Midwest Generation, LLC
Midwest Generation, LLC
Powerton Generating Station
13082 E. Manito Road
Pekin, Illinois 60087

October 18, 2024

Illinois Environmental Protection Agency
Compliance Assurance Section
Bureau of Water
1021 North Grand Avenue East
Springfield, Illinois 62702

RE: Midwest Generation LLC—Powerton Generating Station W1798010008
CCR Permit No. 2024-CC-100030
Special Condition 17 – Retrofit Construction Completion Report

To Whom It May Concern:

In accordance with Special Condition 17 of CCR Permit No. 2024-CC-100030 and 35 IAC 845.770(g), Midwest Generation (MWG) is hereby providing one original and two copies of the Retrofit Construction Completion Report for the Bypass Basin to the Illinois Environmental Protection Agency (Agency). The retrofit completion certification will be mailed to the Agency under a separate cover.

Please contact Jill Buckley at jill.buckley@nrg.com with any questions.

Sincerely,

Todd Mundorf
Powerton Plant Manager

cc: Mark Liska – Illinois EPA (via e-mail)
Darin LeCrone – Illinois EPA (via e-mail)
Lauren Hunt – Illinois EPA (via e-mail)
Joe Kotas – Powerton Station (via e-mail)
Jill Buckley – Midwest Generation (via e-mail)

Attachments

CONSTRUCTION ACCEPTANCE REPORT

BYPASS BASIN RETROFIT

POWERTON GENERATING STATION
PEKIN, ILLINOIS

Prepared For:
MIDWEST GENERATION, LLC

Prepared By:
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
NAPERVILLE, ILLINOIS

CEC Project 343-014

OCTOBER 2024

Civil & Environmental Consultants, Inc.
1230 East Diehl Road, Suite 200 | Naperville, IL 60563 | p: 630-963-6026 f: 630-963-6027 | www.cecinc.com

Layer	Area (acres)	Layer Thickness (feet)	Total Volume (cy)	Testing Requirement		Number of Required Tests	Number of Completed Tests
Structural Fill	0.5	0.0-2.7	1,400	In-Situ Moisture Content (ASTM D2216)	1 per 500 cy	3	5
				Moisture Density Curve (ASTM D1557)	1 per 500 cy	3	5
				Atterberg Limits (ASTM D4318)	1 per 500 cy	0	0
				Grain Size Analysis (ASTM D422)	1 per 500 cy	3	5
				Soil Classification (ASTM D2487)	1 per 500 cy	3	5
				Density/Moisture (ASTM D6938)	4 per lift	16	16
				Thickness	4 per acre per lift	8	8
Coarse Aggregate Bedding	0.03	1	50	Grain Size Analysis (ASTM D422)	1 per 500 cy	1	1
				Thickness	4 per lift	4	4
Protective Warning Layer and Road Surfacing	0.5	0.5	400	Grain Size Analysis (ASTM D422)	1 per 500 cy	1	1
				Thickness	4 per lift	4	4
Riprap Bedding	0.45	0.5	375	Grain Size Analysis (ASTM D422)	1 per 500 cy	1	1
				Thickness	4 per lift	4	4
Riprap Materials	0.45	0.5	375	Grain Size Analysis (ASTM D422)	1 per 500 cy	1	1
				Thickness	4 per lift	4	4
Sand Filter Layer	1	0.5-1.0	975	Hydraulic Conductivity (ASTM D2434)	1 per 500 cy	2	2
				Grain Size Analysis (ASTM D422)	1 per 500 cy	2	2
				Thickness	4 per lift	8	8

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APPENDICES

1.0 INTRODUCTION

On behalf of Midwest Generation, LLC (MWG), Civil & Environmental Consultants, Inc. (CEC) has prepared this report and the accompanying drawings as documentation of the Bypass Basin Retrofit at the Powerton Generating Station located in Pekin, Tazewell County, Illinois (site).

1.1 BACKGROUND

The Bypass Basin is an existing non-hazardous coal combustion residuals (CCR) waste disposal facility. The site, which is owned and operated by MWG, was issued a Coal Combustion Residual Surface Impoundment Permit No. 2024-CC-100030 on July 3, 2024, to retrofit the Bypass Basin.

At the time of construction, the Bypass Basin was out of service. The purpose of this project was to retrofit the Bypass Basin in accordance with the Illinois Pollution Control Board's CCR Rule (Title 35 of the Illinois Administrative Code Part 845) and with the United States Environmental Protection Agency's CCR Rule (Title 40 of the Code of Federal Regulations Part 257 Subpart D).

The Bypass Basin was retrofitted by removing all CCR and CCR-mixed materials stored in the basin and decontaminating the basin's existing geomembrane liner and appurtenant structures, which remain in place. Following removal of CCR and CCR-mixed material and decontamination of the basin facilities remaining in-place, the retrofit included installation of a new composite liner system and new leachate collection and removal system (LCRS) within the Bypass Basin over the basin's existing decontaminated and leak-tested geomembrane liner.

This report includes a detailed description of the work performed and supporting appendices consisting of photographs taken during various stages of the construction, copies of material testing results, field documentation records, daily field reports, and record drawings.

1.2 STATEMENT OF CERTIFICATION

Retrofit of the Bypass Basin commenced on August 9, 2024 and was substantially completed on October 4, 2024. Not including the CCR and CCR-mixed removal and basin decontamination, CEC observed the retrofit construction on a full-time basis. Removal of CCR and CCR-mixed material from the basin and decontamination of the basin facilities remaining in-place were conducted by MWG prior to the start of the retrofit project.

Following removal of CCR and CCR-mixed material from the basin and decontamination of the basin facilities remaining in-place, a composite liner system and LCRS was installed within the Bypass Basin over the basin's existing decontaminated and leak-tested geomembrane liner.

Retrofit of the approximately 1.0-acre Bypass Basin included the following components, presented in chronological sequence:

- Removal of CCR and CCR-mixed material from the basin;
- Decontamination of the basin facilities remaining in-place;
- Leak-testing and repair of existing geomembrane liner;
- Installation of composite liner system consisting of geosynthetic clay liner (GCL) and 60 mil textured high-density polyethylene (HDPE) geomembrane liner; and
- Leachate collection and removal system.

An index report is included with this report and can be found in Appendix D. This report serves as certification that the approximate 1-acre retrofit project was completed in accordance with the requirements of Illinois Environmental Protection Agency Coal Combustion Residual Surface Impoundment Permit No. 2024-CC-100030.

2.0 CONSTRUCTION DOCUMENTS AND PARTIES

The construction quality assurance (CQA), design, and regulatory documents, as well as the parties associated with the construction of the final cover are listed below.

2.1 CONSTRUCTION AND REFERENCE DOCUMENTS

The retrofit CQA, design, and regulatory documents are identified as follows:

- Illinois Environmental Protection Agency Coal Combustion Residual Surface Impoundment Permit No. 2024-CC-100030.
- Bypass Basin Retrofit Construction Plans, Sargent & Lundy, August 30, 2024.
- Specification P-1400 Earthwork for Bypass Basin Retrofit, Sargent & Lundy, July 12, 2024.
- Specification P-1401 Construction Quality Assurance for Bypass Basin Retrofit, Sargent & Lundy, July 12, 2024.
- Specification P-1402 Geosynthetic Materials for Bypass Basin Retrofit, Sargent & Lundy, July 12, 2024.
- Geosynthetic Research Institute (GRI) GM13 Standard Specification – Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes, Revision 18, April 5, 2024.
- Geosynthetic Research Institute (GRI) GM19a Standard Specification – Seam Strength and Related Properties of Thermally Bonded Homogeneous Polyolefin Geomembrane/ Barriers, Revision 10, March 18, 2021.

2.2 PARTIES

The following parties were involved in the retrofit of the Bypass Basin:

- Midwest Generation, LLC (MWG) – Owner/Operator.
- Sargent & Lundy, LLC (S&L) - Design Engineer.
- Civil & Environmental Consultants, Inc. (CEC) - CQA Consultant.
- Bluff City Materials, Inc. (BCM) - Retrofit Contractor.
- Clean Air and Water Systems (CAAWS) - Liner Installation Subcontractor.
- Wang Engineering (WEI) - Soils Testing Laboratory.
- NASHnal Soil Testing (NST) - Soils Testing Laboratory.
- Construction Field Services (CFS) - Soils Testing Laboratory.
- TRI Environmental Inc. (TRI) - Geosynthetics Testing Laboratory.
- Geotechnics, Inc. - Geosynthetics Testing Laboratory.

A signed statement by the construction quality assurance officer, Mr. Maurice Dean Jones, Jr., P.E., is included in Appendix A. This statement designates the CQA officers-in-absentia. This report also includes:

- Existing liner decontamination and integrity verifications completed by S&L prior to start of the retrofit construction in Appendix B.
- As-built construction plans documenting the final construction of the retrofit project are provided as Appendix C.
- Index and acceptance reports documenting approval of contractor deliverables and testing results for the composite liner system and leachate collection and removal system in Appendix D.

3.0 CCR REMOVAL AND LINER DECONTAMINATION

Prior to the commencement of the Bypass Basin Retrofit, MWG had the CCR and CCR-mixed materials removed from the basin; the facilities remaining in-place decontaminated; and existing HDPE liner leak-tested and repaired. The purpose of removing the CCR and mixed CCR materials; decontamination of the facilities remaining in-place; and existing HDPE liner leak-testing and repair was to demonstrate that, following the material removal and the decontamination work described, the existing HDPE geomembrane liner in the Bypass Basin is not contaminated with CCR constituents and remains competent for re-use as a supplemental liner in the retrofitted basin.

Documentation of the CCR and CCR-mixed material removal, decontamination, and liner testing was provided in two reports prepared by S&L. The S&L reports documenting the work are provided in Appendix B with reports B-1: Analytical Test Results for Existing Bypass Basin Liner and B-2: Integrity Test Results for Existing Bypass Basin Liner.

4.0 STRUCTURAL FILL PLACEMENT

The structural fill is a compacted soil layer consisting of a poorly graded sand. The structural fill layer required a varied thickness to achieve the design grades provided by S&L. This section discusses the following CQA requirements for the structural fill:

- Material qualification for acceptance;
- Construction procedures and testing; and
- Final grading and thickness confirmation of the structural fill.

Photographs documenting installation of the structural fill are included with the daily field reports in Appendix E.

4.1 SOIL MATERIALS QUALIFICATION

Prior to delivery to the site, the earthwork contractor submitted test results of the material to be utilized as structural fill. The earthwork contractor chose to use a granular material for the structural fill. The requirements and testing frequency are provided in Table 1 below. In accordance with the CQA plan, the structural fill was to be rounded and not crushed, with less than 2% organic or other deleterious materials, have a maximum particle size less than 1 inch, and not have a silt content of greater than 12%. A summary of the laboratory test data is provided in Appendix F-1.

Table 1: Structural Fill Prequalification Testing

Property, Test Method	Sampling Frequency	Number of Required Tests	Number of Passing Tests
Sieve Analysis (ASTM C136)	2 Per Source	2	2
Classification of Material (ASTM D2487)	2 Per Source	2	2
Organic Content (ASTM D2974)	2 Per Source	2	2
Atterberg Limits (ASTM D4318)	2 Per Source	N/A	N/A

Atterberg limits were not required due to the earthwork contractor using a granular material.

4.2 STRUCTURAL FILL CONSTRUCTION

The structural fill was placed in four lifts approximately 8 inches thick in the loose condition using a John Deere 333G skid steer mounted with a dozer blade. The first lift measured approximately 10 inches due to the constraint of at least 10 inches of earthen material above the existing liner beneath any vehicles. Each lift was compacted using a Bomag BW 211D smooth drum roller making two passes per lift of structural fill. Each lift was moisture conditioned to achieve adequate compaction. Lift thickness was controlled by the skid steer operator using a Topcon global positioning system mounted on the blade, BCM's project engineer with global positioning system rover pole, and visually monitored and checked by CEC.

Following placement and compaction of each lift, in-place moisture and density tests, consisting of a nuclear density gauge and sand cone, were performed to determine placement acceptance in accordance with the CQA plan. The structural fill used in these areas were free of debris, organic, and other deleterious material.

In-place moisture-density tests were performed by the CQA consultant as the compacted soil layers were placed and compacted. Moisture-density tests were taken using a Troxler Model 3440 nuclear density gauge in accordance with ASTM International (ASTM) D-6938 at a minimum frequency of four tests per lift. The gauge was standardized daily using the standard block supplied by the manufacturer. The standard moisture and density counts were compared to the average of the previous four daily counts to ensure conformance with the manufacturer's specifications. Moisture-density tests were also taken using the sand cone method ASTM D-1556. Sand cone tests were taken at a frequency of one per ten nuclear density tests or at least one per day.

The number of nuclear moisture-density tests performed during structural fill construction was sixteen tests (sixteen tests required) and the number of sand-cone tests performed was four tests (four tests required). Moisture-density test results are included with the daily field reports in Appendix E.

Five samples (three required) were collected from the structural fill after placement. Laboratory results for the structural fill samples are provided in Appendix F-2.

4.3 CERTIFICATION SURVEY

The structural fill was placed as described above until design grades were met or exceeded. After the final grades were achieved, the surface of this layer was rolled with a smooth drum roller to seal the surface in preparation for the GCL, HDPE geomembrane liner, drainage geocomposite, and other fill materials. Final as-built elevations were surveyed by BCM and recorded on a minimum 50-foot grid and at changes in slope to verify structural fill final grades and required thicknesses. As-built elevations and summary tables are presented on the as-built drawings in Appendix C.

5.0 GEOSYNTHETIC CLAY LINER

The GCL overlies the structural fill and is composed of a base and cover geotextile encapsulating a layer of sodium bentonite clay. The GCL was manufactured by CETCO, a Minerals Technologies company, and installed by CAAWS. This section describes the following GCL CQA requirements:

- GCL materials;
- Structural fill surface preparation; and
- GCL installation and seaming.

5.1 GCL MATERIAL

The GCL was delivered in factory-rolled sections, with each roll having dimensions of 14.5 feet in width and approximately 150 feet in length. The GCL rolls were staged in a prepared area. The CQA consultant viewed each roll for visible damage or defects.

Prior to delivery, CETCO supplied quality control certifications of the material for each roll. Testing results are provided in Appendix G-1. Third-party conformance testing was required, and testing results are provided in Appendix G-2. The quality control certifications were in accordance with the CQA plan.

5.2 SITE PREPARATION

Prior to the placement of the GCL, representatives of the liner installer (CAAWS) and the CQA officer performed a viewing of the structural fill surface for soil clods, stones, and/or protrusions that would impair the integrity of the GCL. Areas that were deemed unsuitable were addressed by the earthwork contractor prior to GCL placement. Upon completion of the visual inspection, a subgrade acceptance form was completed stating that the subgrade was suitable to the installer's representative for GCL and geomembrane placement. Copies of the signed subgrade acceptance form are provided in Appendix H-1.

5.3 GCL INSTALLATION

The GCL rolls were deployed by attaching the roll to a spreader bar rigged to an excavator with a skid steer fitted with a winch that would pull the rolls toward the winch. Equipment was operated from outside the basin to reduce disturbance to the structural fill. The panels were deployed to minimize the number of seams required. Individual panels were deployed as close as possible to their installation position to minimize having to drag them into place. As it was deployed, each panel was assigned a unique field identification number by CAAWS. The GCL panel layout diagram showing the extent of panels is provided in Appendix H-9.

Adjacent GCL panels were overlapped approximately 6 inches on the longitudinal seams and 24 inches on end seams. After the panels were placed, the edge of upper panel was pulled back, and dry granular bentonite was poured in a continuous manner along the overlap. The overlapping GCL panels were then heat bonded. Granular bentonite was installed at the point of intersection of the existing structures such as concrete structures and marker posts. At each of the intersections, the GCL was installed higher on the structure than the existing geomembrane liner.

After seaming was complete, CAAWS and CEC conducted a walkdown to visually check areas of the GCL. No defects, holes, tears, and signs of damage during installation were observed. GCL was installed into the anchor trench at the top of the slopes.

6.0 FLEXIBLE MEMBRANE LINER

The flexible membrane liner (FML) overlies the GCL and is composed of a 60 mil HDPE textured geomembrane. The FML was manufactured by SKAPS Industries (SKAPS) and installed by CAAWS. This section describes the following FML CQA requirements:

- FML materials;
- FML installation and seaming;
- Quality control testing; and
- Defects and repair observations.

Photographs documenting installation of the geomembrane are included with the daily field reports in Appendix E.

6.1 FML MATERIAL

The 60 mil HDPE textured geomembrane was delivered in factory-rolled sections, with each roll having dimensions of approximately 24 feet in width and approximately 560 feet in length. The geomembrane rolls were staged in a prepared area. The CQA consultant viewed each roll for visible damage or defects.

Prior to delivery, SKAPS supplied quality control certifications of the material for each roll. Testing results are provided in Appendix G-3. Third-party conformance testing was required, and testing results are provided in Appendix G-4. The quality control certifications were in accordance with the CQA plan.

6.2 FML INSTALLATION

The geomembrane rolls were deployed by attaching the roll to a spreader bar rigged to an excavator, and a skid steep fitted with a winch that would pull the rolls toward the winch. The panels were deployed to minimize the number of seams required. Individual panels were deployed as close as possible to their installation position to minimize having to drag them into place. As it was deployed, each panel was assigned a unique field identification number by CAAWS.

Panels were examined for damage and manufacturing imperfections after placement and prior to seaming. Observed defects were marked by the CQA consultant and repaired by CAAWS. Panel deployment logs, summarizing information for each panel deployed in each area are presented in Appendix H-2. The geomembrane panel layout diagram showing the extent of liner panels and repair and destruct test sample locations for each area is included in the as-built drawings set, provided in Appendix H-10.

The panel layout was placed in such a way that the upper panel is overlapped above the lower panel prior to seaming. The upper panel for each seam is the first panel listed on Appendix H-3 Panel Seaming Log in the application. For example, "10/1" identifies Panel 10 as the upper panel and Panel 1 as the lower panel for that seam.

Adjacent geomembrane panels were overlapped approximately 6 inches to accommodate proper seaming. Double fusion seams were performed between two geomembrane panels, while extrusion weld seams were performed on repairs and pipe penetrations. Unbound edges of the geomembrane panels were temporarily loaded with sandbags to protect the geomembrane panels from wind uplift until seaming of the edges could be performed.

The 60 mil textured HDPE geomembrane panels were manufactured with approximately 6 inches of non-textured (smooth) on the edges along the entire length of each roll. Therefore, the majority of the welds were performed between two smooth geomembrane panel edges.

At the concrete inlet and outlet structures, the FML was battened to both concrete structure. Holes were initially drilled into the concrete structure 6 inches on center in a line. An expansion bolt was placed within the drilled holes. A neoprene sponge, the GCL, and the HDPE liner were then placed over the bolt maintaining the layers in that order. A stainless-steel strip was then placed over the liners and bolts. The stainless steel strip was secured using a washer and nut which were placed over the steel strip and tightened. Finally, a silicone caulk was applied at the highest point along where the FML meets the concrete structure.

6.3 QUALITY CONTROL TESTING

Quality control testing of the FML was completed in accordance with the CQA plan and GRI-GM19a "Seam Strength and Related Properties of Thermally Bonded Homogeneous Polyolefin Geomembrane Barriers", as appropriate. Field forms documenting the deployment and characteristics of the FML and field-testing results are included in Appendix H and summarized in the following sections.

6.3.1 Resin Testing

SKAPS performed quality control testing on the resin used to manufacture both the 60 mil geomembrane materials and the welding rod products. Each resin batch was tested, at minimum, for density and melt flow index. The reported test results were reviewed by the CQA consultant and confirmed to pass the manufacturer's minimum requirements in accordance with the CQA Plan and GRI-GM13 criteria. The manufacturer test results are included in Appendix G-3.

6.3.2 Roll Testing

The geomembrane rolls supplied for this project were tested and certified at the manufacturing facility. Conformance testing results of each roll exceeded the manufacturer's minimum requirements in accordance with the CQA. Third-party conformance testing was required and are included in Appendix G-4.

6.3.3 Field CQA Testing

Prior to field seaming, trial weld samples were prepared and tested in the field using a field tensiometer to qualify welders for daily seaming activities. Trial weld samples were made from excess liner and prepared using the same procedures and under the conditions anticipated during field welding. Five 1-inch-wide samples were tested for peel and five samples were tested for shear. The CQA consultant observed the trial weld preparation and testing of the test strips. The minimum strength criterion required during peel and shear testing for both extrusion welds and fusion welds is as shown in Table 2 below.

Table 2: Minimum Peel and Sheer Values (pounds per inch)

	FUSION	**EXTRUSION**
CQA Plan Requirements:		
MINIMUM PEEL	91	78
MINIMUM SHEAR	120	120

This process was performed at the beginning and middle of each day, after seaming activities ceased for more than one hour, and after equipment shutdowns. The time between trial weld samples throughout a full working day was kept to a maximum of five hours. Once the trial weld specimens had passed the criteria, the equipment and operator were allowed to proceed with FML welding activities. All trial weld samples passed the CQA plan criteria. The field load cell calibration certificate and the trial weld logs are provided in Appendix H-6.

Production seaming was performed using a dual-track hot wedge welder, which creates an air channel between the two fusion tracks, allowing for the seams to be non-destructively pressure tested. Repairs, patching, and tie-ins to adjacent cell liners were performed with extrusion welders.

The various procedures associated with both fusion-seaming and extrusion-seaming operations were observed by the CQA consultant. These observations included seam preparation, weather conditions, general seaming procedures, overlap of geomembrane panels, and temporary bonding procedures. Seams were inspected along their entire length for quality and seam completion with imperfections marked by the CQA consultant and subsequently repaired by CAAWS. Panel seaming logs are presented in Appendix H-3.

6.3.4 Non-Destructive Seam Testing

Non-destructive testing methods of geomembrane liner seams consisted of air channel pressure testing for double wedge fusion seams and vacuum testing for extrusion weld seams. Seams and repairs failing non-destructive testing were repaired and retested until passing results were obtained.

Air channel testing consisted of pressurizing the channels between the double wedge seams to a pressure of 27 to 30 pounds per square inch and held at this pressure for a minimum of five minutes. A passing test yielded a maximum drop in pressure of 3 pounds per square inch over the five-minute period.

Vacuum testing of extrusion seams were performed by applying a soapy solution to the seam and placing a vacuum box with a foam seal over the repair. A minimum 5-pounds-per-square-inch vacuum was applied for a minimum of ten seconds and the weld was observed for leaks that would appear as multiplying soap bubbles. Areas with weld defects were marked, repaired, and retested.

Results of non-destructive testing of double wedge fusion seams are presented in Appendix H-4 and in Appendix H-5 for extrusion seams.

6.3.5 Destructive Seam Testing

Destructive geomembrane seam samples were obtained at a minimum frequency of one per 500 linear feet of seam per welder. Destructive samples were obtained and labeled numerically, with three samples taken from each destructive test location. One sample section was tested on-site by CAAWS, a second sample was sent to TRI for third-party testing, and a third sample was untested and kept for records. Destructive sample locations were repaired by welding a piece of geomembrane over the cut section with an extrusion welder. A summary log of destructive samples is presented in Appendix H-7. All destruct seam test samples passed the GRI-GM19a criteria. In total of eight destruct seam test tests were collected for on-site and off-site third-party testing consisting of over 3,500 lineal feet of liner seaming. Results of destructive sample third-party testing is provided as Appendix H-8.

6.4 DEFECTS AND REPAIR OBSERVATIONS

Geomembrane panels were initially monitored for damage prior to deployment. Additionally, the CQA consultant observed the geomembrane panels and seams on a continuous basis throughout the installation process of each subsequent layer of the final cover.

Each repair was documented by the CQA consultant and repaired by CAAWS by welding a patch over the damaged area with an extrusion welder. Each patch exceeded the damaged areas by a minimum of 3 inches. Extrusion welds used for repairs were non-destructively tested using the vacuum test.

7.0 LEACHATE COLLECTION AND REMOVAL SYSTEM

This section describes the CQA requirements for the LCRS. Photographs documenting installation of the LCRS are included with the daily field reports in Appendix E. The LCRS was installed after completion of the geomembrane liner during the period of August 26 to September 12. The LCRS consists of:

- A 6-inch diameter perforated HDPE pipe with coarse aggregate bedding;
- A 12-inch diameter HDPE sump and riser pipe;
- A drainage geocomposite;
- A sand filter layer and a protective warning layer on the floor of the basin; and
- A sand filter layer, riprap bedding layer, and a riprap slope protection layer along the slopes.

7.1 INSTALLATION PROCEDURE

The FML was first installed within the center trench of the basin's floor. A non-woven geotextile was placed within the trench, and then the coarse aggregate bedding material was placed over the geotextile. The 6-inch diameter perforated leachate collection pipe was placed within the trench. Photos of the installation are included with the daily field reports in Appendix E. After the leachate collection pipe was in position, the 12-inch sump and riser pipe were placed at the south end of the basin within the sump area. Locations of both leachate collection pipes can be found in the as-built survey data in Appendix C.

Once the FML was completely installed with testing having been passed, the drainage geocomposite was installed over the FML. The CQA plan did not provide laboratory testing requirements for the drainage geocomposite but overlaps and observations of the seaming was observed by the CQA consultant. The drainage geocomposite was placed within the anchor trench with the anchor trench backfilled shortly thereafter. Compaction results were taken and are included in the daily field reports in Appendix E.

The basin's floor sand filter layer was placed in one lift approximately 13 inches thick in the loose condition using a John Deere 333G skid steer mounted with a dozer blade. Observations of thickness were performed by the CQA consultant with two samples collected with the fill material testing results within Appendix F-2. Following the placement of the basin's sand filter layer, the protective warning layer and access ramp's road surface was installed with the same equipment. Thickness was verified and a sample was collected for testing.

The basin's side slope was then backfilled with 6-inch layers of sand filter, riprap bedding, and riprap. This material was installed with a John Deere 350G excavator. Samples were taken of the riprap bedding and riprap and testing results can be found within Appendix F-2.

7.2 CERTIFICATION SURVEY

The coarse aggregate bedding, sand filter, protective warning layer, riprap bedding, and riprap were placed as described above until designed final grades were met or exceeded. After the final grades were achieved, the final as-built elevations were surveyed and recorded on a minimum 50-foot grid and at changes in slope to verify the final grades and required minimum thicknesses were achieved. As-built elevations and summary tables are presented on the as-built drawings in Appendix C.

8.0 CONSTRUCTION CLARIFICATIONS

The following construction clarifications were required during retrofit of the Bypass Basin. A description of design modifications and the documentation of the subsequent reconstruction is provided in the following section.

8.1 MODIFICATION TO GRADES AT TOP OF RAMP

To meet the design specification requiring 12 inches of sand cushion over the existing liner, the final grades near the top ramp had to be modified. Modifications to the final surface were designed and incorporated in the field by BCM at the time of construction to maintain the required sand cushion thickness. This modification did not affect the construction of the retrofit.

8.2 SUMP AND RISER PIPE REORIENTATION

The 12-inch-diameter sump and riser pipe were pre-welded by the manufacturer in accordance with dimensions shown on the construction plans. During installation of the sump and riser pipe it was determined the existing basin slope was shown incorrectly in the construction drawings. S&L and BCM made a field modification for the sump and riser pipe to be rotated allowing the sump and riser pipe to rest on the basin side slope. This modification did not affect the construction of the drainage layers or operation of the sump.

9.0 CERTIFICATION

Civil & Environmental Consultants, Inc. has prepared this construction acceptance report to document the Powerton Station Bypass Basin Retrofit. The construction occurred in conformance with the CQA plan and applicable local, state, or federal regulations, with no exceptions noted. The report includes pertinent quality assurance/quality control test data, record drawings of the construction, construction photographs and a narrative detailing construction methods used, problems encountered during the work, and the solutions implemented. CQA for this work was conducted under the supervision of a registered professional engineer knowledgeable in CCR impoundment design, construction, and operations.

The following specific certifications are included per Specification P-1401 Construction Quality Assurance for Bypass Basin Retrofit, Section 014632, Paragraph 104.2b3.1.5, which are required by Title 35 of the Illinois Administrative Code 845.290(b)(3):

- The pipe bedding material contains no undesirable objects.
- The anchor trench and backfill were constructed to prevent damage to the geosynthetic materials.
- Tears, rips, punctures, and other damage to geosynthetic materials during installation were repaired.
- Geomembrane seams were properly constructed and tested in accordance with the manufacturer's specifications.
- Filter material consisting of uniform granular fill, to avoid clogging, was used in construction.
- Filter material, as placed, possesses structural strength adequate to support the maximum loads imposed by the overlying materials and equipment used at the facility.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties, both civil and criminal, for submitting false information including possible fines and imprisonment."

Engineer Name	Maurice Dean Jones, Jr., P.E.
PE Registration Number	062.051317
PE License Expiration	November 30, 2025
State of Registration	Illinois
Date of Report Certification	October 18, 2024

Engineer Signature

Oct. 18, 2024

Date

Engineer's Seal:

APPENDIX A

PROFESSIONAL ENGINEER CERTIFICATION

STATEMENT FROM QUALITY ASSURANCE OFFICER

FROM: Mr. Maurice Dean Jones Jr., P.E.
Construction Quality Assurance Officer

DATE: October 18, 2024

RE: Powerton Generating Station - 2024 Bypass Basin Retrofit
Construction Quality Assurance Certification Report
Designation of CQA Officers-in-Absentia

I, Maurice Dean Jones Jr., P.E., was unable to be present to perform inspections, testing and other activities as detailed in the construction quality assurance (CQA) program. I supervised and established inspection procedures at the initiation of specified critical activities, and during those activities and as frequently as required thereafter based on my professional judgement. The designated CQA officer-in-absentia prepared the daily CQA inspection reports which I reviewed on a daily basis.

I hereby designate Derek Dorsz and, in his absence Alec Bush, as the CQA officers-in-absentia on the days noted in the attached daily CQA inspection reports. Both Mr. Dorsz and Mr. Bush exercised professional judgement in carrying out the duties of the CQA officer. I assume full personal responsibility for inspections performed and reports prepared by the designated CQA officers-in-absentia during my absence.

Maurice Dean Jones

Maurice Dean Jones Jr., P.E.
Construction Quality Assurance Officer

APPENDIX B

EXISTING LINER DECONTAMINATION AND INTEGRITY VERIFICATION

APPENDIX B-1

ANALYTICAL TEST RESULTS

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Letter No. 12661-181-SL-IEPA-0004
May 7, 2024
Project No. File No. 12661-181

Re: Analytical Test Results for Existing Bypass Basin Liner

Mr. Mark Liska
Illinois EPA, Bureau of Water
1021 North Grand Avenue East
Springfield, IL 62702

Electronic copy submitted via email to Mark.Liska@Illinois.gov

Dear Mr. Liska:

On behalf of Midwest Generation, LLC (MWG), Sargent & Lundy is submitting the enclosed analytical test results demonstrating that, following the material removal and decontamination work described herein, the existing high-density polyethylene (HDPE) geomembrane liner in the Bypass Basin at the Powerton Generating Station ("Powerton" or the "Station") is not contaminated with coal combustion residual (CCR) constituents. In accordance with 35 Ill. Adm. Code 845.770(a)(4), these analytical test results are being submitted in support of MWG's request to re-use the Bypass Basin's existing geomembrane liner as a supplemental liner under the new composite liner system to be installed when the basin is retrofitted. Pursuant to 35 Ill. Adm. Code 845.770(a)(4), MWG will submit the following information under separate cover after the data becomes available:

1. Visual evidence that the existing geomembrane liner no longer contains CCR constituents.
2. Visual evidence that the existing geomembrane liner is competent.
3. Electrical leak location survey test results demonstrating that the existing geomembrane liner is competent.

The following sections describe relevant background information on the Bypass Basin Retrofit Project, material removal and liner decontamination procedures, and liner sample collection, testing procedures, and testing results.

BACKGROUND

Powerton's Bypass Basin is an existing CCR surface impoundment that was used by the Station as a settling pond when the Station's primary settling pond, the Ash Surge Basin, was being cleaned. When in service, the Bypass Basin received bottom ash transport water discharged from the Station's dewatering bins (which initially treat the Station's CCR sluice water by initial sedimentation of solids) and other process waste streams related to electric power-generating operations. In 2010, the Bypass Basin's original liner was replaced with a 60-mil HDPE geomembrane liner. To facilitate periodic removal of ash in accordance with historical cleaning practices, and to protect the liner during cleaning, the HDPE geomembrane liner was covered with a non-woven geotextile, a 12-inch-thick sand cushion layer, and a 6-inch-thick gravel warning layer. In early October 2020, the Station took the Bypass Basin out of service to clean the basin, and the basin has not been used since.

On July 18, 2022, MWG submitted a construction permit application to the Illinois Environmental Protection Agency (Illinois EPA or "Agency") to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system. Under MWG's proposed retrofit design, both new systems would be installed over the basin's existing HDPE geomembrane liner, which would be re-used as a supplemental liner in the retrofitted basin. Under the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments" ("Illinois CCR Rule"), an "existing competent geomembrane liner" may be re-used as "a supplemental liner by submitting visual inspection, and analytical testing results to demonstrate that the existing liner is not contaminated with CCR constituents." 35 Ill. Adm. Code 845.770(a)(4).

On March 5, 2024, MWG submitted an amended written retrofit plan to the Agency to communicate changes to MWG's planned sequencing and schedule for the Bypass Basin Retrofit Project, which were based on input that Illinois EPA provided MWG during an in-person meeting on February 27, 2024. Per the amended retrofit plan, MWG will retrofit the Bypass Basin in two phases. Phase 1 includes the following activities, which are necessary for MWG to submit the visual inspection and analytical test data Illinois EPA requires to approve re-using the Bypass Basin's existing geomembrane liner under 35 Ill. Adm. Code 845.770(a)(4):

1. Remove the gravel, sand, and geotextile that were placed over the existing geomembrane liner.
2. Decontaminate the basin's existing geomembrane liner.
3. Visually inspect the geomembrane liner for CCR and for damage (*i.e.*, tears, holes, *etc*.) and repair any observed damage.
4. Submit samples of the basin's existing geomembrane liner to a certified laboratory for analytical testing to confirm the liner is not contaminated with CCR constituents.
5. Perform an electrical leak location survey to verify the basin's existing geomembrane liner is competent and repair any identified damage.
6. Submit the visual inspection, laboratory test, and electrical leak location survey results to Illinois EPA for review.

As discussed in the following sections, items 1 through 4 have been completed or are nearly completed. Items 5 and 6 are expected to be completed this month.

LINER CLEANING

On March 11, 2024, the Station started carefully removing the gravel warning and sand cushion layers over the Bypass Basin's existing geomembrane liner. The gravel and sand materials were removed via hydro-excavation, starting at the ends of the basin and working towards the middle of the basin. To prevent damage to the existing liner, the vacuum truck removing the gravel, sand, and washwater was positioned on top of the basin's embankments. To date, almost all of the gravel, sand, and non-woven geotextile layers over the existing geomembrane liner have been removed; only the surfacing over the access ramp into the Bypass Basin remains to be removed, which is expected to be completed within the next two weeks. After all gravel, sand, and non-woven geotextile layers over the basin's ramp have been removed, the Station will pressure wash the geomembrane liner.

LINER SAMPLING

On April 12, 2024, Station personnel collected three samples of the Bypass Basin's existing geomembrane liner that had been cleaned. As shown on the enclosed map, one sample was taken from the basin's west sideslope, and two samples were taken from the basin floor: one near the outlet structure and one near the inlet structure. Each sample was approximately 18-inches square, and each sample location was patched with 60-mil HDPE geomembrane fusion-welded to the existing geomembrane liner. The enclosed photographs show the three sample locations and the patches that were installed over these locations.

The three sample locations were selected to obtain representative samples of the entire existing geomembrane liner. These three locations collectively represent the range of ash loads typically present in a settling pond like the Bypass Basin. Larger ash particles tend to settle out closer to the inlet structure, while finer ash particles tend to settle out closer to the outlet structure. Meanwhile, the geomembrane liner along the Bypass Basin's sideslopes is exposed, while the liner was covered with a non-woven geotextile along the basin floor. Therefore, a liner sample was collected near the basin's inlet, near the basin's outlet, and along one of the basin's sideslopes.

On April 15, 2024, the Station shipped the three geomembrane liner samples to Eurofins Chicago's laboratory for analysis. Eurofins Chicago is an accredited laboratory in the State of Illinois under the National Environmental Laboratory Accreditation Program (NELAP).The laboratory received the samples on April 16, 2024.

ANALYTICAL TESTING PROCEDURES

To verify the geomembrane liner samples were not contaminated, each sample was analyzed for the eight metals with toxicity characteristics under the Resource Conservation and Recovery Act (RCRA), seven of which are constituents of concern to be analyzed during groundwater monitoring under the Illinois CCR Rule: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. 35 Ill. Adm. Code 845.600(a)(1). The analytical methods used to determine whether the liner samples contained these metals were selected and performed in accordance with U.S. EPA's SW-846, *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*. First, the Toxicity Characteristic Leaching Procedure (SW-846 Test Method 1311) was used to obtain an extraction fluid simulating leachate that could be released from the Bypass Basin's existing geomembrane liner. Then, to determine the concentrations of the noted metals except for mercury, the extraction fluid was prepared for analysis using Method 3010A (acid digestion) and subsequently analyzed using Method 6010D (inductively coupled plasma–optical emission spectrometry). To determine the concentration of mercury present on the samples, the extraction fluid specimen was prepared and analyzed in accordance with Method 7470A (cold-vapor atomic absorption).

ANALYTICAL TESTING RESULTS

Table 1 summarizes the analytical test results on the three samples from the Bypass Basin's existing HDPE geomembrane liner for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The complete analytical data package from which these test results were obtained is enclosed. Table 1 also compares the analytical test results to the default groundwater protection standards (GWPS) specified by 35 Ill. Adm. Code 845.600(a)(1), which are the Class I (drinking water) standards for groundwater under 35 Ill. Adm. Code 620.410. As shown in the table, there were only five total instances where an analyte was found above its method detection limit (MDL): barium (SP-3 only), cadmium (SP-1 only), and selenium (all three samples). However, it is important to note that the concentrations of all eight metals were determined to be less than the maximum concentrations permitted under Illinois Class I (drinking water) standards for groundwater for all three liner samples.

Table 1. Comparison Between Analytical Test Results for Bypass Basin Liner Samples and Default Illinois CCR Rule Groundwater Protection Standards.(1)

Analyte	SW-846 Method	MDL	RL	Liner Sample ID No.			IL Class I GWPS(2)
				SP-1	SP-2	SP-3	
Arsenic	6010D	0.010	0.050	<0.010	<0.010	<0.010	0.010
Barium	6010D	0.050	0.50	<0.050	<0.050	0.061 J	2.0
Cadmium	6010D	0.0020	0.0050	0.0036 J	<0.0020	<0.0020	0.005
Chromium	6010D	0.010	0.025	<0.010	<0.010	<0.010	0.1
Lead	6010D	0.0075	0.050	<0.0075	<0.0075	<0.0075	0.0075
Selenium	6010D	0.020	0.050	0.024 J B *+	0.024 J B *+	0.021 J B *+	0.05
Silver	6010D	0.010	0.025	<0.010 *+	<0.010 *+	<0.010 *+	0.05
Mercury	7470A	--	0.00020	<0.00020	<0.00020	<0.00020	0.002

Notes:
(1) All units are mg/L.
(2) 35 Ill. Adm. Code 845.600(a)(1).

Qualifiers:
*+ LCS and/or LCSD is outside acceptance limits, high biased.
B Compound was found in the blank and sample.
J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Acronyms & Abbreviations:
LCS Laboratory Control Sample
LCSD Laboratory Control Sample Duplicate
MDL Method Detection Limit
RL Reporting Limit

CONCLUSIONS & NEXT STEPS

Based on the analytical test results, the procedures used by the Station to clean the basin's existing liner have successfully removed CCR and CCR-contaminated sediments from the liner. Per Table 1, the concentrations of arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury in all three samples were determined to be less than the maximum concentrations permitted under Illinois Class I (drinking water) standards for groundwater. Moreover, HDPE geomembranes are known to have high chemical resistance to heavy metals, with one study demonstrating that only negligible permeation of heavy metal ions in concentrated acid solutions was observed in HDPE geomembranes after four years of testing. This study concluded that HDPE geomembranes are "virtually ideal barriers for heavy metals."[1] Thus, leaving the Bypass Basin's existing HDPE geomembrane liner in-place as a supplemental liner under the new composite liner system in the retrofitted basin will not pose a threat to groundwater, and by extension, human health or the environment.

