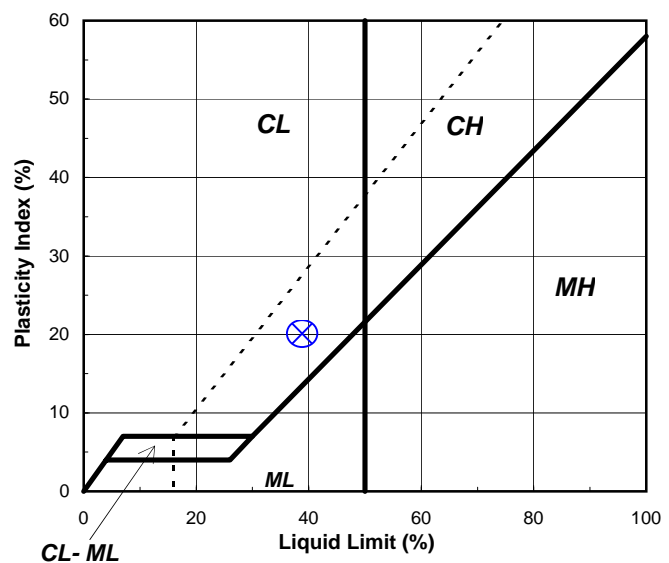
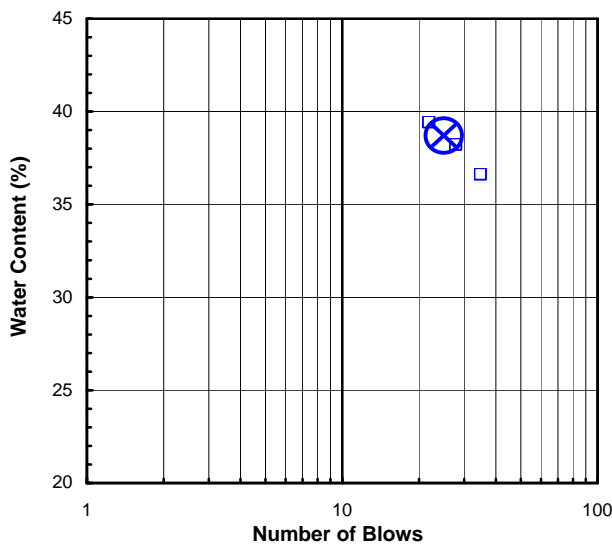
Liquid Limit Test	1	2	3	M U L T I P O I N T
Tare Number:	2	183	221	
Wt. of Tare & Wet Sample (g):	40.99	40.64	40.30	
Wt. of Tare & Dry Sample (g):	35.22	34.74	34.34	
Weight of Tare (g):	19.45	19.29	19.21	
Weight of Water (g):	5.8	5.9	6.0	
Weight of Dry Sample (g):	15.8	15.5	15.1	
Moisture Content (%):	36.6	38.2	39.4	
Number of Blows:	35	28	22	

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	228	230		Liquid Limit (%): 39
Wt. of Tare & Wet Sample (g):	24.90	24.14		Plastic Limit (%): 19
Wt. of Tare & Dry Sample (g):	23.94	23.18		Plasticity Index (%): 20
Weight of Tare (g):	18.70	18.08		USCS Symbol: CL
Weight of Water (g):	1.0	1.0		
Weight of Dry Sample (g):	5.2	5.1		
Moisture Content (%):	18.3	18.8	-0.5	

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By JP Date 9/9/15 Checked By KC Date 9/10/15

PERMEABILITY TEST

ASTM D 5084-10

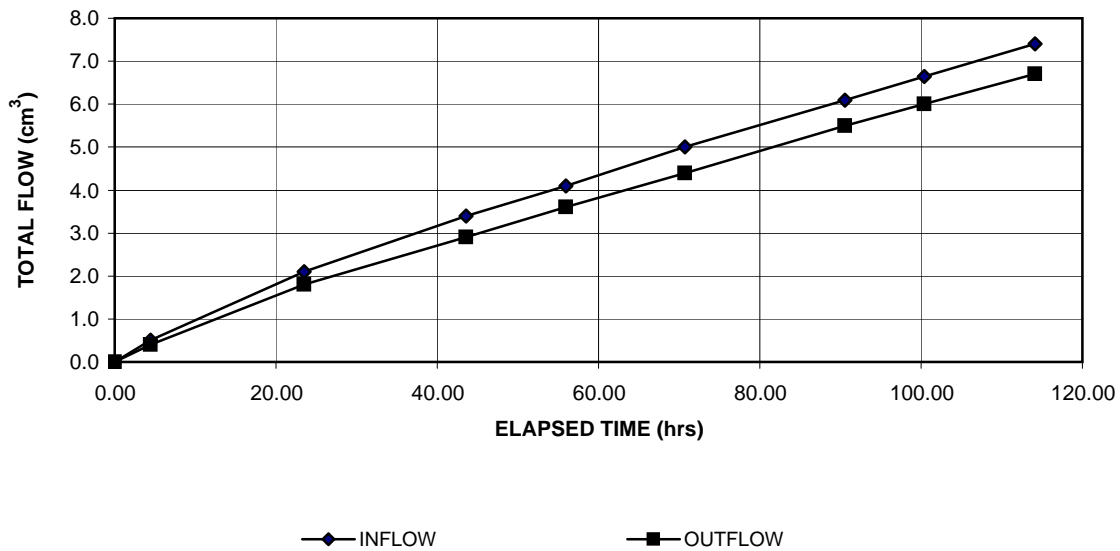


Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-004

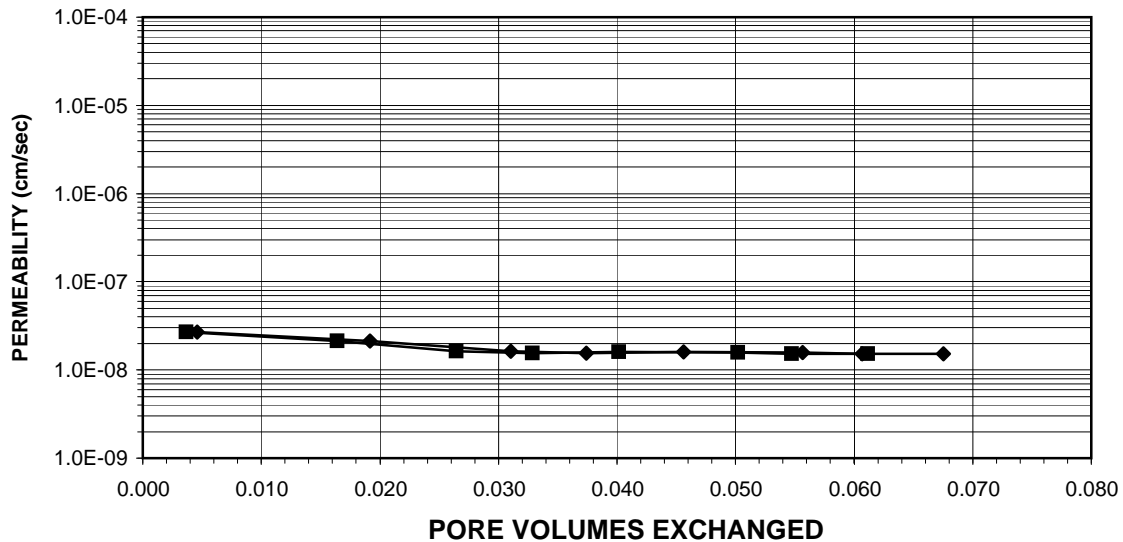
Boring No.: Pond B
Depth (ft): Middle 16" of tube
Sample No.: GT-3