After the Station finishes cleaning and decontaminating the Bypass Basin's existing liner, a contractor will perform an electrical leak location survey to confirm the liner is competent. After the survey has been performed, MWG will submit the survey results and photographs of the decontaminated liner. Collectively, this forthcoming data and the data enclosed with this letter will demonstrate the Bypass Basin's existing HDPE geomembrane liner no longer contains CCR or CCR-contaminated sediments and is competent.

Following the Agency's review of the enclosed analytical test results and forthcoming data on the liner's competency, we kindly request Illinois EPA provide written approval for re-using the Bypass Basin's existing HDPE geomembrane liner as a supplemental liner in the retrofit construction. In the meantime, please do not hesitate to contact me directly at (312) 269-6373 or via email at tdehlin@sargentlundy.com if you have any questions on the enclosed analytical test results.

We appreciate Illinois EPA's feedback and support on the Bypass Basin Retrofit Project, and we look forward to continuing to work with the Agency on this matter.

Best regards,

Th. Dehlin

Thomas Dehlin, P.E.
Manager / Consultant

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[1] Sangam, H.P. and Rowe, R. K. "Migration of dilute aqueous organic pollutants through HDPE geomembranes." *Geotextiles and Geomembranes.* 19. (2001.) pp. 329–357.

Enclosures:

1. Analytical Test Results
2. Sample Locations
3. Sample Photographs

Copies Furnished (via Email):

1. Lauren Hunt, Illinois EPA
2. Darin LeCrone, Illinois EPA
3. EPA.CCR.Part845.Coordinator@Illinois.gov
4. Sharene Shealey, MWG
5. Jill Buckley, MWG
6. Todd Mundorf, MWG

eurofins | Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

Attn: Joseph Kotas
Midwest Generation EME LLC
13082 E Manito Road
Pekin, Illinois 61554

Generated 5/3/2024 9:14:06 AM Revision 1

JOB DESCRIPTION

Bypass Basin

JOB NUMBER

500-249025-1

Eurofins Chicago
2417 Bond Street
University Park IL 60484

See page two for job notes and contact information.

myEOL

Eurofins Chicago

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Chicago Project Manager.

Authorization

Generated
5/3/2024 9:14:06 AM
Revision 1

Authorized for release by
Diana Mockler, Project Manager I
Diana.Mockler@et.eurofinsus.com
(219)252-7570

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Case Narrative

Job ID: 500-249025-1 — Eurofins Chicago

Job Narrative
500-249025-1

Revision
The report being provided is a revision of the original report sent on 4/26/2024. The report (revision 1) is being revised due to: Client requesting results for metals by 6010 be reported between the RL and the MDL.

Receipt
The samples were received on 4/16/2024 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 2.0º C and 5.4º C.

Metals
Method 6010D: The laboratory control sample (LCS) for prep batch 764583 recovered outside control limits for the following analytes: Ag and Se. These analytes were biased high in the LCS and were below the reporting limit in the associated samples; therefore, the data have been reported.

Method 6010D: The leachate blank for preparation batch 500-764205 and 500-764583 and analytical batch 500-764833 contained Selenium above the method detection limit. This target analyte concentration was less than the reporting limit (RL) in the method blank; therefore, re-extraction and/or re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CHI
7470A	Mercury	SW846	EET CHI
1311	TCLP Extraction	SW846	EET CHI
1311	Toxicity Characteristic Leaching Procedure	SW846	EET CHI
3010A	Preparation, Total Metals	SW846	EET CHI
7470A	Preparation, Mercury	SW846	EET CHI

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-249025-1	SP-1	Solid	04/12/24 10:00	04/16/24 09:45
500-249025-2	SP-2	Solid	04/12/24 10:12	04/16/24 09:45
500-249025-3	SP-3	Solid	04/12/24 10:35	04/16/24 09:45

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Bypass Basin

Job ID: 500-249025-1

Client Sample ID: SP-1
Date Collected: 04/12/24 10:00
Date Received: 04/16/24 09:45

Lab Sample ID: 500-249025-1
Matrix: Solid

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.010		0.050	0.010	mg/L		04/23/24 16:24	04/24/24 19:04	1
Barium	<0.050		0.50	0.050	mg/L		04/23/24 16:24	04/24/24 19:04	1
Cadmium	**0.0036**	**J**	0.0050	0.0020	mg/L		04/23/24 16:24	04/24/24 19:04	1
Chromium	<0.010		0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:04	1
Lead	<0.0075		0.050	0.0075	mg/L		04/23/24 16:24	04/24/24 19:04	1
Selenium	**0.024**	**J B *+**	0.050	0.020	mg/L		04/23/24 16:24	04/24/24 19:04	1
Silver	<0.010	*+	0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:04	1

Method: SW846 7470A - Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		04/25/24 11:45	04/26/24 09:52	1

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Bypass Basin

Job ID: 500-249025-1

Client Sample ID: SP-2

Date Collected: 04/12/24 10:12
Date Received: 04/16/24 09:45

Lab Sample ID: 500-249025-2

Matrix: Solid

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.010		0.050	0.010	mg/L		04/23/24 16:24	04/24/24 19:07	1
Barium	<0.050		0.50	0.050	mg/L		04/23/24 16:24	04/24/24 19:07	1
Cadmium	<0.0020		0.0050	0.0020	mg/L		04/23/24 16:24	04/24/24 19:07	1
Chromium	<0.010		0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:07	1
Lead	<0.0075		0.050	0.0075	mg/L		04/23/24 16:24	04/24/24 19:07	1
Selenium	**0.024**	**J B *+**	0.050	0.020	mg/L		04/23/24 16:24	04/24/24 19:07	1
Silver	<0.010	*+	0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:07	1

Method: SW846 7470A - Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		04/25/24 11:45	04/26/24 09:54	1

Client Sample Results

Client: Midwest Generation EME LLC Job ID: 500-249025-1
Project/Site: Bypass Basin

Client Sample ID: SP-3 Lab Sample ID: 500-249025-3
Date Collected: 04/12/24 10:35 **Matrix: Solid**
Date Received: 04/16/24 09:45

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.010		0.050	0.010	mg/L		04/23/24 16:24	04/24/24 19:18	1
Barium	**0.061**	**J**	0.50	0.050	mg/L		04/23/24 16:24	04/24/24 19:18	1
Cadmium	<0.0020		0.0050	0.0020	mg/L		04/23/24 16:24	04/24/24 19:18	1
Chromium	<0.010		0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:18	1
Lead	<0.0075		0.050	0.0075	mg/L		04/23/24 16:24	04/24/24 19:18	1
Selenium	**0.021**	**J B *+**	0.050	0.020	mg/L		04/23/24 16:24	04/24/24 19:18	1
Silver	<0.010	*+	0.025	0.010	mg/L		04/23/24 16:24	04/24/24 19:18	1

Method: SW846 7470A - Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		04/25/24 11:45	04/26/24 10:01	1

Qualifiers

Metals

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Midwest Generation EME LLC
Project/Site: Bypass Basin

Job ID: 500-249025-1

Method: 6010D - Metals (ICP)

Lab Sample ID: LCS 500-764583/2-A
Matrix: Solid
Analysis Batch: 764833

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 764583

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.100	0.102		mg/L		102	80 - 120
Barium	0.500	0.485	J	mg/L		97	80 - 120
Cadmium	0.0500	0.0578		mg/L		116	80 - 120
Chromium	0.200	0.197		mg/L		98	80 - 120
Lead	0.100	0.0881		mg/L		88	80 - 120
Selenium	0.100	0.125	*+	mg/L		125	80 - 120
Silver	0.0500	0.0618	*+	mg/L		124	80 - 120

Lab Sample ID: LB 500-764205/1-C
Matrix: Solid
Analysis Batch: 764833

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 764583

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.010		0.050	0.010	mg/L		04/23/24 16:24	04/24/24 18:34	1
Barium	<0.050		0.50	0.050	mg/L		04/23/24 16:24	04/24/24 18:34	1
Cadmium	<0.0020		0.0050	0.0020	mg/L		04/23/24 16:24	04/24/24 18:34	1
Chromium	<0.010		0.025	0.010	mg/L		04/23/24 16:24	04/24/24 18:34	1
Lead	<0.0075		0.050	0.0075	mg/L		04/23/24 16:24	04/24/24 18:34	1
Selenium	0.0216	J	0.050	0.020	mg/L		04/23/24 16:24	04/24/24 18:34	1
Silver	<0.010		0.025	0.010	mg/L		04/23/24 16:24	04/24/24 18:34	1

Method: 7470A - Mercury

Lab Sample ID: MB 500-764931/12-A
Matrix: Solid
Analysis Batch: 765155

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 764931

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		04/25/24 11:45	04/26/24 09:29	1

Lab Sample ID: LCS 500-764931/14-A
Matrix: Solid
Analysis Batch: 765155

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 764931

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00201	0.00199		mg/L		99	80 - 120

Client Sample ID: SP-1
Lab Sample ID: 500-249025-1
Date Collected: 04/12/24 10:00
Matrix: Solid
Date Received: 04/16/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	3010A			764583	MC	EET CHI	04/23/24 16:24 - 04/23/24 22:24 [1]
TCLP	Analysis	6010D		1	764833	SJ	EET CHI	04/24/24 19:04
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	7470A			764931	MJG	EET CHI	04/25/24 11:45 - 04/25/24 13:45 [1]
TCLP	Analysis	7470A		1	765155	MJG	EET CHI	04/26/24 09:52

Client Sample ID: SP-2
Lab Sample ID: 500-249025-2
Date Collected: 04/12/24 10:12
Matrix: Solid
Date Received: 04/16/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	3010A			764583	MC	EET CHI	04/23/24 16:24 - 04/23/24 22:24 [1]
TCLP	Analysis	6010D		1	764833	SJ	EET CHI	04/24/24 19:07
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	7470A			764931	MJG	EET CHI	04/25/24 11:45 - 04/25/24 13:45 [1]
TCLP	Analysis	7470A		1	765155	MJG	EET CHI	04/26/24 09:54

Client Sample ID: SP-3
Lab Sample ID: 500-249025-3
Date Collected: 04/12/24 10:35
Matrix: Solid
Date Received: 04/16/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	3010A			764583	MC	EET CHI	04/23/24 16:24 - 04/23/24 22:24 [1]
TCLP	Analysis	6010D		1	764833	SJ	EET CHI	04/24/24 19:18
TCLP	Leach	1311			764205		EET CHI	04/22/24 12:13 - 04/23/24 06:00 [1]
TCLP	Prep	7470A			764931	MJG	EET CHI	04/25/24 11:45 - 04/25/24 13:45 [1]
TCLP	Analysis	7470A		1	765155	MJG	EET CHI	04/26/24 10:01

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: Midwest Generation EME LLC
Job ID: 500-249025-1
Project/Site: Bypass Basin

Laboratory: Eurofins Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	IL00035	04-29-24

Chicago
2417 Bond Street
University Park, IL 60466
phone 708 534 5200 fax 708 534 5363

eurofins | Environment Testing

Chain of Custody Record

Client Contact	Project Manager : Joseph Kotas	Site Contact: J. Kotas	Date: 4/15/24	COC No
Midwest Generation- Powerton Generating Station	Tel/Fax:	Lab Contact: MOCKLER	Carrier: UPS NDA	1 of 1 COCs
13082 E Manito Road	Analysis Turnaround Time			Job No 500-249025
Pekin, IL 61554	Calendar (C) or Work Days (W) ________		500-249025 COC	
(8159016549 Phone	TAT if different from Below ________			
(xxx) xxx-xxxx FAX	☐ 2 weeks			SDG No
Project Name Liner	☐ 1 week			
Site Bypass Basin	☐ 2 days			
P O #	☐ 1 day			

	Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	SW-846 Method 1311 RCRA 8 Metals	Sample Specific Notes
1	SP-1	4/12/2024	10 00 AM	Solid	SOLID	1		✓	
2	SP-2	4/12/2024	10 12 AM	Solid	SOLID	1		✓	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____________

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☒ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Special Instructions/QC Requirements & Comments:

5.9 7524

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	MW Gen	4/15/24 1600	[signature]	EETA	04/16/24 0945
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received by	Company	Date/Time

Chicago
2417 Bond Street

University Park, IL 60466
phone 708 534 5200 fax 708 534 5363

eurofins | Environment Testing

Chain of Custody Record

Client Contact	**Project Manager:** Joseph Kotas	**Site Contact:** J. Kotas	**Date:** 4/15/24	COC No
Midwest Generation- Powerton Generating Station	**Tel/Fax:**	**Lab Contact:**	**Carrier:** UPS NDA	1 of 1 COCs
13082 E Manito Road	**Analysis Turnaround Time**			Job No 500-249025
Pekin, IL 61554	Calendar (C) or Work Days (W) ______			
(8159016549 Phone	TAT if different from Below ______			
(xxx) xxx-xxxx FAX	☐ 2 weeks			SDG No
Project Name Liner	☐ 1 week			
Site Bypass Basin	☐ 2 days			
P O #	☐ 1 day			

	Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	SW-846 Method 1311 (RCRA 8 Metals)	Sample Specific Notes
3	SP-3	4/12/2024	10 35 AM	Solid	SOLID	1		✓	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☒ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Special Instructions/QC Requirements & Comments:

2.4→2.0

Relinquished by: [signature]	Company: MW GEN	Date/Time: 4/15/24 4:00pm	Received by: [signature]	Company: EETA	Date/Time: 04/16/24 0945
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received by	Company	Date/Time

Login Sample Receipt Checklist

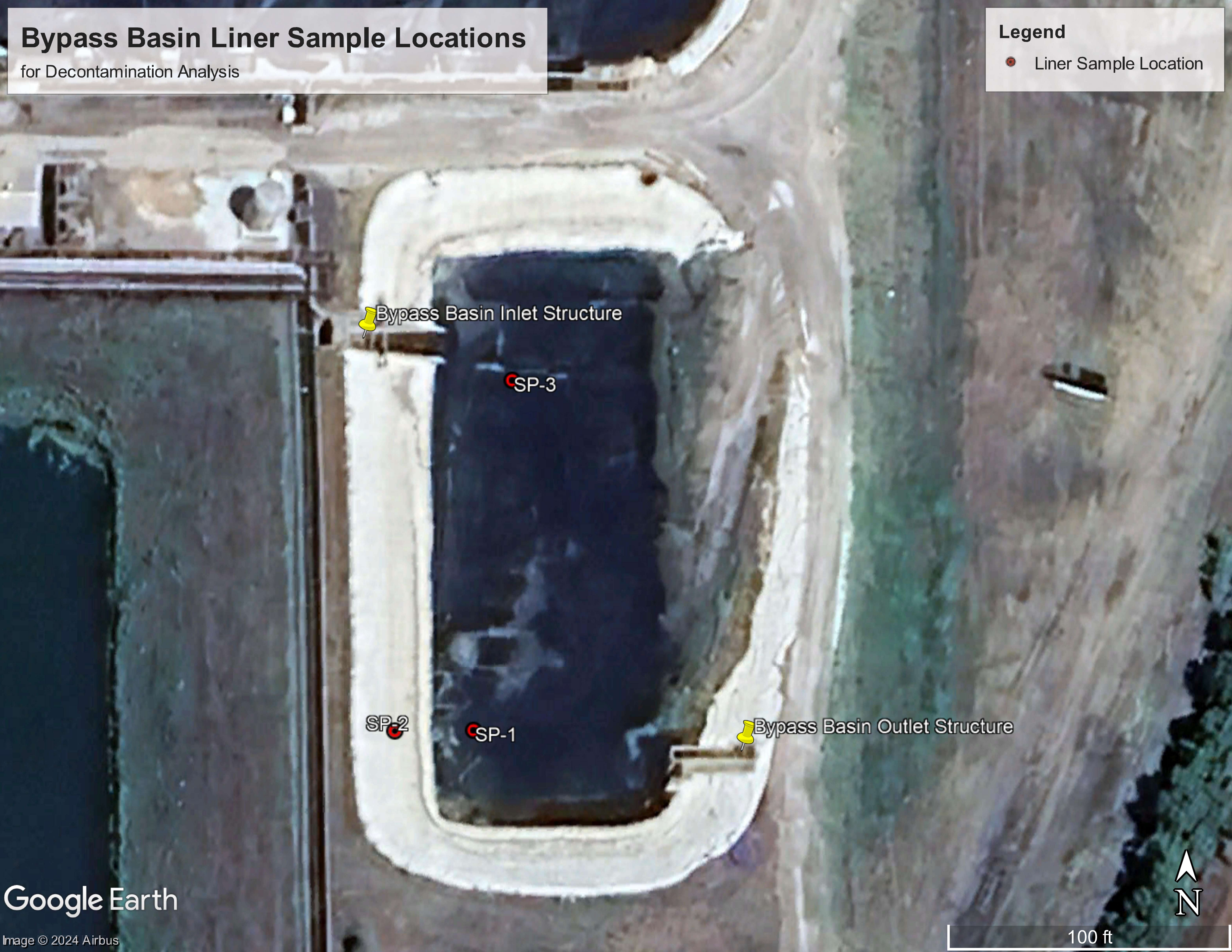
Client: Midwest Generation EME LLC

Job Number: 500-249025-1

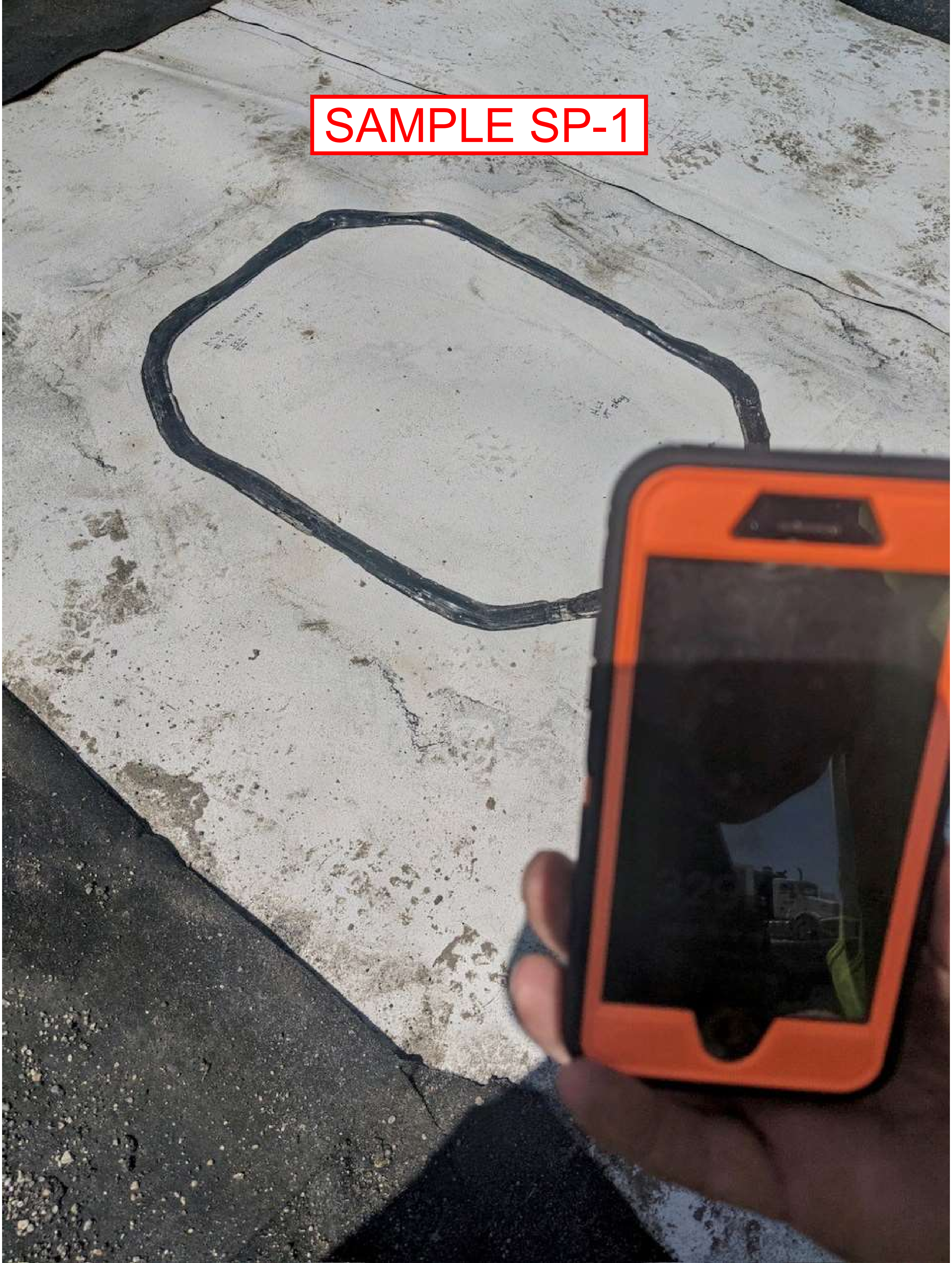
Login Number: 249025
List Number: 1
Creator: Schmidt, Kara

List Source: Eurofins Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	5.4,2.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Bypass Basin Liner Sample Locations
for Decontamination Analysis
Legend
Liner Sample Location
Bypass Basin Inlet Structure
SP-3
SP-2
SP-1
Bypass Basin Outlet Structure
Google Earth
Image © 2024 Airbus
N
100 ft


SAMPLE SP-1

SAMPLE SP-2


SAMPLE SP-3

APPENDIX B-2

INTEGRITY TEST RESULTS

Thomas Dehlin, P.E.
Manager / Consultant (Licensed in IL, KY, and WY)
(312) 269-6373
tdehlin@sargentlundy.com

Letter No. 12661-181-SL-IEPA-0005
June 17, 2024
Project No. File No. 12661-181

Re: Integrity Test Results for Existing Bypass Basin Liner

Mr. Mark Liska
Illinois EPA, Bureau of Water
1021 North Grand Avenue East
Springfield, IL 62702

Electronic copy submitted via email to Mark.Liska@Illinois.gov

Dear Mr. Liska:

On behalf of Midwest Generation, LLC (MWG), Sargent & Lundy is submitting the enclosed electrical leak location survey results and photographs demonstrating that (1) the existing high-density polyethylene (HDPE) geomembrane liner in the Bypass Basin at the Powerton Generating Station ("Powerton" or the "Station") is competent and (2) the basin no longer contains CCR or CCR-contaminated sediments. In accordance with 35 Ill. Adm. Code 845.770(a)(4), these analytical test results and photographs are being submitted in support of MWG's request to re-use the Bypass Basin's existing geomembrane liner as a supplemental liner under the new composite liner system to be installed when the basin is retrofitted.

The following sections describe relevant background information on the Bypass Basin Retrofit Project, the electrical leak location survey performed on the basin's existing geomembrane liner, repairs made to the liner, and photographs of the empty and decontaminated basin.

BACKGROUND

Powerton's Bypass Basin is an existing CCR surface impoundment that was used by the Station as a settling pond when the Station's primary settling pond, the Ash Surge Basin, was being cleaned. When in service, the Bypass Basin received bottom ash transport water discharged from the Station's dewatering bins (which initially treat the Station's CCR sluice water by initial sedimentation of solids) and other process waste streams related to electric power-generating operations. In 2010, the Bypass Basin's original liner was replaced with a 60-mil HDPE geomembrane liner. To facilitate periodic removal of ash in accordance with historical cleaning practices, and to protect the liner during cleaning, the HDPE geomembrane liner along the basin floor was covered, from bottom to top, with a non-woven geotextile, a 12-inch-thick sand cushion layer, and a 6-inch-thick gravel warning layer. In early October 2020, the Station took the Bypass Basin out of service to clean the basin, and the basin has not been used since.

On July 18, 2022, MWG submitted a construction permit application to the Illinois Environmental Protection Agency (Illinois EPA or "Agency") to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system. Under MWG's proposed retrofit design, both new systems would be installed over the basin's existing HDPE geomembrane liner, which would be re-used as a supplemental liner in the retrofitted basin. Under the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments" ("Illinois CCR Rule"), an "existing competent geomembrane liner" may be re-used as "a supplemental liner by submitting visual inspection, and analytical testing results to demonstrate that the existing liner is not contaminated with CCR constituents." 35 Ill. Adm. Code 845.770(a)(4).

On March 5, 2024, MWG submitted an amended written retrofit plan to the Agency to communicate changes to MWG's planned sequencing and schedule for the Bypass Basin Retrofit Project, which were based on input provided by Illinois EPA on February 27, 2024. Per the amended retrofit plan, MWG will retrofit the Bypass Basin in two phases. Phase 1 includes the following activities, which are necessary for MWG to submit the visual inspection and analytical test data Illinois EPA requires to approve re-using the Bypass Basin's existing geomembrane liner under 35 Ill. Adm. Code 845.770(a)(4):

1. Remove the gravel, sand, and geotextile that were placed over the existing geomembrane liner.
2. Decontaminate the basin's existing geomembrane liner.
3. Visually inspect the geomembrane liner for CCR and for damage (*i.e.*, tears, holes, *etc*.) and repair any observed damage.
4. Submit samples of the basin's existing geomembrane liner to a certified laboratory for analytical testing to confirm the liner is not contaminated with CCR constituents.
5. Perform an electrical leak location survey to verify the basin's existing geomembrane liner is competent and repair any identified damage.
6. Submit the visual inspection, laboratory test, and electrical leak location survey results to Illinois EPA for review.

Items 1 through 4 were completed earlier this year as described in Letter No. 12661-181-SL-IEPA-0004 submitted to Illinois EPA on May 7, 2024. Since that previous correspondence, Items 5 and 6 have been completed and are detailed in the following sections.

ELECTRICAL LEAK LOCATION SURVEY

After the Station finished cleaning, decontaminating, visually inspecting, and repairing, as necessary, the Bypass Basin's existing liner, an electrical leak location survey was performed. Weaver Consultants Group ("Weaver") conducted the survey on May 23, 2024. The survey was performed in accordance with ASTM D7002, "Standard Practice for Electrical Leak Location on Exposed Geomembranes Using the Water Puddle Method." Weaver's survey methodology and results are included in the report ("Weaver Report") enclosed herewith.

As detailed in the Weaver Report, Weaver identified three locations in the Bypass Basin's geomembrane liner. Location 1 was near the seam between geomembrane liner panels P2 and P12. Locations 2 and 3 were at the bases of the pipe boots installed over the marker posts in geomembrane liner panels P36 and P18, respectively. These locations are identified on Figure 1 of the Weaver's Report, and photographs of the aberrations are shown in Appendix A of the report.

As noted in their report, Weaver did not visually observe any other aberrations in the Bypass Basin's geomembrane liner. It should be noted that the miniscule nature of the three aberrations identified by the survey demonstrates the method's sensitivity and effectiveness at identifying the smallest anomalies in a geomembrane liner. Accordingly, this electrical leak location survey provides assurance that the Bypass Basin's existing geomembrane liner is competent.

LINER REPAIRS

After the survey was completed, Clean Air and Water (CAAW) Systems repaired the three locations identified by Weaver.[1] Figures 1, 2, and 3 show the repairs juxtaposed with the photographs that Weaver took during the survey. As shown in Figure 1, an HDPE geomembrane patch was placed over Location 1 near the seam between panels P2 and P12; the patch was extrusion-welded to the base sheets on both sides of the seam. Per Figure 2, additional extrudate was placed around the base of the marker post in panel P36, effectively covering the original weld at Location 2. Per Figure 3, Location 3 at the marker post in panel P18 was repaired in the same manner. At each location, CAAW Systems subsequently tested the integrity of the extrusion weld in accordance with ASTM D5641, "Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber." None of the locations exhibited leakage during the vacuum chamber test. Therefore, the repairs made at the three locations identified by Weaver are competent.

Figure 1. Repair of Location 1 Near Seam Between Liner Panels P2 and P12.

(a) Weaver Photograph (#5) of Location 1

(b) HDPE Geomembrane Patch Welded Over Location 1

[1] Clean Air and Water Systems is an experienced supplier and installer of geosynthetic containment systems and is the company that installed the Bypass Basin's liner in 2010.

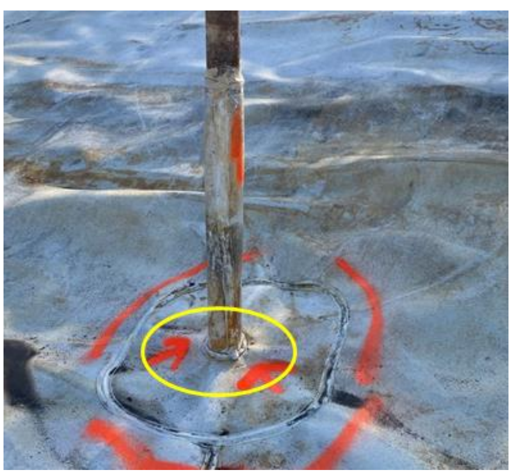
Figure 2. Repair of Location 2 at Base of Marker Post in Liner Panel P36.

(a) Weaver Photograph (#6) of Location 2

(b) Additional Extrudate Placed Around Marker Post

Figure 3. Repair of Location 3 at Base of Marker Post in Liner Panel P18.

(a) Weaver Photograph (#7) of Location 3



(b) Additional Extrudate Placed Around Marker Post

CONCLUSIONS & NEXT STEPS

Collectively, the analytical test results and photographs submitted with this letter and Letter No. 12661-181-SL-IEPA-0004 on May 7, 2024, demonstrate that (1) the Bypass Basin's existing HDPE geomembrane liner is competent and (2) the basin no longer contains CCR or CCR-contaminated sediments. Per the analytical test results documented in Letter No. 12661-181-SL-IEPA-0004, the procedures used by the Station to clean the basin's existing liner successfully removed CCR and CCR-contaminated sediments from the liner. Photographs of the cleaned and decontaminated basin are provided in Figures 4 through 7 below. Based on the electrical leak location survey results and the repairs made to the three locations identified by Weaver, the Bypass Basin's existing HDPE geomembrane liner is competent. Therefore, the basin's existing liner is suitable for re-use as a supplemental liner under the retrofitted basin's new composite liner system in accordance with 35 Ill. Adm. Code 845.770(a)(4).

Figure 4. Cleaned and Decontaminated Bypass Basin (Looking Southwest).

Figure 5. Cleaned and Decontaminated Bypass Basin (Looking Southwest).

Figure 6. Cleaned and Decontaminated Bypass Basin (Looking West).

Figure 7. Cleaned and Decontaminated Bypass Basin (Looking Northwest).

Following the Agency's review of the enclosed electrical leak location survey test results, the documented liner repairs, and the photographs above, we kindly request Illinois EPA provide written approval for re-using the Bypass Basin's existing HDPE geomembrane liner as a supplemental liner in the retrofit construction. Please do not hesitate to contact me directly at (312) 269-6373 or via email at tdehlin@sargentlundy.com if you have any questions on the enclosed survey results.

We appreciate Illinois EPA's feedback and support on the Bypass Basin Retrofit Project, and we look forward to continuing to work with the Agency on this matter.

Best regards,

Th. Dehlin

Thomas Dehlin, P.E.
Manager / Consultant

Enclosure:

1. "Leak Location Survey for the Bypass Basin liner at the Powerton Generating Station located in Pekin, Il." by Weaver Consultants Group (June 5, 2024)

Copies Furnished (via Email):

1. Lauren Hunt, Illinois EPA
2. Darin LeCrone, Illinois EPA
3. EPA.CCR.Part845.Coordinator@Illinois.gov
4. Sharene Shealey, MWG
5. Jill Buckley, MWG
6. Joe Kotas, MWG
7. Todd Mundorf, MWG

Weaver Consultants Group

June 5, 2024

Mr. Matt Sondrol
Clean Air and Water Systems
123 Elm Street
Dousman, WI 53118

RE: Leak Location Survey for the Bypass Basin liner at the Powerton Generating Station located in Pekin, Il.

Dear Mr. Sondrol,

This correspondence provides the description and results of the electrical leak location survey (LLS) performed over the existing geomembrane in the Bypass Basin at the Powerton Generating Station located in Pekin, Il. The survey was performed by Mr. Jeff Blum and Ms. Elaine Girbach of Weaver Consultants Group on May 23rd, 2024.

Background

The Bypass Basin consists of an existing white 60-mil HDPE geomembrane liner installed above a subgrade. The pond also consists of several pipe penetrations with geomembrane boots. The liner survey area was approximately 0.8 acre. Photographs of the survey and findings are included.

Methodology

The electrical leak location survey (LLS) test procedure is based on ASTM International Standard D7002, Standard Practices for Electrical Leak Location on Exposed Geomembranes Using the Water Puddle Method.

An electric potential is applied across the geomembrane with a low voltage direct current source that is introduced to the water sprayed above the geomembrane and a current return electrode placed in the subbase below the geomembrane. Since the polyethylene geomembrane is an electrical insulator, a leak must be present to allow the electrical current to flow from the current source through the geomembrane to the current return electrode.

The water puddle device contains and pushes a puddle of water on top of the exposed geomembrane and creates a conduit for current to flow through leaks. High potential gradients of a characteristic pattern identify the location of electrical conductivity, which are typically found as holes in the geomembrane. Voltage changes when a current is detected and a leak is converted to an audible signal at the meter.

Leak Detection Sensitivity

A test of the leak detection sensitivity was performed and documented as part of the leak location survey. The test was conducted at the beginning of the survey and periodically throughout the survey to quantify sensitivity and verify equipment functionality. The sensitivity test was performed using an "artificial hole" using a cut end of an insulated 18 AWG wire in accordance with ASTM D7002. The artificial leak was connected to the same soil subbase that lies directly below the geomembrane to provide a current path.

The sensitivity test was conducted using the same speed of the water puddle or lance that was used for the actual survey.

Production Survey / Observation

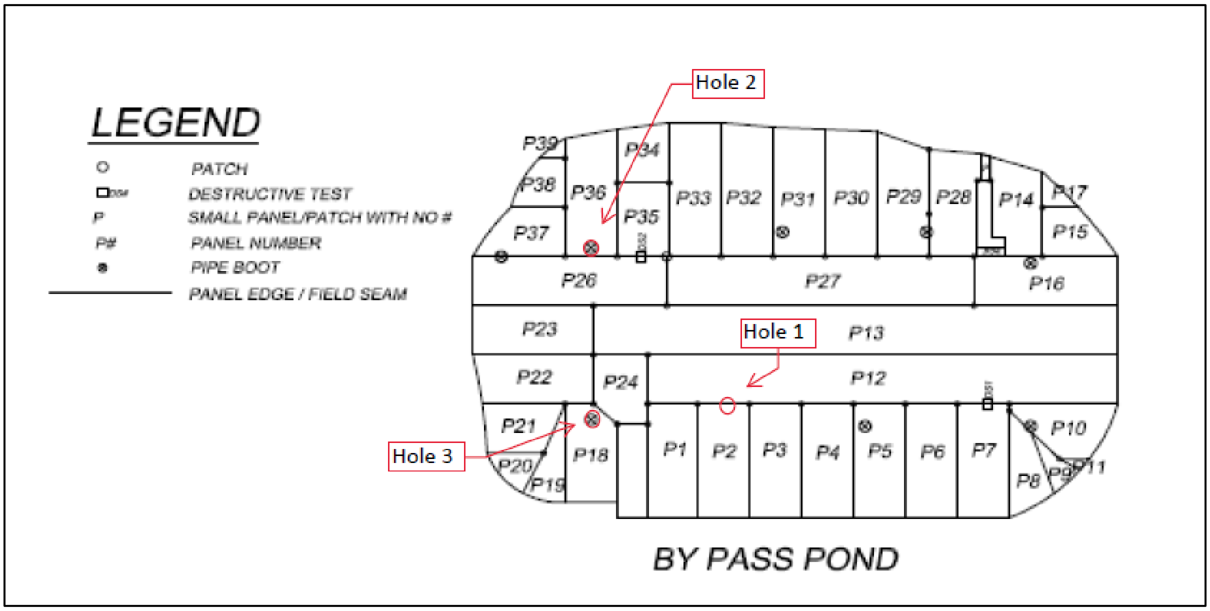
The pond consisted of an exposed geomembrane liner with eight (8) pipe penetrations. A geomembrane pipe penetration boot was installed around each pipe penetration. Additionally, the pond had two concrete structures that the geomembrane liner was connected to using stainless steel batten strips. The geomembrane at the location of batten strips could not be tested for leaks due to the conductive nature of the concrete and stainless-steel batten strips.

Weaver Consultants performed the LLS over an approximate area of 0.8 acres of exposed geomembrane. The water puddle method was utilized over the entire project area which consisted of the floor and slopes.

During the course of the survey the weather conditions consisted of sunny skies, moderate winds, and temperatures in the 90's.

Three (3) locations were found to produce elevated readings indicative of the presence of a leak or hole. These locations are as shown in Figure 1. Each location is shown in the photographs in Appendix A. Over the remainder of the lined area there were no other signals indicating the presence of a hole or leak in the geomembrane. Additionally, during the leak location survey visual observations of the surface of the geomembrane were performed looking for indications of the presence of a hole. No additional holes were observed visually.

Figure 1



Summary

The electrical leak location survey performed on the basin liner identified three (3) holes as shown in Figure 1.

We trust this information is sufficient for your needs at this time. If you have any questions regarding this submittal or require further information, please feel free to contact our office at (616) 458-8052.

Respectfully,
Weaver Consultants Group

Jeffrey A. Blum
Senior Project Manager

Tamara Perkins
Senior Project Engineer

Photograph #1
Date: 5/23/24

Description:
Bypass Pond looking south.

Photograph #2
Date: 5/23/24

Description:
Bypass Pond north end.

Photograph #3
Date: 5/23/24

Description:
Performing the water puddle leak location at the north end.

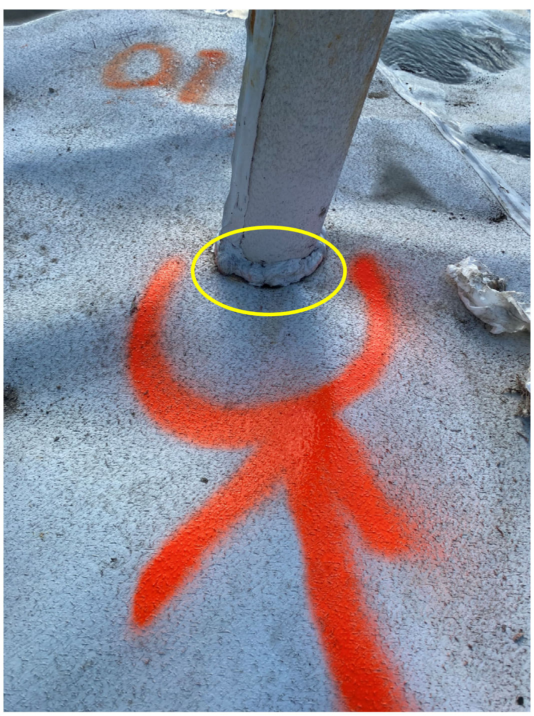
Photograph #4
Date: 5/23/24

Description:
Performing the water puddle leak location on the west slope.