AVERAGE PERMEABILITY = 1.6E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.6E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-004

Boring No.: Pond B
Depth (ft): Middle 16" of tube
Sample No.: GT-3

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown Sandy Clay with Rock Fragments

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	1706	1743
Weight of Tare & Wet Sample (g)	194.21	852.25
Weight of Tare & Dry Sample (g)	180.40	741.10
Weight of Tare (g)	82.78	83.54
Weight of Water (g)	13.81	111.15
Weight of Dry Sample (g)	97.62	657.56
Moisture Content (%)	14.1	16.9

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	762.31	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	762.31	780.72
Length 1 (in)	3.352	3.318
Length 2 (in)	3.366	3.361
Length 3 (in)	3.353	3.342
Top Diameter (in)	2.872	2.876
Middle Diameter (in)	2.876	2.883
Bottom Diameter (in)	2.883	2.885
Average Length (in)	3.36	3.34
Average Area (in ²)	6.50	6.52
Sample Volume (cm ³)	357.62	356.92
Unit Wet Weight (g/cm ³)	2.13	2.19
Unit Wet Weight (pcf)	133.1	136.5
Unit Dry Weight (pcf)	116.6	116.8
Unit Dry Weight (g/cm ³)	1.87	1.87
Void Ratio, e	0.45	0.44
Porosity, n	0.31	0.31
Pore Volume (cm ³)	110.3	109.6
Total Weight of Sample After Test (g)		769.1

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
 Client Project: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID No.: 2015-471-001-004

Boring No.: Pond B
 Depth (ft): Middle 16" of tube
 Sample No.: GT-3

Pressure Heads (Constant)

Top Cap (psi) 67.5
 Bottom Cap (psi) 70.0
 Cell (psi) 75.0
 Total Pressure Head (cm) 175.8
 Hydraulic Gradient 20.72

Final Sample Dimensions

Sample Length (cm), L 8.48
 Sample Diameter (cm) 7.32
 Sample Area (cm²), A 42.07
 Inflow Burette Area (cm²), a-in 0.861
 Outflow Burette Area (cm²), a-out 0.859
 B Parameter (%) 95

AVERAGE PERMEABILITY = 1.6E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 1.6E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/4/15	12	59	0.000	0.0	0.0	201.0	0	22.0	NA
9/4/15	17	25	4.433	0.5	0.4	199.9	0	22.0	2.7E-08
9/5/15	12	30	23.517	2.1	1.8	196.4	0	22.0	2.1E-08
9/6/15	8	35	43.600	3.4	2.9	193.7	0	22.0	1.6E-08
9/6/15	20	54	55.917	4.1	3.6	192.0	0	22.8	1.5E-08
9/7/15	11	40	70.683	5.0	4.4	190.1	0	22.0	1.6E-08
9/8/15	7	30	90.517	6.1	5.5	187.5	0	22.0	1.6E-08
9/8/15	17	25	100.433	6.7	6.0	186.3	0	22.0	1.5E-08
9/9/15	7	5	114.100	7.4	6.7	184.6	1	22.0	1.5E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

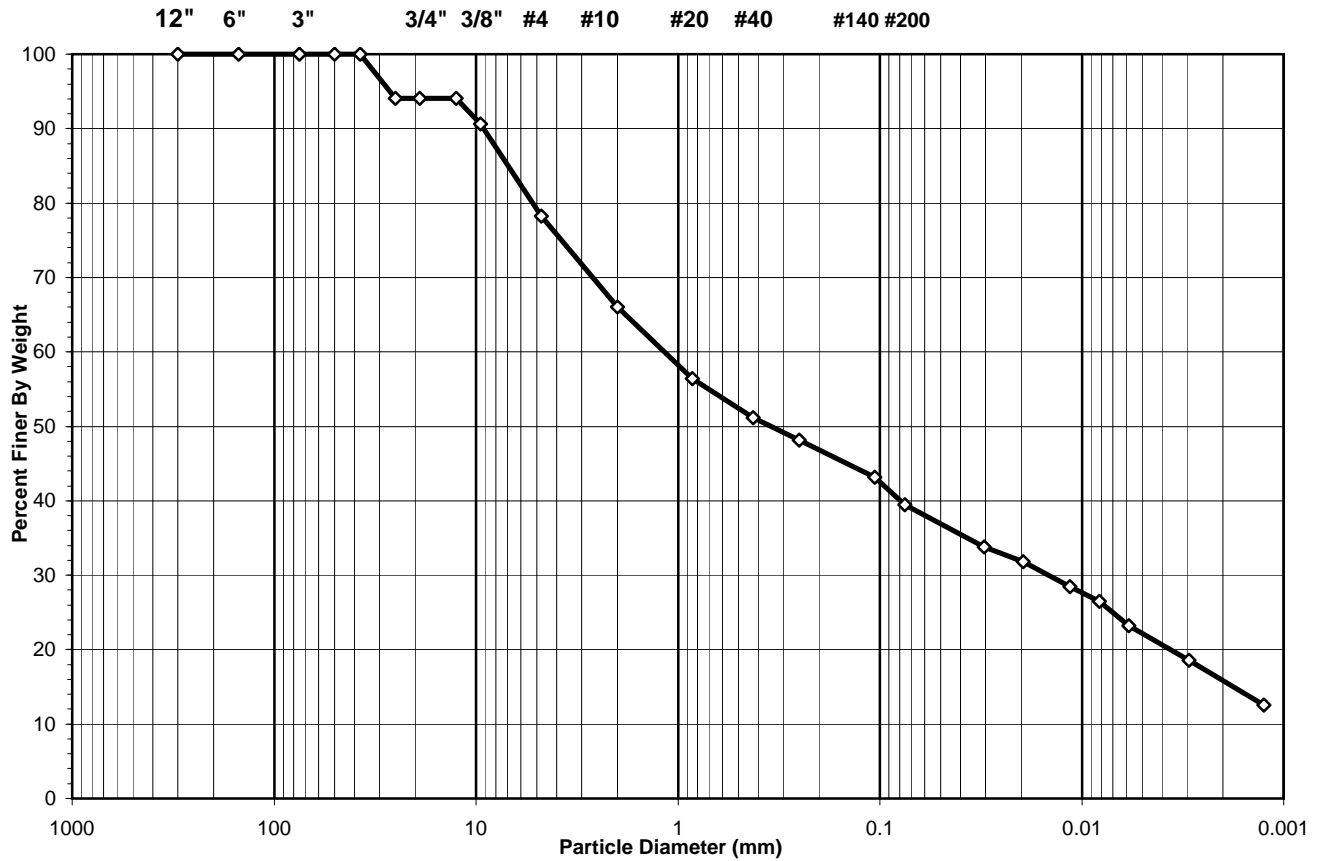
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-4
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