Photograph #5
Date: 5/23/24

Description:

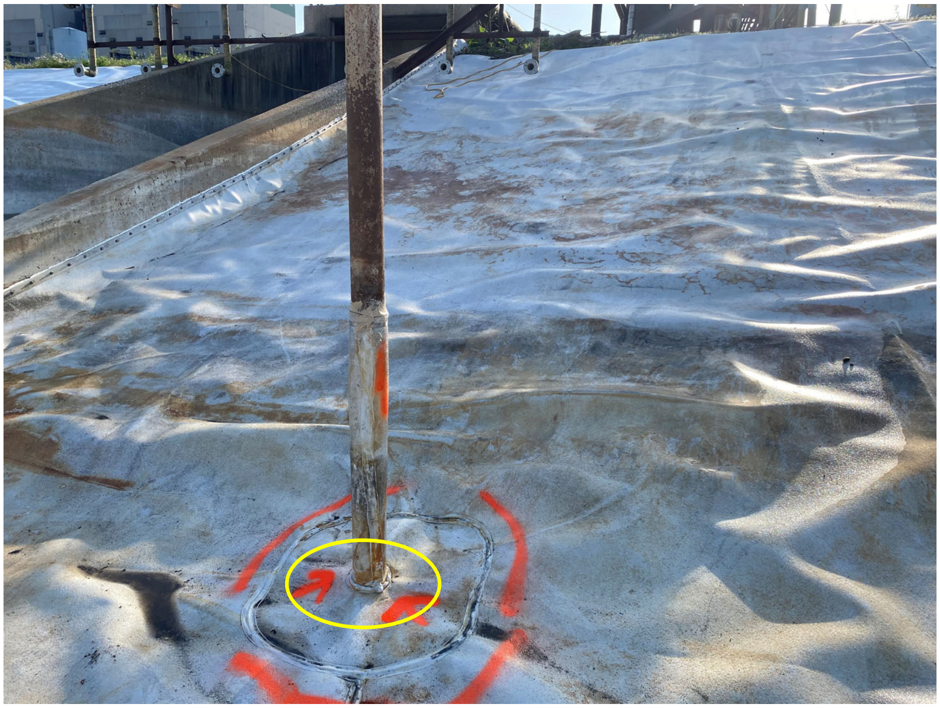
Hole location #1. Two deep scratches through the geomembrane.



Photograph #6
Date: 5/23/24

Description:

Hole location #2. The leak signal was at the base of the extrusion weld of the pipe penetration boot along the west side.



Photograph #7
Date: 5/23/24

Description:
Hole location #3. The leak signal was at the base of the extrusion weld of the pipe penetration boot along the north, south, and west side.

APPENDIX C

AS-BUILT CONSTRUCTION DRAWINGS

As-Built Survey Data for Powerton Retrofit Bypass Basin

Location: MWRD Powerton Generating Station

Created by: Bluff City Construction, LLC

Prepared for: Civil and Environmental Consultants, Inc

Date: 09/27/24

PREPARED BY:

BLUFF CITY CONSTRUCTION
2252 SOUTHWIND BOULEVARD
BARTLETT, ILLINOIS
PHONE: 630-497-8700 FAX: 630-497-9800

BCC

DESIGNED	AKG	OWNER	xxx
DRAWN	AKG	Proj Type	xxx
APPROVED	BAT	Proj #	C025
DATE	09-27-24	Folder	XXX
SCALE	1:20	File	xxx

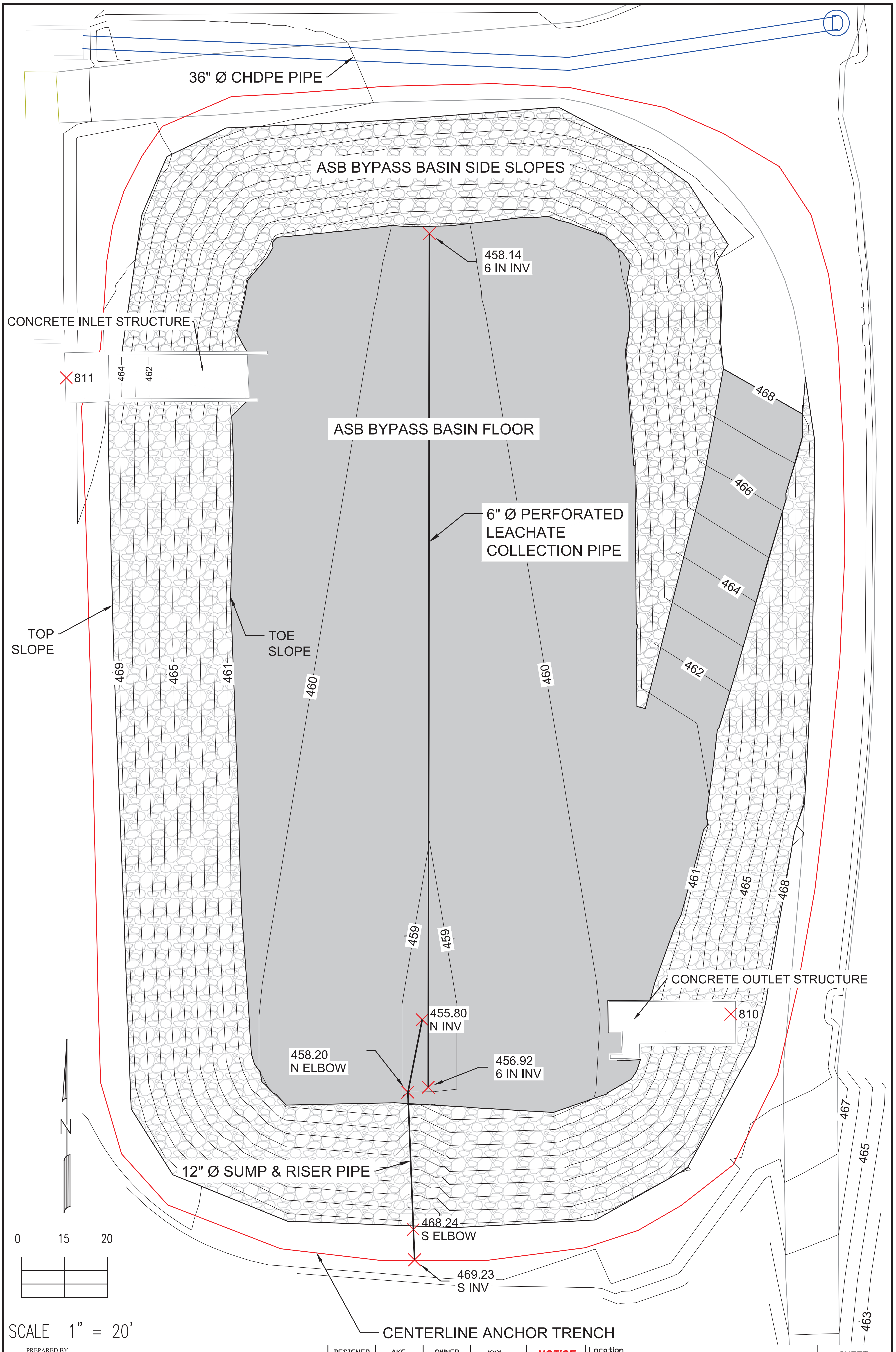
NOTICE

TOLERANCES (EXCEPT AS NOTED)

Location: **PEKIN, IL**

Title: COVER

SHEET **1** / **9**



PREPARED BY:

BLUFF CITY CONSTRUCTION
2252 SOUTHWIND BOULEVARD
BARTLETT, ILLINOIS
PHONE: 630-497-8700 FAX: 630-497-9800

BCC

DESIGNED	AKG	OWNER	xxx
DRAWN	AKG	Proj Type	xxx
APPROVED	BAT	Proj #	C025
DATE	09-30-24	Folder	XXX
SCALE	1:20	File	xxx

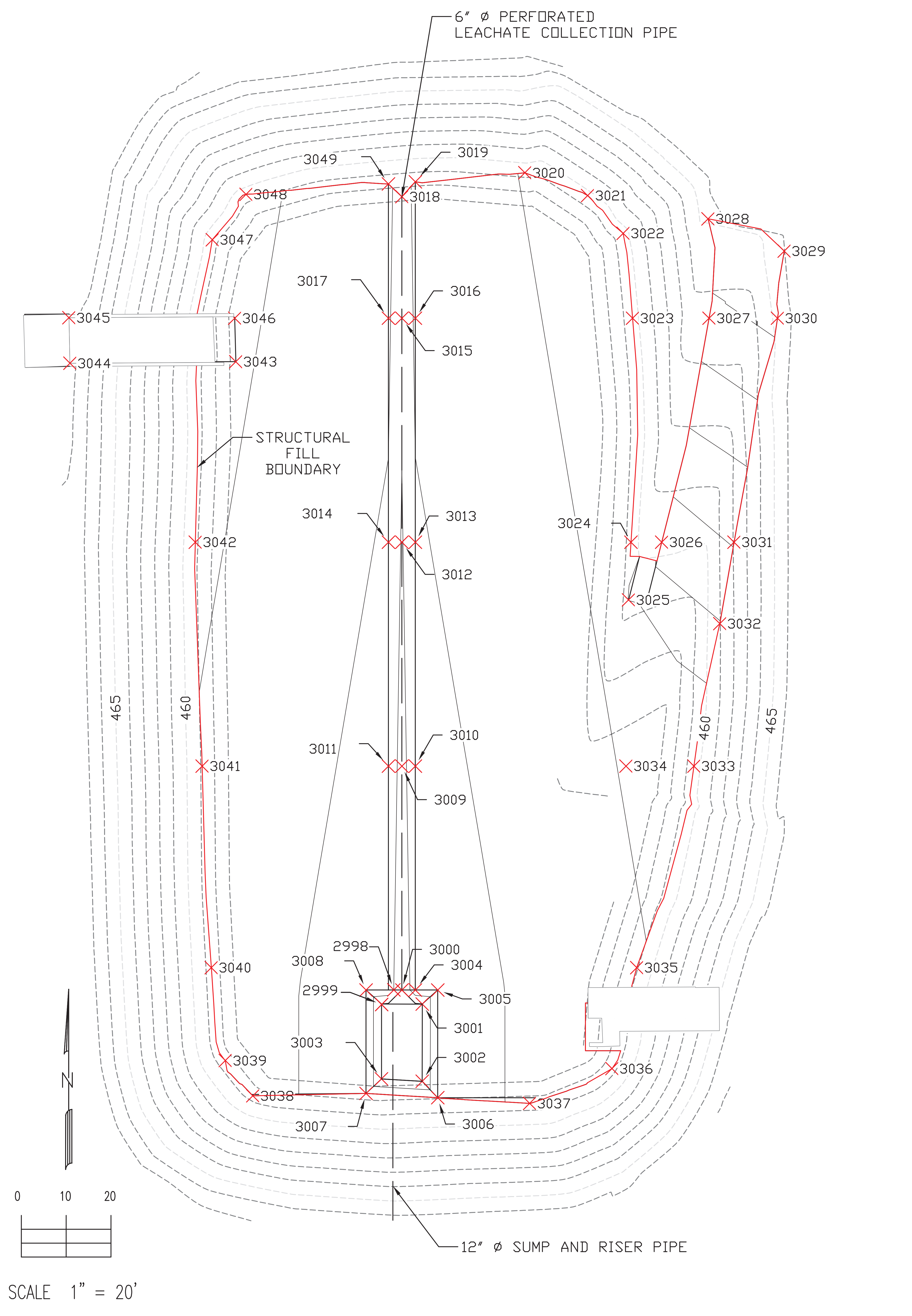
NOTICE

TOLERANCES
(EXCEPT AS NOTED)

Location
Powerton Retrofit Bypass Basin

Title
Retrofit Bypass As-Built

SHEET
2
9



PREPARED BY:

BLUFF CITY CONSTRUCTION
2252 SOUTHWIND BOULEVARD
BARTLETT, ILLINOIS
PHONE: 630-497-8700 FAX: 630-497-9800

BCC
SAND AND GRAVEL • RECYCLE • RECLAMATION

DESIGNED	AKG	OWNER	xxx
DRAWN	AKG	Proj Type	xxx
APPROVED	BAT	Proj #	C025
DATE	09-30-24	Folder	XXX
SCALE	1:20	File	xxx

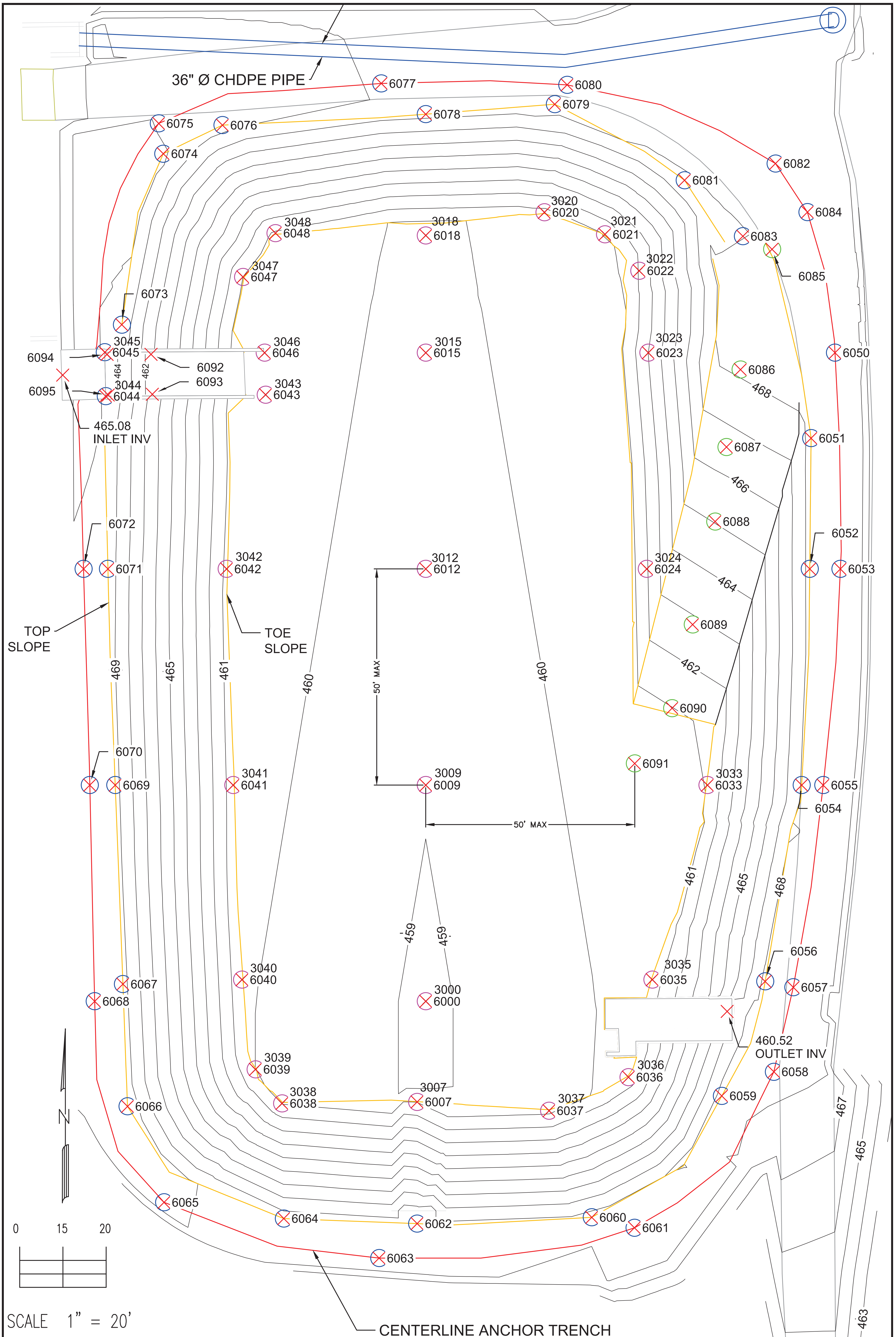
NOTICE
This print and its contents is the property of Bluff City Materials, Inc. and is subject to return upon demand and is not to be used in any way that could be considered to be detrimental to their interests.

TOLERANCES
(EXCEPT AS NOTED)

Location
Powerton Retrofit Bypass Basin

Title
Structural Fill Survey Locations

SHEET
3
9



PREPARED BY:

BLUFF CITY CONSTRUCTION
2252 SOUTHWIND BOULEVARD
BARTLETT, ILLINOIS
PHONE: 630-497-8700 FAX: 630-497-9800

BCC

DESIGNED	AKG	OWNER	xxx
DRAWN	AKG	Proj Type	xxx
APPROVED	BAT	Proj #	C025
DATE	09-30-24	Folder	XXX
SCALE	1:20	File	xxx

NOTICE

This print and its contents is the property of Bluff City Materials, Inc. and is subject to return upon demand and is not to be used in any way that could be considered to be detrimental to their interests.

TOLERANCES (EXCEPT AS NOTED)

Location
POWERTON RETROFIT BYPASS BASIN

Title
Above Liner Survey Locations

SHEET
4
9

Powerton Floor As-Built Survey Data

			Structural Fill Layer				Structural Fill to Sand Filter Layer						Sand Filter Layer to Protective Warning Layer				
Point Location	Northing	Easting	Design Elevation of Structural Fill	ASB Structural Fill	Deviation (ft)	Reason for Deviation	ASB Structural Fill	ASB Sand Filter Layer	Thickness (ft)	Minimun Design Requiremnt (ft)	Deviation (ft)	Reason for Deviation	ASB Sand Filter Layer	ASB Protective Warning Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)
2998	1411888.54	2432867.19	456.40	456.43	0.03		456.43	NA	NA	NA	NA		NA	NA	NA	NA	NA
2999	1411885.38	2432864.45	456.40	456.41	0.01		456.41	NA	NA	NA	NA		NA	NA	NA	NA	NA
3000	1411888.52	2432868.99	456.40	456.43	0.03		456.43	458.33	1.90	1.00	0.90	6" CA7 & 6" Pipe	458.33	458.84	0.51	0.50	0.01
3001	1411885.38	2432873.54	456.40	456.42	0.02		456.42	NA	NA	NA	NA		NA	NA	NA	NA	NA
3002	1411868.13	2432873.53	456.40	456.44	0.04		456.44	NA	NA	NA	NA		NA	NA	NA	NA	NA
3003	1411868.68	2432864.44	456.40	456.45	0.05		456.45	NA	NA	NA	NA		NA	NA	NA	NA	NA
3004	1411888.52	2432871.99	457.40	457.42	0.02		457.42	NA	NA	NA	NA		NA	NA	NA	NA	NA
3005	1411888.52	2432876.99	457.55	457.55	0.00		457.55	NA	NA	NA	NA		NA	NA	NA	NA	NA
3006	1411864.47	2432876.99	457.55	457.58	0.03		457.58	458.59	1.01	1.00	0.00		458.59	NA	NA	NA	NA
3007	1411865.43	2432860.99	457.55	457.58	0.03		457.58	459.47	1.89	1.00	0.89	12" Pipe	459.47	459.98	0.51	0.50	0.01
3008	1411888.52	2432860.99	457.55	457.58	0.02		457.58	458.58	1.01	1.00	0.01		458.58	NA	NA	NA	NA
3009	1411938.52	2432868.99	456.66	456.67	0.01		456.67	458.64	1.97	1.00	0.97	6" CA7 & 6" Pipe	458.64	459.22	0.58	0.50	0.08
3010	1411938.52	2432871.99	457.65	457.66	0.01		457.66	NA	NA	NA	NA		NA	NA	NA	NA	NA
3011	1411938.52	2432865.99	457.65	457.68	0.03		457.68	NA	NA	1.00	NA		NA	NA	NA	NA	NA
3012	1411988.52	2432868.99	456.92	456.96	0.04		456.96	458.84	1.88	1.00	0.88	6" CA7 & 6" Pipe	458.84	459.36	0.52	0.50	0.02
3013	1411988.52	2432871.99	457.90	457.98	0.08		457.98	NA	NA	1.00	NA		NA	NA	NA	NA	NA
3014	1411988.52	2432865.99	457.91	457.92	0.01		457.92	NA	NA	NA	NA		NA	NA	NA	NA	NA
3015	1412038.52	2432868.99	457.17	457.18	0.01		457.18	459.09	1.91	1.00	0.91	6" CA7 & 6" Pipe	459.09	459.60	0.51	0.50	0.01
3016	1412038.52	2432871.99	458.16	458.19	0.03		458.19	NA	NA	NA	NA		NA	NA	NA	NA	NA
3017	1412038.52	2432865.99	458.16	458.17	0.01		458.17	NA	NA	1.00	NA		NA	NA	NA	NA	NA
3018	1412065.65	2432868.99	457.31	457.31	0.00		457.31	459.28	1.97	1.00	0.97	6" CA7 & 6" Pipe	459.28	459.79	0.51	0.50	0.01
3019	1412068.97	2432871.99	458.31	458.33	0.01		458.33	NA	NA	NA	NA		NA	NA	NA	NA	NA
3020	1412071.00	2432896.44	459.10	459.12	0.02		459.12	460.12	1.00	1.00	0.00		460.12	460.65	0.53	0.50	0.03
3021	1412065.91	2432910.44	459.51	459.52	0.01		459.52	460.56	1.04	1.00	0.04		460.56	461.08	0.52	0.50	0.02
3022	1412057.48	2432918.37	459.64	459.64	0.00		459.64	460.73	1.09	1.00	0.09		460.73	461.27	0.54	0.50	0.04
3023	1412038.52	2432920.48	459.61	459.62	0.01		459.62	460.64	1.02	1.00	0.02		460.64	461.15	0.51	0.50	0.01
3024	1411988.52	2432920.12	459.34	459.36	0.02		459.36	460.39	1.03	1.00	0.03		460.39	460.95	0.56	0.50	0.06
3025	1411975.62	2432919.58	460.34	460.34	0.00		460.34	461.40	1.06	1.00	0.06		461.40	NA	NA	NA	NA
3026	1411988.52	2432926.97	461.35	461.36	0.01		461.36	NA	NA	NA	NA		NA	NA	NA	NA	NA
3027	1412038.52	2432937.55	464.65	464.72	0.07		464.72	465.78	1.06	1.00	0.06		465.78	NA	NA	NA	NA
3028	1412060.71	2432937.31	465.79	465.87	0.08		465.87	NA	NA	NA	NA		NA	NA	NA	NA	NA
3029	1412053.51	2432954.31	465.98	466.05	0.07		466.05	NA	NA	NA	NA		NA	NA	NA	NA	NA
3030	1412038.52	2432952.81	465.28	465.30	0.02		465.30	466.33	1.03	1.00	0.03		466.33	NA	NA	NA	NA
3031	1411988.52	2432943.12	462.07	462.08	0.01		462.08	NA	NA	NA	NA		NA	NA	NA	NA	NA
3032	1411970.33	2432939.94	460.97	460.98	0.01		460.98	NA	NA	NA	NA		NA	NA	NA	NA	NA
3033	1411938.52	2432934.16	459.52	459.53	0.01		459.53	460.54	1.01	1.00	0.01		460.54	461.08	0.54	0.50	0.04
3034	1411938.52	2432918.99	459.06	459.06	0.00		459.06	460.07	1.01	1.00	0.01		460.07	NA	NA	NA	NA
3035	1411893.52	2432921.40	458.91	458.93	0.02		458.93	459.96	1.02	1.00	0.02		459.96	460.47	0.52	0.50	0.02
3036	1411870.98	2432915.88	458.72	458.78	0.05		458.78	459.81	1.04	1.00	0.04		459.81	460.32	0.51	0.50	0.01
3037	1411863.20	2432897.51	458.18	458.20	0.02		458.20	459.29	1.09	1.00	0.09		459.29	459.78	0.50	0.50	0.00
3038	1411864.90	2432835.74	458.36	458.40	0.04		458.40	459.44	1.05	1.00	0.05		459.44	459.96	0.52	0.50	0.02
3039	1411872.77	2432829.60	458.49	458.50	0.01		458.50	459.50	1.00	1.00	0.00		459.50	460.02	0.52	0.50	0.02
3040	1411893.52	2432826.49	458.61	458.65	0.04		458.65	459.69	1.04	1.00	0.04		459.69	460.26	0.57	0.50	0.07
3041	1411938.52	2432824.43	458.90	458.90	0.00		458.90	459.91	1.01	1.00	0.01		459.91	460.46	0.55	0.50	0.05
3042	1411988.52	2432822.91	459.19	459.22	0.03		459.22	460.26	1.04	1.00	0.04		460.26	460.84	0.58	0.50	0.08
3047	1412056.05	2432826.70	459.42	459.43	0.01		459.43	460.49	1.06	1.00	0.06		460.49	461.06	0.57	0.50	0.07
3048	1412066.18	2432834.23	459.28	459.29	0.01		459.29	460.35	1.06	1.00	0.06		460.35	460.90	0.55	0.50	0.05
3049	1412068.49	2432865.99	458.31	458.34	0.03		458.34	459.35	1.01	1.00	0.01		459.35	NA	NA	NA	NA

Notes : Maximum Acceptable Deviation from Grade (ft): +0.1 to -0.0

NA = Not Applicable (Points that are Labeled "NA" do not apply to other lifts on the 50' grid. They only apply to the structural fill lift.

Reason for Deviation of Data:

- Points 3000, 3009, 3012, 3015, and 3018 were taken along the centerline of the ditch, where minimal structural fill was required. Additionally, this area contains 6 inches of bedding material and a 6-inch leachate collection pipe. The comparison accurately reflects the elevation difference between the structural fill and sand filter layers.
- Point 3007 was taken along the centerline of the 12" sump pipe, where little to no structural fill was required. The comparison accurately reflects the elevation difference between the structural fill and sand filter layers.

Reference Documents:

(3) Powerton Structural Fill Point Locations

(4) Powerton Survey Point Locations

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APPROVED	BAT	Proj #	C025
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SCALE	NA	File	xxx

TOLERANCES (EXCEPT AS NOTED)

Location: **Powerton Retrofit Bypass Basin**

Title: Powerton Floor As-Built Survey Data

SHEET 5 / 9

Powerton Side Slope As-Built Survey Data

			Sand Filter Layer				Sand Filter Layer to Rip Rap Bedding Layer						Rip Rap Bedding Layer to Rip Rap Slope Protection Layer					
Point Location	Northing	Easting	Design Elevation of Sand Filter Layer	ASB Top of Sand Filter Layer	Deviation (ft)	Reason for Deviation	ASB Top of Sand Filter Layer	ASB Top of Rip Rap Bedding Layer	Thickness (ft)	Minimun Design Requirement (ft)	Deviation (ft)	Reason for Deviation	ASB Top of Rip Rap Bedding Layer	ASB Top of Rip Rap Slope Protection Layer	Thickness (ft)	Minimun Design Requirement (ft)	Deviation (ft)	Notes
3007	1411865.23	2432866.99	458.97	458.99	0.02		458.99	459.53	0.54	0.50	0.04		459.53	460.06	0.53	0.50	0.03	
3018	1412065.64	2432868.97	458.78	458.87	0.09		458.87	459.39	0.52	0.50	0.02		459.39	459.90	0.51	0.50	0.01	
3020	1412066.36	2432896.48	459.60	459.65	0.05		459.65	460.19	0.54	0.50	0.04		460.19	460.70	0.51	0.50	0.01	
3021	1412061.96	2432909.54	460.01	460.05	0.04		460.05	460.55	0.50	0.50	0.00		460.55	461.05	0.50	0.50	0.00	
3022	1412057.53	2432911.72	460.04	460.06	0.02		460.06	460.58	0.52	0.50	0.02		460.58	461.15	0.57	0.50	0.07	
3023	1412038.47	2432911.38	459.93	459.99	0.06		459.99	460.55	0.56	0.50	0.06		460.55	461.14	0.59	0.50	0.09	
3024	1411988.49	2432913.55	459.74	459.80	0.06		459.80	460.33	0.52	0.50	0.02		460.33	460.85	0.53	0.50	0.03	
3033	1411938.39	2432931.53	460.01	460.02	0.01		460.02	460.56	0.54	0.50	0.04		460.56	461.06	0.50	0.50	0.00	
3035	1411893.52	2432920.17	459.41	459.44	0.03		459.44	459.98	0.54	0.50	0.04		459.98	460.51	0.53	0.50	0.03	
3036	1411870.89	2432909.26	459.22	459.23	0.01		459.23	459.77	0.53	0.50	0.03		459.77	460.29	0.53	0.50	0.03	
3037	1411866.74	2432898.64	458.66	458.71	0.05		458.71	459.22	0.51	0.50	0.01		459.22	459.74	0.52	0.50	0.02	
3038	1411868.42	2432841.68	458.86	458.89	0.03		458.89	459.46	0.57	0.50	0.07		459.46	460.02	0.56	0.50	0.06	
3039	1411872.83	2432832.58	458.99	459.06	0.07		459.06	459.65	0.59	0.50	0.09		459.65	460.17	0.51	0.50	0.01	
3040	1411893.44	2432829.47	459.11	459.15	0.04		459.15	459.68	0.53	0.50	0.03		459.68	460.19	0.51	0.50	0.01	
3041	1411938.59	2432828.34	459.40	459.42	0.02		459.42	459.96	0.54	0.50	0.04		459.96	460.50	0.54	0.50	0.04	
3042	1411988.51	2432826.66	459.69	459.71	0.02		459.71	460.21	0.50	0.50	0.00		460.21	460.75	0.53	0.50	0.03	
3047	1412055.96	2432832.01	459.92	459.96	0.04		459.96	460.46	0.50	0.50	0.00		460.46	460.97	0.51	0.50	0.01	
3048	1412062.42	2432836.73	459.78	459.83	0.05		459.83	460.36	0.53	0.50	0.03		460.36	460.88	0.52	0.50	0.02	
6051	1412018.75	2432958.13	467.35	467.39	0.04		467.39	467.93	0.54	0.50	0.04		467.93	468.50	0.57	0.50	0.07	
6052	1411988.52	2432957.82	467.30	467.32	0.02		467.32	467.82	0.50	0.50	0.00		467.82	468.35	0.53	0.50	0.03	
6054	1411938.52	2432955.96	467.09	467.16	0.07		467.16	467.66	0.50	0.50	0.00		467.66	468.18	0.52	0.50	0.02	
6056	1411893.12	2432947.50	467.24	467.26	0.02		467.26	467.79	0.53	0.50	0.03		467.79	468.30	0.50	0.50	0.00	
6059	1411866.64	2432937.48	467.40	467.42	0.02		467.42	467.93	0.51	0.50	0.01		467.93	468.44	0.51	0.50	0.01	
6060	1411838.55	2432907.38	467.12	467.13	0.01		467.13	467.64	0.51	0.50	0.01		467.64	468.15	0.51	0.50	0.01	
6062	1411837.09	2432866.99	467.36	467.48	0.12		467.48	467.99	0.52	0.50	0.02		467.99	468.55	0.56	0.50	0.06	
6064	1411838.27	2432836.15	467.57	467.62	0.05		467.62	468.19	0.56	0.50	0.06		468.19	468.76	0.57	0.50	0.07	
6066	1411864.22	2432799.98	468.43	468.45	0.02		468.45	468.95	0.50	0.50	0.00		468.95	469.47	0.52	0.50	0.02	
6067	1411892.49	2432798.92	468.34	468.34	0.00		468.34	468.89	0.55	0.50	0.05		468.89	469.46	0.56	0.50	0.06	
6069	1411938.52	2432797.15	468.31	468.35	0.04		468.35	468.91	0.56	0.50	0.06		468.91	469.45	0.54	0.50	0.04	
6071	1411988.52	2432795.46	468.59	468.61	0.02		468.61	469.16	0.54	0.50	0.04		469.16	469.66	0.51	0.50	0.01	
6073	1412045.01	2432798.68	468.70	468.73	0.03		468.73	469.31	0.57	0.50	0.07		469.31	469.81*	0.50*	0.50	0.00*	Data Pending
6074	1412084.55	2432808.26	469.07	469.08	0.01		469.08	469.59	0.51	0.50	0.01		469.59	470.09*	0.50*	0.50	0.00*	Data Pending
6076	1412091.16	2432821.96	468.21	468.26	0.05		468.26	468.84	0.58	0.50	0.08		468.84	469.34*	0.50*	0.50	0.00*	Data Pending
6078	1412093.70	2432868.99	467.32	467.92	0.60	NE Ramp Increase	467.92	468.44	0.52	0.50	0.02		468.44	468.94*	0.50*	0.50	0.00*	Data Pending
6079	1412095.99	2432898.84	467.57	468.02	0.45	NE Ramp Increase	468.02	468.56	0.54	0.50	0.04		468.56	469.06*	0.50*	0.50	0.00*	Data Pending
6081	1412078.41	2432928.88	466.78	467.67	0.89	NE Ramp Increase	467.67	468.24	0.57	0.50	0.07		468.24	468.74*	0.50*	0.50	0.00*	Data Pending
6083	1412065.47	2432942.35	466.89	467.53	0.64	NE Ramp Increase	467.53	468.08	0.55	0.50	0.05		468.08	468.58*	0.50*	0.50	0.00*	Data Pending

Notes : Maximum Acceptable Deviation from Grade (ft): +0.1 to -0.0

* = Proposed Data Value

Reason for Deviation of Data:

- Points 6078, 6079, 6081, and 6083 were taken along the top of the slope. The slight grade change at the northeast corner of the ramp affected the top of slope grades in this area, requiring them to be adjusted to match the proposed finish grade.
- Points 6073, 6074, 6076, 6078, 6079, 6081, and 6083 represent the proposed elevations for the top of the Rip Rap Slope Protection layer. Please note that all Rip Rap Slope Protection material has been placed, but the top of the slope cannot be brought to the final grade until the Northern Pipe work is completed.

Reference Documents:

(3) Powerton Structural Fill Point Locations

(4) Powerton Survey Point Locations

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DATE	DESCRIPTION OF REVISION	BY	DESIGNED	BAT	OWNER	xxx
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			APPROVED	BAT	Proj #	C025
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			SCALE	NA	File	xxx

TOLERANCES (EXCEPT AS NOTED)

Location: Powerton Retrofit Bypass Basin

Title: Powerton Slopes As-Built Survey Data

Powerton Ramp As-Built Survey Data

			Structural Fill						Structural Fill to Sand Cushion Layer						Sand Cushion Layer to Protective Warning Layer					
Point Location	Northing	Easting	Pre-existing Liner Elevation	ASB Top of Structural Fill	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)	Reason for Deviation	ASB Top of Structural Fill	ASB Top of Sand Cushion Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)	Reason for Deviation	ASB Top of Sand Cushion Layer	ASB Top of Protective Warning Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)	Notes
6085	1412062.54	2432949.18	466.35	467.40	1.05	1.00	0.05		467.40	468.41	1.01	1.00	0.01		468.41	468.91*	0.50*	0.5	0.00*	**Data Pending**
6086	1412034.73	2432941.84	463.40	464.63	1.23	1.00	0.23	Ramp Elevation Increase	464.63	466.78	2.14	1.00	1.14	Ramp Elevation Increase	466.78	467.28*	0.50*	0.5	0.00*	**Data Pending**
6087	1412016.66	2432938.58	462.20	463.44	1.24	1.00	0.24	Ramp Elevation Increase	463.44	465.49	2.05	1.00	1.05	Ramp Elevation Increase	465.49	466.06	0.57	0.5	0.07	
6088	1411999.42	2432935.90	460.91	462.44	1.53	1.00	0.53	Ramp Elevation Increase	462.44	464.00	1.56	1.00	0.56	Ramp Elevation Increase	464.00	464.53	0.53	0.5	0.03	
6089	1411975.55	2432930.72	459.04	460.92	1.88	1.00	0.88	Ramp Elevation Increase	460.92	461.93	1.01	1.00	0.01		461.93	462.46	0.53	0.5	0.03	
6090	1411956.41	2432926.01	457.43	459.41	1.98	1.00	0.98	Ramp Elevation Increase	459.41	460.43	1.02	1.00	0.02		460.43	460.92	0.50	0.5	0.00	
6091	1411943.60	2432917.36	456.62	459.18	2.56	1.00	1.56	Ramp Elevation Increase	459.18	460.21	1.03	1.00	0.03		460.21	460.76	0.55	0.5	0.05	

Notes : Maximum Acceptable Deviation from Grade (ft): +0.1 to -0.0

* = Proposed Data Value

Reason for Deviation of Data:

- Points 6086, 6087, 6088, 6089, 6090, and 6091 were taken along the centerline of the ramp. The slight grade change at the northeast corner of the ramp affected the quantity of fill to maintain the proposed slope.
- Points 6085 and 6086 represent the proposed elevations for the top of the protective warning layer. Please note that all of the sand cushion layer material has been placed and is awaiting the completion of the northern pipe work before the remaining protective warning layer can be installed.

Reference Documents: (3) Powerton Structural Fill Point Locations

(4) Powerton Survey Point Locations

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DATE	DESCRIPTION OF REVISION	BY				
			DESIGNED	BAT	OWNER	xxx
			DRAWN	BAT	Proj Type	xxx
			APPROVED	BAT	Proj #	C025
			DATE	09-27-24	Folder	XXX
			SCALE	NA	File	xxx

TOLERANCES (EXCEPT AS NOTED)

Location **Powerton Retrofit Bypass Basin**

Title Powerton Ramp As-Built Survey Data

SHEET 7 9

Powerton Inlet Structure As-Built Survey Data

Point Location	Northing	Easting	Structural Fill Layer: Design Elevation of Structural Fill	ASB Structural Fill	Deviation (ft)
3043	1412028.81	2432831.94	459.12	459.13	0.01
3044	1412028.47	2432794.93	460.19	460.25	0.06
3045	1412038.62	2432794.72	460.24	460.31	0.07
3046	1412038.52	2432831.71	459.18	459.24	0.06
6092	1412038.16	2432805.42	459.99	460.02	0.03
6093	1412028.91	2432805.74	459.93	459.94	0.01

Structural Fill to Sand Filter Layer				
ASB Structural Fill	ASB Sand Filter Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)
459.13	460.16	1.03	1.00	0.03
460.25	460.76	0.51	0.50	0.01
460.31	460.85	0.54	0.50	0.04
459.24	460.25	1.01	1.00	0.01
460.02	460.54	0.52	0.50	0.02
459.94	460.45	0.51	0.50	0.01

Sand Filter Layer to Rip Rap Bedding Layer				
ASB Sand Filter Layer	ASB Rip Rap Bedding Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)
460.16	NA	NA	NA	NA
460.76	461.32	0.56	0.50	0.06
460.85	461.41	0.56	0.50	0.06
460.25	NA	NA	0.50	NA
460.54	461.07	0.53	0.50	0.03
460.45	460.99	0.54	0.50	0.04

Rip Rap Bedding Layer to Rip Rap Slope Protection Layer				
ASB Rip Rap Bedding Layer	ASB Rip Rap Slope Protection	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)
NA	NA	NA	NA	NA
461.32	464.72	3.40	0.50	2.90
461.41	464.78	3.37	0.50	2.87
NA	NA	NA	NA	NA
461.07	461.58	0.51	0.50	0.01
460.99	461.51	0.52	0.50	0.02

Inlet Structure Slope Check Table			
Direction of Fall	Distance (LF)	Fall (ft)	Slope (%)
West to East	26.2	0.81	3.09%
North to South	10.2	0.06	0.57%

Inlet Stucture Invert			
Point Location	Northing	Easting	ASB Invert at Inlet Structure
811	1412033.34	2432785.00	465.08

Point Location	Northing	Easting	Sand Filter Layer to Protective Warning Layer: ASB Sand Filter Layer	ASB Protective Warning Layer	Thickness (ft)	Minimum Design Requirment (ft)	Deviation (ft)
3043	1412028.81	2432831.94	460.16	460.67	0.51	0.50	0.01
3046	1412038.52	2432831.71	460.25	460.77	0.52	0.50	0.02

Notes :

NA = Not Applicable (Points that are Labeled "NA" do not apply to the other lifts for material within the inlet structure.

Point 811 = Represents the location and invert at the west end of the inlet structure, where the concrete plug was removed from the existing weir wall.

Design Criteria Allowance:
- Maximum Acceptable Deviation from Grade (ft): +0.1 to -0.0
- Slope of Inlet Structure to match 3% grade from the floor of Basin extending into the structure.
- Cross Slope of Inlet Structure to be at least 0.5%.

Reason for Deviation of Data:
- Points 3044 and 3045 are over the original design due to the change of the grading plan within the inlet structure. The design elevation of the Rip Rap at the west wall was changed to be brought to the invert of the inlet to minimize the drop distace of incoming contaminated water. This helps ensure the longevity of the inlet structure.