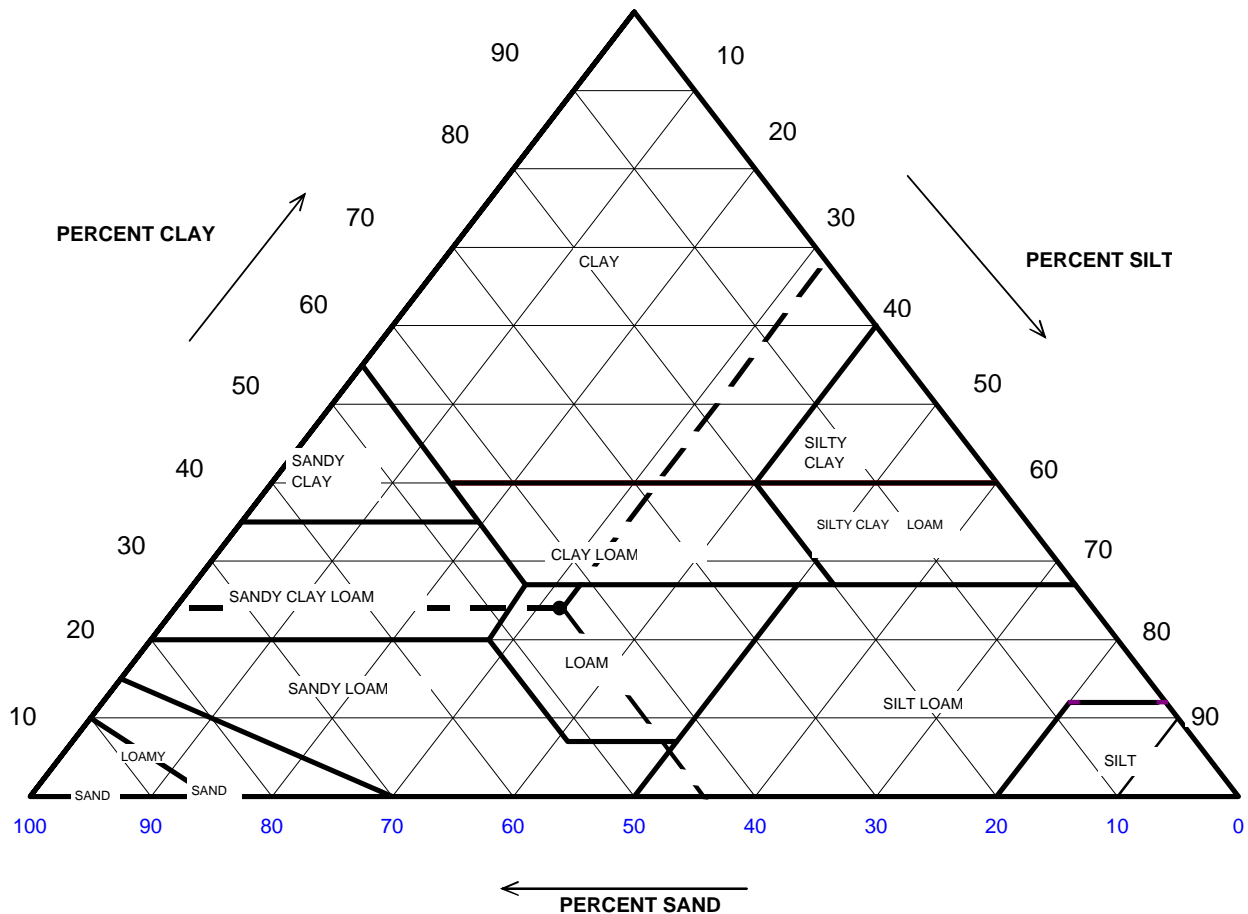


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	21.72
#4 To #200	<i>Sand</i>	38.85
Finer Than #200	<i>Silt & Clay</i>	39.43
USCS Symbol: <i>SC, TESTED</i>		
USCS Classification: <i>CLAYEY SAND WITH GRAVEL</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-4
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	66.05	Gravel	33.95	0.00
0.05	36.90	Sand	29.15	44.13
0.002	15.86	Silt	21.04	31.86
		Clay	15.86	24.01
		USDA Classification:	LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-4
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	967	Tare No.	NA
Weight of Tare & Wet Sample (g)	441.20	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	400.80	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	100.44	Weight of Tare (g)	NA
Weight of Water (g)	40.40	Weight of Water (g)	NA
Weight of Dry Sample (g)	300.36	Weight of Dry Sample (g)	NA
Moisture Content (%)	13.5	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	300.36
Dry Weight of -3/4" Sample (g)	164.04	Weight of - #200 Material (g)	118.43
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	181.93
Dry Weight of +3/4" Sample (g)	17.89		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained	Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)	(%)	(%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	17.89	5.96	5.96	94.04	94.04
3/4"	19.0	0.00	0.00	5.96	94.04	94.04
1/2"	12.5	0.00	0.00	5.96	94.04	94.04
3/8"	9.50	10.23	3.41	9.36	90.64	90.64
#4	4.75	37.11	12.36	21.72	78.28	78.28
#10	2.00	36.74	12.23	33.95	66.05	66.05
#20	0.85	29.02	9.66	43.61	56.39	56.39
#40	0.425	15.69	5.22	48.83	51.17	51.17
#60	0.250	9.10	3.03	51.86	48.14	48.14
#140	0.106	14.91	4.96	56.83	43.17	43.17
#200	0.075	11.24	3.74	60.57	39.43	39.43
Pan	-	118.43	39.43	100.00	-	-

Tested By **RAL** Date **9/8/15** Checked By **KC** Date **9/14/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-4
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	31.0	23.7	5.75	25.2	85.8	0.01287	0.0305	33.8
5	29.5	23.7	5.75	23.7	80.7	0.01287	0.0195	31.8
15	27.0	23.7	5.75	21.2	72.2	0.01287	0.0114	28.5
30	25.5	23.7	5.75	19.7	67.1	0.01287	0.0082	26.4
60	23.0	24	5.64	17.4	58.9	0.01282	0.0059	23.2
250	19.5	24	5.64	13.9	47.1	0.01282	0.0029	18.6
1440	15.0	24.1	5.61	9.4	31.9	0.01281	0.0013	12.6

Soil Specimen Data	Other Corrections
Tare No. 2337	
Weight of Tare & Dry Material (g) 129.72	a - Factor 0.99
Weight of Tare (g) 95.57	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 39.43
Weight of Dry Material (g) 29.2	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of tube
 Sample No.: GT-4
 Soil Description: BROWN LEAN CLAY

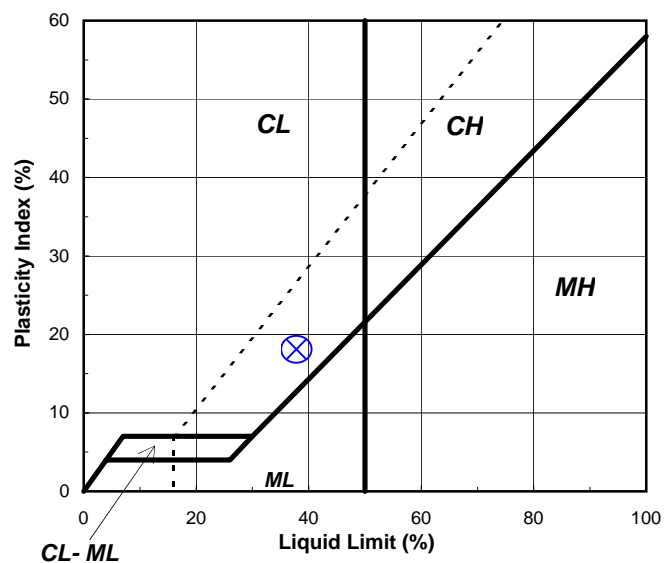
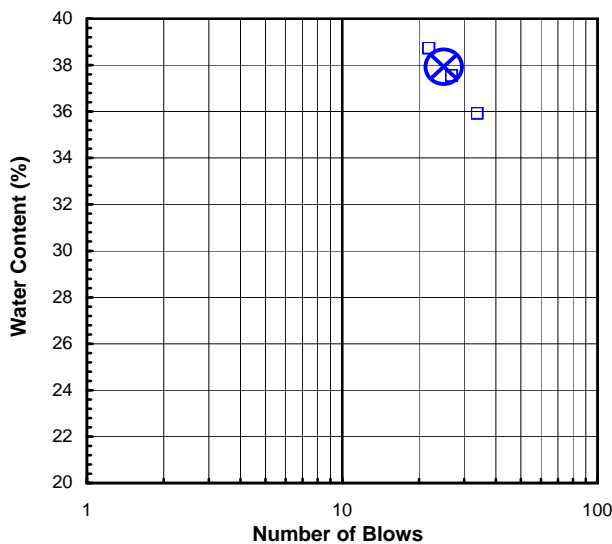
Note: The USCS symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

Liquid Limit Test	1	2	3	M U L T I P O I N T
Tare Number:	157	163	244	
Wt. of Tare & Wet Sample (g):	38.20	38.57	39.29	
Wt. of Tare & Dry Sample (g):	32.73	32.98	33.57	
Weight of Tare (g):	17.49	18.08	18.79	
Weight of Water (g):	5.5	5.6	5.7	
Weight of Dry Sample (g):	15.2	14.9	14.8	
Moisture Content (%):	35.9	37.5	38.7	
Number of Blows:	34	27	22	

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	180	184		
Wt. of Tare & Wet Sample (g):	25.76	25.91		
Wt. of Tare & Dry Sample (g):	24.76	24.84		
Weight of Tare (g):	19.64	19.64		
Weight of Water (g):	1.0	1.1		
Weight of Dry Sample (g):	5.1	5.2		
Moisture Content (%):	19.5	20.6	-1.0	
<i>Note: The acceptable range of the two Moisture contents is ± 2.6</i>				
				Liquid Limit (%): 38
				Plastic Limit (%): 20
				Plasticity Index (%): 18
				USCS Symbol: CL

Flow Curve

Plasticity Chart



Tested By JP Date 9/11/15 Checked By KC Date 9/14/15

PERMEABILITY TEST

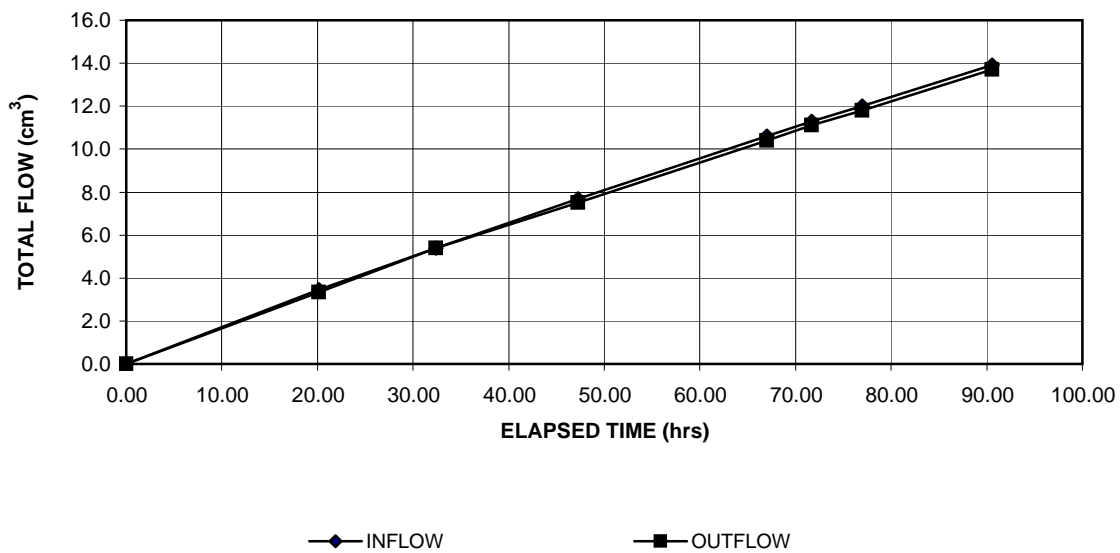
ASTM D 5084-10



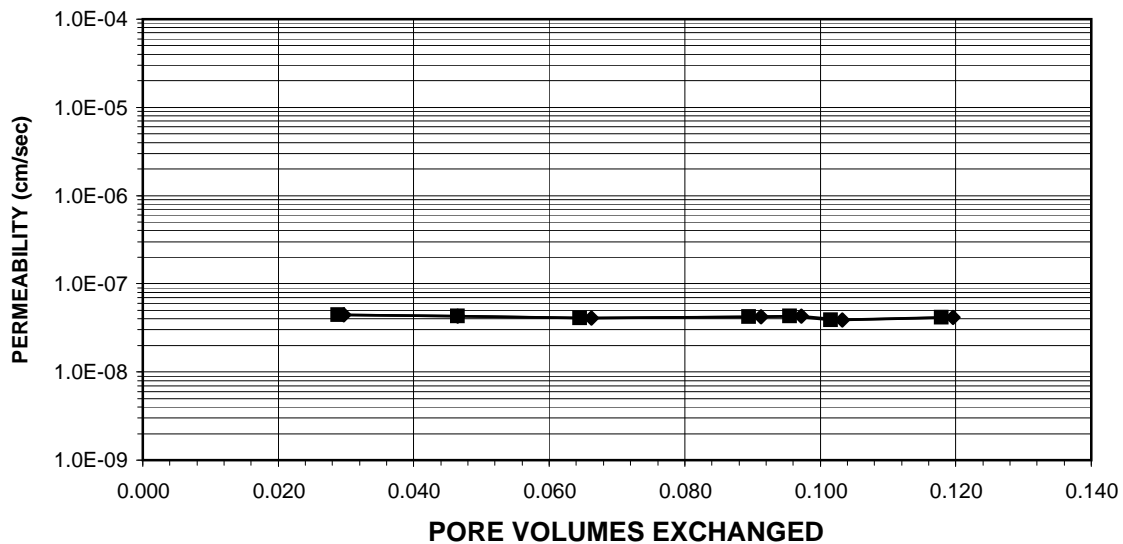
Client:	CB&I	Boring No.: Pond B
Client Project:	NRG Conemaugh	Depth (ft): Upper 8" of Tube
Project No.:	2015-471-001	Sample No.: GT-4
Lab ID No.:	2015-471-001-005	