Reference Documents:
(2) Retrofit Bypass As-Built
(3) Powerton Structural Fill Point Locations
(4) Powerton Survey Point Locations

PREPARED BY:
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2252 SOUTHWIND BOULEVARD
BARTLETT, ILLINOIS 60103
PHONE: 630-497-8700 FAX: 630-497-9800

PREPARED FOR:
CIVIL & ENVIRONMENTAL CONSULTANTS, Inc
1230 EAST DIEHL ROAD, SUITE 200
NAPERVILE, ILLINOIS 60563
PHONE: 630-963-6026

DATE	DESCRIPTION OF REVISION	BY				
			DESIGNED	BAT	OWNER	xxx
			DRAWN	BAT	Proj Type	xxx
			APPROVED	BAT	Proj #	C025
			DATE	09-30-24	Folder	XXX
			SCALE	NA	File	xxx

Location: Powerton Retrofit Bypass Basin

Title: Powerton Inlet Structure As-Built Survey Data

SHEET 8
9

Powerton Pipe As-Built Survey Data

6" Diameter Perferated HDPE Leachate Collection Pipe				
Pt #	Northing	Easting	Elevation	Description
3500	1412066.73	2432868.98	458.14	Invert of Pipe South
3501	1412066.64	2432868.99	458.63	Top of Pipe at Weld
3502	1412049.68	2432868.75	458.37	Top of Pipe at Weld
3503	1412009.60	2432868.92	458.23	Top of Pipe at Weld
3504	1411969.51	2432868.51	457.94	Top of Pipe at Weld
3505	1411929.31	2432868.58	457.76	Top of Pipe at Weld
3506	1411889.20	2432868.27	457.47	Top of Pipe at Weld
3507	1411869.35	2432868.68	457.43	Top of Pipe at Weld
3508	1411869.26	2432868.72	456.93	Invert of Pipe South

6" Pipe Slope Check			
Direcion of Fall	Distance (LF)	Fall (ft)	Slope (%)
North to South	197.5	1.21	0.6%

12" Diameter Perferated HDPE Sump Pipe				
Pt #	Northing	Easting	Elevation	Description
3510	1411884.90	2432867.30	455.80	Invert of Pipe North
3511	1411854.74	2432865.06	462.11	Top of Pipe at Weld
3512	1411868.11	2432863.99	458.20	Top of Elbow North
3513	1411835.93	2432865.44	468.55	Top of CPLG South
3514	1411829.69	2432865.75	470.22	Top of Pipe South
3515	1411829.30	2432865.55	469.23	Invert of Pipe South
3516	1411836.38	2432865.28	468.24	Top of Elbow South

Notes :

- Top of Pipe Shots taken at weld are adjacent to the weld point.

Design Criteria Allowance:

- Maximum Acceptable Deviation from Grade (ft): +0.1 to -0.0
- Slope of 6" HDPE pipe to be at least 0.5% to match slope of leachate collection trench design.

Reference Documents: POW-BBR-CSK-006 Revision 2
(2) - Retrofit Bypass As-Built

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DATE	DESCRIPTION OF REVISION	BY

DESIGNED	BAT	OWNER	xxx
DRAWN	BAT	Proj Type	xxx
APPROVED	BAT	Proj #	C025
DATE	09-27-24	Folder	XXX
SCALE	NA	File	xxx

Location: Powerton Retrofit Bypass Basin

Title: Powerton Pipe As-Built Survey Data

SHEET 9

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APPENDIX D

INDEX REPORT

Appendix D
Index and Acceptance Report
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

Index Number	S&L Approval Date	Description	Acceptance
1	Monday, July 29, 2024	Analytical test results for existing bypass basin liner.	Yes
2	Monday, July 29, 2024	Integrity test results for existing bypass basin liner.	Yes
3	Friday, August 2, 2024	Structural fill/sand filter gradation results.	Yes
4	Friday, August 2, 2024	Riprap bedding deleterious, soundness, and LA abrasion pre-construction test results.	Yes
5	Friday, August 2, 2024	Riprap gradation test results.	Yes
6	Monday, August 5, 2024	HDPE geomembrane and drainage geocomposite pre-construction submittal.	Yes
7	Wednesday, August 7, 2024	Coarse aggregate bedding, riprap bedding, crushed stone slope gradation results.	Yes
8	Friday, August 9, 2024	Structural fill/sand filter gradation results.	Yes
9	Friday, August 9, 2024	Visual inspection of leachate collection pipes.	Yes
10	Monday, August 12, 2024	Protective warning layer/road surfacing gradation results.	Yes
11	Monday, August 12, 2024	Visual observations of structural fill placement.	Yes
12	Tuesday, August 13, 2024	Compaction and thickness verification of structural fill placement.	Yes
13	Tuesday, August 13, 2024	Observed and inspected delivery of HDPE geomembrane and geocomposite. Collected three samples of structural fill layer.	Yes
14	Tuesday, August 13, 2024	Sand filter hydraulic conductivity test results.	Yes
15	Wednesday, August 14, 2024	Compaction and thickness verification of structural fill placement. Collected a sample of structural fill layer.	Yes
16	Wednesday, August 14, 2024	GCL conformance testing and pre-construction submittals.	Yes
17	Thursday, August 15, 2024	Leachate collection pipe details, certifications, and specifications.	Yes
18	Friday, August 16, 2024	Wedge anchors, batten strips, and banding specifications.	Yes
19	Monday, August 19, 2024	Protective warning layer/road surfacing gradation results.	Yes
20	Monday, August 19, 2024	Coarse aggregate bedding/slope surfacing gradation results.	Yes
21	Monday, August 19, 2024	Compaction and thickness verification of structural fill placement.	Yes
22	Monday, August 19, 2024	Observed and inspected delivery of GCL.	Yes
23	Tuesday, August 20, 2024	Compaction and thickness verification of structural fill placement. Observe excavation of anchor trench. Collected a sample of the structural fill and coarse aggregate bedding layers.	Yes
24	Tuesday, August 20, 2024	Quality reports for protective warning layer/road surfacing and coarse aggregate bedding/slope surfacing.	Yes
25	Tuesday, August 20, 2024	Gradation and Atterberg's for anchor trench backfill.	Yes
26	Wednesday, August 21, 2024	Observe and QC GCL and HDPE deployment and seaming. Observe placement of coarse aggregate bedding and leachate collection pipes.	Yes
27	Thursday, August 22, 2024	Observe and QC GCL and HDPE deployment, seaming, and seam testing. Observe excavation of anchor trench. Collect two destructive samples of HDPE.	Yes
28	Friday, August 23, 2024	Observe and QC GCL and HDPE deployment, seaming, and seam testing. Collect six destructive samples of HDPE.	Yes
29	Saturday, August 24, 2024	Observe and QC seaming and seam testing.	Yes
30	Monday, August 26, 2024	Observe and QC sealing of HDPE and observe deployment and seaming of geocomposite.	Yes
31	Tuesday, August 27, 2024	Observe and QC deployment and seaming of geocomposite. Observe, inspect, and perform density tests on anchor trench backfill.	Yes

Appendix D
Index and Acceptance Report
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

Index Number	S&L Approval Date	Description	Acceptance
32	Wednesday, August 28, 2024	Observe and perform density tests of anchor trench backfill.	Yes
33	Thursday, August 29, 2024	Observe placement and thickness verification of sand filter. Collected a sand filter layer sample.	Yes
34	Tuesday, September 3, 2024	Observe placement and thickness verification of sand filter. Collected a sand filter layer sample.	Yes
35	Thursday, September 4, 2025	Observe placement and thickness verification of sand filter and protective warning layer. Collected a protective warning layer sample.	Yes
36	Wednesday, September 4, 2024	Riprap bedding layer gradations and quality reports.	Yes
37	Thursday, September 5, 2024	Observe placement and thickness verification of sand filter and riprap bedding. Collected a riprap bedding layer sample.	Yes
38	Monday, September 9, 2024	Observe placement and thickness verification of sand filter and riprap bedding.	Yes
39	Monday, September 9, 2024	Riprap gradation and quality test reports.	Yes
40	Tuesday, September 10, 2024	Observe placement and thickness verification of riprap bedding and road surfacing.	Yes
41	Wednesday, September 11, 2024	Observe placement and thickness verification of riprap layer. Collected a riprap layer sample.	Yes
42	Thursday, September 12, 2024	Observe placement and thickness verification of riprap layer.	Yes
43	Friday, September 13, 2024	Observe placement and thickness verification of road surfacing layer.	Yes
44	Friday, September 13, 2024	Riprap quality test report.	Yes
45	Monday, September 16, 2024	Observe placement and thickness verification of road surfacing layer.	Yes
46	Monday, September 23, 2024	GCL Conformance test results.	Yes

APPENDIX E

DAILY FIELD REPORTS

DAILY FIELD REPORT

Date: 08/09/2024 (Friday)
Report No.: 01-080924

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Partly Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	57-71

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☒ **Yes** ☐ **No**

Date CEC representative was last onsite: **This was first site visit**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

Joe Kotas with NRG

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **10 AM**	SITE DEPARTURE: **3PM**

- Observed delivery of leachate collection pipes.
  - 2 pieces of 12" sump and riser pipe (pre welded connections) and 6 pieces of 6" perforated leak collection pipe.
  - Perforations were properly spaced apart with proper diameters (5" and ½", respectively)
  - Locations of perforations on the sump pipe (Detail 008-06) were not in correct orientation.
- Observed import of structural fill material. Material appeared to be consistent with samples received by BCC prior to material submission to Sargent & Lundy (S&L).

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☒ **Yes** ☐ **No**

- Perforations on the sump pipe were close to the top of the riser pipe. BCC will have their subcontractor cut the pipe at the connection, reorientate the perforations, and reweld the connection prior to final placement.

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Work will begin next week.

Civil & Environmental Consultants, Inc.

ATTACHMENTS

N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

N/A

PHOTOGRAPHS

Photo 1: Picture of delivered leachate collection pipe.

Photo 2: Perforations on sump pipe are aligned with the top of the pipe once it will be placed in the bypass basin.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/09/2024 CEC MANAGER: Dean Jones DATE: 08/09/2024

This document is draft until reviewed and approved by a Project Manager

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Partly Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	60-77

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **5 PM**

- Observed placement of 1st lift of structural fill.
    - Placed with Morooka's and skid steer pushing the material.
    - At least 10" of material was placed before equipment traversed over it.
    - No hard brakes, sharp turns, nor quick stops were seen while traversing over the liner and structural fill.
    - 12" of structural fill was placed on the base of the bypass basin.
    - Thickness was controlled utilizing GPS on the skid steer.
    - Compaction efforts will take place the following day.
- Performed calibration of nuclear density gauge and sand cone tests.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Compaction efforts will take place the following day.

Civil & Environmental Consultants, Inc.

ATTACHMENTS

Field Density Test Report and Sand Cone Test Reports

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

N/A

PHOTOGRAPHS

Photo 1: Placement of structural fill on the base of the bypass basin.

Photo 2: Performing nuclear density tests and sand cone tests.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/12/2024 CEC MANAGER: Dean Jones DATE: 08/13/2024

This document is draft until reviewed and approved by a Project Manager

DAILY FIELD REPORT

Date: 08/12/2024 (Monday)
Report No.: 02-081224

Civil & Environmental Consultants, Inc.

NUCLEAR COMPACTION TEST DATA (ASTM D6938)

PROJECT NAME: Powerton Bypass Basin Retrofit
PROJECT NUMBER: 343-014
CEC TECHNICIAN: Derek Dorsz
GAUGE NUMBER: 27636
CONTRACTOR: Bluff City Construction

STANDARD COUNTS:

DENSITY 949 **% DEVIATION** 0.63 **±1% PASSING**
MOISTURE 613 **% DEVIATION** 0.49 **±2% PASSING**

TEST NUMBER	C-1	C-2	C-3	C-4	C-5	
LOCATION	N/A	N/A	N/A	N/A	N/A	
ELEVATION OR LIFT NUMBER	N/A	N/A	N/A	N/A	N/A	
LIFT THICKNESS (in.)	12	12	12	12	12	
NUMBER OF PASSES	2	2	2	2	2	
PROBE DEPTH (in.)	0	0	0	0	0	
FIELD WET DENSITY (pcf)	110.8	110.8	110.3	110.9	109.8	
FIELD DRY DENSITY (pcf)	107.2	106.8	106.5	107.2	106.9	
COMPACTION (%)	95.0	94.7	94.4	95	94.8	
COMPACTION PASS/FAIL	N/A	N/A	N/A	N/A	N/A	
FIELD MOISTURE (%)	3.2	3.6	3.4	3.3	2.6	
MOISTURE PASS/FAIL	N/A	N/A	N/A	N/A	N/A	
LAB PROCTOR MDD	112.8	112.8	112.8	112.8	112.8	
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified	Modified	Modified	
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0	95.0	95.0	
LABORATORY OMC (%)	12.0	12.0	12.0	12.0	12.0	
SPECIFIED MOISTURE RANGE	N/A	N/A	N/A	N/A	N/A	
RETEST NUMBER	N/A	N/A	N/A	N/A	N/A	

REMARKS	Confirmation testing in conjunction with Sand Cone Tests.

NOTES:
1. MDD denotes Maximum Dry Density.
2. OMC denotes Optimum Moisture Content.
3. Elevations and lift thicknesses are approximate.
4. N denote Northing, E denotes Easting, and Z denotes elevation. Coordinates given by Bluff City Construction.

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)

Date: 8/12/24 Test No: 1

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams
-Weight of cone/jar aperatus with sand = (W) in grams 6630.000 grams
-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.
-Weigh moist/wet soil from excavation W_S = 1425.000 grams
- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.
- Weigh jar and remaining sand (**W_2**) 3838.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 1219.000 grams

Volume of Excavation = 796.732 cm^3

Wet Density of Excavated Soil W_W = 1788.556 kg/m^3

Dry Density of Soil
- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.
- Obtain weight in grams of dry soil W_D = 1370.000 grams
- Moisture Content of sample = 3.860 %

Soil Dry Density = 1722.090 **kg/m^3**

***Soil Dry Unit Wt. = 107.46 **lb/ft^3** *** measured in force (lb/ft^3)

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)
Date: 8/12/24 Test No: 2

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams
-Weight of cone/jar aperatus with sand = (W) in grams 6343.000 grams
-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.
-Weigh moist/wet soil from excavation W_s = 987.000 grams
- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.
- Weigh jar and remaining sand (**W_2**) 3923.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 847.000 grams

Volume of Excavation = 553.595 cm^3

Wet Density of Excavated Soil W_W = 1782.893 kg/m^3

Dry Density of Soil
- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 947.000 grams
- Moisture Content of sample = 4.053 %

Soil Dry Density = 1713.452 **kg/m^3**

***Soil Dry Unit Wt. = 106.92 **lb/ft^3** *** measured in force (lb/ft^3)

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)

Date: 8/12/24 Test No: 3

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) =	1573.000	grams
-Weight of cone/jar aperatus with sand = (W) in grams	6001.000	grams
-Enter pre-determined density of sand in jar =	1.530	g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 1089.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand (**W_2**) 3483.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 945.000 grams

Volume of Excavation = 617.647 cm^3

Wet Density of Excavated Soil W_W = 1763.143 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 1049.000 grams

- Moisture Content of sample = 3.673 %

Soil Dry Density = 1700.675 **kg/m^3**

***Soil Dry Unit Wt. = 106.12 **lb/ft^3** *** measured in force (lb/ft^3)

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)
Date: 8/12/24 Test No: 4

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams

-Weight of cone/jar aperatus with sand = (W) in grams 5793.000 grams

-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 1267.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand **(W_2)** 3125.000 grams + weight of sand in the full cone **(W_1)** and subtract from weight of full jar **(W)**: **W - (W_1+W_2)** 1095.000 grams

Volume of Excavation = 715.686 cm^3

Wet Density of Excavated Soil W_W = 1770.329 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 1225.000 grams

- Moisture Content of sample = 3.315 %

Soil Dry Density = 1713.527 **kg/m^3**

***Soil Dry Unit Wt. = 106.92 **lb/ft^3** *** measured in force (lb/ft^3)

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)

Date: 8/12/24 Test No: 5

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) =	1573.000	grams
-Weight of cone/jar aperatus with sand = (W) in grams	5276.000	grams
-Enter pre-determined density of sand in jar =	1.530	g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 1498.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand **(W_2)** 2409.000 grams + weight of sand in the full cone **(W_1)** and subtract from weight of full jar **(W)**: **W - (W_1+W_2)** 1294.000 grams

Volume of Excavation = 845.752 cm^3

Wet Density of Excavated Soil W_W = 1771.206 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D =	1455.000	grams
- Moisture Content of sample =	2.870	%

Soil Dry Density = 1721.782 **kg/m^3**

***Soil Dry Unit Wt. = 107.44 **lb/ft^3** *** measured in force (lb/ft^3)

DAILY FIELD REPORT

Date: 08/13/2024 (Tuesday)
Report No.: 03-081324

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	63-82

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **5 PM**

- Observed compaction efforts on 1st and 2nd lift of structural fill.
  - Structural fill was compacted with a Bomag BW 211D
  - Pre-compaction thickness of the 1st lift was 13" and compacted thickness was 12".
  - Pre-compaction thickness of the 2nd lift was 9" and compacted thickness was 8".
  - Structural fill was conditioned with water and rolled with the compaction equipment two times.
  - Performed nuclear density testing on 1st and 2nd lift of structural fill with adequate results. See attachment for report.
  - Performed sand cone test at the end of the day. See attached report.
- Observed placement, conditioning, and compaction of 2nd lift of structural fill.
  - Material was placed in the same fashion as the 1st lift utilizing the same equipment and methods.
- Observed delivery and unload of HDPE geomembrane.
  - Geomembrane came with identifying labels which contain information located on Photo 1.
  - Rolls received onsite were the same rolls identified in the approved submittal.
  - Rolls of geomembrane were unloaded utilizing the straps which came with the rolls. Rolls were placed in an adequate storage area
- Observed delivery and unload of drainage geocomposite and geomembrane fabric.
  - Rolls received onsite were the same rolls identified in the approved submittal.
  - Rolls of geocomposite and geomembrane were unloaded by rolling off the trailer. Rolls were then placed in an adequate storage area.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- 23 rolls of membrane were delivered, but 24 were approved through submittals. Inquired through S&L if this is correct number of rolls to be delivered.

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- Field Density Test Report
- Sand Cone Test Reports

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-SF-1 Structural fill sample
- PBBR-SF-2 Structural fill sample
- PBBR-SF-3 Structural fill sample

PHOTOGRAPHS

Photo 1: Label on geomembrane

∗ No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Civil & Environmental Consultants, Inc.

Photo 2: Unloading geomembrane.

Photo 3: Moisture conditioning of structural fill.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/13/2024 CEC MANAGER: Dean Jones DATE: 08/15/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

DAILY FIELD REPORT

Date: 08/13/2024 (Tuesday)
Report No.: 03-081324

Civil & Environmental Consultants, Inc.

NUCLEAR COMPACTION TEST DATA (ASTM D6938)

PROJECT NAME: Powerton Bypass Basin Retrofit
PROJECT NUMBER: 343-014
CEC TECHNICIAN: Derek Dorsz
GAUGE NUMBER: 27636
CONTRACTOR: Bluff City Construction

STANDARD COUNTS:

DENSITY 949 **% DEVIATION** 0.63 **±1% PASSING**
MOISTURE 613 **% DEVIATION** 0.49 **±2% PASSING**

TEST NUMBER	1	2	3	4	5	6
LOCATION	N: 1411999.2 E: 2432878.3	N: 1411896.3 E: 2432844.8	N: 1411995.8 E: 2432843.1	N: 1411902.1 E: 2432894.8	N: 1412009.8 E: 2432834.8	N: 1411948.4 E: 2432845.8
ELEVATION OR LIFT NUMBER	Lift 1 Z: 456.9	Lift 1 Z: 457.1	Lift 1 Z: 456.9	Lift 1 Z 457.0	Lift 2 Z 458.0	Lift 2 Z 457.8
LIFT THICKNESS (in.)	12	12	12	12	8	8
NUMBER OF PASSES	2	2	2	2	2	2
PROBE DEPTH (in.)	0	0	0	0	0	0
FIELD WET DENSITY (pcf)	109.9	113.1	113.2	111.2	115.6	112.5
FIELD DRY DENSITY (pcf)	107.2	107.5	108.6	107.5	110.6	107.8
COMPACTION (%)	95.0	95.3	96.3	95.3	98.1	95.6
COMPACTION PASS/FAIL	PASS	PASS	PASS	PASS	PASS	PASS
FIELD MOISTURE (%)	2.5	5.2	4.2	3.5	4.5	4.3
MOISTURE PASS/FAIL	PASS	PASS	PASS	PASS	PASS	PASS
LAB PROCTOR MDD	112.8	112.8	112.8	112.8	112.8	112.8
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified	Modified	Modified	Modified
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0	95.0	95.0	95.0
LABORATORY OMC (%)	12.0	12.0	12.0	12.0	12.0	12.0
SPECIFIED MOISTURE RANGE	N/A	N/A	N/A	N/A	N/A	N/A
RETEST NUMBER	N/A	N/A	N/A	N/A	N/A	N/A
REMARKS						

DAILY FIELD REPORT

Date: 08/13/2024 (Tuesday)
Report No.: 03-081324

Civil & Environmental Consultants, Inc.

TEST NUMBER	7	8				
LOCATION	N: 1412032.9 E: 2432890.6	N: 1411929.3 E: 2432882.9				
ELEVATION OR LIFT NUMBER	Lift 2 Z: 457.7	Lift 2 Z: 457.8				
LIFT THICKNESS (in.)	8	8				
NUMBER OF PASSES	2	2				
PROBE DEPTH (in.)	0	0				
FIELD WET DENSITY (pcf)	109.8	109.8				
FIELD DRY DENSITY (pcf)	107.4	107.5				
COMPACTION (%)	95.2	95.3				
COMPACTION PASS/FAIL	PASS	PASS				
FIELD MOISTURE (%)	2.2	2.1				
MOISTURE PASS/FAIL	PASS	PASS				
LAB PROCTOR MDD	112.8	112.8				
PROCTOR TYPE (Mod./Stan.)	Modified	Modified				
SPECIFIED MIN. COMPACTION (%)	95.0	95.0				
LABORATORY OMC (%)	12.0	12.0				
SPECIFIED MOISTURE RANGE	N/A	N/A				
RETEST NUMBER	N/A	N/A				
REMARKS						

NOTES:
1. MDD denotes Maximum Dry Density.
2. OMC denotes Optimum Moisture Content.
3. Elevations and lift thicknesses are approximate.
4. N denote Northing, E denotes Easting, and Z denotes elevation. Coordinates given by Bluff City Construction.

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)

Date: 8/13/24 Test No: 7

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams

-Weight of cone/jar aperatus with sand = (W) in grams 6794.000 grams

-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_s = 1175.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand (**W_2**) 4200.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 1021.000 grams

Volume of Excavation = 667.320 cm^3

Wet Density of Excavated Soil W_W = 1760.774 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 1150.000 grams

- Moisture Content of sample = 2.128 %

Soil Dry Density = 1724.091 **kg/m^3**

***Soil Dry Unit Wt. = 107.58 **lb/ft^3** *** measured in force (lb/ft^3)

DAILY FIELD REPORT

Date: 08/14/2024 (Wednesday)
Report No.: 04-081424

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Mostly Clear
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	61-82

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT[(1)]

Work performed since CEC representative's last site visit? [(1)] ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **4 PM**

- Observed BCC place and compact 3rd lift of structural fill.
  - Structural fill was compacted with a Bomag BW 211D
  - Pre-compaction thickness of the 3rd lift was 9" and compacted thickness was 8".
  - Structural fill was conditioned with water and rolled with the compaction equipment two times.
  - Graded center line trench with skid steer.
  - Performed nuclear density testing on 3rd lift of structural fill with adequate results. See attachment for report.
  - Performed sand cone test at the end of the day. See attached report.
- BCC restaged all drainage layer membranes.
- BCC prepared site for overnight rain. Constructed wind rows along center trench and staged pumps in sump area to pump out any water the following day.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- 23 rolls of membrane were to be delivered, per S&L.

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Structural fill grading being adjusted by BCC. Approximate 1.1' drop in elevation.

ATTACHMENTS

- Field Density Test Report
- Sand Cone Test Reports

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-SF-4 Structural fill sample

PHOTOGRAPHS

Photo 1: Staging area for liners.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Photo 2: Placing 3rd lift of structural fill.

Photo 3: View of the center trench.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/14/2024 CEC MANAGER: Dean Jones DATE: 08/15/2024

This document is draft until reviewed and approved by a Project Manager

DAILY FIELD REPORT

Date: 08/14/2024 (Wednesday)
Report No.: 04-081424

Civil & Environmental Consultants, Inc.

NUCLEAR COMPACTION TEST DATA (ASTM D6938)

PROJECT NAME: Powerton Bypass Basin Retrofit
PROJECT NUMBER: 343-014
CEC TECHNICIAN: Derek Dorsz
GAUGE NUMBER: 27636
CONTRACTOR: Bluff City Construction

STANDARD COUNTS:
DENSITY 951 **% DEVIATION** 0.21 **±1% PASSING**
MOISTURE 611 **% DEVIATION** 0.33 **±2% PASSING**

TEST NUMBER	9	10	11	12		
LOCATION	N: 1411884.9 E: 2432838.2	N: 1411988.3 E: 2432835.4	N: 1412035.0 E: 2432908.0	N: 1411952.2 E: 2432885.2		
ELEVATION OR LIFT NUMBER	Lift 3 Z: 458.2	Lift 3 Z: 458.7	Lift 3 Z: 458.6	Lift 3 Z 458.1		
LIFT THICKNESS (in.)	8	8	8	8		
NUMBER OF PASSES	2	2	2	2		
PROBE DEPTH (in.)	0	0	0	0		
FIELD WET DENSITY (pcf)	110.4	111.1	110.7	113.8		
FIELD DRY DENSITY (pcf)	107.2	107.7	107.9	110.7		
COMPACTION (%)	95.0	95.5	95.7	98.2		
COMPACTION PASS/FAIL	PASS	PASS	PASS	PASS		
FIELD MOISTURE (%)	3.0	3.1	2.6	2.8		
MOISTURE PASS/FAIL	PASS	PASS	PASS	PASS		
LAB PROCTOR MDD	112.8	112.8	112.8	112.8		
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified	Modified		
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0	95.0		
LABORATORY OMC (%)	12.0	12.0	12.0	12.0		
SPECIFIED MOISTURE RANGE	N/A	N/A	N/A	N/A		
RETEST NUMBER	N/A	N/A	N/A	N/A		
REMARKS						

NOTES:
1. MDD denotes Maximum Dry Density.
2. OMC denotes Optimum Moisture Content.
3. Elevations and lift thicknesses are approximate.
4. N denote Northing, E denotes Easting, and Z denotes elevation. Coordinates given by Bluff City Construction.

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)

Date: 8/14/24 Test No: 11

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams

-Weight of cone/jar aperatus with sand = (W) in grams 4538.000 grams

-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 810.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand (**W_2**) 2274.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 691.000 grams

Volume of Excavation = 451.634 cm^3

Wet Density of Excavated Soil W_W = 1793.488 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 790.000 grams

- Moisture Content of sample = 2.469 %

Soil Dry Density = 1750.271 **kg/m^3**

***Soil Dry Unit Wt. = 109.22 **lb/ft^3** *** measured in force (lb/ft^3)

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Rain 0.8” / Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	69-76

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor’s Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC’S LAST VISIT(1)

Work performed since CEC representative’s last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC’s last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **4 PM**

- Observed BCC clear and grub areas along the south and west perimeter top of slope where future anchor trench is to be constructed.
- Spoils stored in eastern storage area awaiting direction from NRG.
- No tears on existing liner were observed.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: Cleared anchor trench area on west side.

Photo 2: Cleared anchor trench area on south side.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/15/2024 CEC MANAGER: Dean Jones DATE: 08/16/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

DAILY FIELD REPORT

Date: 08/16/2024 (Friday)
Report No.: 06-081624

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Rain 2.0"/Partly Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	68-83

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	NRG/Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **11 AM**

- No work today due to recent rain event.
- BCC pumped standing water out of sump area.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- Samples dropped off at lab for conformance testing.

PHOTOGRAPHS

Photo 1: Structural fill after rain event.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/16/2024 CEC MANAGER: Dean Jones DATE: 08/19/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

DAILY FIELD REPORT

Date: 08/19/2024 (Monday)
Report No.: 07-081924

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Partly Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	63-79

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **4PM**

- Placement and compaction structural fill inside inlet structure and placement of the 4th lift within the bottom of the basin.
    - Verified and approved of lift thickness within inlet structure.
- Fusion welded 6" HDPE perforated leachate collection pipe and staged for future installation.
- Placed lower sand cushion layer on west and south sides of basin.
- Pumped standing water out from concrete outlet structure.
- Unloaded and staged GCL rolls.
    - Unloading and staging area were observed to be acceptable.
    - Rolls delivered were rolls within approved submittal.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

Civil & Environmental Consultants, Inc.

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

PHOTOGRAPHS

Photo 1: Structural fill inside concrete inlet structure.

Photo 2: Lower sand cushion layer on west side.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Photo 3: Staged GCL rolls.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/19/2024 CEC MANAGER: Dean Jones DATE: 08/20/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

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Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Partly Cloudy
ISSUED DATE:	07/12/24	TEMP. RANGE (°F)	63-79

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: Enter Date CEC's last site visit

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7 AM**	SITE DEPARTURE: **4PM**

- Watered and compacted 4th lift of structural fill.
  - Verified thickness and performed compaction testing on lift.
- Graded structural fill on access ramp into basin.
- Electrofusion coupled 12" HDPE riser pipe.
- Excavated anchor trench on south, west, and northwest edges of basin.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Clean Air and Water Systems (CAAWS) will be onsite tomorrow.
- Flowable fill scheduled for Thursday, 8/22/24.

ATTACHMENTS

- Field Density Test Report and Sand Cone Test Reports

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-SF-5 Structural fill sample taken.
- PBBR-CAB-1 Coarse aggregate bedding sample taken.

PHOTOGRAPHS

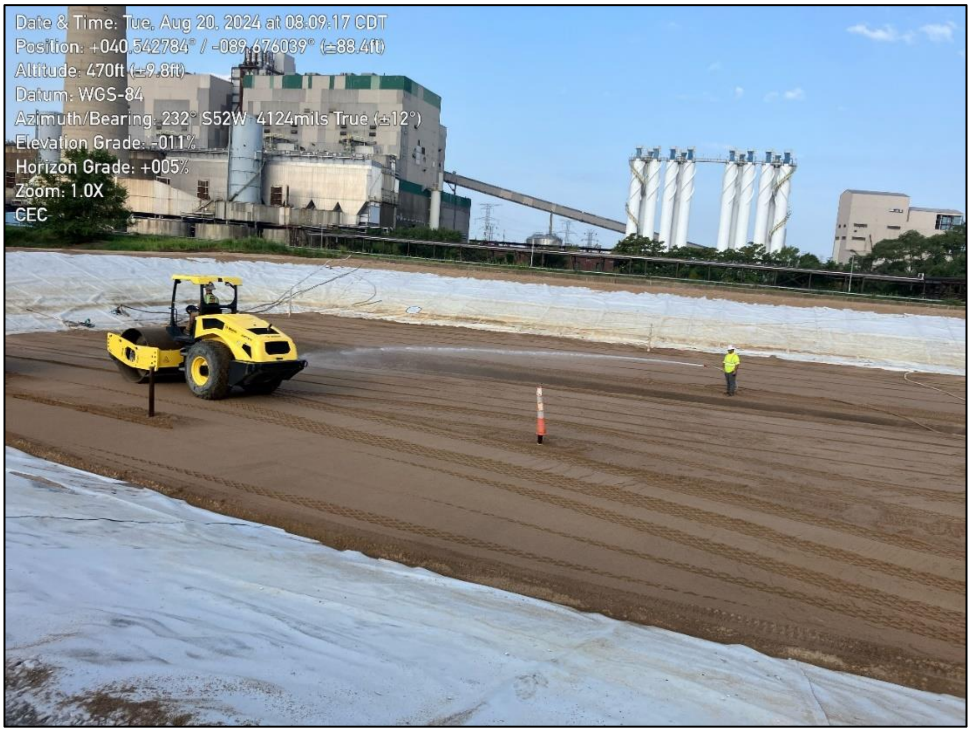

Photo 1: Hydrating and compacting 4th lift of structural fill.

Photo 2: Excavated anchor trench on west side.

∗ No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

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Photo 3: Electrofusion coupler on 12" HDPE pipe

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/20/2024 CEC MANAGER: Dean Jones DATE: 08/21/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

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Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/21/24	TEMP. RANGE (°F)	53-75

PERSONNEL

FIELD REP(S):	Derek Dorsz, Alexander Bush	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt
CONTRACTOR:	Clean Air and Water Systems (CAAWS)	SUPERVISOR:	Andy Khamarlorm
CONTRACTOR:	Otto Baum Clean Air and Water Systems (CAAWS)	SUPERVISOR: Supervisor:	

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT[(1)]

Work performed since CEC representative's last site visit? [(1)] ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Tuesday, August 20, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **5:48 PM**

- BCC graded structural fill on access ramp into basin.
- BCC surveyed the access ramp into the basin and central trench.
- BCC had removed water from the south end of the central trench using a water pump with a standard garden hose.
- CAAWS foreman (Andy) had inspected and approved of the bypass basin subgrade.
- CAAWS had prepared for liner and GCL deployment by filling sandbags to weigh down deployed GCL and geomembrane liner.
- CAAWS crew started deploying GCL and geomembrane panels down the central trench, and south slopes within the bypass basin using a skid steer equipped with a pully system positioned along the roadway north of the bypass basin.
- CAAWS had deployed 22 panel sections of GCL throughout the workday. Rolls used for deployment included rolls # LL-23-2024-172, LL-23-2024-163, LL-23-2024-158, LL-23-2024-177, LL-23-2024-169, LL-23-2024-165, LL-23-2024-171, LL-23-2024-174, and LL-23-2024-156.
- CAAWS crew had sealed GCL seems using granular bentonite and a blowtorch.
- CAAWS had deployed 9 panel sections of geomembrane 60 mil HDPE liner. Using rolls # 3119002715, and 3118002716.

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- BCC had placed CA-7 stone within the central trench before placing and surveying a perforated pipe in the central trench.
- CAAWS crew had fusion welded and air tested Panels P-1 through P-9.
- Otto Baum applied Recrete 20 to inlet structure and grouted pipe at the outlet structure.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- CAAWS arrived on site around 7 am and began NRG safety training.
- Flowable fill scheduled for Thursday, 8/22/24.

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- CAAWS crew had removed two 2-foot sections from two select rolls of GCL liner for laboratory testing.

PHOTOGRAPHS

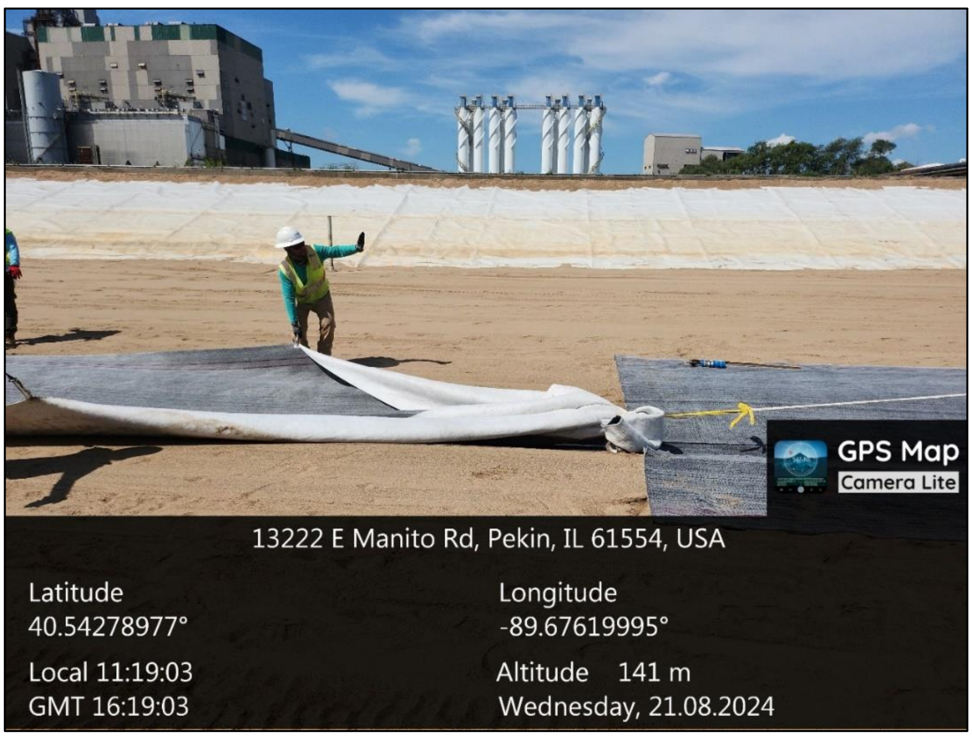

Photo 1: shows CAAWS crew deploying GCL liner in the central trench within the bypass basin.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

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Photo 2: Photo shows CAAWS crew fusion welding geomembrane panels along the southwest slope while deploying GCL to the southeast slopes.

Photo 3: CAAWS crew performing air testing for seamed panels.

APPROVED BY

FIELD REP: Alexander Bush DATE: 08/21/2024 CEC MANAGER: Dean Jones DATE: 08/23/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 08/22/2024 (Thursday)
Report No.: 10-082224

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/22/24	TEMP. RANGE (°F)	52-77

PERSONNEL

FIELD REP(S):	Dean Johns, Alexander Bush, Saurabhh Saawant	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt
CONTRACTOR:	Clean Air and Water Systems (CAAWS)	SUPERVISOR(S):	Andy Khamarlorm

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Wednesday, August 21, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **6:30 AM**	SITE DEPARTURE: **5:05 PM**

- BCC had placed a one-foot diameter perforated pipe into the south end of the bypass basin that ran up and to the east on the south face slope.
- BCC had placed stone over the perforated pipe placed within the central trench.
- CAAWS started detail work by patching air test locations along the southern slopes of the bypass basin.
- CAAWS vac-tested patched air test locations and stick-up locations on the south end of the bypass basin.
- CAAWS removed, tested and patched 2 destructive test from panel seams P3/P2 and P7/P1. Both tests passed.
- CAAWS bolting and bracing GCL and Geomembrane to the southeast concrete structure.
- Otto Baum filled the existing pipe along the northern slope with flowable fill.
- BCC started excavation of the anchor trench along the southeast corner.
- CAAWS had deployed 19 panel sections of GCL throughout the workday. Rolls used for deployment included rolls # LL-23-2024-152, LL-23-2024-166, LL-23-2024-153, LL-23-2024-159, and LL-23-2024-154
- CAAWS sealed GCL seems using granular bentonite and a blowtorch.
- CAAWS deployed 8 panel sections of 60 mil HDPE liner. Using rolls # 3119002716, and 3118002717.
- CAAWS fusion welded and air tested Panels P-10 through P-17.

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UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Meet with Tom from S&L to discuss two locations along the southeast and northwest concrete structures that had no room above the existing bracing system to bolt the new GCL and geomembrane liner system.
- Spoke with Tom regarding the air content within the flowable fill during field testing. Flowable fill was accepted.

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- CAAWS crew had removed two destructive test samples for field and laboratory testing.