AVERAGE PERMEABILITY = 4.1E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.1E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-005

Boring No.: Pond B
Depth (ft): Upper 8" of Tube
Sample No.: GT-4

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown Sandy Clay with Rock Fragments

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	785	605
Weight of Tare & Wet Sample (g)	202.10	459.52
Weight of Tare & Dry Sample (g)	183.22	405.60
Weight of Tare (g)	85.29	86.44
Weight of Water (g)	18.88	53.92
Weight of Dry Sample (g)	97.93	319.16
Moisture Content (%)	19.3	16.9

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	720.55	NA
Weight of Tube (g)	0.00	NA
Weight of Wet Sample (g)	720.55	706.14
Length 1 (in)	3.184	3.232
Length 2 (in)	3.193	3.190
Length 3 (in)	3.201	3.211
Top Diameter (in)	2.883	2.874
Middle Diameter (in)	2.877	2.857
Bottom Diameter (in)	2.872	2.873
Average Length (in)	3.19	3.21
Average Area (in ²)	6.50	6.46
Sample Volume (cm ³)	340.19	339.93
Unit Wet Weight (g/cm ³)	2.12	2.08
Unit Wet Weight (pcf)	132.2	129.7
Unit Dry Weight (pcf)	110.8	110.9
Unit Dry Weight (g/cm ³)	1.78	1.78
Void Ratio, e	0.52	0.52
Porosity, n	0.34	0.34
Pore Volume (cm ³)	116.5	116.2
Total Weight of Sample After Test (g)		725.8

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
 Client Project: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID No.: 2015-471-001-005

Boring No.: Pond B
 Depth (ft): Upper 8" of Tube
 Sample No.: GT-4

Pressure Heads (Constant)

Top Cap (psi) 67.5
 Bottom Cap (psi) 70.0
 Cell (psi) 75.0
 Total Pressure Head (cm) 175.8
 Hydraulic Gradient 21.55

Final Sample Dimensions

Sample Length (cm), L 8.16
 Sample Diameter (cm) 7.28
 Sample Area (cm²), A 41.68
 Inflow Burette Area (cm²), a-in 0.875
 Outflow Burette Area (cm²), a-out 0.961
 B Parameter (%) 96

AVERAGE PERMEABILITY = 4.1E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 4.1E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/5/15	12	30	0.000	0.0	0.0	201.0	0	22.0	NA
9/6/15	8	38	20.133	3.5	3.4	193.6	0	22.0	4.4E-08
9/6/15	20	54	32.400	5.4	5.4	189.2	0	22.8	4.3E-08
9/7/15	11	45	47.250	7.7	7.5	184.4	0	22.0	4.1E-08
9/8/15	7	30	67.000	10.6	10.4	178.1	0	22.0	4.2E-08
9/8/15	12	13	71.717	11.3	11.1	176.6	0	22.0	4.3E-08
9/8/15	17	30	77.000	12.0	11.8	175.1	0	22.0	3.9E-08
9/9/15	7	5	90.583	13.9	13.7	170.9	1	22.0	4.2E-08

Tested By: TRE Date: 9/3/15 Checked By: KC Date: 9/10/15

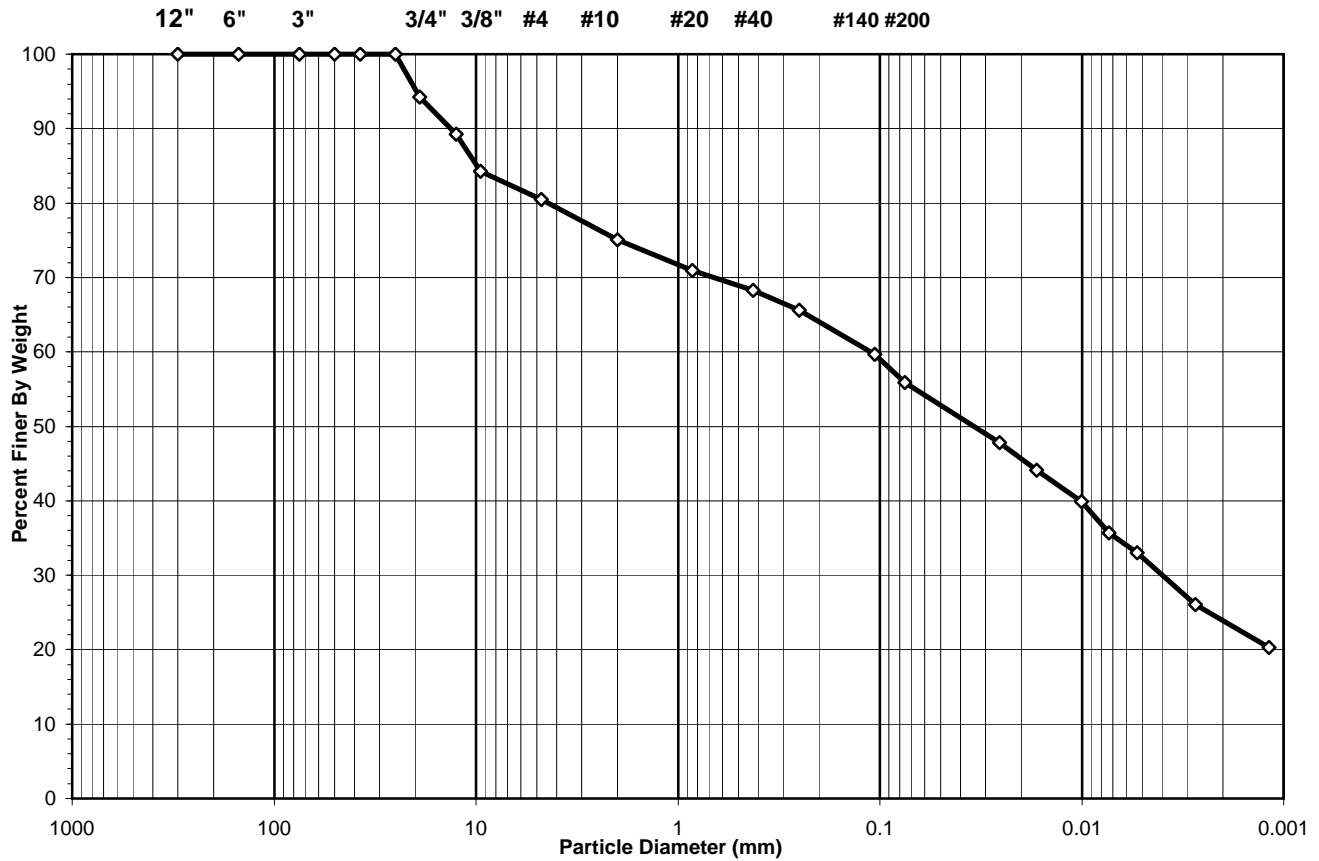
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-5
 Soil Color: Brown

USCS USDA	SIEVE ANALYSIS					HYDROMETER	
	cobble	gravel		sand		silt and clay fraction	
	cobble	gravel		sand		silt	clay

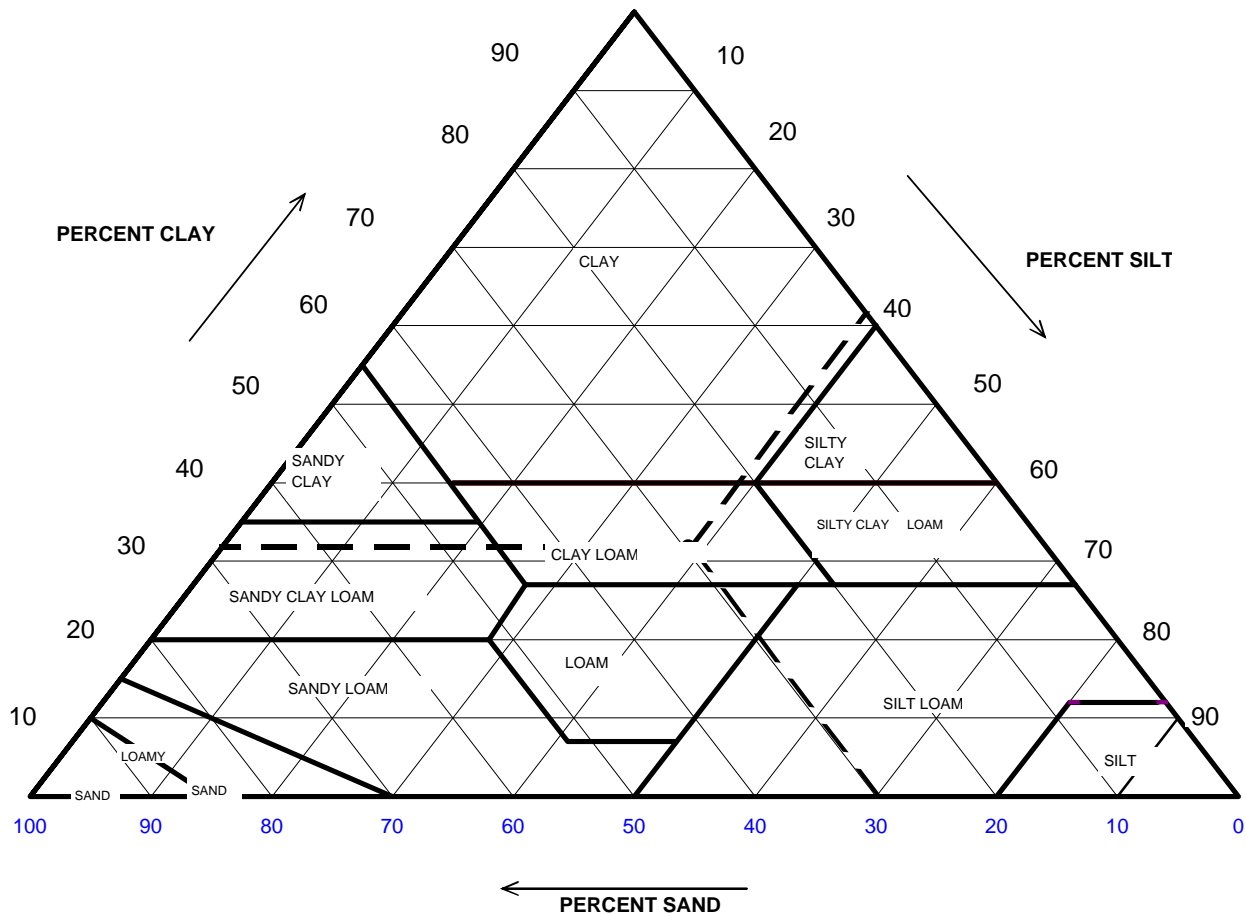


USCS Summary		
Sieve Sizes (mm)		Percentage
Greater Than #4	<i>Gravel</i>	19.48
#4 To #200	<i>Sand</i>	24.62
Finer Than #200	<i>Silt & Clay</i>	55.90
USCS Symbol: <i>CL, TESTED</i>		
USCS Classification: <i>SANDY LEAN CLAY WITH GRAVEL</i>		

USDA CLASSIFICATION CHART

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-5
 Soil Color: Brown



Particle Size (mm)	Percent Finer (%)	USDA SUMMARY	Actual Percentage (%)	Corrected % of Minus 2.0 mm material for USDA Classificat. (%)
2	75.09	Gravel	24.91	0.00
0.05	52.86	Sand	22.23	29.60
0.002	23.88	Silt	28.99	38.60
		Clay	23.88	31.80
		USDA Classification:	CLAY LOAM	

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-5
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	31	Tare No.	NA
Weight of Tare & Wet Sample (g)	608.58	Weight of Tare & Wet Sample (g)	NA
Weight of Tare & Dry Sample (g)	547.20	Weight of Tare & Dry Sample (g)	NA
Weight of Tare (g)	203.32	Weight of Tare (g)	NA
Weight of Water (g)	61.38	Weight of Water (g)	NA
Weight of Dry Sample (g)	343.88	Weight of Dry Sample (g)	NA
Moisture Content (%)	17.8	Moisture Content (%)	NA

Wet Weight of -3/4" Sample (g)	NA	Weight of the Dry Sample (g)	343.88
Dry Weight of -3/4" Sample (g)	131.79	Weight of - #200 Material (g)	192.24
Wet Weight of +3/4" Sample (g)	NA	Weight of + #200 Material (g)	151.64
Dry Weight of +3/4" Sample (g)	19.85		
Total Dry Weight of Sample (g)	NA		

Sieve Size	Sieve Opening	Weight of Soil Retained	Percent Retained	Accumulated Percent Retained	Percent Finer	Accumulated Percent Finer
	(mm)	(g)	(%)	(%)	(%)	(%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.00
1"	25.0	0.00	0.00	0.00	100.00	100.00
3/4"	19.0	19.85	5.77	5.77	94.23	94.23
1/2"	12.5	17.14	4.98	10.76	89.24	89.24
3/8"	9.50	17.19	5.00	15.76	84.24	84.24
#4	4.75	12.81	3.73	19.48	80.52	80.52
#10	2.00	18.67	5.43	24.91	75.09	75.09
#20	0.85	14.22	4.14	29.05	70.95	70.95
#40	0.425	9.12	2.65	31.70	68.30	68.30
#60	0.250	9.29	2.70	34.40	65.60	65.60
#140	0.106	20.37	5.92	40.32	59.68	59.68
#200	0.075	12.98	3.77	44.10	55.90	55.90
Pan	-	192.24	55.90	100.00	-	-