PHOTOGRAPHS

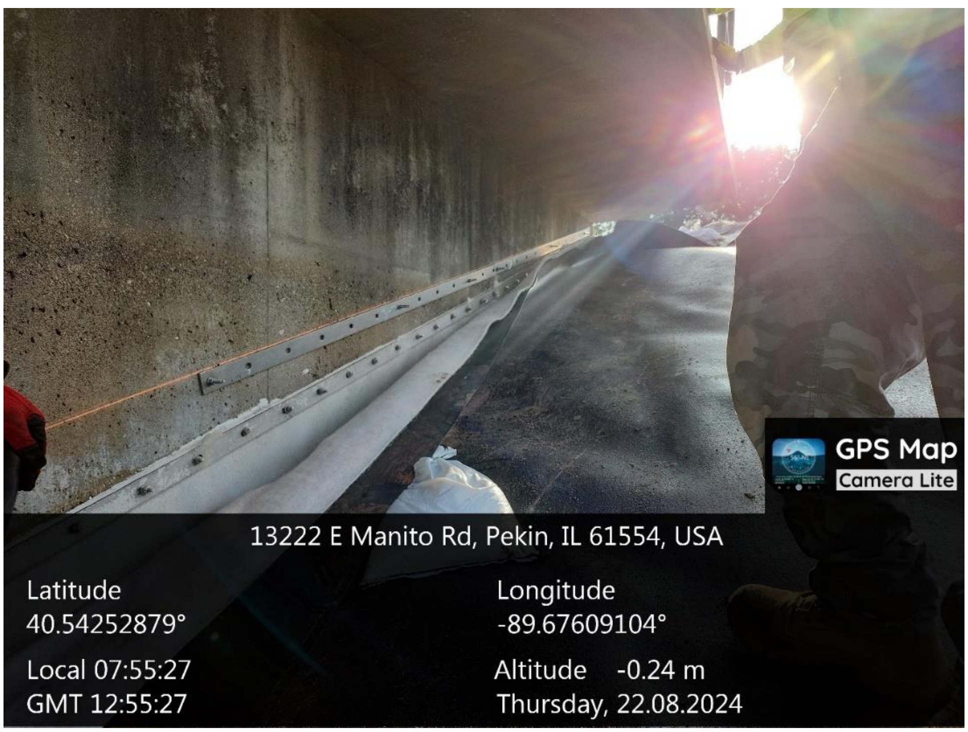

Photo 1: CAAWS crew installing bracing along the southeast concrete structure to secure the GCL and geomembrane to the structure.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

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Photo 2: photo shows CAAWS performing field testing on destructive sample D-2.

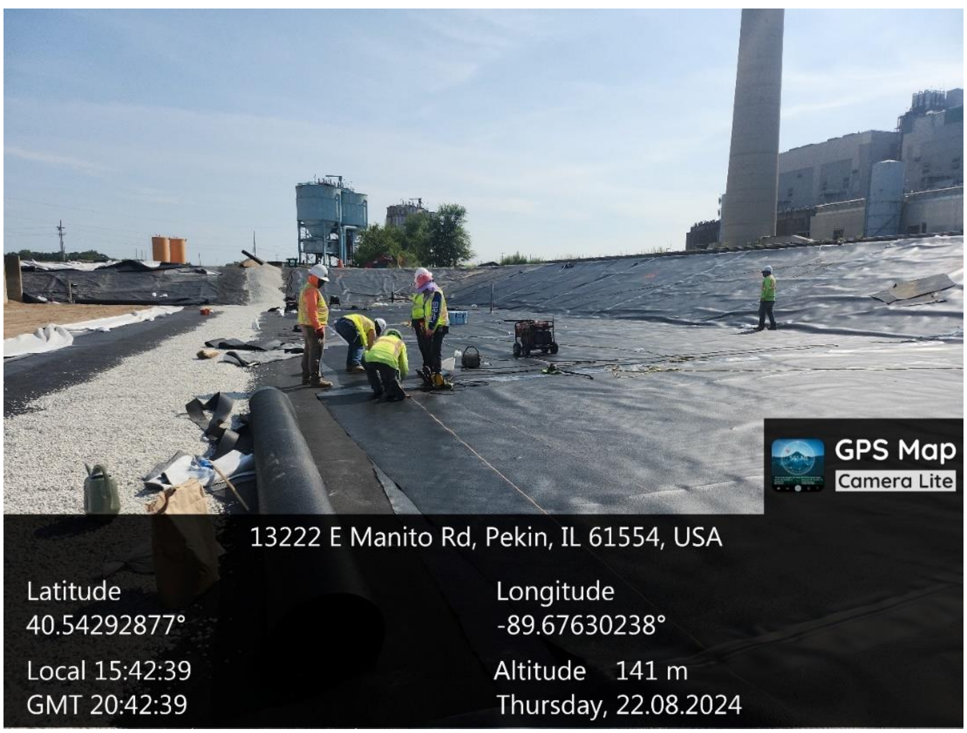

Photo 3: CAAWS preparing west side slope panels to be fusion welded to the center trench panel (P-1). Photo also shows the central trench pipe systems orientation to the east.

APPROVED BY

FIELD REP:	Alexander Bush	DATE:	08/22/2024	CEC MANAGER:	Dean Jones	DATE:	08/23/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 08/23/2024 (Friday)
Report No.: 11-082324

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/23/24	TEMP. RANGE (°F)	55-82

PERSONNEL

FIELD REP(S):	Alexander Bush, Saurabhh Saawant	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt
CONTRACTOR:	Clean Air and Water Systems (CAAWS)	SUPERVISOR(S):	Andy Khamarlorm

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Thursday, August 22, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **5:48 PM**

- CAAWS started detail work by patching air test locations along the western slopes of the bypass basin.
- CAAWS vac-tested patched air test locations and stick-up locations on the western half of the bypass basin.
- CAAWS collected, tested and patched six destructive test samples throughout the day from panel seams P-21/P-18, P-15/P-14, P-33/P-23, P-34/P-35, and from repair R-10 along P-1 and from repair R-34 and P-18. Each test passed.
- BCC placed sand over the exposed pipe opening along the northeast slope and northern roadway of the bypass basin.
- BCC assisted with GCL and Geomembrane deployment.
- CAAWS deployed 36 panel sections of GCL throughout the workday. Rolls used for deployment included rolls # LL-23-2024-156, LL-23-2024-160, LL-23-2024-173, LL-23-2024-170, LL-23-2024-175, LL-23-2024-155, LL-23-2024-157, LL-23-2024-164, LL-23-2024-168, LL-23-2024-161, LL-23-2024-176, and LL-23-2024-165.
- CAAWS sealed GCL seems using granular bentonite and a blowtorch.
- CAAWS deployed 18 panel sections of geomembrane 60 mil HDPE liner. Using rolls # 3119002717, 3119002714, and 3119002713.
- CAAWS fusion welded into position Panels P-18 through P-35.

Civil & Environmental Consultants, Inc.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- CAAWS removed six destructive test samples from the south end of the bypass basin for field and laboratory testing.

PHOTOGRAPHS

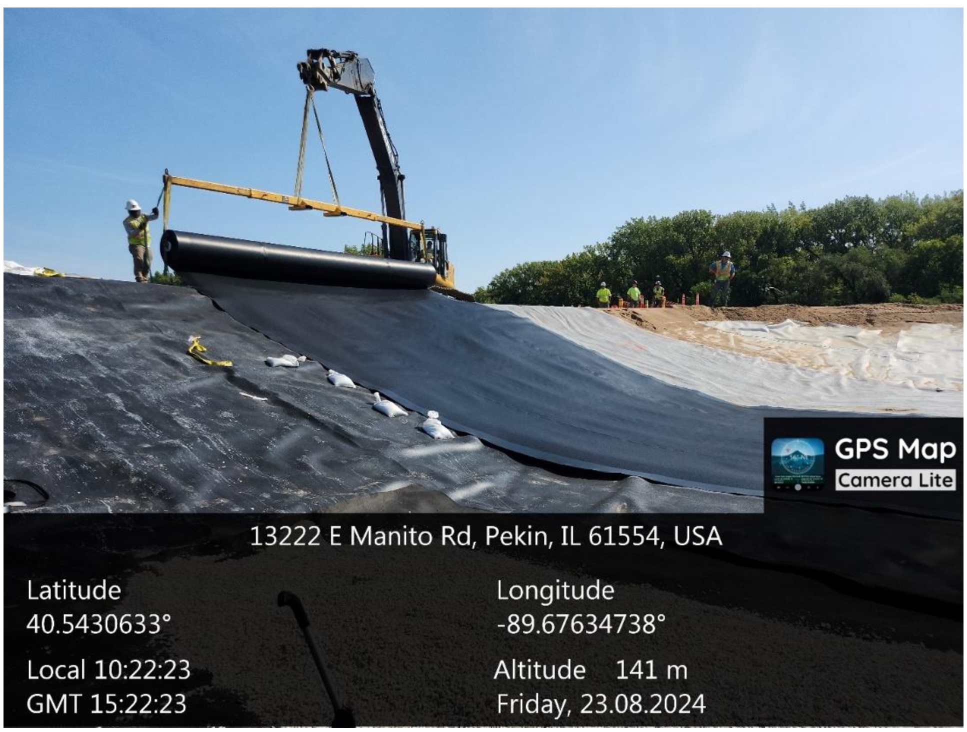

Photo 1: CAAWS crew deploying panel P-24 of geomembrane liner.

∗ No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

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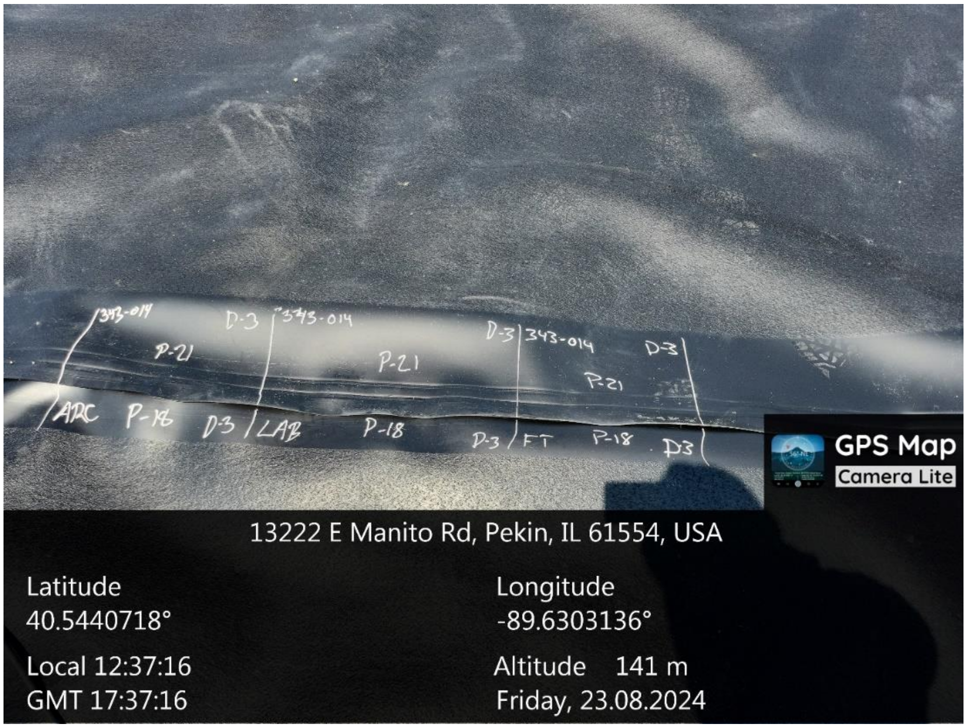

Photo 2: destructive sample D-3 laid out on panel seam P-21/P-18.

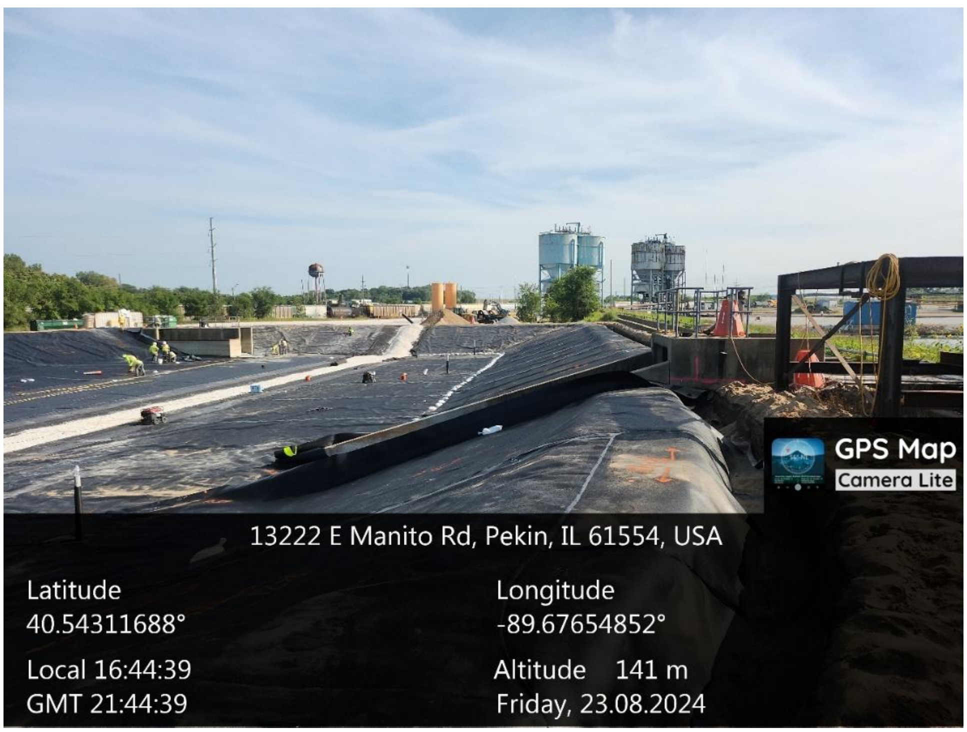

Photo 3: completion of GCL and geomembrane deployment within the bypass basin.

APPROVED BY

FIELD REP:	Alexander Bush	DATE:	08/23/2024	CEC MANAGER:	Dean Jones	DATE:	08/26/2024

This document is draft until reviewed and approved by a Project Manager

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

DAILY FIELD REPORT

Date: 08/24/2024 (Saturday)
Report No.: 12-082424

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/24/24	TEMP. RANGE (°F)	60-90

PERSONNEL

FIELD REP(S):	Alexander Bush	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Friday, August 23, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **5:48 PM**

- CAAWS crew had begun detail work in the morning by patching air test locations along the southeast slopes and floor of the bypass basin.
- CAAWS crew had vac-tested patched air test locations and stick-up locations on the eastern half of the bypass basin.
- CAAWS crew had finished attaching liner to the southeast concrete structure using steel bracing and bolts.
- CAAWS crew had silicon sealed the liner edge around the southeast concrete structure.
- CAAWS crew had begun attaching liner to the northwest concrete structure using steel bracing and bolts.
- CAAWS crew had silicon sealed the liner edge around the northwest concrete structure.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

a

PHOTOGRAPHS

Photo 1: shows CAAWS crew making repairs along the southeast basin floor.

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Photo 2: photo shows the completed liner edge attached to the south east concrete structure

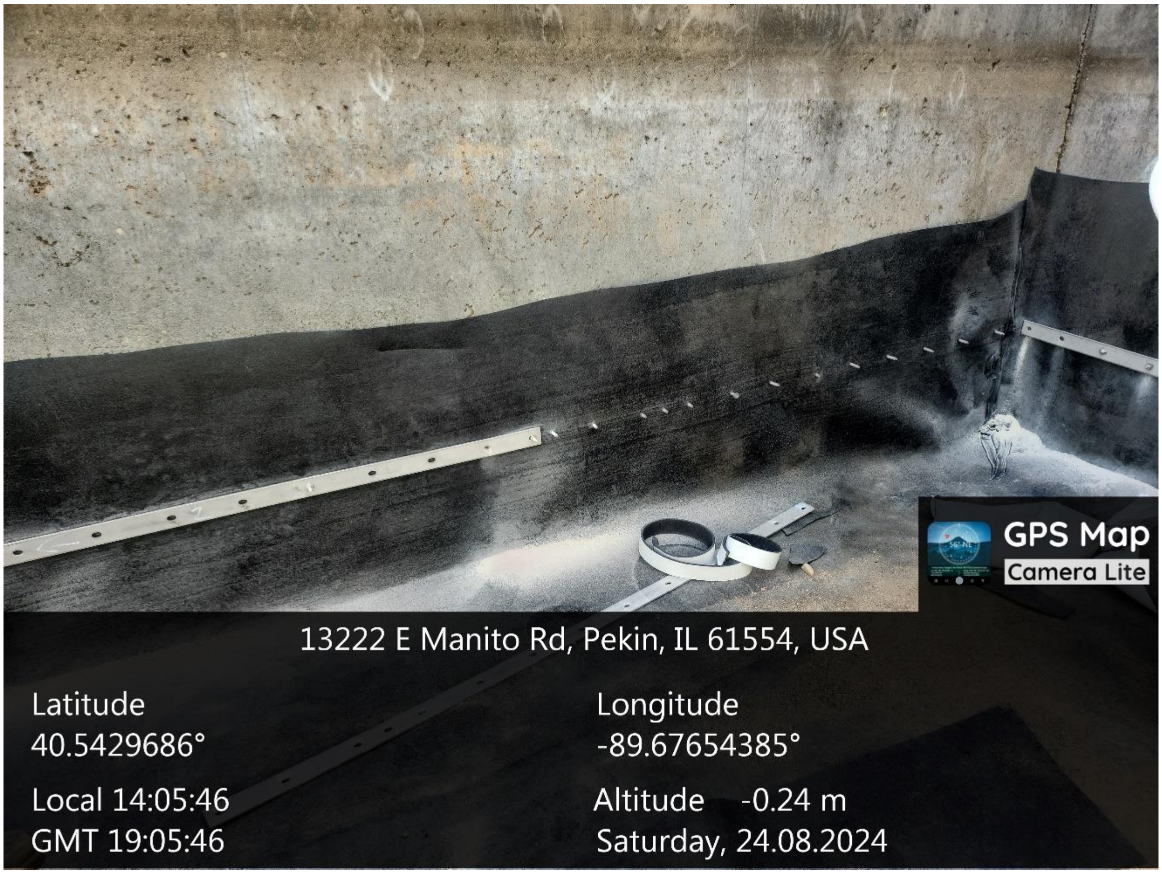

Photo 3: shows the CAAWS crew bolting the liner into position within the north west concrete inlet.

APPROVED BY

FIELD REP:	Alexander Bush	DATE:	08/23/2024	CEC MANAGER:	Draft Until Reviewed	DATE:	Date

This document is draft until reviewed and approved by a Project Manager

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* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/26/24	TEMP. RANGE (°F)	73-94

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt
CONTRACTOR:	Clean Air and Water Systems (CAAWS)	SUPERVISOR(S):	Andy Khamarlorm

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Sunday, August 25, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- CAAWS began deploying drainage geocomposite liner across the basin.
- CAAWS applied proper over lap of 4", zip tied the drainage geocomposite together, and heat bonded the fabric together over the grid.
- CAAWS completed attaching liner to the inlet concrete structure using steel bracing and bolts.
- CAAWS silicon sealed the liner edge inlet the northwest concrete structure.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

PHOTOGRAPHS

Photo 1: shows CAAWS crew deploying drainage geocomposite.

Photo 2: shows the CAAWS crew deploying geocomposite and installing batten strips.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Civil & Environmental Consultants, Inc.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/26/2024 CEC MANAGER: Dean Jones DATE: 028/28/24

This document is draft until reviewed and approved by a Project Manager

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/26/24	TEMP. RANGE (°F)	73-97

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt
CONTRACTOR:	Clean Air and Water Systems (CAAWS)	SUPERVISOR(S):	Andy Khamarlorm

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Monday, August 26, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- CAAWS completed deploying drainage geocomposite liner across the basin.
- CAAWS completed liner connections at existing marker posts.
- CAAWS completed placing the liner system in the anchor trench.
- BCC completed excavation of the anchor trench along the eastern and northern perimeter.
- BCC completed 3 lifts of backfill within the anchor trench along the south, east, and north perimeter.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- Field Density Test Report
- Sand Cone Test Reports

Civil & Environmental Consultants, Inc.

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

PHOTOGRAPHS

Photo 1: shows BCC excavating anchor trench.

Photo 2: shows the CAAWS crew placing liner inside anchor trench.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Photo 3: shows BCC compacting the anchor trench backfill.

.APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/27/2024 CEC MANAGER: Dean Jones DATE: 08/28/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 08/27/2024 (Tuesday)
Report No.: 14-082724

Civil & Environmental Consultants, Inc.

NUCLEAR COMPACTION TEST DATA (ASTM D6938)

PROJECT NAME: Powerton Bypass Basin Retrofit   **PROJECT NUMBER:** 343-014
CEC TECHNICIAN: Derek Dorsz   **GAUGE NUMBER:** 27636
CONTRACTOR: Bluff City Construction

STANDARD COUNTS:

DENSITY	954	**%**	**DEVIATION**	0.73	**±1% PASSING**
MOISTURE	613	**%**	**DEVIATION**	0.33	**±2% PASSING**

TEST NUMBER	17	18	19	20	21	22
LOCATION	N: 1411829.1 E: 2432881.7	N: 1411992.6 E: 2432965.1	N: 412100.8 E: 2432858.7	N: 1411829.1 E: 2432881.7	N: 1411992.6 E: 2432965.1	N: 1412100.8 E: 2432858.7
ELEVATION OR LIFT NUMBER	Lift 1 Z: 465.3	Lift 1 Z: 465.6	Lift 1 Z: 466.1	Lift 2 Z: 465.8	Lift 2 Z: 466.1	Lift 2 Z: 466.6
LIFT THICKNESS (in.)	6	6	6	6	6	6
NUMBER OF PASSES	4	4	4	4	4	4
PROBE DEPTH (in.)	0	0	0	0	0	0
FIELD WET DENSITY (pcf)	131.0	131.6	131.5	130.2	131.5	132.0
FIELD DRY DENSITY (pcf)	113.0	113.5	114.2	114.3	114.6	114.7
COMPACTION (%)	95.1	95.5	96.1	96.2	96.5	96.5
COMPACTION PASS/FAIL	PASS	PASS	PASS	PASS	PASS	PASS
FIELD MOISTURE (%)	13.7	13.8	13.2	12.2	12.9	13.1
MOISTURE PASS/FAIL	PASS	PASS	PASS	PASS	PASS	PASS
LAB PROCTOR MDD	118.8	118.8	118.8	118.8	118.8	118.8
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified	Modified	Modified	Modified
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0	95.0	95.0	95.0
LABORATORY OMC (%)	13.0	13.0	13.0	13.0	13.0	13.0
SPECIFIED MOISTURE RANGE	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0
RETEST NUMBER	N/A	N/A	N/A	N/A	N/A	N/A
REMARKS						

Civil & Environmental Consultants, Inc.

TEST NUMBER	23	24	25			
LOCATION	N: 1411829.1 E: 2432881.7	N: 1411992.6 E: 2432965.1	N: 1412100.8 E: 2432858.7			
ELEVATION OR LIFT NUMBER	Lift 3 Z: 466.3	Lift 3 Z: 466.6	Lift 3 Z: 467.1			
LIFT THICKNESS (in.)	6	6	6			
NUMBER OF PASSES	4	4	4			
PROBE DEPTH (in.)	0	0	0			
FIELD WET DENSITY (pcf)	133.2	132.9	133.2			
FIELD DRY DENSITY (pcf)	115.2	114.8	115.2			
COMPACTION (%)	97.0	96.6	97.0			
COMPACTION PASS/FAIL	PASS	PASS	PASS			
FIELD MOISTURE (%)	13.5	13.6	13.5			
MOISTURE PASS/FAIL	PASS	PASS	PASS			
LAB PROCTOR MDD	118.8	118.8	118.8			
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified			
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0			
LABORATORY OMC (%)	13.0	13.0	13.0			
SPECIFIED MOISTURE RANGE	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0			
RETEST NUMBER	N/A	N/A	N/A			
REMARKS						

NOTES:

1. MDD denotes Maximum Dry Density.
2. OMC denotes Optimum Moisture Content.
3. Elevations and lift thicknesses are approximate.
4. N denote Northing, E denotes Easting, and Z denotes elevation. Coordinates given by Bluff City Construction.

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)
Date: 8/27/24 Test No: 25

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) = 1573.000 grams

-Weight of cone/jar aperatus with sand = (W) in grams 6597.000 grams

-Enter pre-determined density of sand in jar = 1.530 g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 1702.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand (**W_2**) 3820.000 grams + weight of sand in the full cone (**W_1**) and subtract from weight of full jar (**W**): **W - (W_1+W_2)** 1204.000 grams

Volume of Excavation = 786.928 cm^3

Wet Density of Excavated Soil W_W = 2162.841 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D = 1390.000 grams

- Moisture Content of sample = 18.331 %

Soil Dry Density = 1827.783 **kg/m^3**

***Soil Dry Unit Wt. = 114.05 **lb/ft^3** *** measured in force (lb/ft^3)

DAILY FIELD REPORT

Date: 08/28/2024 (Wednesday)
Report No.: 15-082824

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/26/24	TEMP. RANGE (°F)	71-88

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Tuesday, August 27, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC completed backfill of anchor trench along the west perimeter.
- BCC installed upper sand cushion layer along the west perimeter and northwest corner of basin.
- BCC pumped water from within the basin from prior night's rain, approximately 0.7".

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- Field Density Test Report
- Sand Cone Test Reports

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

PHOTOGRAPHS

Photo 1: shows water within basin before being pumped out.

Photo 2: shows the BCC compacting the anchor trench backfill.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

Photo 3: shows the sand cushion layer on the west perimeter.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/28/2024 CEC MANAGER: Dean Jones DATE: 08/29/2024

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DAILY FIELD REPORT

Date: 08/28/2024 (Wednesday)
Report No.: 15-082824

Civil & Environmental Consultants, Inc.

NUCLEAR COMPACTION TEST DATA (ASTM D6938)

PROJECT NAME: Powerton Bypass Basin Retrofit **PROJECT NUMBER:** 343-014
CEC TECHNICIAN: Derek Dorsz **GAUGE NUMBER:** 27636
CONTRACTOR: Bluff City Construction

STANDARD COUNTS:

DENSITY	954	**%**	**DEVIATION**	0.73	**±1% PASSING**
MOISTURE	613	**%**	**DEVIATION**	0.33	**±2% PASSING**

TEST NUMBER	26	27	28			
LOCATION	N: 1411942.7 E: 2432791.2	N: 1411942.7 E: 2432791.2	N: 1411942.7 E: 2432791.2			
ELEVATION OR LIFT NUMBER	Lift 1 Z: 466.2	Lift 2 Z: 466.7	Lift 3 Z: 467.2			
LIFT THICKNESS (in.)	6	6	6			
NUMBER OF PASSES	4	4	4			
PROBE DEPTH (in.)	0	0	0			
FIELD WET DENSITY (pcf)	135.6	135.7	135.9			
FIELD DRY DENSITY (pcf)	115.6	114.9	114.5			
COMPACTION (%)	97.3	96.7	96.4			
COMPACTION PASS/FAIL	PASS	PASS	PASS			
FIELD MOISTURE (%)	14.7	15.3	15.7			
MOISTURE PASS/FAIL	PASS	PASS	PASS			
LAB PROCTOR MDD	118.8	118.8	118.8			
PROCTOR TYPE (Mod./Stan.)	Modified	Modified	Modified			
SPECIFIED MIN. COMPACTION (%)	95.0	95.0	95.0			
LABORATORY OMC (%)	13.0	13.0	13.0			
SPECIFIED MOISTURE RANGE	10.0 – 16.0	10.0 – 16.0	10.0 – 16.0			
RETEST NUMBER	N/A	N/A	N/A			
REMARKS						

NOTES:
1. MDD denotes Maximum Dry Density.
2. OMC denotes Optimum Moisture Content.
3. Elevations and lift thicknesses are approximate.
4. N denote Northing, E denotes Easting, and Z denotes elevation. Coordinates given by Bluff City Construction.

Civil & Environmental Consultants, Inc.

Sand Cone Analysis (Cannot be performed in soils with coarse aggregates)
Date: 8/28/24 Test No: 28

This method is using balance scales measuring mass **to determine unit weight**. If you are using digital scales or scales with springs for the force-measuring mechanism, use the "Pounds-Force" Tab.

Obtain Sample for Wet Density

- Excavate hole with large metal spoon or garden trowel that is 3 to 4" in diameter and 3 to 4 inches deep in order to obtain a sample of at least 500 grams (1.1 lbs).

- Fill the cone on the apparatus with the sand from the sandcone to detemine the weight of the sand in the cone.

-Weight of sand from full cone (W_1) in Pounds (grams) =	1573.000	grams
-Weight of cone/jar aperatus with sand = (W) in grams	6384.000	grams
-Enter pre-determined density of sand in jar =	1.530	g/cm^3

-Place base plate over excavated hole with hole in base plate in ceter of excavated hole.

-Weigh moist/wet soil from excavation W_S = 1430.000 grams

- Place cone (attached to sand jar) over hole and open valve.
- Turn Valve off and remove cone and base plate. If excavation is not full, spread sand evenly in excavation and repeat last step.

- Determine Volume of Hole Excavated.

- Weigh jar and remaining sand **(W_2)** 3795.000 grams + weight of sand in the full cone **(W_1)** and subtract from weight of full jar **(W)**: **W - (W_1+W_2)** 1016.000 grams

Volume of Excavation = 664.052 cm^3

Wet Density of Excavated Soil W_W = 2153.445 kg/m^3

Dry Density of Soil

- Place moist soil obtained from the excavation into pan for drying after weighing on the scale
- Place material in iron skillet over active burner and break apart the core so that it can be dried over the heat.
- Carefully remove dried material from skillet making sure to transfer all material into a tin or other aparatus to be weighed.

- Obtain weight in grams of dry soil W_D =	1198.000	grams
- Moisture Content of sample =	16.224	%

Soil Dry Density = 1852.844 **kg/m^3**

***Soil Dry Unit Wt. = 115.62 **lb/ft^3** *** measured in force (lb/ft^3)

DAILY FIELD REPORT

Date: 08/29/2024 (Thursday)
Report No.: 16-082924

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	72-86

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**
Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**
Date CEC representative was last onsite: **Wednesday, August 28, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- Dean Jones onsite.

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **2:00 PM**

- BCC began installing 12" sand filter layer at the ramp and basin.
- Verified lift thickness prior to compaction from other equipment.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- A geotextile is to be installed beneath the road surfacing aggregate within all areas to have regular traffic, which include the north and east sides of the basin.
- No work scheduled Friday, 8/30/2024 and Monday 9/2/2024.

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-Sand-1 collected from sand filter layer.

PHOTOGRAPHS

Photo 1: shows sand drainage layer being placed on the ramp into the basin.

Photo 2: shows the sand drainage layer being placed within the basin.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 08/29/2024 CEC MANAGER: Dean Jones DATE: 08/30/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 09/03/2024 (Tuesday)
Report No.: 17-090324

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Mostly Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	55-77

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**
Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**
Date CEC representative was last onsite: **Thursday, August 29, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC completed placing sand filter layer within the basin floor.
- BCC placed upper sand cushion layer along top perimeter of basin.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**
- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-Sand-2 collected from sand filter layer.

PHOTOGRAPHS

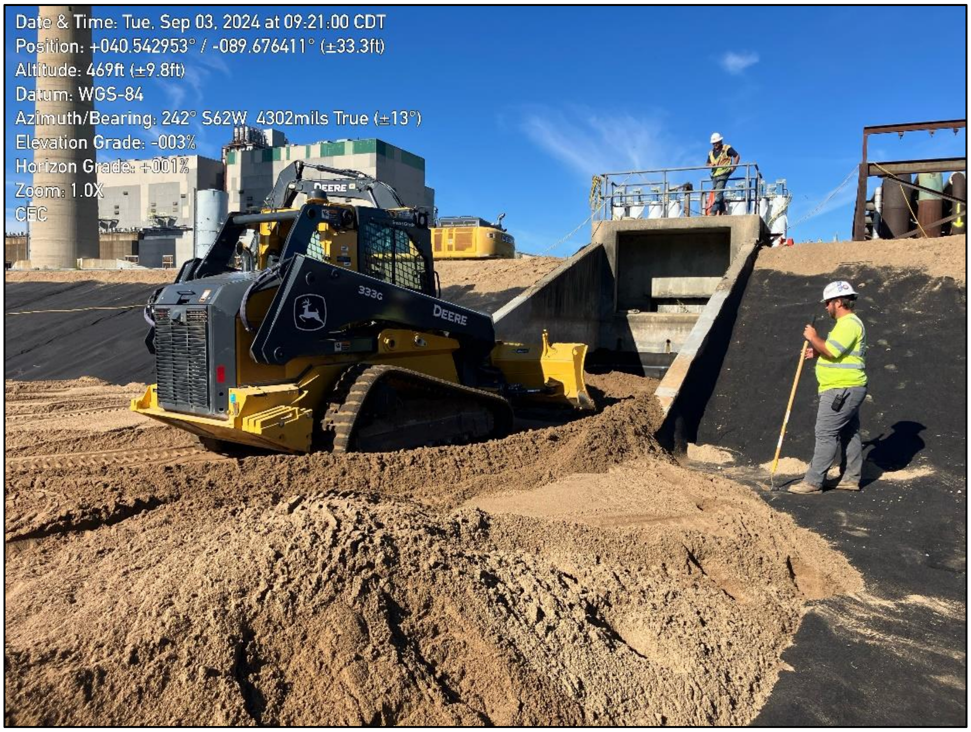

Photo 1: shows sand filter layer being installed within inlet structure.

Photo 2: shows the completed sand filter layer within basin.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/03/2024 CEC MANAGER: Dean Jones DATE: 09/04/2024

This document is draft until reviewed and approved by a Project Manager

NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

* No representations or warranties are made regarding the accuracy of the information generated by the Theodolite application, which is stamped on the photo, or the suitability of that information for any; legal, engineering, surveying, or other use or purpose.

DAILY FIELD REPORT

Date: 09/04/2024 (Wednesday)
Report No.: 18-090424

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	54-81

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT[(1)]

Work performed since CEC representative's last site visit? [(1)] ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Tuesday, September 3, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC completed installation of 6" protective warning layer within the basin floor.
- BCC began placing 6" sand filter layer along slopes of basin.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-PWL-1 collected from protective warning layer.

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: shows protective warning layer being installed within basin floor.

Photo 2: shows the sand filter layer being placed on slope of ramp.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/04/2024 CEC MANAGER: Dean Jones DATE: 09/05/2024

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Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	64-88

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Wednesday, September 4, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **3:00 PM**

- BCC continued to place 6" sand filter layer along eastern slope.
- BCC began to place 6" rip rap bedding layer along eastern and northern slopes.
- BCC electro coupled sump riser pipe.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Weekly Progress Meeting

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-RB-1 collected from rip rap bedding layer.

PHOTOGRAPHS

Photo 1: shows electro coupler on the 12" riser pipe.

Photo 2: shows rip rap bedding layer on northeast slope.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/05/2024 CEC MANAGER: Dean Jones DATE: 09/06/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 09/09/2024 (Monday)
Report No.: 20-090924

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	64-88

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**
Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**
Date CEC representative was last onsite: **Thursday, September 5, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC continued to place 6" sand filter layer along southern and western slopes.
- BCC began to place 6" rip rap bedding layer along southern and western slopes.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: shows placing sand filter layer along western slope.

Photo 2: shows placing of rip rap bedding layer on western slope.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/09/2024 CEC MANAGER: Dean Jones DATE: 09/10/2024

This document is draft until reviewed and approved by a Project Manager

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DAILY FIELD REPORT

Date: 09/10/2024 (Tuesday)
Report No.: 21-091024

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	64-88

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**
Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**
Date CEC representative was last onsite: **Monday, September 9, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC completed placement of 6" rip rap bedding layer.
- BCC installed woven geosynthetic fabric and 6" road surfacing on the basin ramp.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**
- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

PHOTOGRAPHS

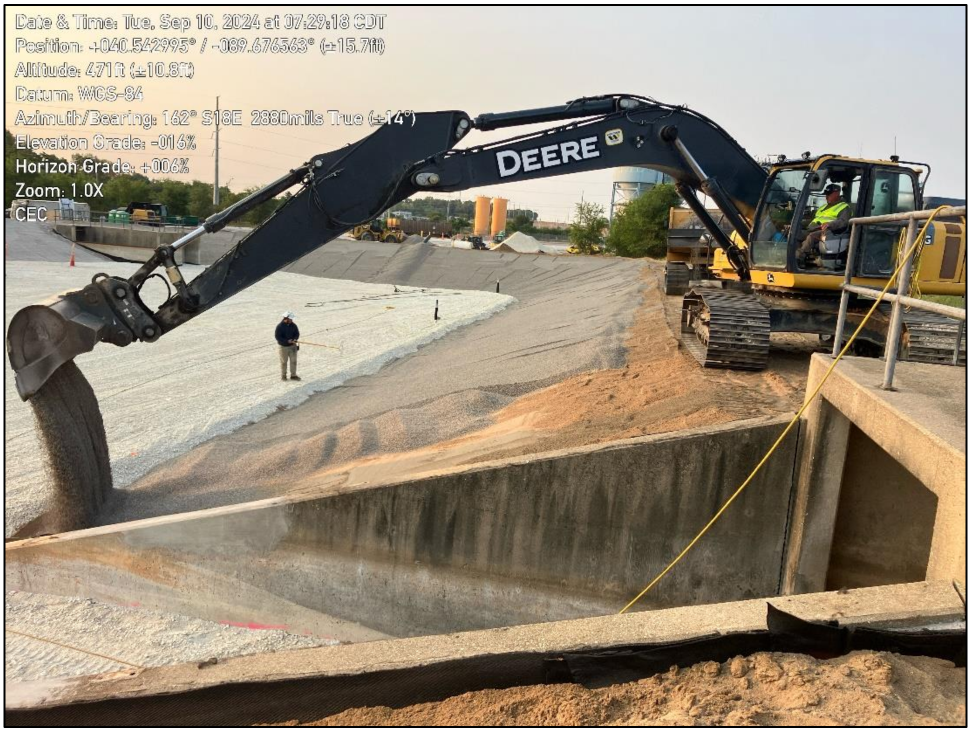

Photo 1: shows placing rip rap bedding along western slope.

Photo 2: shows placing of road surfacing on the basin's ramp.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/10/2024 CEC MANAGER: Dean Jones DATE: 09/11/2024

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Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	54-85

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Tuesday, September 10, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM** | SITE DEPARTURE: **4:00 PM**

- BCC placed 6" layer of rip rap along eastern, northern, and western slopes of the basin.
- BCC placed 6" layer of rip rap layer within the inlet structure.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- PBBR-RR-1 was collected from the rip rap material.

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: shows placing of rip rap along northern slope.

Photo 2: shows placing of rip rap along the western slope.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/11/2024 CEC MANAGER: Dean Jones DATE: 09/11/2024

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DAILY FIELD REPORT

Date: 09/12/2024 (Thursday)
Report No.: 23-091224

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	59-89

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT[(1)]

Work performed since CEC representative's last site visit? [(1)] ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Wednesday, September 11, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- Dean Jones onsite.

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **4:00 PM**

- BCC completed placement of 6" layer of rip rap along southern slope of the basin.
- BCC graded sand cushion layer near the southeast perimeter ramp and along the east perimeter for future road surfacing placement.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- Weekly progress meeting held.

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: shows placing of rip rap along southern slope.

Photo 2: shows grading of southeastern perimeter ramp.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/12/2024 CEC MANAGER: Dean Jones DATE: 09/13/2024

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NOTICE: Our firm's professionals are represented onsite solely to observe operations of the contractor identified to form opinions about the adequacy of those operations and to report those opinions to our client. The presence and activities of our field representative do not relieve the contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods operations and sequences of construction.

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DAILY FIELD REPORT

Date: 09/13/2024 (Friday)
Report No.: 24-091324

Civil & Environmental Consultants, Inc.

PROJECT INFORMATION

PROJECT NAME:	BYPASS BASIN RETROFIT CQA		
LOCATION:	Powerton Generating Station	CEC PROJECT NO:	343-014.0200
PLANS AND SPECS:	S&L Bypass Basin Retrofit Project	WEATHER:	Partially Sunny
ISSUED DATE:	08/19/24	TEMP. RANGE (°F)	63-79

PERSONNEL

FIELD REP(S):	Derek Dorsz	CEC PROJ. MANAGER(S):	Dean Jones
CLIENT:	Midwest Generation	CLIENT CONTACT(S):	Joe Kotas
CONTRACTOR:	Bluff City Construction (BCC)	SUPERVISOR(S):	Larry Hunt

SAFETY MEETINGS AND PARTICIPATION

Participation in Contractor's Tailgate Safety Meeting? ☐ **Yes** ☒ **No** *Vehicle Check Performed?* ☒ **Yes or** ☐ **No**

Plan for the Day Required (WSM 200.25): ☐ Yes (CLICK LINK BELOW) ☒ No

WORK PERFORMED SINCE CEC'S LAST VISIT(1)

Work performed since CEC representative's last site visit? (1) ☐ **Yes** ☒ **No**

Date CEC representative was last onsite: **Thursday, September 12, 2024**

(1) Critical work or work requiring continuous observation that has been completed without CEC representation being present onsite. CEC was not made aware that this work was being completed.