Tested By **RAL** Date **9/11/15** Checked By **KC** Date **9/14/15**

HYDROMETER ANALYSIS

ASTM D 422-63 (2007)

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-5
 Soil Color: Brown

Elapsed Time	R Measured	Temp.	Composite Correction	R Corrected	N	K Factor	Diameter	N'
(min)		(°C)			(%)		(mm)	(%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	51.0	24.1	5.61	45.4	85.5	0.01281	0.0255	47.8
5	47.5	24.1	5.61	41.9	78.9	0.01281	0.0167	44.1
15	43.5	24.1	5.61	37.9	71.4	0.01281	0.0100	39.9
30	39.5	24.1	5.61	33.9	63.9	0.01281	0.0073	35.7
60	37.0	23.9	5.68	31.3	59.0	0.01284	0.0053	33.0
250	30.5	23.6	5.79	24.7	46.6	0.01288	0.0027	26.0
1440	25.0	23.7	5.75	19.2	36.3	0.01287	0.0012	20.3

Soil Specimen Data	Other Corrections
Tare No. 704	
Weight of Tare & Dry Material (g) 150.38	a - Factor 0.99
Weight of Tare (g) 92.84	
Weight of Deflocculant (g) 5.0	Percent Finer than # 200 55.90
Weight of Dry Material (g) 52.5	Specific Gravity 2.7 Assumed

Note: Hydrometer test is performed on - # 200 sieve material.

ATTERBERG LIMITS

ASTM D 4318-10

Client: CB&I
 Client Reference: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of tube
 Sample No.: GT-5
 Soil Description: BROWN LEAN CLAY

Note: The USCS symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried) sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

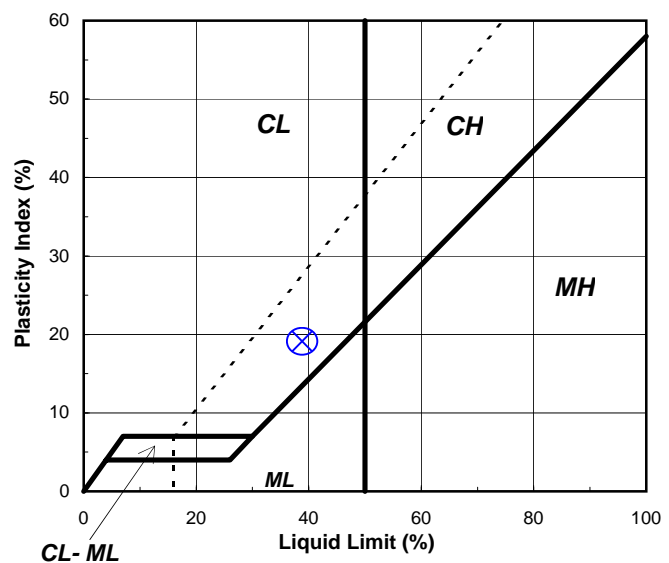
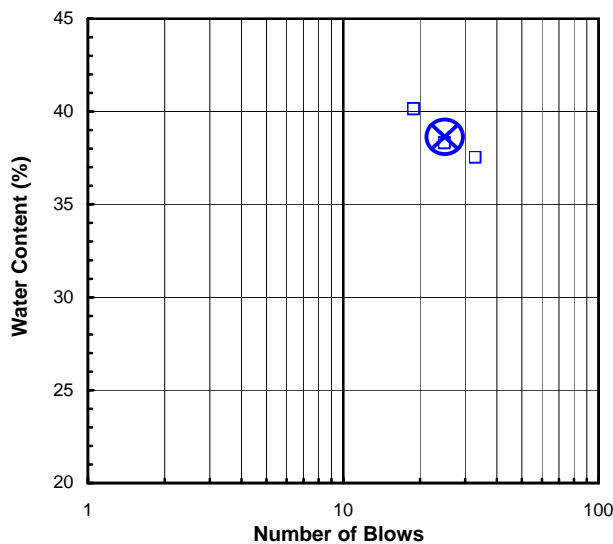
Liquid Limit Test	1	2	3	M U L T I P O I N T
Tare Number:	150	202	209	
Wt. of Tare & Wet Sample (g):	39.90	37.32	40.75	
Wt. of Tare & Dry Sample (g):	34.41	31.77	34.61	
Weight of Tare (g):	19.77	17.27	19.30	
Weight of Water (g):	5.5	5.6	6.1	
Weight of Dry Sample (g):	14.6	14.5	15.3	
Moisture Content (%):	37.5	38.3	40.1	
Number of Blows:	33	25	19	

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	215	216		Liquid Limit (%): 39
Wt. of Tare & Wet Sample (g):	24.66	25.28		Plastic Limit (%): 20
Wt. of Tare & Dry Sample (g):	23.62	24.24		Plasticity Index (%): 19
Weight of Tare (g):	18.36	19.21		USCS Symbol: CL
Weight of Water (g):	1.0	1.0		
Weight of Dry Sample (g):	5.3	5.0		
Moisture Content (%):	19.8	20.7	-0.9	

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By JP Date 9/11/15 Checked By KC Date 9/14/15