ONSITE REPRESENTATIVES PRESENT TODAY

- N/A

SUMMARY OF WORK OBSERVED, LOCATION, AND CONTRACTOR PERFORMING WORK

SITE ARRIVAL: **7:00 AM**	SITE DEPARTURE: **11:00 AM**

- BCC placed woven geosynthetic along the eastern and southern perimeters.
- BCC placed and compacted 6" layer of road surfacing along these areas.

UNEXPECTED, UNUSUAL, OR NONCONFORMING OBSERVATIONS (NEW / RESOLVED)

Unexpected, unusual, or nonconforming work observed? ☐ **Yes** ☒ **No**

- N/A

SUMMARY OF MEETINGS / DISCUSSIONS / PHONE CONVERSATIONS

- N/A

ATTACHMENTS

- N/A

DESCRIPTION OF SAMPLES TAKEN OR MATERIALS DELIVERED TO LAB

- N/A

Civil & Environmental Consultants, Inc.

PHOTOGRAPHS

Photo 1: shows placing of road surfacing along eastern perimeter road.

Photo 2: shows compacted road surfacing at the southeastern corner.

APPROVED BY

FIELD REP: Derek Dorsz DATE: 09/13/2024 CEC MANAGER: Dean Jones DATE: 09/13/2024

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APPENDIX F

FILL MATERIALS

APPENDIX F-1

PRE-CONFORMANCE TESTING RESULTS

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: **ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.**

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/2/2024

Report for Illinois Department of Transportation

MISTIC ID

Report By:
Company:

AGGREGATE GRADATION REPORT

Version: 2024_InitialInstall

Inspector No.:	940000000	Name: Joe Ragar	Date Sampled: 060724	Seq No:	008		
Mix Plant No.:		Name:		Contract No:		Job No.:	
Responsible Loc:	94	Lab: PL	Lab Name: R. A. Cullinan		Source Name: Hurley/Lowry		

SOURCE	MATL CODE	TYPE INSP	ORIGINAL ID	SPECIFICATION	SAMPLED FROM	WASH DRY	Load Out / Terminal	Ledge
51790-24	**027FA01**	**PRO**		**Std**	**SP**	**W**		0

SIEVE IN / MM		1	1/2 / 25	3/8 / 9.5	#4 / 4.75	#8 / 2.36	#10 / 2.0	#16 / 1.18	#30 / .6	#40 / .425	#50 / .3		#80 / .18			#100 / .15		#200 / .075
PASS %				**100**	**100**	**93**		**83**	**55**		**12**					**1**		**0.4**

%WASH - 200	PI RATIO	RESULT	REMARK
0.1		**APPR**	**Ledge -**

Insp. Quantity (tons)
0

SIEVE English	SIEVE Metric	Indiv. Wt. Retained	Accum Weights	Accum Passing	Pct Passing	Spec Min	Spec Max	Out Flag	Rounded Passing
3	75								
2.5	63								
2	50								
1.75	45								
1.5	37.5								
1	25								
3/4	19								
5/8	15.9								
1/2	12.5								
3/8	9.5				**100.0**	100	100		100
1/4	6.3								
#4	4.75	0.4	0.4	0.1	**99.9**	94	100		100
#8	2.36	38.9	39.3	7.3	**92.7**				93
#10	2								
#16	1.18	52.2	91.5	17.0	**83.0**	45	85		83
#30	0.6	148.7	240.2	44.7	**55.3**				55
#40	0.425								
#50	0.3	230.9	471.1	87.7	**12.3**	3	29		12
#80	0.18								
#100	0.15	58.7	529.8	98.6	**1.4**	0	10		1
#200	0.075	5.4	535.2	99.6	**0.4**	0	3		0.4
Pan		0.1							
Tot Dry Wt.		537.2	% Washed - 200		0.10				
Tot Wash Wt.		536.9							
Diff (-.075)		0.3	#200 / #40						

Orig. Wet Weight: 551.2 Moisture %: 2.61

(Mix Plant Only)

Lot:

Bin:

Tech/Insp: Joe Ragar

Tested By: Joe Ragar

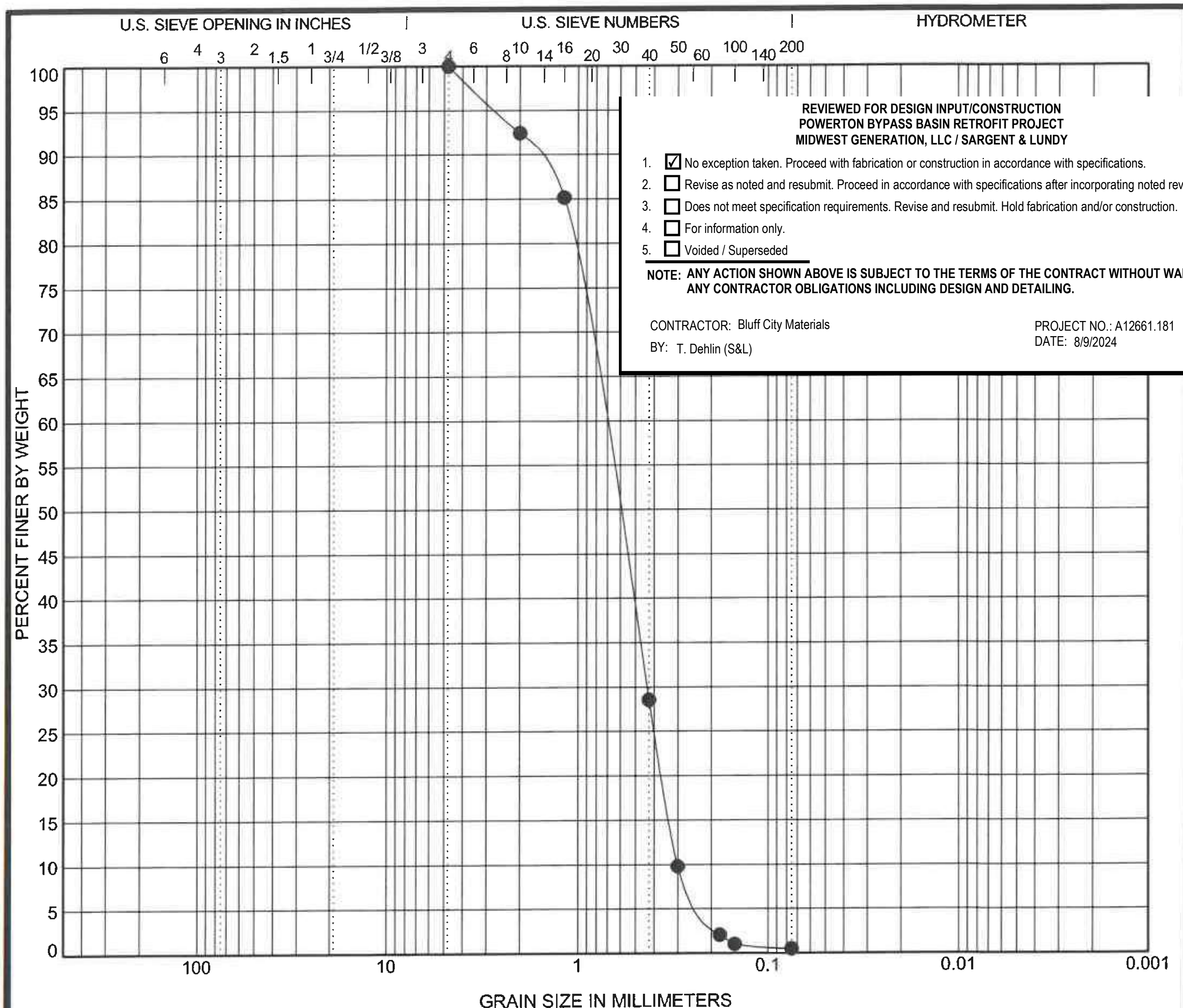
Agency: R. A. Cullinan

Validity Check OK

Copies to:

Report Date: July 11, 2024
/FOR DTY03504
MI504QC Excel Version 12.20-03.01.24

(This is a Field/Laboratory Report for MISTIC Input)



REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: T. Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/9/2024

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● **Sand Filter#1**	**0.0 ft**	**POORLY GRADED SAND(SP)**	**NP**	**NP**	**NP**	**0.84**	**2.49**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **Sand Filter#1**	**0.0 ft**	**4.75**	**0.749**	**0.436**	**0.301**	**0.0**	**99.5**	**0.5**	

WEI GRAIN SIZE USCS KE2453BC.GPJ US LAB.GDT 8/9/24

WEI SINCE 1982
Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: Powerton Generating Station

Location: Pekin, IL

Number: 12661-181

Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

ORGANIC CONTENT in SOILS by LOSS on IGNITION

ASTM D 2974, Method A

Client: Bluff City
Project: Powerton
WEI Job: Powerton
Type/Condition: Bulk
Testing Furnace Temp °C.: 440

Analyst Name: M. Ciapas
Date Tested: 8/6/2024

Sample No.	FA-1 S#3	FA-1 S#3			
Wet Soil + Tare	104.05	106.01			
Dry Soil + Tare	102.28	104.17			
Tare Mass	45.66	44.25			
w (%)	3.1	3.1			
Dry Soil + Tare	102.28	104.17			
Ash+ Tare	102.18	104.06			
Tare Mass	45.66	44.25			
Ash Content (%)	99.8	99.8			
Organic Content (%)	0.2	0.2			

8/7/2024 S&L Note: The sampled material is not CCR. "Ash content" does not mean CCR. In the context of ASTM D2974, the term "ash content" means "the percentage by dry weight of material remaining after an oven dry organic soil or peat is burned by a prescribed method." *See* ASTM D653.

Prepared By: [signature] 8/7/2024

Reviewed By: [signature] 8-7-24

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☐ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☑ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/7/2024

wang_bluffcity_fa1_s03_loi_20240807.xls

AASHTO ACCREDITATION PROGRAM

Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

ORGANIC CONTENT in SOILS by LOSS on IGNITION

ASTM D 2974, Method A

Client: Bluff City
Project: Powerton
WEI Job: Powerton
Type/Condition: Bulk
Testing Furnace Temp °C.: 440

Analyst Name: M. Ciapas
Date Tested: 8/1/2024

Sample No.	FA-1 S#1	FA-1 S#1	FA-1 S#2	FA-1 S#2	
Wet Soil + Tare	118.08	117.94	108.47	101.12	
Dry Soil + Tare	114.07	113.8	105.66	98.66	
Tare Mass	44.48	44.29	44.23	44.47	
w (%)	5.8	6.0	4.6	4.5	
Dry Soil + Tare	114.07	113.80	105.66	98.66	
Ash+ Tare	113.89	113.59	105.54	98.52	
Tare Mass	44.48	44.29	44.23	44.47	
Ash Content (%)	99.7	99.7	99.8	99.7	
Organic Content (%)	0.3	0.3	0.2	0.3	

8/7/2024 S&L Note:
The sampled material is not CCR. "Ash content" does not mean CCR. In the context of ASTM D2974, the term "ash content" means "the percentage by dry weight of material remaining after an oven dry organic soil or peat is burned by a prescribed method." *See* ASTM D653.

Prepared By: 8/1/2024

Reviewed By: 8/1/2024

n:\projects\2024\ka245344\working files\laboratory-field data-boring logs\ws_wang_bluffcity_lois_20240801.xls

AASHTO ACCREDITATION PROGRAM

Central Stone
46445 Sweetbay Lane Hannibal MO

IL DEPARTMENT OF TRANSPORTATION
AGGREGATE GRADATION REPORT

Inspector No:	960000000	Insp Name:		Date Sampled:	Thu, Aug 1, 2024	Sequence No:	001
Mix Plant No:		Mix Plant:				Source Name:	Central Stone @ FLORENCE CS33
Resp Loc:	96	Contract No:		Job Number:			
Lab:	PL	Lab Name:	Florence (CS33)			Source Location:	Hannibal, MO

Source Number	Material Code	Type Insp	Spec.	Sampled From	Wash Dry
51492-04	042CM07	PRO	22-1	SP	wash

CA	4	3	2.5	2	1.75	1.5	1.25	1	3/4	5/8	1/2	3/8	1/4	#4	#8	#16	#30	#40	#50	#100	#200
% Pass						100%		100%	98%	79%	43%	14%	4%	3%	2%	2%					1.6%

Wash 200	Test Result	Source Pile	Remarks
1.6	APPR		BARGE

Sieve (English)	Over Load	Individual Weight Retained	Accum. Weights	Accum. Percent Retained	Percent Retained	Percent Passing	Spec. Range	In/Out	OverLoad
4	12600								
3	12600								
2.5	10600								
2	8400								
1.75	7500								
1.5	6300	0.0		0.0	0.0	100.0	100-100		
1.25	5400								
1	4200	0.0		0.0	0.0	100.0	90-100		
3/4	3200	114.0		2.1	2.1	97.9			
5/8	2700	1000.0		20.8	18.7	79.2			
1/2	2100	1915.0		56.6	35.8	$\boxed{43.4}$	$\boxed{20-50}$		
3/8	1600	1568.0		85.9	29.3	14.1			
1/4	1100	537.0		95.9	10.0	4.1			
#4	800	69.0		97.2	1.3	2.8	0-10		
#8	470	29.0		97.7	0.5	2.3			
#16	470	6.0		97.9	0.1	2.1			
#30	470								
#40	470								
#50	470								
#100	470								
#200	470	29.0		98.4	0.5	1.6	0-2.5		
Pan	0	4.0		98.5	0.1	1.5			

Total Dry Wt.	5353.0
Total Wash Wt.	5268.0
Diff	85.0

% Washed 1.6

ight 0.0 Moisture %

8/7/2024 S&L Comment:
Per IDOT Standard Specs., Paragraph 1004.01(c), the acceptance criterion for CA7 is 30 to 60 percent passing the 1/2 in. sieve. Because this material has 43.4 percent passing the 1/2 in. sieve, it is acceptable.

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/7/2024

Tech/Ins

Tested Greg (James) Fletcher

Agency: Central Stone

Copies DISTRICT MATERIALS
MATERIALS ENGINEER
PRODUCER

Report Date: Thu, Aug 1, 2024
/FOR DTY03504
MI504QX
B1_Application Report ID:25136

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
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CONTRACTOR: Bluff City Materials — PROJECT NO.: A12661.181
BY: Tom Dehlin (S&L) — DATE: 8/19/2024

Date Received ______

MIDLAND STANDARD ENGINEERING & TESTING, INC.

410 Nolen Drive South Elgin, Illinois 60177 (847) 844-1895 office@msetinc.com

AGGREGATE ANALYSIS

PROJECT:	Powerton Generating Station	**TEST NO:**	02AC
LOCATION:	Pekin, IL	**DATE:**	8/14/24
CLIENT:	Wang Engineering	**OUR JOB NO.**	24650

CLASSIFICATION: IDOT CA07 Grey Crushed Limestone

SAMPLED BY: Wang

SOURCE: Central Stone

Wt. Before Wash ___ 5032.0 Wt. After Wash ___ 4877.2

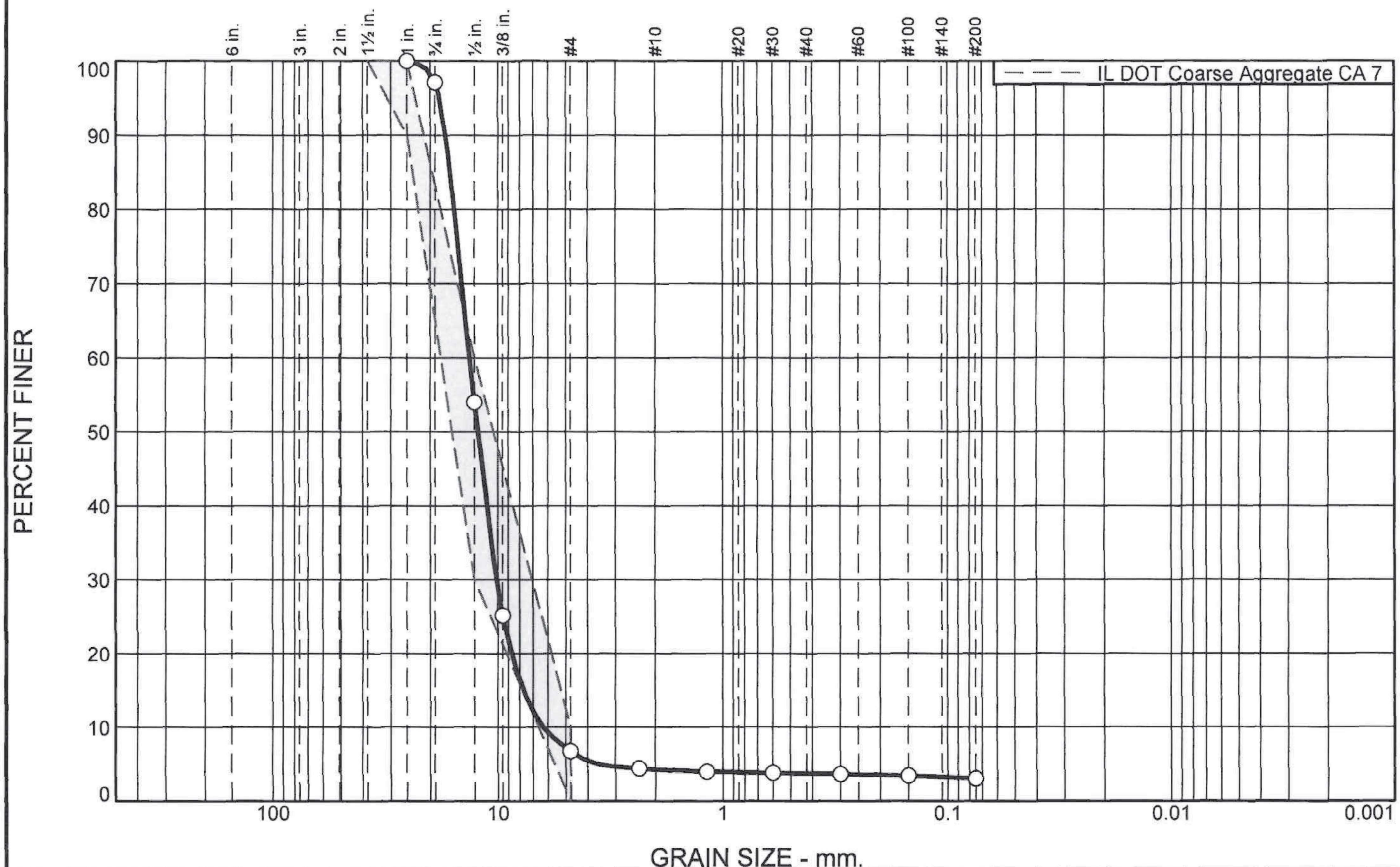
TEST METHOD	
ASTM C 136	X
ASTM C 117	

SIEVE NO.	WEIGHT RETAINED	ACCUM. WEIGHT RETAINED	% RETAINED	% PASSING	SPECIFICATIONS IDOT CA07)	Results
2"						
1 1/2"					**100%**	
1"			0.0	100.0	**90 to100%**	
3/4"	145.3	145.3	2.9	97.1		
1/2"	2169	2314.3	46.0	54.0	**30 to 60%**	
3/8"	1451.1	3765.4	74.8	25.2		
#4	927.3	4692.7	93.3	6.7	**0 to10%**	
#8	116.5	4809.2	95.6	4.4		
#16	21.0	4830.2	96.0	4.0		
#30	10.1	4840.3	96.2	3.8		
#50	8.2	4848.5	96.4	3.6		
#100	11.5	4860.0	96.6	3.4		
#200	17.8	4877.8	96.9	3.1		
PAN	3.0	4880.8	97.0			
WASHED THROUGH NO. 200		YES				

Respectfully Submitted: William D. Prigge, P.E.
Technical Manager

Date Tested:__________ Tested By:__________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.9	90.4	2.4	0.6	0.6	3.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0	90-100	
3/4"	97.1		
1/2"	54.0	30-60	
3/8"	25.2		
#4	6.7	0-10	
#8	4.4		
#16	4.0		
#30	3.8		
#50	3.6		
#100	3.4		
#200	3.1		

* IL DOT Coarse Aggregate CA 7

Soil Description

Grey Crushed Limestone IDOT CA07

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 17.0959 D_{85}= 16.3067 D_{60}= 13.3932
D_{50}= 12.2318 D_{30}= 10.1403 D_{15}= 7.6987
D_{10}= 6.2798 C_u= 2.13 C_c= 1.22

Classification

USCS= GP AASHTO= A-1-a

Remarks

Location: Pekin, IL
Sample Number: SN-2

Date: 8/14/24

MIDLAND STANDARD ENGINEERING & TESTING INC
"Our work is beneath you"
MSET

Client: Wang Engineering
Project: Powerton Generating Station

Project No: 24650 **Figure**

Tested By: MN **Checked By:** WDP

Illinois Department of Transportation

Office of Highways Project Implementation / Bureau of Materials
126 East Ash Street / Springfield, Illinois 62704

10/2/2023

CENTRAL STONE

46445 SWEET BAY LANE
HANNIBAL, MO 63401

Dear CENTRAL STONE, #(51492-04)

This letter is to inform you of the test results on the following products received by the AG - Aggregate Lab for acceptance testing:

Test Id	Material Code	Material Long Name	Special Id	Quantity	Test Status	Test Completed Date
2336350	042CM11	STONE CRUSHED, CLASS C QUALITY		10000.0000 TONS	Approved	9/20/2023

08/20/2024 S&L Note:
Based on the results in this report, this material qualifies as Class B per IDOT Standard Specs. Paragraph 1004.01(b).

Sincerely,

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/20/2024

Illinois Department of Transportation

Illinois Department of Transportation

Material Code: 042CM11 - STONE CR CLCQ

Test ID: 2336350

Completed Date: 9/20/2023

Producer: 51492-04 CENTRAL STONE, FLORENCE, IL
Supplier: 51492-04 CENTRAL STONE, FLORENCE, IL
Description 1: 13.7-37.5M LEDGE 5 -JAW,6,CONE,CONE,VSI
Description 2: SADG
Description 3: AQ
Sample Status: APPROVED

Contract #:
Sample Date: 8/16/2023
Special ID:
Inspected Qty: 10000 TONS
Approved By: Sean Stutler

Test Name: AG - Soundness (CA06, CA07, CA08, CA09, CA10, CA11) - 1
Version 1

Test Date: 9/15/2023
Tested By: AG

	Result	Unit of Measure
Pan Loss Retained on 1/2" and 3/8"	136	
Average Loss Retained on 1/2" and 3/8"	6.8	
Pan Loss Retained on #4	92	
Average Loss Retained on #4	2.3	
Weighted Average Loss	9.1	
Borderline?	N/A	
Pass or Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - Specific Gravity - Coarse - 1
Version 1

Test Date: 9/11/2023
Tested By: AG

	Result	Unit of Measure
Dry Specific Gravity	2.560	
SSD Specific Gravity	2.609	
Absorption	1.9	
Apparent Specific Gravity	2.692	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - Deleterious Count - Coarse (C Quality) - 1
Version 1

Test Date: 9/11/2023
Tested By: AG

	Result	Unit of Measure
Soft & Unsound Percent	0.4	
Soft & Unsound Results	1	
Clay Lumps Percent	0.00	
Clay Lumps Results	1	
Shale Percent	0.0	
Shale Results	1	
Other Deleterious Percent	0.0	
Other Deleterious Results	1	
Total Deleterious Percent	0.4	
Total Deleterious Results	1	

08/20/2024 S&L Note:
Based on the results in this report, this material qualifies as Class B per IDOT Standard Specs. Paragraph 1004.01(b).

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - LA Abrasion - 1
Version 2

Test Date: 9/6/2023
Tested By: AG

	Result	Unit of Measure
Percent Loss	38.9	
Borderline Percent loss - A+, A,B,C Quality	Borderline	
Borderline Percent loss - D Quality	N/A	
Pass/Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/7/2023

Fw: Ca7

Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>
Tue 8/20/2024 2:17 PM
To:Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>

From: Blake Treder <blaket@grp7.com>
Sent: Tuesday, August 20, 2024 8:59 AM
To: Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>; Sahlas, Aimee J <aimee.j.sahlas@sargentlundy.com>; Nielson, David E <DAVID.E.NIELSON@Sargentlundy.com>
Cc: Jeff Theien <Jefft@grp7.com>; Larry Hunt <LarryH@grp7.com>
Subject: FW: Ca7

Tom,

Please see email below from the Central Stone material source confirming that the CA11 quality tests also apply to the CA-6/7 material.

If you have any questions, please reach out.

Best,

Blake

From: Travis Harsell <tharsell@centralstoneco.com>
Sent: Tuesday, August 20, 2024 8:41 AM
To: Blake Treder <blaket@grp7.com>
Cc: Jeff Theien <Jefft@grp7.com>
Subject: RE: Ca7

Blake

The original CA11 test would apply to the CA6 and CA7 for this project. This test was for our ledge 5 aggregate and would apply to all materials produced from ledge 5. All material we supply to J&L Dock comes from this ledge and would be what you are using for this project.

Thanks

Travis Harsell
Sales Representative

Central Stone Company
46445 Sweetbay Lane
Hannibal, MO 63401
Direct: 573-735-4505
Cell: 573-501-0396

CENTRAL STONE
Company

Illinois Department of Transportation

Illinois Department of Transportation
Material Code: 042CM07 - STONE CR CLCQ
Test ID: 2323669
Completed Date: 8/9/2023

Producer: 51492-04 CENTRAL STONE, FLORENCE, IL
Supplier: 51492-04 CENTRAL STONE, FLORENCE, IL
Description 1: 0.0-18.3M LEDGE 2 - JAW,6,CONE,CONE,VSI
Description 2: SADG
Description 3: AQ
Sample Status: APPROVED

Contract #:
Sample Date: 6/20/2023
Special ID:
Inspected Qty: 10000 TONS
Approved By: Sean Stutler

Test Name: AG - LA Abrasion - 1
Version 2

Test Date: 7/7/2023
Tested By: AG

	Result	Unit of Measure
Percent Loss	30.6	
Borderline Percent loss - A+, A,B,C Quality	Pass	
Borderline Percent loss - D Quality	N/A	
Pass/Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 8/9/2023

Test Name: AG - Soundness (CA06, CA07, CA08, CA09, CA10, CA11) - 1
Version 1

Test Date: 7/18/2023
Tested By: AG

	Result	Unit of Measure
Pan Loss Retained on 1/2" and 3/8"	151	
Average Loss Retained on 1/2" and 3/8"	7.6	
Pan Loss Retained on #4	74	
Average Loss Retained on #4	1.9	
Weighted Average Loss	9.4	
Borderline?	N/A	
Pass or Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 8/9/2023

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/20/2024

Test Name: AG - Deleterious Count - Coarse (C Quality) - 1
Version 1

Test Date: 7/31/2023
Tested By: AG

	Result	Unit of Measure
Soft & Unsound Percent	0.7	
Soft & Unsound Results	1	
Clay Lumps Percent	0.00	
Clay Lumps Results	1	
Shale Percent	0.0	
Shale Results	1	
Other Deleterious Percent	0.0	
Other Deleterious Results	1	
Total Deleterious Percent	0.7	
Total Deleterious Results	1	

08/20/2024 S&L Note:
Based on the results in this table, this material qualifies as Class B per IDOT Standard Specs. Paragraph 1004.01(b).

Comments:

Test Validated By: Sean Stutler

Validated Date: 8/9/2023

Test Name: AG - Specific Gravity - Coarse - 1
Version 1

Test Date: 7/31/2023
Tested By: AG

	Result	Unit of Measure
Dry Specific Gravity	2.512	
SSD Specific Gravity	2.574	
Absorption	2.5	
Apparent Specific Gravity	2.678	

Comments:

Test Validated By: Sean Stutler

Validated Date: 8/9/2023

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/2/2024

Report for Illinois Department of Transportation

MISTIC ID

Report By:
Company:

AGGREGATE GRADATION REPORT

Version: 2024_InitialInstall

Inspector No.:	940000000	Name:	Joe Ragar	Date Sampled: 060724	Seq No:	008		
Mix Plant No.:		Name:			Contract No:		Job No.:	
Responsible Loc:	94	Lab:	PL	Lab Name: R. A. Cullinan		Source Name: Hurley/Lowry		

SOURCE	MATL CODE	TYPE INSP	ORIGINAL ID	SPECIFICATION	SAMPLED FROM	WASH DRY	Load Out / Terminal	Ledge
51790-24	**027FA01**	**PRO**		**Std**	**SP**	**W**		0

SIEVE IN / MM		1	1/2	3/8	#4	#8	#10	#16	#30	#40	#50		#80			#100		#200
			25	9.5	4.75	2.36	2.0	1.18	.6	.425	.3		.18			.15		.075
PASS %				**100**	**100**	**93**		**83**	**55**		**12**					**1**		**0.4**

%WASH - 200	PI RATIO	RESULT	REMARK
0.1		**APPR**	**Ledge -**

Insp. Quantity (tons)
0

SIEVE English	SIEVE Metric	Indiv. Wt. Retained	Accum Weights	Accum Passing	Pct Passing	Spec Min	Spec Max	Out Flag	Rounded Passing
3	75								
2.5	63								
2	50								
1.75	45								
1.5	37.5								
1	25								
3/4	19								
5/8	15.9								
1/2	12.5								
3/8	9.5				**100.0**	100	100		100
1/4	6.3								
#4	4.75	0.4	0.4	0.1	**99.9**	94	100		100
#8	2.36	38.9	39.3	7.3	**92.7**				93
#10	2								
#16	1.18	52.2	91.5	17.0	**83.0**	45	85		83
#30	0.6	148.7	240.2	44.7	**55.3**				55
#40	0.425								
#50	0.3	230.9	471.1	87.7	**12.3**	3	29		12
#80	0.18								
#100	0.15	58.7	529.8	98.6	**1.4**	0	10		1
#200	0.075	5.4	535.2	99.6	**0.4**	0	3		0.4

Pan	0.1		
Tot Dry Wt.	537.2	% Washed - 200	0.10
Tot Wash Wt.	536.9		
Diff (-.075)	0.3	#200 / #40	

Orig. Wet Weight: 551.2 Moisture %: 2.61

(Mix Plant Only)

Lot:

Bin:

Tech/Insp: Joe Ragar

Tested By: Joe Ragar

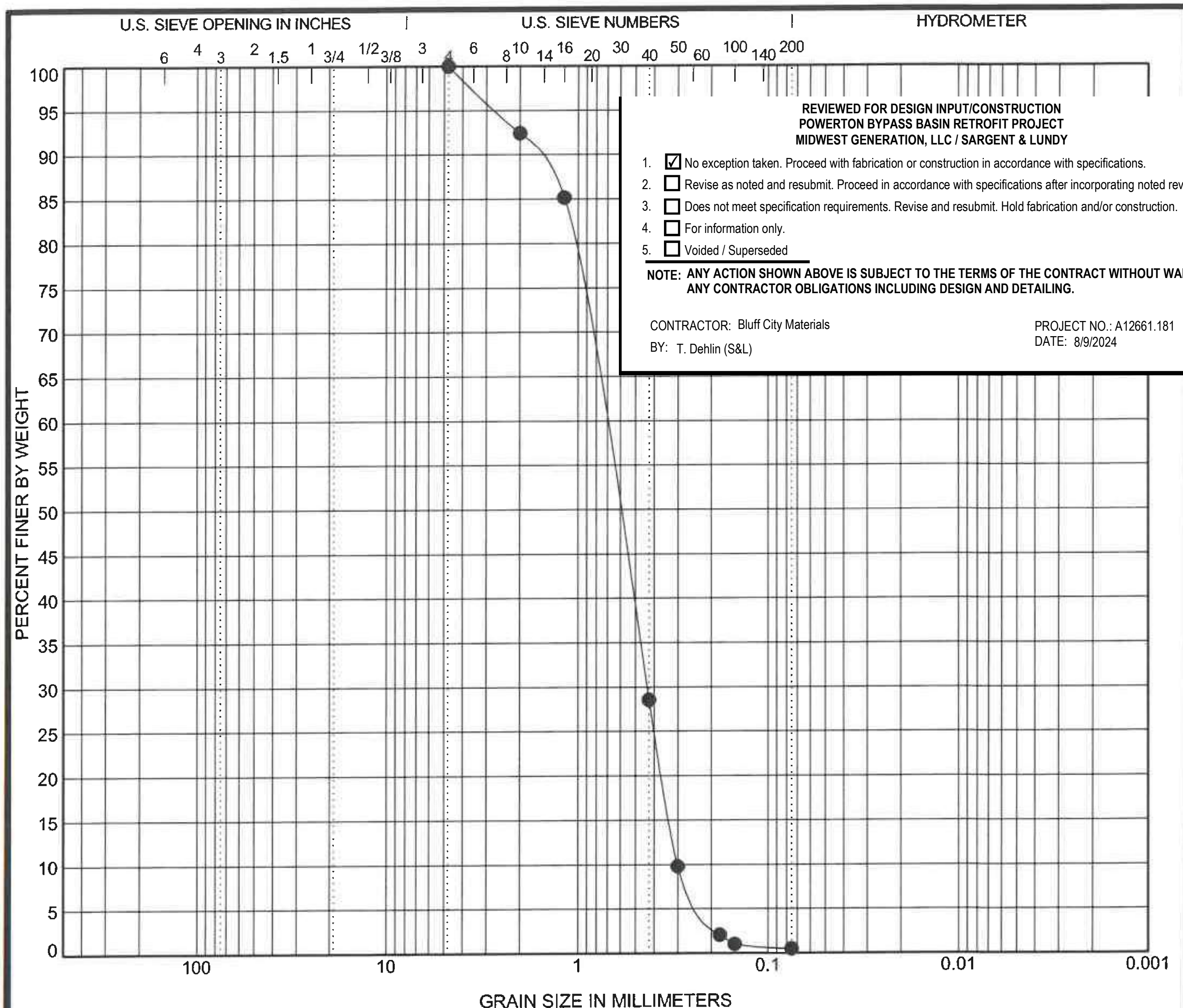
Agency: R. A. Cullinan

Validity Check OK

Copies to:

Report Date: July 11, 2024
/FOR DTY03504
MI504QC Excel Version 12.20-03.01.24

(This is a Field/Laboratory Report for MISTIC Input)



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5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: T. Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/9/2024

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● Sand Filter#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.84	2.49

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● Sand Filter#1	0.0 ft	4.75	0.749	0.436	0.301	0.0	99.5	0.5	

WEI
SINCE 1982
Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: Powerton Generating Station

Location: Pekin, IL

Number: 12661-181

Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
AASHTO T 215 / ASTM D2434

Client: Bluff City
Project: Powerton Generating Station
Analyst Name: M. Snider
WEI Project #: KE245385
Test Date: 8/9/2024
Soil Sample ID: FA-1, Sample #1
Sample Description: Brown, Poorly-graded SAND (SP)

Specific gravity G_s = *2.65*
Specimen dry mass M_d = *756.85* g
Specimen height H = *12.87* cm
Specimen diameter D = *6.35* cm
Piezometer tap distance L = *6.35* cm
Initial void ratio e = 0.43
Dry unit weight g_d = 18.21 kN/m^3
115.98 lbs/ft^3

Trial	1	2	3	4	5
Piezometer level distance (cm) Dh	*5.10*	*5.10*	*5.00*	*4.80*	*4.80*
Duration of sampling (s) t	*60*	*60*	*60*	*60*	*60*
Mass of water collected & container (g) M_{wc}	*254.6*	*253.1*	*251.6*	*250.6*	*250.1*
Mass of container (g) Mc	*168.5*	*168.4*	*169.1*	*168.6*	*169.0*
Water temperature (°C)	*26*	*25.9*	*25.7*	*25.9*	*25.3*
Hydraulic gradient i	0.8	0.8	0.8	0.8	0.8
Discharge velocity (cm/s) v	0.045	0.045	0.043	0.043	0.043
Permeability at test temperature (cm/s) k_T	0.0564	0.0555	0.0551	0.0571	0.0564
Permeability at 20°C (cm/s) k	0.0491	0.0484	0.0483	0.0498	0.0499

Average permeability at test = 0.0561 cm/s 159.06 ft/day
Average permeability at 20°C = 0.0489 cm/s 138.62 ft/day

Prepared by: Matt Ciapas Date: 8/13/2024
Checked by: Mickey Snider Date: 8/13/2024

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/13/2024

AASHTO ACCREDITATION PROGRAM

Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
AASHTO T 215 / ASTM D2434

Client: Bluff City
Project: Powerton Generating Station
WEI Project #: KE245385
Soil Sample ID: FA-1, Sample #2
Analyst Name: M. Snider
Test Date: 8/9/2024
Sample Description: Brown, Poorly-graded SAND (SP)

Specific gravity G_s =	*2.65*	
Specimen dry mass M_d =	*773.75*	g
Specimen height H =	*13.34*	cm
Specimen diameter D =	*6.35*	cm
Piezometer tap distance L =	*6.35*	cm
Initial void ratio e =	0.45	
Dry unit weight g_d =	17.96	kN/m^3
	114.39	lbs/ft^3

Trial	1	2	3	4	5
Piezometer level distance (cm) Dh	*4.30*	*4.20*	*4.40*	*4.60*	*4.80*
Duration of sampling (s) t	*60*	*60*	*60*	*60*	*60*
Mass of water collected & container (g) M_{wc}	*258.9*	*264.6*	*272.4*	*275.5*	*276.9*
Mass of container (g) Mc	*168.5*	*168.5*	*169.2*	*168.7*	*169.2*
Water temperature (^oC)	*24.6*	*24.5*	*24.5*	*24.6*	*24.6*
Hydraulic gradient i	0.7	0.7	0.7	0.7	0.8
Discharge velocity (cm/s) v	0.048	0.051	0.054	0.056	0.057
Permeability at test temperature (cm/s) k_T	0.0703	0.0765	0.0784	0.0776	0.0750
Permeability at 20^oC (cm/s) k	0.0631	0.0688	0.0706	0.0697	0.0673

Average permeability at test =	0.0755	cm/s	214.15	ft/day
Average permeability at 20^oC =	0.0680	cm/s	192.89	ft/day

Prepared by: Matt Ciapas Date: 8/13/2024

Checked by: Mickey Snider Date: 8/13/2024

Central Stone
46445 Sweetbay Lane Hannibal MO

IL DEPARTMENT OF TRANSPORTATION
AGGREGATE GRADATION REPORT

Inspector No:	960000000	Insp Name:		Date Sampled:	Thu, Jul 11, 2024	Sequence No:	001
Mix Plant No:		Mix Plant:				Source Name:	Central Stone @ FLORENCE CS33
Resp Loc:	96	Contract No:		Job Number:			
Lab:	PL	Lab Name:	Florence (CS33)			Source Location:	Hannibal, MO

Source Number	Material Code	Type Insp	Spec.	Sampled From	Wash Dry
51492-04	052CM06	PRO	L5	SP	wash

CA	4	3	2.5	2	1.75	1.5	1.25	1	3/4	5/8	1/2	3/8	1/4	#4	#8	#16	#30	#40	#50	#100	#200
% Pass						100%		95%	86%	77%	69%	60%	48%	40%	29%	24%					11.4%

Wash 200	Test Result	Source Pile	Remarks
10.0	APPR		BARGE

Sieve (English)	Over Load	Individual Weight Retained	Accum. Weights	Accum. Percent Retained	Percent Retained	Percent Passing	Spec. Range	In/Out	Overl
4	12600								
3	12600								
2.5	10600								
2	8400								
1.75	7500								
1.5	6300	0.0		0.0	0.0	100.0	100-100		
1.25	5400								
1	4200	283.0		5.5	5.5	94.5	90-100		
3/4	3200	434.0		14.0	8.5	86.0			
5/8	2700	443.0		22.6	8.6	77.4			
1/2	2100	408.0		30.6	8.0	69.4	50-80		
3/8	1600	487.0		40.1	9.5	59.9			
1/4	1100	632.0		52.4	12.3	47.6			
#4	800	375.0		59.7	7.3	40.3	20-46		
#8	470	555.0		70.6	10.8	29.4			Overload
#16	470	257.0		75.6	5.0	24.4	5-35		
#30	470								
#40	470								
#50	470								
#100	470								
#200	470	665.0		88.6	13.0	11.4	4-12		Overload
Pan	0	71.0		90.0	1.4	10.0			

Total Dry Wt.	5125.0
Total Wash Wt.	4614.0
Diff	511.0

% Washed 10.0

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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5. ☐ Voided / Superseded

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/12/2024

8/12/2024 S&L Comment:
Per IDOT Standard Specs., Paragraph 1004.01(c), the acceptance criterion for CA6 is 60 to 90 percent passing the 1/2 in. sieve. Because this material has 69.4 percent passing the 1/2 in. sieve, it is acceptable.