PERMEABILITY TEST

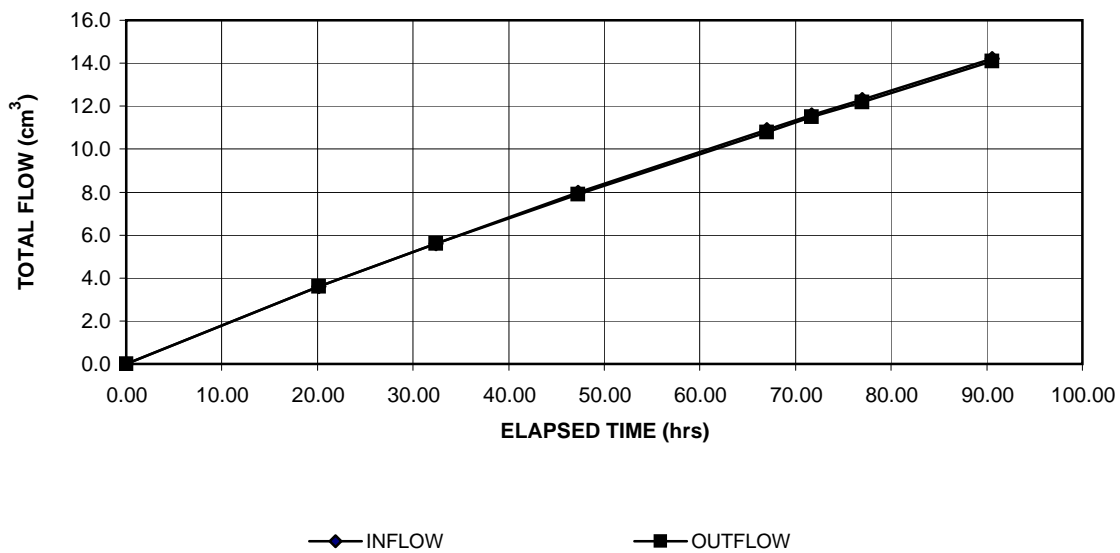
ASTM D 5084-10



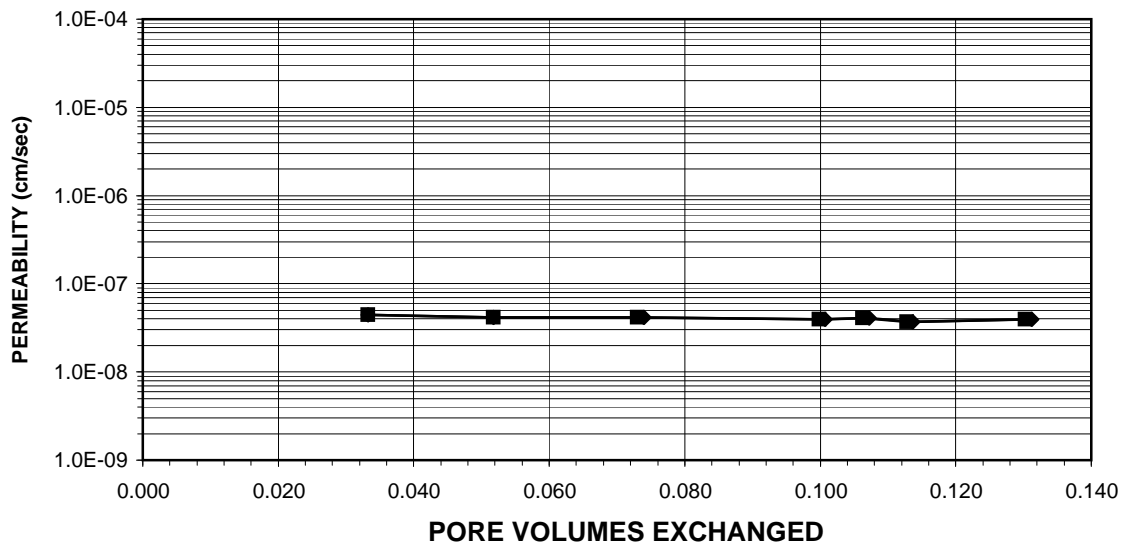
Client: CB&I	Boring No.: Pond B
Client Project: NRG Conemaugh	Depth (ft): Lower 8" of Tube
Project No.: 2015-471-001	Sample No.: GT-5
Lab ID No.: 2015-471-001-006	

AVERAGE PERMEABILITY = 3.9E-08 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.9E-10 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
Client Project: NRG Conemaugh
Project No.: 2015-471-001
Lab ID No.: 2015-471-001-006

Boring No.: Pond B
Depth (ft): Lower 8" of Tube
Sample No.: GT-5

Specific Gravity: 2.70 Assumed
Sample Condition: Undisturbed

Visual Description: Brown Clay

MOISTURE CONTENT:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Tare Number	555	599
Weight of Tare & Wet Sample (g)	340.94	125.88
Weight of Tare & Dry Sample (g)	301.10	118.92
Weight of Tare (g)	81.75	83.94
Weight of Water (g)	39.84	6.96
Weight of Dry Sample (g)	219.35	34.98
Moisture Content (%)	18.2	19.9

SPECIMEN:	<u>BEFORE TEST</u>	<u>AFTER TEST</u>
Weight of Tube & Wet Sample (g)	925.54	NA
Weight of Tube (g)	226.05	NA
Weight of Wet Sample (g)	699.49	709.76
Length 1 (in)	3.059	3.077
Length 2 (in)	3.047	3.082
Length 3 (in)	3.083	3.086
Top Diameter (in)	2.896	2.870
Middle Diameter (in)	2.857	2.873
Bottom Diameter (in)	2.886	2.877
Average Length (in)	3.06	3.08
Average Area (in ²)	6.51	6.48
Sample Volume (cm ³)	326.91	327.45
Unit Wet Weight (g/cm ³)	2.14	2.17
Unit Wet Weight (pcf)	133.6	135.3
Unit Dry Weight (pcf)	113.0	112.8
Unit Dry Weight (g/cm ³)	1.81	1.81
Void Ratio, e	0.49	0.49
Porosity, n	0.33	0.33
Pore Volume (cm ³)	107.7	108.2
Total Weight of Sample After Test (g)		701.0

Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15

PERMEABILITY TEST

ASTM D 5084-10



Client: CB&I
 Client Project: NRG Conemaugh
 Project No.: 2015-471-001
 Lab ID No.: 2015-471-001-006

Boring No.: Pond B
 Depth (ft): Lower 8" of Tube
 Sample No.: GT-5

Pressure Heads (Constant)

Top Cap (psi) 67.5
 Bottom Cap (psi) 70.0
 Cell (psi) 75.0
 Total Pressure Head (cm) 175.8
 Hydraulic Gradient 22.45

Final Sample Dimensions

Sample Length (cm), L 7.83
 Sample Diameter (cm) 7.30
 Sample Area (cm²), A 41.83
 Inflow Burette Area (cm²), a-in 0.899
 Outflow Burette Area (cm²), a-out 0.876
 B Parameter (%) 97

AVERAGE PERMEABILITY = 3.9E-08 cm/sec @ 20°C

AVERAGE PERMEABILITY = 3.9E-10 m/sec @ 20°C

DATE	TIME		ELAPSED TIME	TOTAL INFLOW	TOTAL OUTFLOW	TOTAL HEAD	FLOW	TEMP.	INCREMENTAL PERMEABILITY
(mm/dd/yy)	(hr)	(min)	t (hr)	(cm ³)	(cm ³)	h (cm)	(0 flow) (1 stop)	(°C)	@ 20°C (cm/sec)
9/5/15	12	30	0.000	0.0	0.0	206.0	0	22.0	NA
9/6/15	8	38	20.133	3.6	3.6	197.8	0	22.0	4.4E-08
9/6/15	20	54	32.400	5.6	5.6	193.3	0	22.0	4.2E-08
9/7/15	11	45	47.250	8.0	7.9	188.0	0	22.0	4.1E-08
9/8/15	7	30	67.000	10.9	10.8	181.4	0	22.0	4.0E-08
9/8/15	12	13	71.717	11.6	11.5	179.8	0	22.0	4.1E-08
9/8/15	17	30	77.000	12.3	12.2	178.2	0	22.0	3.7E-08
9/9/15	7	5	90.583	14.2	14.1	173.9	1	22.0	4.0E-08

Tested By: JAB Date: 9/4/15 Checked By: KC Date: 9/10/15