8/12/2024 S&L Comment:
Per IDOT Standard Specs., Paragraph 1004.01(c), the acceptance criterion for CA6 is 30 to 56 percent passing the No. 4 sieve. Because this material has 40.3 percent passing the No. 4 sieve, it is acceptable.

Validity Check OK

Tech/Ins

Tested Greg (James) Fletcher

Agency: Central Stone

Copies DISTRICT MATERIALS
MATERIALS ENGINEER
PRODUCER

8/12/2024 S&L Comment:
Per IDOT Standard Specs., Paragraph 1004.01(c), the acceptance criterion for CA6 is 10 to 40 percent passing the No. 16 sieve. Because this material has 24.4 percent passing the No. 16 sieve, it is acceptable.

Report Date: Thu, Jul 11, 2024
/FOR DTY03504
MI504QX
B1_Application Report ID:24353

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials PROJECT NO.: A12661.181
BY: Tom Dehlin (S&L) DATE: 8/19/2024

Date Received ______

MIDLAND STANDARD ENGINEERING & TESTING, INC.

410 Nolen Drive South Elgin, Illinois 60177 (847) 844-1895 office@msetinc.com

AGGREGATE ANALYSIS

PROJECT: Powerton Generating Station **TEST NO:** 01AC
LOCATION: Pekin, IL **DATE:** 8/14/24
CLIENT: Wang Engineering **OUR JOB NO.** 24650

CLASSIFICATION: IDOT CA06 Grey Crushed Limestone
SAMPLED BY: Wang
SOURCE: Central Stone

Wt. Before Wash ___ 6270.5 Wt. After Wash ___ 5448.5

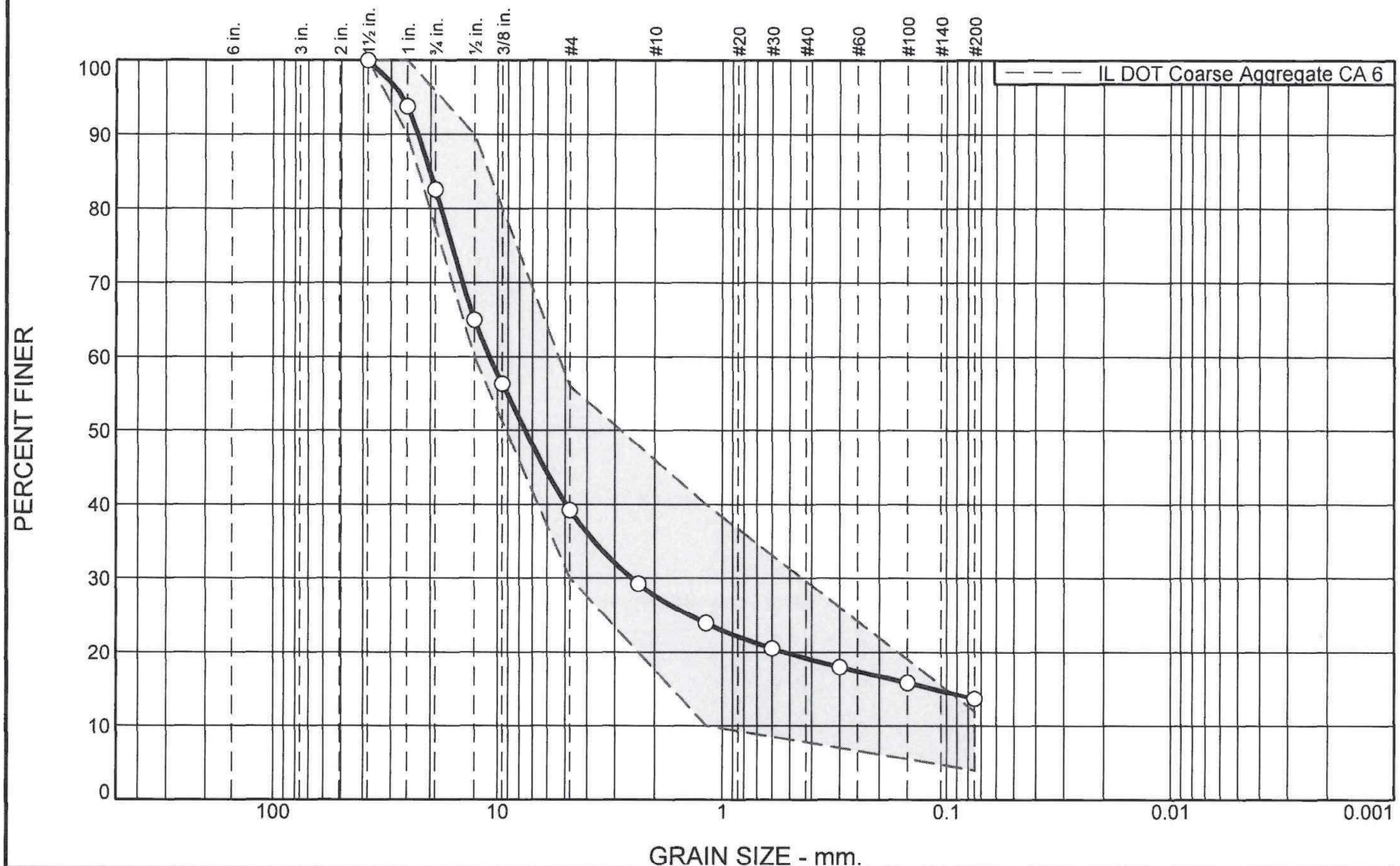
TEST METHOD: ASTM C 136 X; ASTM C 117

SIEVE NO.	WEIGHT RETAINED	ACCUM. WEIGHT RETAINED	% RETAINED	% PASSING	SPECIFICATIONS IDOT CA06)	Results
2"						
1 1/2"			0.0	100.0	100%	
1"	389.8	389.8	6.2	93.8	90 to 100%	
3/4"	703.3	1093.1	17.4	82.6		
1/2"	1103.2	2196.3	35.0	65.0	60 to 90%	
3/8"	543.3	2739.6	43.7	56.3		
#4	1070.9	3810.5	60.8	39.2	30 to 56%	
#8	627.1	4437.6	70.8	29.2		
#16	331.8	4769.4	76.1	23.9	10 to 40%	
#30	216.6	4986.0	79.5	20.5		
#50	158.1	5144.1	82.0	18.0		
#100	132.3	5276.4	84.1	15.9		
#200	135.6	5412.0	86.3	**13.7**	4 to 12%	
PAN	26.7	5438.7	86.7			
WASHED THROUGH NO. 200		YES				

8/19/2024 S&L Comment:
The fines content being 1.7% higher than the 12% threshold established by IDOT Standard Specs. Paragraph 1004.01(c) for CA 6 material is not considered to be detrimental to the material's performance under its specified uses as the Protective Warning Layer and road surfacing material. Therefore, this material gradation is acceptable for use as the Protective Warning Layer and crushed stone surfacing for roads on the Bypass Basin Retrofit Project.

Respectfully Submitted: William D. Prigge, P.E.
Technical Manager

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.4	43.4	11.6	8.5	5.4	13.7	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0	100	
1"	93.8	90-100	
3/4"	82.6		
1/2"	65.0	60-90	
3/8"	56.3		
#4	39.2	30-56	
#8	29.2		
#16	23.9	10-40	
#30	20.5		
#50	18.0		
#100	15.9		
#200	13.7	4-12	X

* IL DOT Coarse Aggregate CA 6

Soil Description

Grey Crushed Limestone - CA-6

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 22.7262 D_{85}= 20.1779 D_{60}= 10.8841
D_{50}= 7.5345 D_{30}= 2.5288 D_{15}= 0.1140
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO= A-1-a

8/19/2024 S&L Comment:
The fines content being 1.7% higher than the 12% threshold established by IDOT Standard Specs. Paragraph 1004.01(c) for CA 6 material is not considered to be detrimental to the material's performance under its specified uses as the Protective Warning Layer and road surfacing material. Therefore, this material gradation is acceptable for use as the Protective Warning Layer and crushed stone surfacing for roads on the Bypass Basin Retrofit Project.

Location: Pekin, IL
Sample Number: SN-1

MIDLAND STANDARD ENGINEERING & TESTING, INC. "Our work is beneath you" MSET

Client: Wang Engineering
Project: Powerton Generating Station
Project No: 24650 **Figure**

Tested By: EW **Checked By:** WDP

Illinois Department of Transportation
Office of Highways Project Implementation / Bureau of Materials
126 East Ash Street / Springfield, Illinois 62704

10/2/2023

CENTRAL STONE
46445 SWEET BAY LANE
HANNIBAL, MO 63401

Dear CENTRAL STONE, #(51492-04)

This letter is to inform you of the test results on the following products received by the AG - Aggregate Lab for acceptance testing:

Test Id	Material Code	Material Long Name	Special Id	Quantity	Test Status	Test Completed Date
2336350	042CM11	STONE CRUSHED, CLASS C QUALITY		10000.0000 TONS	Approved	9/20/2023

08/20/2024 S&L Note:
Based on the results in this report, this material qualifies as Class B per IDOT Standard Specs. Paragraph 1004.01(b).

Sincerely,

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/20/2024

Illinois Department of Transportation

Illinois Department of Transportation

Material Code: 042CM11 - STONE CR CLCQ

Test ID: 2336350

Completed Date: 9/20/2023

Producer: 51492-04 CENTRAL STONE, FLORENCE, IL
Supplier: 51492-04 CENTRAL STONE, FLORENCE, IL
Description 1: 13.7-37.5M LEDGE 5 -JAW,6,CONE,CONE,VSI
Description 2: SADG
Description 3: AQ
Sample Status: APPROVED

Contract #:
Sample Date: 8/16/2023
Special ID:
Inspected Qty: 10000 TONS
Approved By: Sean Stutler

Test Name: AG - Soundness (CA06, CA07, CA08, CA09, CA10, CA11) - 1
Version 1

Test Date: 9/15/2023
Tested By: AG

	Result	Unit of Measure
Pan Loss Retained on 1/2" and 3/8"	136	
Average Loss Retained on 1/2" and 3/8"	6.8	
Pan Loss Retained on #4	92	
Average Loss Retained on #4	2.3	
Weighted Average Loss	9.1	
Borderline?	N/A	
Pass or Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - Specific Gravity - Coarse - 1
Version 1

Test Date: 9/11/2023
Tested By: AG

	Result	Unit of Measure
Dry Specific Gravity	2.560	
SSD Specific Gravity	2.609	
Absorption	1.9	
Apparent Specific Gravity	2.692	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - Deleterious Count - Coarse (C Quality) - 1
Version 1

Test Date: 9/11/2023
Tested By: AG

	Result	Unit of Measure
Soft & Unsound Percent	0.4	
Soft & Unsound Results	1	
Clay Lumps Percent	0.00	
Clay Lumps Results	1	
Shale Percent	0.0	
Shale Results	1	
Other Deleterious Percent	0.0	
Other Deleterious Results	1	
Total Deleterious Percent	0.4	
Total Deleterious Results	1	

08/20/2024 S&L Note:
Based on the results in this report, this material qualifies as Class B per IDOT Standard Specs. Paragraph 1004.01(b).

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/20/2023

Test Name: AG - LA Abrasion - 1
Version 2

Test Date: 9/6/2023
Tested By: AG

	Result	Unit of Measure
Percent Loss	38.9	
Borderline Percent loss - A+, A,B,C Quality	Borderline	
Borderline Percent loss - D Quality	N/A	
Pass/Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 9/7/2023

Fw: Ca7

Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>
Tue 8/20/2024 2:17 PM
To:Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>

From: Blake Treder <blaket@grp7.com>
Sent: Tuesday, August 20, 2024 8:59 AM
To: Dehlin, Thomas J <THOMAS.J.DEHLIN@sargentlundy.com>; Sahlas, Aimee J <aimee.j.sahlas@sargentlundy.com>; Nielson, David E <DAVID.E.NIELSON@Sargentlundy.com>
Cc: Jeff Theien <Jefft@grp7.com>; Larry Hunt <LarryH@grp7.com>
Subject: FW: Ca7

Tom,

Please see email below from the Central Stone material source confirming that the CA11 quality tests also apply to the CA-6/7 material.

If you have any questions, please reach out.

Best,

Blake

From: Travis Harsell <tharsell@centralstoneco.com>
Sent: Tuesday, August 20, 2024 8:41 AM
To: Blake Treder <blaket@grp7.com>
Cc: Jeff Theien <Jefft@grp7.com>
Subject: RE: Ca7

Blake

The original CA11 test would apply to the CA6 and CA7 for this project. This test was for our ledge 5 aggregate and would apply to all materials produced from ledge 5. All material we supply to J&L Dock comes from this ledge and would be what you are using for this project.

Thanks

Travis Harsell
Sales Representative

Central Stone Company
46445 Sweetbay Lane
Hannibal, MO 63401
Direct: 573-735-4505
Cell: 573-501-0396

CENTRAL STONE
Company

Illinois Department of Transportation
Office of Highways Project Implementation / Bureau of Materials
126 East Ash Street / Springfield, Illinois 62704

10/18/2023

CENTRAL STONE
46445 SWEET BAY LANE
HANNIBAL, MO 63401

Dear CENTRAL STONE, #(51492-04)

This letter is to inform you of the test results on the following products received by the AG - Aggregate Lab for acceptance testing:

Test Id	Material Code	Material Long Name	Special Id	Quantity	Test Status	Test Completed Date
2336334	052CM06	STONE, CRUSHED CLASS D QUALITY		10000.0000 TONS	Approved	10/17/2023

Sincerely,

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/20/2024

Illinois Department of Transportation

Illinois Department of Transportation

Material Code: 052CM06 - STONE CR CLDQ

Test ID: 2336334

Completed Date: 10/17/2023

Producer: 51492-04 CENTRAL STONE, FLORENCE, IL
Supplier: 51492-04 CENTRAL STONE, FLORENCE, IL
Description 1: 13.7-37.5M LEDGE 5 -JAW,6,CONE,CONE,VSI
Description 2: SA
Description 3: AQ
Sample Status: APPROVED

Contract #:
Sample Date: 8/16/2023
Special ID:
Inspected Qty: 10000 TONS
Approved By: Sean Stutler

Test Name: AG - LA Abrasion - 1
Version 2

Test Date: 9/28/2023
Tested By: AG

	Result	Unit of Measure
Percent Loss	42.5	
Borderline Percent loss - A+, A,B,C Quality	N/A	
Borderline Percent loss - D Quality	Pass	
Pass/Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 10/4/2023

Test Name: AG - Soundness (CA06, CA07, CA08, CA09, CA10, CA11) - 1
Version 1

Test Date: 10/11/2023
Tested By: AG

	Result	Unit of Measure
Pan Loss Retained on 1/2" and 3/8"	98	
Average Loss Retained on 1/2" and 3/8"	4.9	
Pan Loss Retained on #4	102	
Average Loss Retained on #4	2.6	
Weighted Average Loss	7.5	
Borderline?	N/A	
Pass or Fail	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 10/17/2023

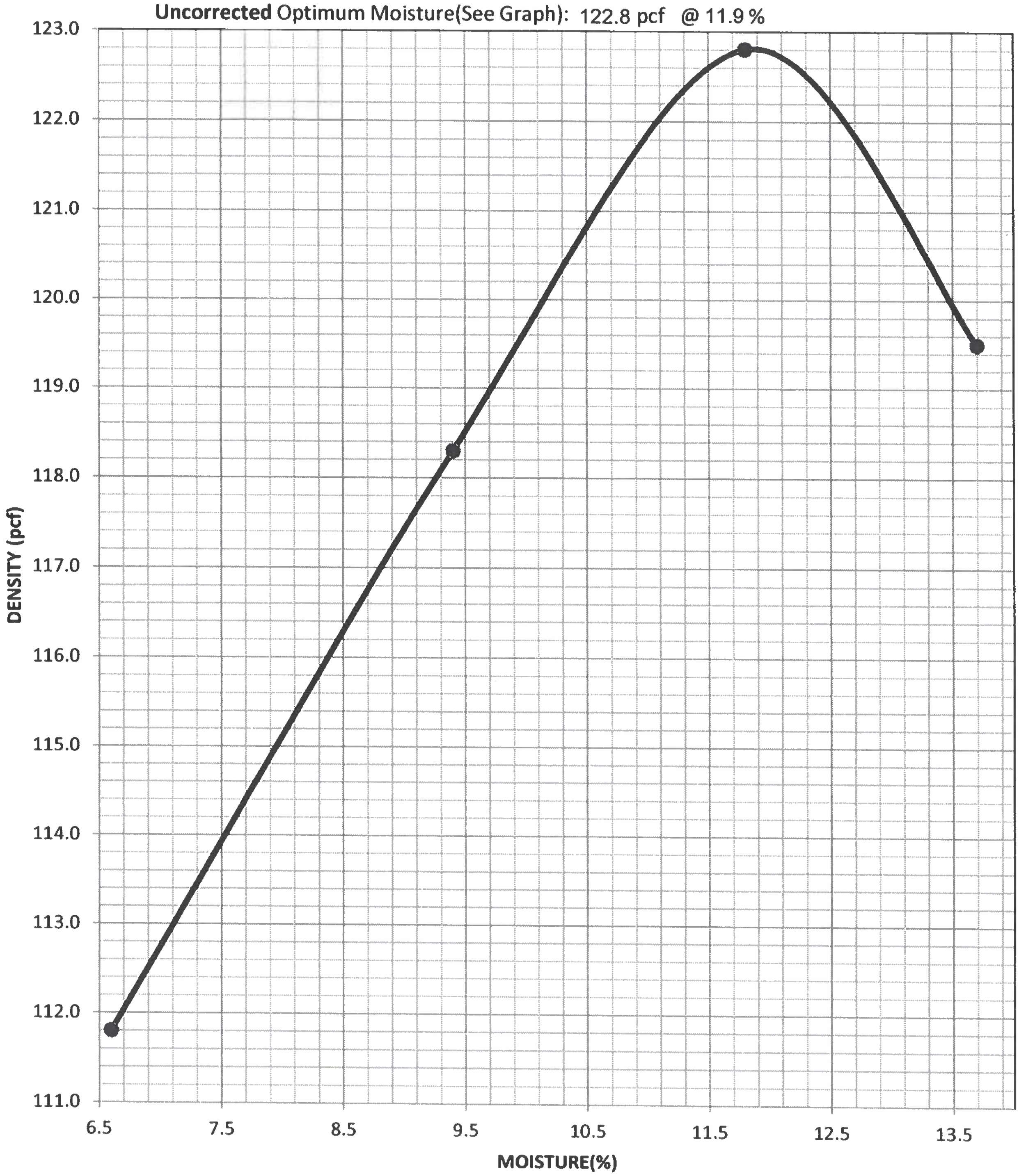
Producer: Central Stone
Producer#: 51492-04
Material Code: 052CM06
Sampled From: SP/Ledge 5
Scalpe2

CORRECTED OPTIMUM MOISTURE

128.4 pcf @ 10.1%

7/17/2023

Uncorrected Optimum Moisture(See Graph): 122.8 pcf @ 11.9 %



Illinois Department of Transportation

40

Hydrometer Analysis of Soils
Limit Test Data and P.I.
(AASHTO T-88)

Producer:	Central Stone	Sampled From:	SP/Ledge 5
Prod. #:	51492-04	Date Sampled:	06/20/23
Mat. Code:	052CM06		

Orig. Starting Wt.	
Hygro. Moist. %	
Corr.% Pass.#10	
Specific Gravity	

Meniscus Correction	-1.0
Corrected Dry Wt.	
Decimal %Pass.#10	

Date: 07/20/23

Valid Temperature Ranges: 66.0 °F to 75.0 °F

Time Min.	Temp F°	Observed Bulb Rd.	Actual Bulb Rd.	Comp. Corr.	Corr. Bulb Rd.	% in Suspen.	Max. Dia. mm
1	68.0			6.25			
5	68.0			6.25			
15	68.0			6.25			
30	68.0			6.25			
60	68.0			6.25			
90	68.0			6.25			
120	68.0			6.25			
250	68.0			6.25			
						#NUM!	0.0020
1440	68.0			6.25			

Sieve	Cumul. Wt. Ret.	% Ret.	% Pass	Corr. % Pass
3/4				
1/2				
3/8				
#4				
#8				
#10				
#20				
#40				
#100				
#200				

%Clay	#NUM!
%Silt	#N/A
%Sand	#N/A
%Gravel	
%Combined	#N/A

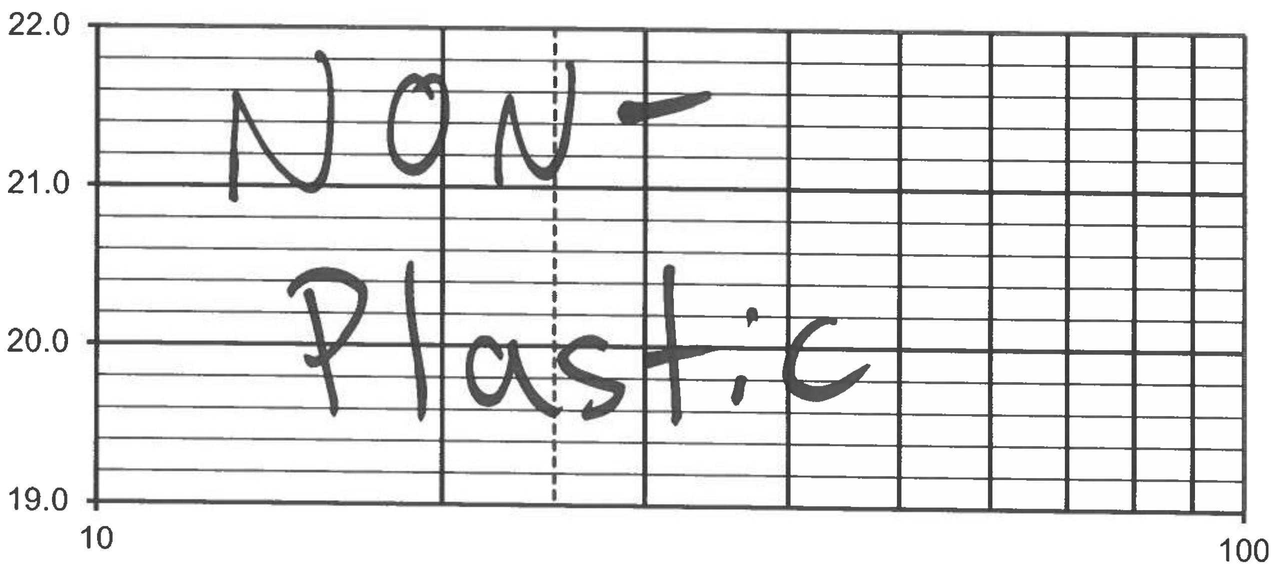
IDOT Class.	#NUM!	#DIV/0!	#DIV/0!

	Plastic Limit			
Pan No.	1	2	3	4
Wet Wt.				
Dry Wt.				
Moisture	0.000	0.000	0.000	0.000
Pan Wt.				
Wt. Dry Mat'l.	0.000	0.000	0.000	0.000
% Moisture	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

	Liquid Limit		
	5	6	7
	0.000	0.000	0.000
	0.000	0.000	0.000
	#DIV/0!	#DIV/0!	#DIV/0!
No. Blows			

LL	#DIV/0!
PL	#DIV/0!
PI	#DIV/0!

% Water



No. Blows

Central Stone
46445 Sweetbay Lane Hannibal MO

IL DEPARTMENT OF TRANSPORTATION
AGGREGATE GRADATION REPORT

Inspector No:	960000000	Insp Name:		Date Sampled:	Thu, Jul 11, 2024	Sequence No:	001
Mix Plant No:		Mix Plant:				Source Name:	Central Stone @ FLORENCE CS33
Resp Loc:	96	Contract No:		Job Number:			
Lab:	PL	Lab Name:	Florence (CS33)			Source Location:	Hannibal, MO

Source Number	Material Code	Type Insp	Spec.	Sampled From	Wash Dry
51492-04	042CM16	PRO	L5	SP	wash

CA	4	3	2.5	2	1.75	1.5	1.25	1	3/4	5/8	1/2	3/8	1/4	#4	#8	#16	#30	#40	#50	#100	#200
% Pass											100%	97%	65%	33%	4%	3%					2.0%

Wash 200	Test Result	Source Pile	Remarks
1.9	APPR		

Sieve (English)	Over Load	Individual Weight Retained	Accum. Weights	Accum. Percent Retained	Percent Retained	Percent Passing	Spec. Range	In/Out	OverLoad
4	12600								
3	12600								
2.5	10600								
2	8400								
1.75	7500								
1.5	6300								
1.25	5400								
1	4200								
3/4	3200								
5/8	2700								
1/2	2100	0.0		0.0	0.0	100.0	100-100		
3/8	1600	57.0		2.6	2.6	97.4	91-97		
1/4	1100	710.0		35.0	32.4	65.0			
#4	800	714.0		67.5	32.5	32.5	22-38		
#8	470	636.0		96.5	29.0	3.5			Overload
#16	470	14.0		97.1	0.6	2.9	0-8		
#30	470								
#40	470								
#50	470								
#100	470								
#200	470	19.0		98.0	0.9	2.0			
Pan	0	2.0		98.1	0.1	1.9			

8/7/2024 S&L Comment: Per IDOT Standard Specs, Paragraph 1004.01(c), The acceptance criterion for CA16 is 94 to 100 percent passing the 3/8 in. sieve. Because this material has 97.4% passing the 3/8 in sieve, it is acceptable.

Orig. Wet Weight 0.0 Moisture %

(Mix Plant Only)
Lot:
Bin:

Validity Check OK

8/7/2024 S&L Comment: Per IDOT Standard Specs, Paragraph 1004.01(c), The acceptance criterion for CA16 is 15 to 45 percent passing the #4 sieve. Because this material has 32.5% passing the #4 sieve, it is acceptable.

Total Dry Wt. 2194.0
Total Wash Wt. 2153.0
Diff 41.0

% Washed 1.9

8/7/2024 S&L Comment: Per IDOT Standard Specs, Paragraph 1004.01(c), The acceptance criterion for CA16 is 0 to 4 percent passing the #16 sieve. Because this material has 2.9% passing the #16 sieve, it is acceptable.

Tech/Ins
Tested Greg (James) Fletcher
Agency: Central Stone
Copies DISTRICT MATERIALS
MATERIALS ENGINEER
PRODUCER

Report Date: Thu, Jul 11, 2024
/FOR DTY03504
MI504QX
B1_Application Report ID:24352

Illinois Department of Transportation

Material Code: 022CA1601 - STONE CR CLAQ SU
Test ID: 2414322
Completed Date: 4/11/2024

Producer: 51972-15 HOLCIM,
Supplier: 51972-15 HOLCIM,
Description 1: LEVEL 1 BREAST 1 - PROD5 (JAW,3X1,HSI,CONE,CONE)
Description 2: SADGZ
Description 3: S#6
Sample Status: APPROVED

Contract #:
Sample Date: 3/19/2024
Special ID:
Inspected Qty: 0 TONS
Approved By: Sean Stutler

Test Name: AG - Deleterious Count - Coarse (A+ Quality) - 1
Version 1

Test Date: 4/3/2024
Tested By: DM

	Result	Unit of Measure
Total Chert Percent	0.0	
Total Chert Results	1	
Deleterious Percent	0.0	
Deleterious Results	1	
Soft & Unsound Percent	0.5	
Soft & Unsound Results	1	
Coal, Shell & Lignite Percent	0.00	
Coal, Shell & Lignite Results	1	
Clay Lumps Percent	0.00	
Clay Lumps Results	1	
Shale Percent	0.0	
Shale Results	1	
Conglomerate Percent	0.0	
Other Deleterious Percent	0.0	
Other Deleterious Results	1	
Total Deleterious Percent	0.5	
Total Deleterious Results	1	

Comments:

Test Validated By: Sean Stutler

Validated Date: 4/11/2024

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 8/2/2024

Test Name: AG - Soundness (CA12, CA13, CA14, CA15, CA16, CA17, CA18, CA19, CA20) - 1
Test Date: 4/10/2024
Version 1
Tested By: ZN

	Result	Unit of Measure
Pan Loss Retained on #4	21	
Average Loss Retained on #4	2.1	
Weighted Average Loss	2.1	
Borderline?	N/A	
Pass or Fail	1	

Comments:
Test Validated By: Sean Stutler
Validated Date: 4/11/2024

Test Name: AG - Specific Gravity - Coarse - 1
Test Date: 4/3/2024
Version 1
Tested By: ZN

	Result	Unit of Measure
Dry Specific Gravity	2.662	
SSD Specific Gravity	2.710	
Absorption	1.8	
Apparent Specific Gravity	2.795	

Comments:
Test Validated By: Sean Stutler
Validated Date: 4/11/2024

Test Name: AG - LA Abrasion - 1
Test Date: 4/1/2024
Version 2
Tested By: CW

	Result	Unit of Measure
Percent Loss	25.1	
Borderline Percent loss - A+, A,B,C Quality	Pass	
Borderline Percent loss - D Quality	N/A	
Pass/Fail	1	

Comments:
Test Validated By: Sean Stutler
Validated Date: 4/11/2024

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 9/4/2024

Date Received ______

RD ENGINEERING & TESTING, INC.

Illinois 60177 (847) 844-1895 office@msetinc.com

AGGREGATE ANALYSIS

PROJECT: Powerton Generating Station
TEST NO:
LOCATION: Pekin, IL
DATE: 8/14/24
CLIENT: Wang Engineering
OUR JOB NO. 24650

CLASSIFICATION: CA-16 Poorly Graded GRAVEL with Sand
SAMPLED BY:
SOURCE:

Wt. Before Wash ___ 3248.9 Wt. After Wash ___ 3158.7

TEST METHOD	
ASTM C 136	X
ASTM C 117	

SIEVE NO.	WEIGHT RETAINED	ACCUM. WEIGHT RETAINED	% RETAINED	% PASSING	SPECIFICATIONS (IDOT FA02)	Results
2"						
1 1/2"						
1"						
3/4"			0.0	100.0		
1/2"	2.8	2.8	0.1	99.9		
3/8"	223.1	225.9	7.0	93.0		
#4	2091.9	2317.8	71.3	28.7		
#8	746.6	3064.4	94.3	5.7		
#16	44.2	3108.6	95.7	4.3		
#30	15.0	3123.6	96.1	3.9		
#50	9.3	3132.9	96.4	3.6		
#100	10.6	3143.5	96.8	3.2		
#200	12.3	3155.8	97.1	2.9		
PAN	2.5	3158.3	97.2			
WASHED THROUGH NO. 200	NO	YES				

9/4/2024 S&L Comment:
Although IDOT Standard Specs. Paragraph 1004.01(c) specifies CA 16 material consist of a coarse aggregate gradation with 100% passing the 1/2" sieve, a minimum of 94% passing the 3/8" sieve, and a minimum of 4% passing the #16 sieve, these slight deviations noted here - 0.1%, 1.0%, and 0.3%, respectively - are not considered to be detrimental to the material's performance under its specified use as the Riprap Bedding Layer along the retrofitted Bypass Basin's interior sideslopes. Therefore, this material gradation is acceptable for use as the Riprap Bedding Layer for the Bypass Basin Retrofit Project.

Date Tested:__________ Tested By:__________

Respectfully Submitted: William D. Prigge, P.E.
Technical Manager

Material	Source	P#200	Na Soundness (% Loss)	LA Abrasion (% Loss)	Shale	Clay Lumps	Coal & Lignite	Soft & Unsound Fragments	Other Deleterious	Total Deleterious
CA16	Powerton	2.9%	1%	25%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	8/12/24									
Specification	1004.01	B Quality	20% max	40% max	2% max	0.5% max	--	6% max	2% max	6% max

TABLE 1

Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

MSET File No.: 24650

Date Received: 8/12/24

Date Tested: 8/15/24

GREGATE TYPE: Limestone 032CA16

PROJECT: Powerton Generating Station

WEI Job No. : KE245385

SAMPLED BY: Wang Engineering

GRADING:	C	% Loss
Original dry weight (gms)	5000.4	
Dry weight after 100 revolutions	4754.5	4.92%
Dry weight after 500 revolutions	3751.5	24.98%
Ratio (should not greatly exceed 0.20 for uniform hardness)	0.20	

Grading	Max	Min
A	1 1/2"	3/8"
B	3/4"	3/8"
C	3/8"	#4
D	#4	#8
Sample Wt.	5 000 ± 10	

ASTM C131

AASHTO T96

Tested By: WF

Sodium Sulfate Soundness Worksheet
ASTM C 88/ AASHTO T104

Project:	Powerton Generation Station	MSET File No.:	24650
Agg Desc:	Grey Crushed Limestone	Date Received:	08/12/24
Product:	IDOT CA16	Date Tested:	08/15/24
Samp. By:	WEI	Tested By:	J. Stotz

Basket No.	Initial Size Fraction	Grad. Of Sample	Original Wt.	Final Wt.	% Loss	Weighted % Loss
A	7	3/8"	418.34	415.88	0.588	0.04
B	64.3	#4	300.06	298.55	0.503	0.32
A	23	#8	100.08	99.20	0.879	0.20
	1.4	#16			0.88	0.01
	0.4	#30			0.88	0.00
	0.3	#50			0.88	0.00
	0.4	#100			0.88	0.00
	0.3	#200			0.88	0.00
	2.9	-#200			0.88	0.03
TOTALS		0				**0.62**

Tested By: ____________

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: **ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.**

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/2/2024

ILLINOIS DEPARTMENT OF TRANSPORTATION
AGGREGATE GRADATION REPORT

MISTIC ID	

Inspector No.:	**960000000**	Insp. Name:	**Producer Sampled D-6**	Date Sampled:	**2/29/2024**
Mix Plant No.:		Mix Plant:			
Resp. Loc.:	**96**	Contract No.:		Job Number:	
Lab:	**PQ**	Lab Name:	**CS33**		

Sequence No.:	**24001**
Source Name:	**Central Stone**
Source Location:	**Florence, IL**

Source Number	Material Code	Type Insp.	Original Test ID	Spec.	Article	Sampled From	Wash Dry	
51492-04	**RR2A Gradation #1**	**PRO**		**Standard**		**SP**	**D**	

CA	3	2.5	2	1.75	1.5	1	3/4	5/8	1/2	3/8	1/4	#4	#8	#16	#30	#40	#60	#100	#200
Percent Passing	**100**	**100**	**52**		**32**	**3**	**1**	**1**	**1**	**1**	**1**	**1**							

Wash 200	Test Results	Remarks	
	APPR		

Sieve (English)	12" Overload	Individual Weight Retained	Cumul. Weight Retained	Cumul. Percent Retained	Percent Passing	Spec. Range % Pass	In/Out	Overload
3	12600	0.0	0	0	100			
2.5	10600	0.0	0.0	0.0	**100.0**			
2	8400	4330.0	4330.0	47.8	**52.2**	30-76		
1.75	7500							
1.5	6300	1861.0	6191.0	68.3	**31.7**			
1	4200	2598.0	8789.0	97.0	**3.0**			
3/4	3200	165.0	8954.0	98.8	**1.2**			
5/8	2700	45.0	8999.0	99.3	**0.7**			
1/2	2100	0.0	8999.0	99.3	**0.7**			
3/8	1600	0.0	8999.0	99.3	**0.7**			
1/4	1100	0.0	8999.0	**99.3**	**0.7**			
#4	800	0.0	8999.0	99.3	**0.7**	0-16		
#8	470							
#16	470							
#30	470							
#40	470							
#60	470							
#100	470							
#200	470							
Pan		64.0	9063.0					
Total Dry Weight:		9063.0						
Total Washed Weight:		0.0						
Diff. (-#200):		0.0			Master Band Target:		**N/A**	

Orig. Wet Weight:	grams	Moisture %:	

Plasticity Index Ratio (#200/#40):	
Plasticity Index Test Results:	

% Washed - #200:

Mix Plant Only
Lot:
Bin:

Authorized By: Greg Fletcher
Tested By: Greg Fletcher
Agency/Company: Central Stone

Copies to: Materials Inspector

Validity Check OK
/FOR DTY03504
MI504QC

Signature ____________ Date ____________

(This is a Field/Laboratory Report for MISTIC Input)

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

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CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 9/9/2024

Date Received ______

RD ENGINEERING & TESTING, INC.
, Illinois 60177 (847) 844-1895 office@msetinc.com

AGGREGATE ANALYSIS

PROJECT: Powerton Generating Station
TEST NO:
LOCATION: Pekin, IL
DATE: 8/14/24
CLIENT: Wang Engineering
OUR JOB NO. 24650

CLASSIFICATION: RR-2
SAMPLED BY:
SOURCE:

Wt. Before Wash ______________ Wt. After Wash __ 39140.0

TEST METHOD: ASTM C 136 — X; ASTM C 117

SIEVE NO.	WEIGHT RETAINED	ACCUM. WEIGHT RETAINED	% RETAINED	% PASSING	SPECIFICATIONS (IDOT FA02)	Results
3"	1280	1280.0	3.3	96.7		
2"	8080	9360.0	23.9	76.1		
1 1/2"	7540	16900.0	43.2	56.8		
1"	10900	27800.0	71.0	29.0		
3/4"	3480	31280.0	79.9	20.1		
1/2"	1800	33080.0	84.5	15.5		
3/8"	940	34020.0	86.9	13.1		
#4	1046.0	35066.0	89.6	10.4		
#8	467.4	35533.4	90.8	9.2		
#16	425.7	35959.1	91.9	8.1		
#40	733.4	36692.5	93.7	6.3		
#80	556.2	37248.7	95.2	4.8		
#200	711.3	37960.0	97.0	3.0		
PAN	587.7	38547.7	98.5			
WASHED THROUGH NO. 200		NO	YES			

9/9/2024 S&L Comment:
Although IDOT Standard Specs. Paragraph 1005.01(c) specifies RR 2 material consist of a gradation with a maximum of 76% passing the 2" sieve, this slight deviation (0.1%) is not considered to be detrimental to the material's performance under its specified use as the Riprap Layer along the retrofitted Bypass Basin's interior sideslopes. Therefore, this material gradation is acceptable for use as the Riprap Layer for the Bypass Basin Retrofit Project.

Date Tested:__________ Tested By:__________

Respectfully Submitted: William D. Prigge, P.E.
Technical Manager

Sodium Sulfate Soundness Worksheet
ASTM C 88/ AASHTO T104

Project:	Powerton Generation Station	MSET File No.:	24650
Agg Desc:	Grey Crushed Limestone	Date Received:	08/12/24
Product:	IDOT RR2	Date Tested:	08/15/24
Samp. By:	WEI	Tested By:	J. Stotz

Basket No.	Initial Size Fraction	Grad. Of Sample	Original Wt.	Final Wt.	% Loss	Weighted % Loss
01, T	7.6	3"			2.83	0.22
03, 02	20.6	2"	3086.5	2738.4	11.28	2.32
D	19.3	1-1/2"	2019.6	1828.3	9.47	1.83
	27.9	1"	1502.9	1460.4	2.83	0.79
	8.9	3/4"			2.83	0.25
	4.6	1/2"			2.83	0.13
	2.4	3/8"			2.83	0.07
	2.7	#4			2.83	0.08
	1.2	#8			2.83	0.03
	1.1	#16			2.83	0.03
	1.8	#40			2.83	0.05
	1.4	#80			2.83	0.04
	1.8	#200			2.83	0.05
	3	-#200			2.83	0.08
TOTALS		0				**5.97**

Tested By: ____________

Sodium Sulfate Soundness Worksheet
ASTM C 88/ AASHTO T104

Project:	Powerton Generation Station	MSET File No.:	24650
Agg Desc:	Grey Crushed Limestone	Date Received:	08/12/24
Product:	IDOT RR#2 (2)	Date Tested:	09/05/24
Samp. By:	WEI	Tested By:	J. Stotz

Basket No.	Initial Size Fraction	Grad. Of Sample	Original Wt.	Final Wt.	% Loss	Weighted % Loss
	3.3	3"				0.32
A	20.6	2"	5199.4	4695.6	9.690	2.00
C, B	19.3	1-1/2"	5199.4	4695.6	9.690	1.87
D	27.9	1"	1526.6	1460.7	4.317	1.20
	8.9	3/4"			4.32	0.38
	4.6	1/2"			4.32	0.20
	2.4	3/8"			4.32	0.10
	2.7	#4			4.32	0.12
	1.2	#8			4.32	0.05
	1.1	#16			4.32	0.05
	1.8	#40			4.32	0.08
	1.4	#80			4.32	0.06
	1.8	#200			4.32	0.08
	3.0	-#200			4.32	0.13
TOTALS		0				**6.64**

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

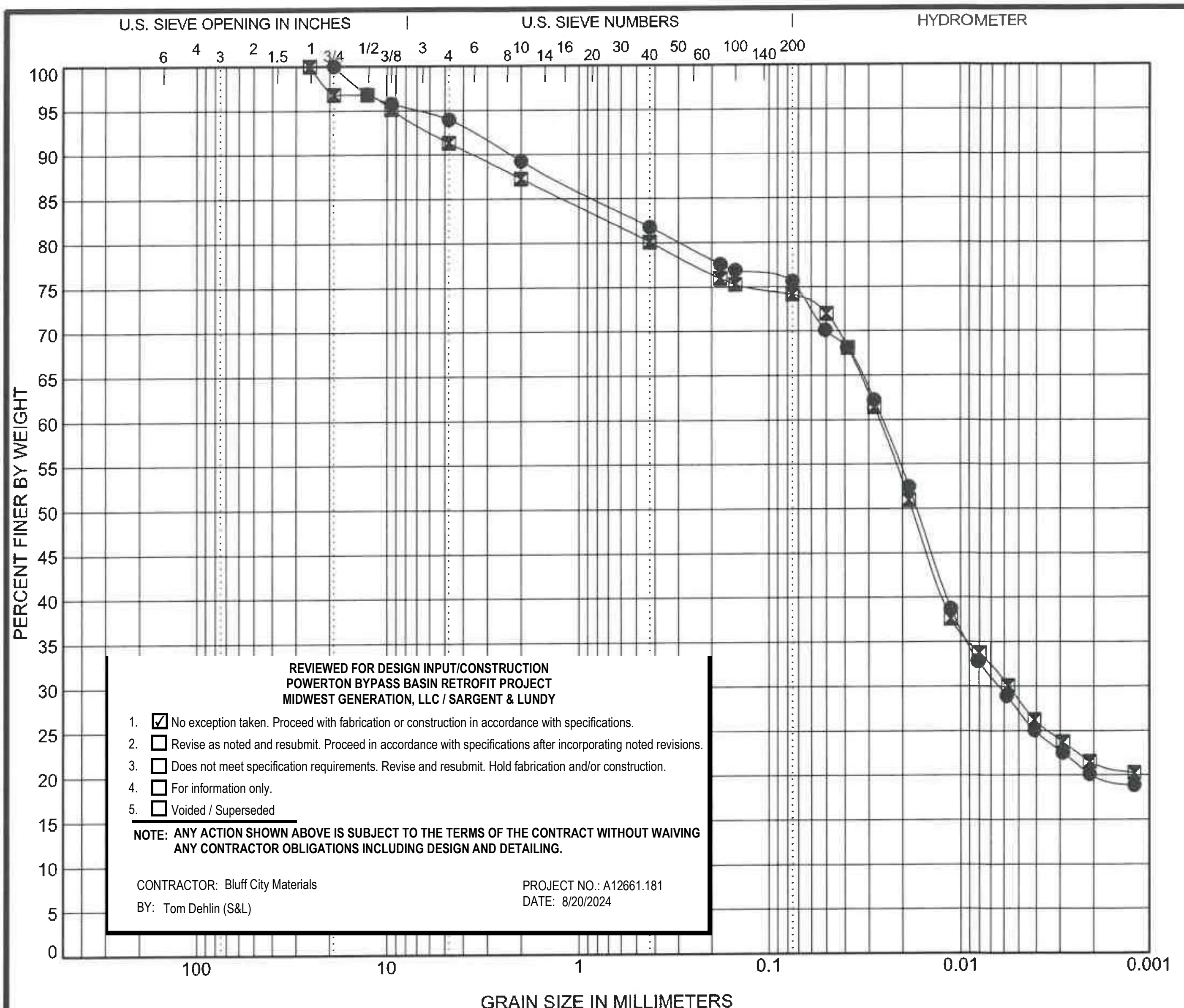
1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: Bluff City Materials
BY: Tom Dehlin (S&L)

PROJECT NO.: A12661.181
DATE: 9/13/2024

Tested By: ______________



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● **AT Clay 1#1**	**0.0 ft**	**LEAN CLAY with SAND(CL)**	**38**	**16**	**22**		
☒ **AT Clay 2#1**	**0.0 ft**	**LEAN CLAY with SAND(CL)**	**38**	**16**	**22**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **AT Clay 1#1**	**0.0 ft**	**19**	**0.026**	**0.006**		**6.0**	**18.3**	**48.4**	**27.2**
☒ **AT Clay 2#1**	**0.0 ft**	**25.4**	**0.026**	**0.006**		**8.6**	**17.3**	**45.6**	**28.5**

WEI
SINCE 1982
Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: Powerton Generating Station

Location: Pekin, IL

Number: 12661-181

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Bluff City
Project: Powerton
WEI Job No: KE245385
Prep Method: air dried

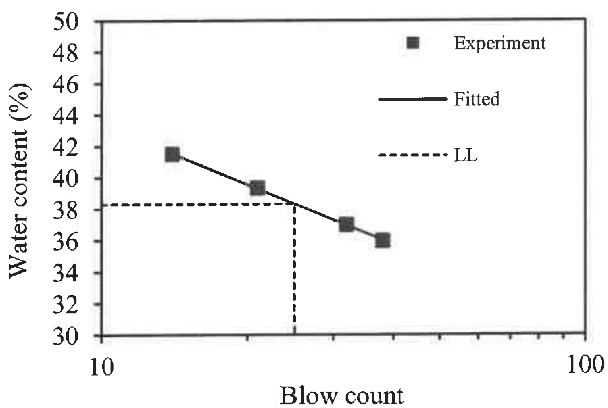
Analyst name: K. Jacob
Test date: August 16, 2024
Soil Sample ID: AT Clay Sample 1
Sample description: LEAN CLAY w/ SAND (CL)
% retained on #40 sieve: 19%

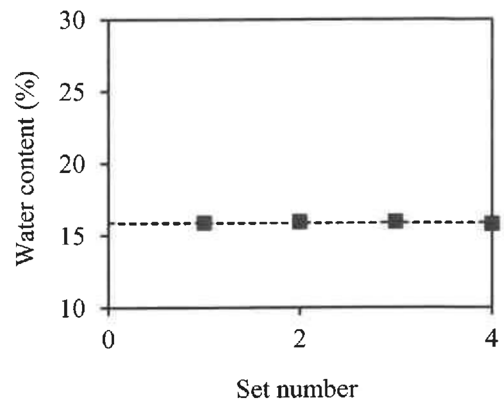
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	*11.16*	*23.37*	*20.14*	*38*	35.97	36.01
2	*11.16*	*22.94*	*19.76*	*32*	36.98	36.96
3	*11.17*	*23.14*	*19.76*	*21*	39.35	39.30
4	*11.22*	*21.72*	*18.64*	*14*	41.51	41.54

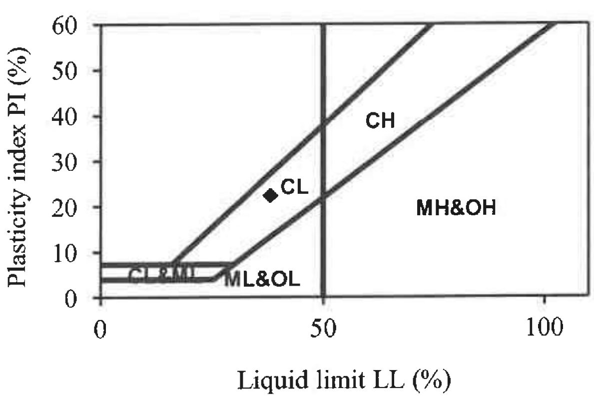
Liquid limit (%) = 38.33
Slope of flow line = 0.143

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	*11.13*	*20.12*	*18.89*	15.85
2	*11.24*	*21.36*	*19.97*	15.92
3	*11.18*	*20.79*	*19.47*	15.92
4	*11.38*	*21.07*	*19.75*	15.77

Plastic limit (%) = 15.87







Liquid limit (%) = *38*
Plastic limit (%) = *16*
Plasticity index (%) = *22*

Prepared by: ____________ Date: 8/20/2024

Checked by: ____________ Date: 8/20/2024

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LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX of SOILS

AASHTO T 89, T 90 / ASTM D 4318

Client: Bluff City
Project: Powerton
WEI Job No: KE245385
Prep Method: air dried

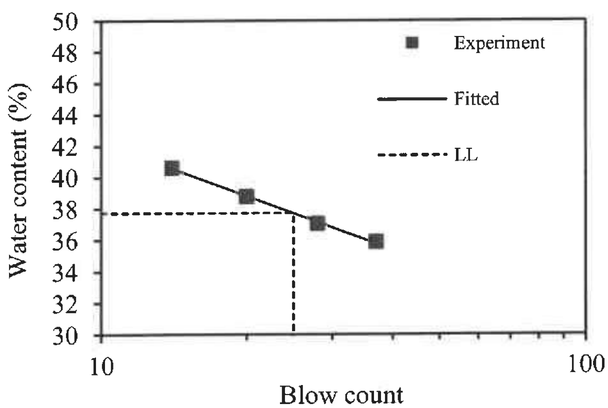
Analyst name: K. Jacob
Test date: August 16, 2024
Soil Sample ID: AT Clay Sample 2
Sample description: LEAN CLAY w/ SAND (CL)
% retained on #40 sieve: 20%

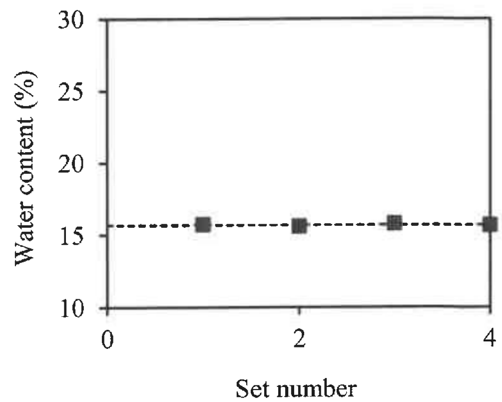
Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	11.36	22.00	19.19	37	35.89	35.79
2	11.10	23.42	20.09	28	37.04	37.17
3	11.16	21.64	18.71	20	38.81	38.83
4	11.08	21.60	18.56	14	40.64	40.59

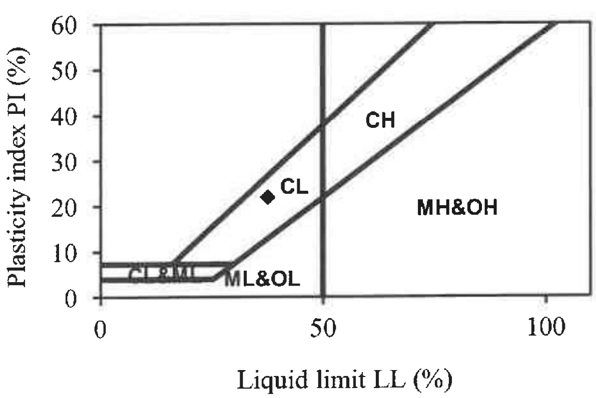
Liquid limit (%) = 37.73
Slope of flow line = 0.129

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	11.12	21.94	20.47	15.72
2	11.37	22.64	21.12	15.59
3	11.29	22.30	20.80	15.77
4	11.07	24.37	22.57	15.65

Plastic limit (%) = 15.68







Liquid limit (%) = 38
Plastic limit (%) = 16
Plasticity index (%) = 22

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Checked by: [signature] Date: 8/21/2024

APPENDIX F-2

CONFORMANCE TESTING RESULTS

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: 343-014
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: circular
As Received Water Content: 5.20%

Analyst Name: M. Ciapas
Date Received: 7/31/2024
Date Tested: 8/9/2024
Soil Sample ID/Location: FA-1 Bulk
Sample Description: Brown Poorly Graded Sand (SP)
Total Mass (g): 19717.3
3/4 sieve mass (g): 0
3/8 sieve mass (g): 0
#4 sieve mass (g): 131.9 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
6025	168.7	156.7	31.2	9.6
	133.9	124.9	31.3	9.6
	147.1	137.0	31.4	9.6
6088	192.5	174.7	21.8	11.7
	160.5	146.3	22.6	11.4
	182.9	166.1	22.4	11.7
6110	152.0	136.0	21.9	14.0
	121.1	109.2	22.3	13.7
	152.0	136.4	22.6	13.7
6079	199.9	176.6	31.1	16.0
	186.4	164.9	31.5	16.1
	177.0	156.1	30.1	16.6

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
6025	9.6	111.0
6088	11.6	112.8
6110	13.8	111.8
6079	16.2	107.8

Mold ID = 2
Volume of Mold = 939 cm^3
Mass of mold M_m = 4195.40 g
Estimated specific gravity G_s = 2.65

	ASTM
Optimum moisture (%) =	**12.0**
Maximum dry unit weight (pcf) =	**112.8**

Prepared by: [signature] Date: 8/12/2024

Checked by: [signature] Date: 8/12/2024

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MOISTURE--DENSITY RELATIONSHIP
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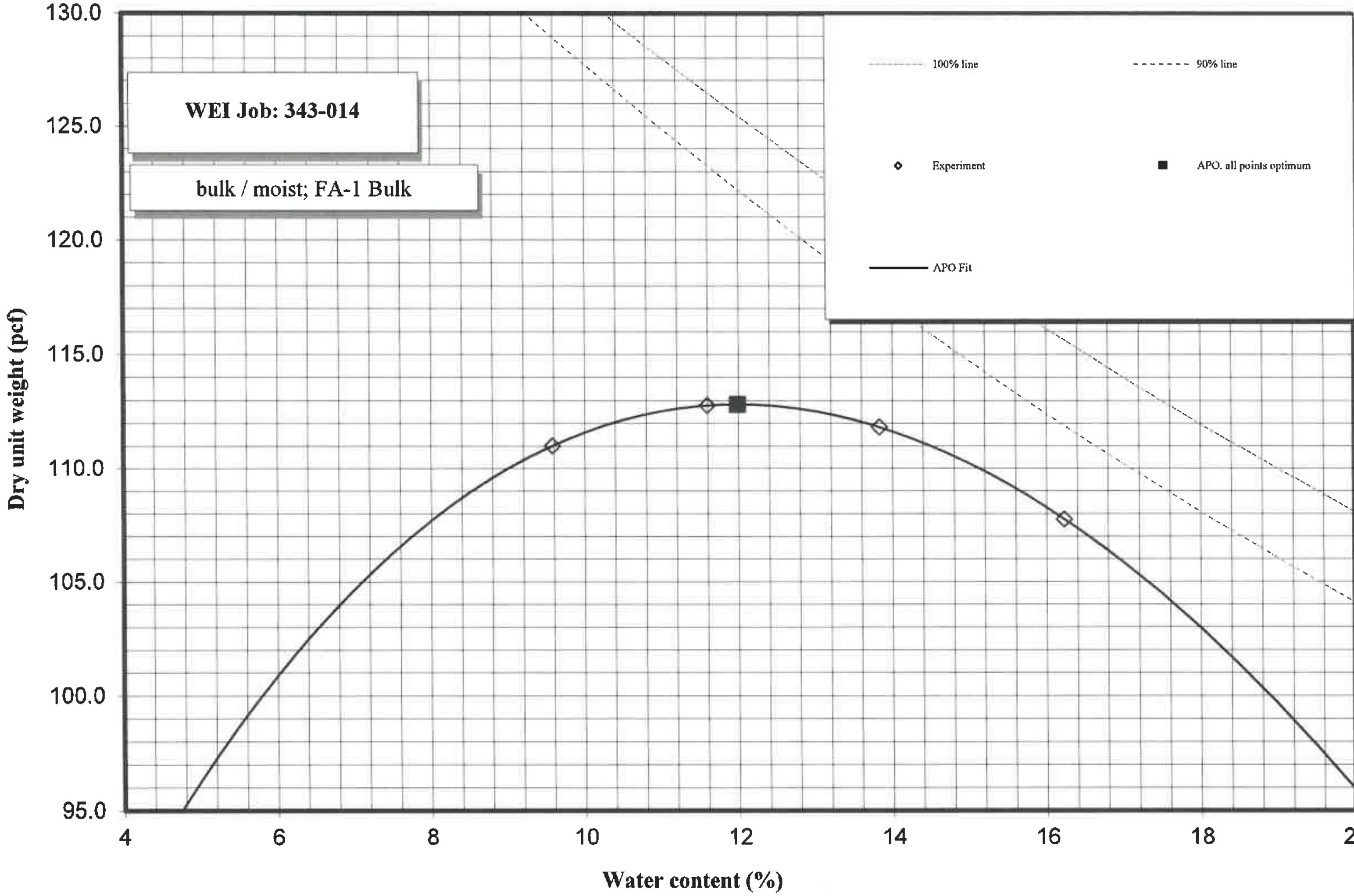

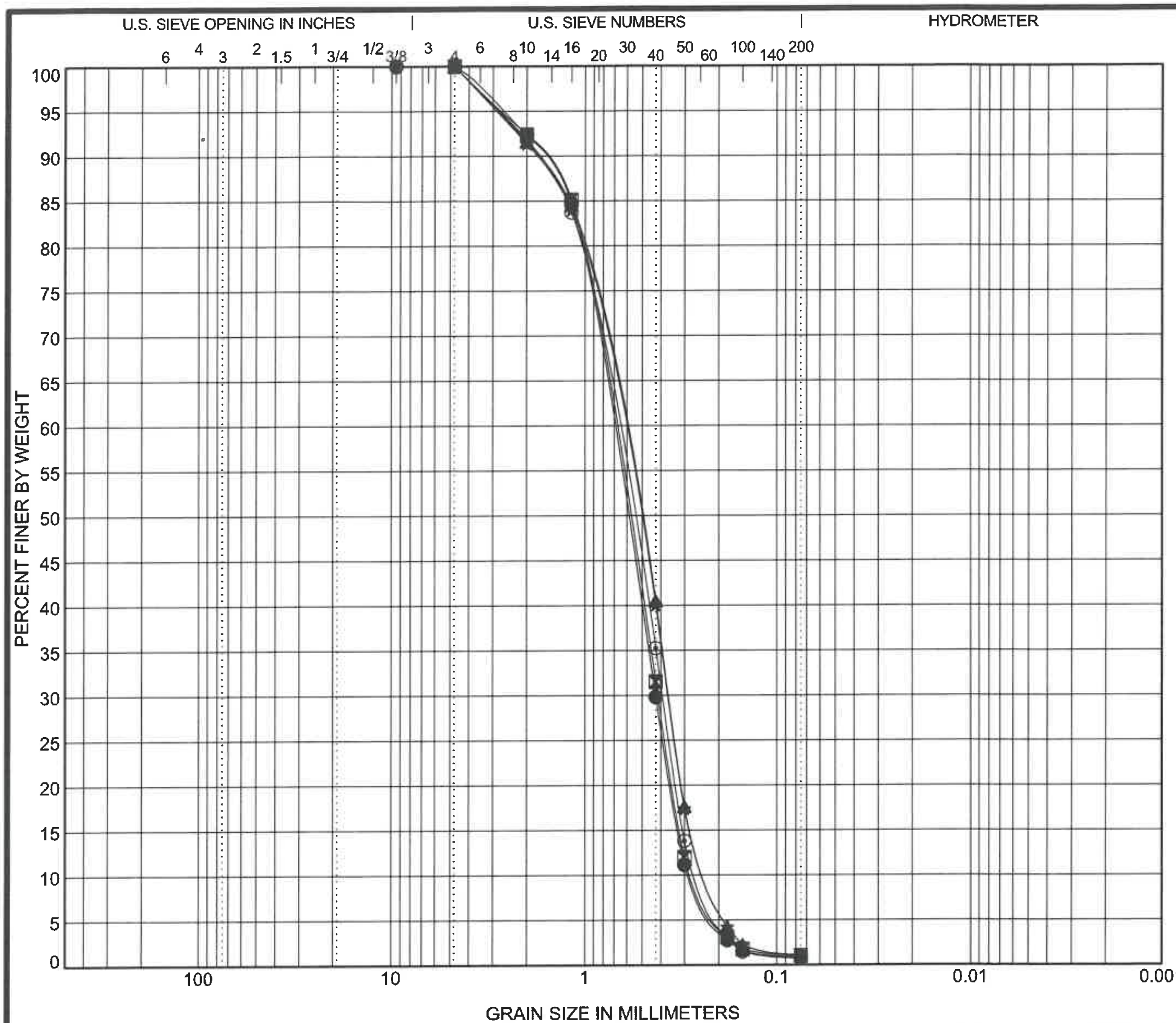

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● PBBR-SF-1#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.87	2.66
⊠ PBBR-SF-2#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.87	2.73
▲ PBBR-SF-3#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.88	2.98
★ PBBR-SF-4#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.87	3.00
⊙ PBBR-SF-5#1	0.0 ft	POORLY GRADED SAND(SP)	NP	NP	NP	0.85	2.85

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PBBR-SF-1#1	0.0 ft	9.5	0.745	0.426	0.28	0.0	99.1	0.9	
⊠ PBBR-SF-2#1	0.0 ft	4.75	0.731	0.414	0.268	0.0	99.0	1.0	
▲ PBBR-SF-3#1	0.0 ft	4.75	0.668	0.362	0.224	0.0	98.9	1.1	
★ PBBR-SF-4#1	0.0 ft	4.75	0.676	0.364	0.225	0.0	98.9	1.1	
⊙ PBBR-SF-5#1	0.0 ft	4.75	0.716	0.39	0.251	0.0	99.3	0.7	

WEI SINCE 1982

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GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399

WEI GRAIN SIZE USCS KE245399.GPJ US LAB.GDT 9/17/24

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: KE245399
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: circular
As Received Water Content: 4.11%

Analyst Name: L. Varzaru
Date Received: 8/23/2024
Date Tested: 8/27/2024
Soil Sample ID/Location: PBBR-SF-1
Sample Description: Brown Poorley Graded SAND (SP)
Total Mass (g): 10027
3/4 sieve mass (g): 6.7 removed
3/8 sieve mass (g): 4.5 removed
#4 sieve mass (g): 17.6 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
6010	152.0	140.8	22.3	9.4
	202.2	186.6	22.5	9.5
	140.2	130.0	22.2	9.4
6077	155.5	141.7	22.5	11.6
	161.7	147.4	22.4	11.4
	162.8	148.4	22.2	11.4
6110	144.0	130.6	31.3	13.5
	203.0	182.8	31.3	13.4
	170.6	153.7	30.2	13.7
6119	134.8	120.9	31.4	15.5
	185.6	164.6	31.6	15.8
	153.5	137.0	30.1	15.4

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
6010	9.5	110.1
6077	11.5	112.0
6110	13.5	111.9
6119	15.6	110.5

Mold ID = 2
Volume of Mold = 941 cm^3
Mass of mold M_m = 4194.70 g
Estimated specific gravity G_s = 2.65

	ASTM
Optimum moisture (%) =	**12.4**
Maximum dry unit weight (pcf) =	**112.2**

Prepared by: [signature] Date: 9/17/2024

Checked by: [signature] Date: 9/17/2024

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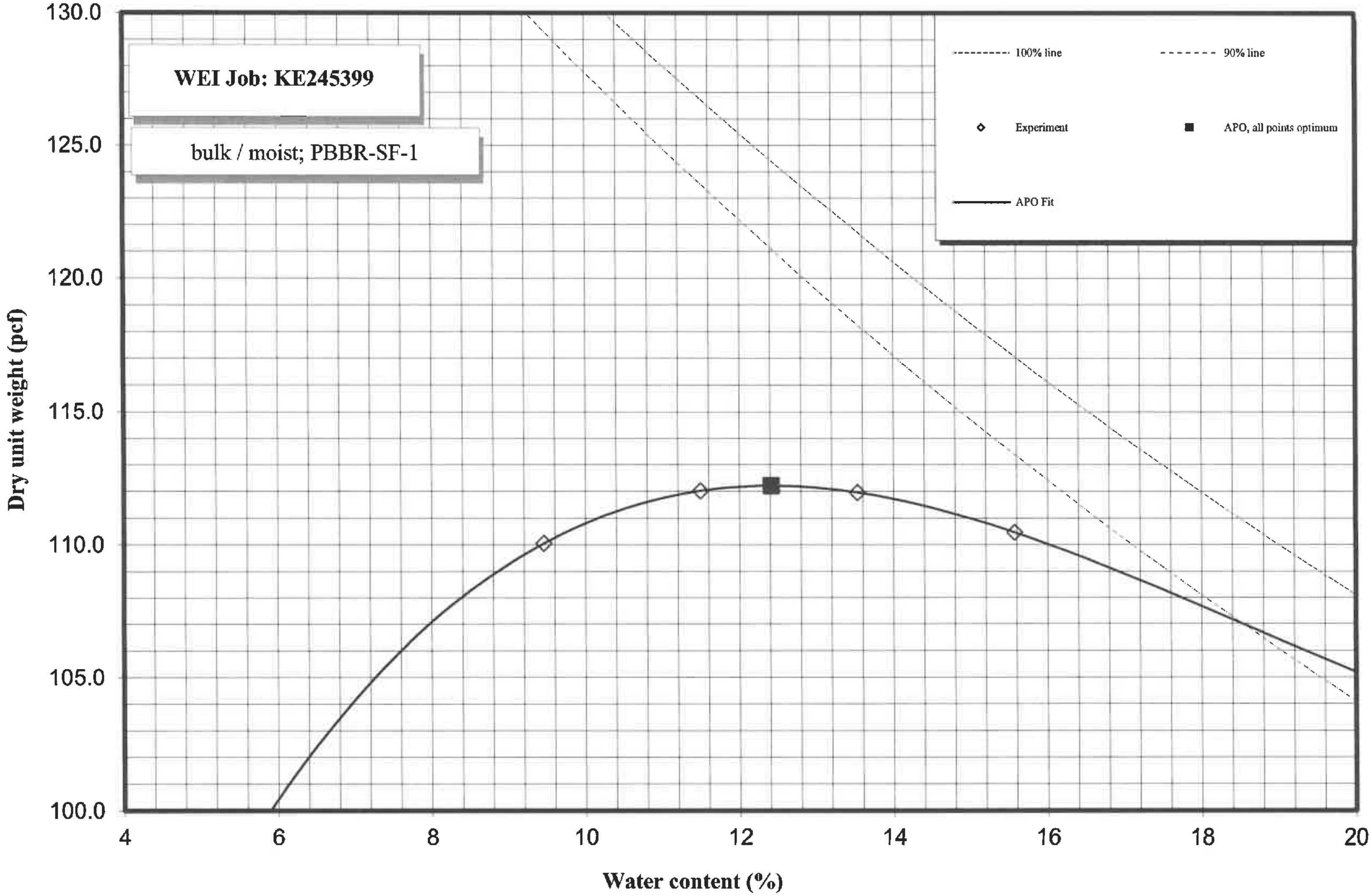

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: KE245399
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: circular
As Received Water Content: 3.40%

Analyst Name: L. Varzaru
Date Received: 8/23/2024
Date Tested: 8/27/2024
Soil Sample ID/Location: PBBR-SF-2
Sample Description: Brown Poorley Graded SAND (SP)
Total Mass (g): 10167.4
3/4 sieve mass (g): 0
3/8 sieve mass (g): 2.4 removed
#4 sieve mass (g): 10.8 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
6006	178.6	167.2	30.1	8.3
	166.9	156.2	31.1	8.6
	168.6	158.0	31.2	8.4
6077	150.9	139.6	30.6	10.3
	199.7	183.4	31.1	10.7
	150.9	139.5	31.1	10.5
6115	181.7	164.8	31.2	12.7
	224.8	203.1	31.4	12.7
	185.8	168.3	31.2	12.8
6120	203.0	180.4	31.4	15.2
	191.0	170.4	31.2	14.8
	191.9	170.9	31.1	15.0

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
6006	8.4	110.8
6077	10.5	113.0
6115	12.7	113.1
6120	15.0	111.1

Mold ID = 2
Volume of Mold = 941 cm^3
Mass of mold M_m = 4194.70 g
Estimated specific gravity G_s = 2.65

	ASTM
Optimum moisture (%) =	**11.7**
Maximum dry unit weight (pcf) =	**113.3**

Prepared by: [signature] Date: 9/17/2024

Checked by: [signature] Date: 9/17/2024

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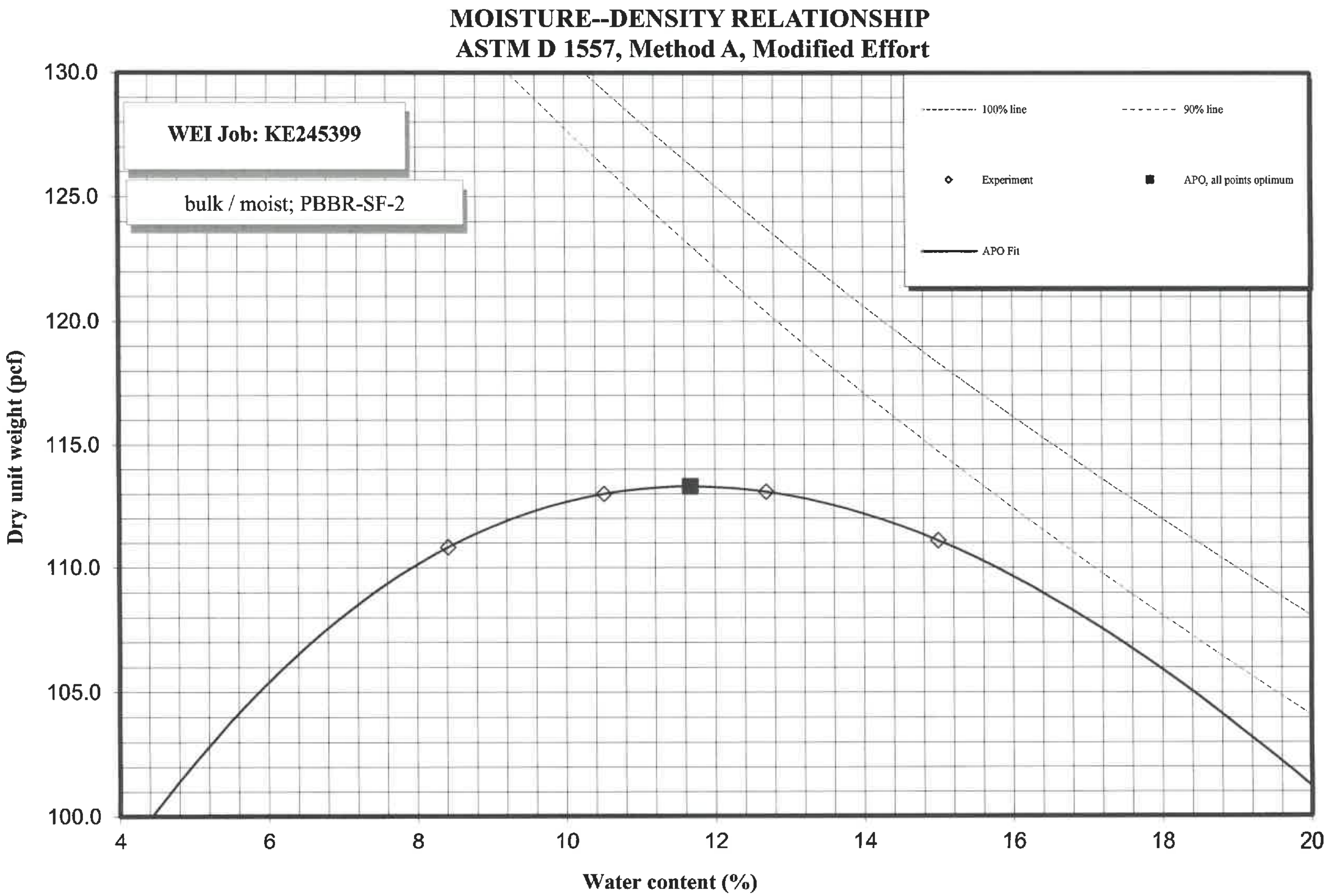

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: KE245399
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: circular
As Received Water Content: 4.49%

Analyst Name: L. Varzaru
Date Received: 8/23/2024
Date Tested: 9/4/2024
Soil Sample ID/Location: PBBR-SF-3
Sample Description: Brown Poorley Graded SAND (SP)
Total Mass (g): 7938.6
3/4 sieve mass (g): 0
3/8 sieve mass (g): 2.6 removed
#4 sieve mass (g): 5.8 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
6038	160.0	146.1	22.1	11.2
	152.3	139.2	22.2	11.2
	138.0	126.1	22.4	11.4
6099	147.0	133.1	22.4	12.5
	165.9	150.0	22.5	12.5
	173.2	155.8	22.1	13.0
6120	146.0	130.2	22.4	14.7
	173.5	154.0	22.1	14.8
	179.4	159.3	22.7	14.7
6105	191.9	169.5	30.7	16.1
	153.9	136.8	31.1	16.2
	167.9	148.8	31.3	16.3

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
6038	11.3	109.9
6099	12.7	112.1
6120	14.7	111.3
6105	16.2	109.1

Mold ID = 2
Volume of Mold = 941 cm^3
Mass of mold M_m = 4194.70 g
Estimated specific gravity G_s = 2.65

	ASTM
Optimum moisture (%) =	**13.3**
Maximum dry unit weight (pcf) =	**112.3**

Prepared by: ~~~ Date: 9/17/2024

Checked by: ~~~ Date: 9/17/2024

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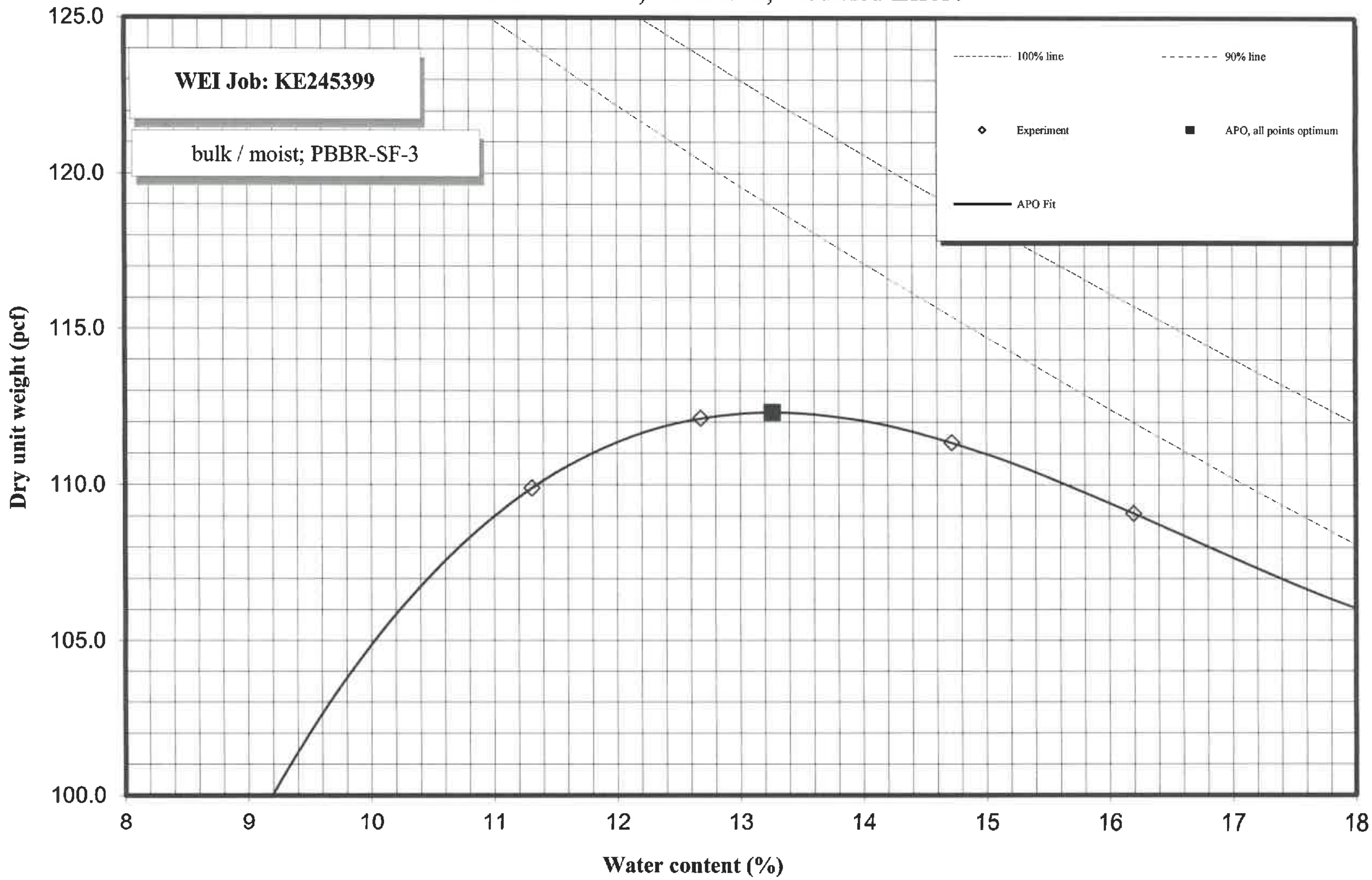

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client:	**CEC**	**Analyst Name:**	**L. Varzaru**
Project:	**Powerton Bypass Basin Retrofit**	**Date Received:**	**8/23/2024**
WEI Job:	**KE245399**	**Date Tested:**	**9/4/2024**
Type/Condition:	*bulk / moist*	**Soil Sample ID/Location:**	**PBBR-SF-4**
Preparation method:	dry	**Sample Description:**	**Brown Poorley Graded SAND (SP)**
Rammer type:	mechanical	**Total Mass (g):**	8407.2
Rammer face:	circular	**3/4 sieve mass (g):**	0
As Received Water Content:	3.82%	**3/8 sieve mass (g):**	0
		#4 sieve mass (g):	8.2 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
5972	122.3	114.7	22.5	8.2
	145.7	136.5	22.1	8.1
	129.3	121.1	22.1	8.3
6060	143.2	131.7	22.2	10.5
	193.0	176.4	22.3	10.8
	160.4	147.2	22.5	10.6
6107	176.0	157.8	22.2	13.4
	184.1	165.8	22.3	12.7
	197.6	177.1	22.3	13.3
6104	181.7	160.5	22.2	15.3
	162.6	143.4	22.6	15.9
	145.9	129.3	22.6	15.6

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
5972	8.2	109.0
6060	10.6	111.9
6107	13.1	112.2
6104	15.6	109.6

Mold ID = 2
Volume of Mold = 941 cm³
Mass of mold M_m = 4194.70 g
Estimated specific gravity G_s = 2.65

	ASTM
Optimum moisture (%) =	**12.1**
Maximum dry unit weight (pcf) =	**112.4**

Prepared by: ______ Date: 9/17/2024

Checked by: ______ Date: 9/17/2024

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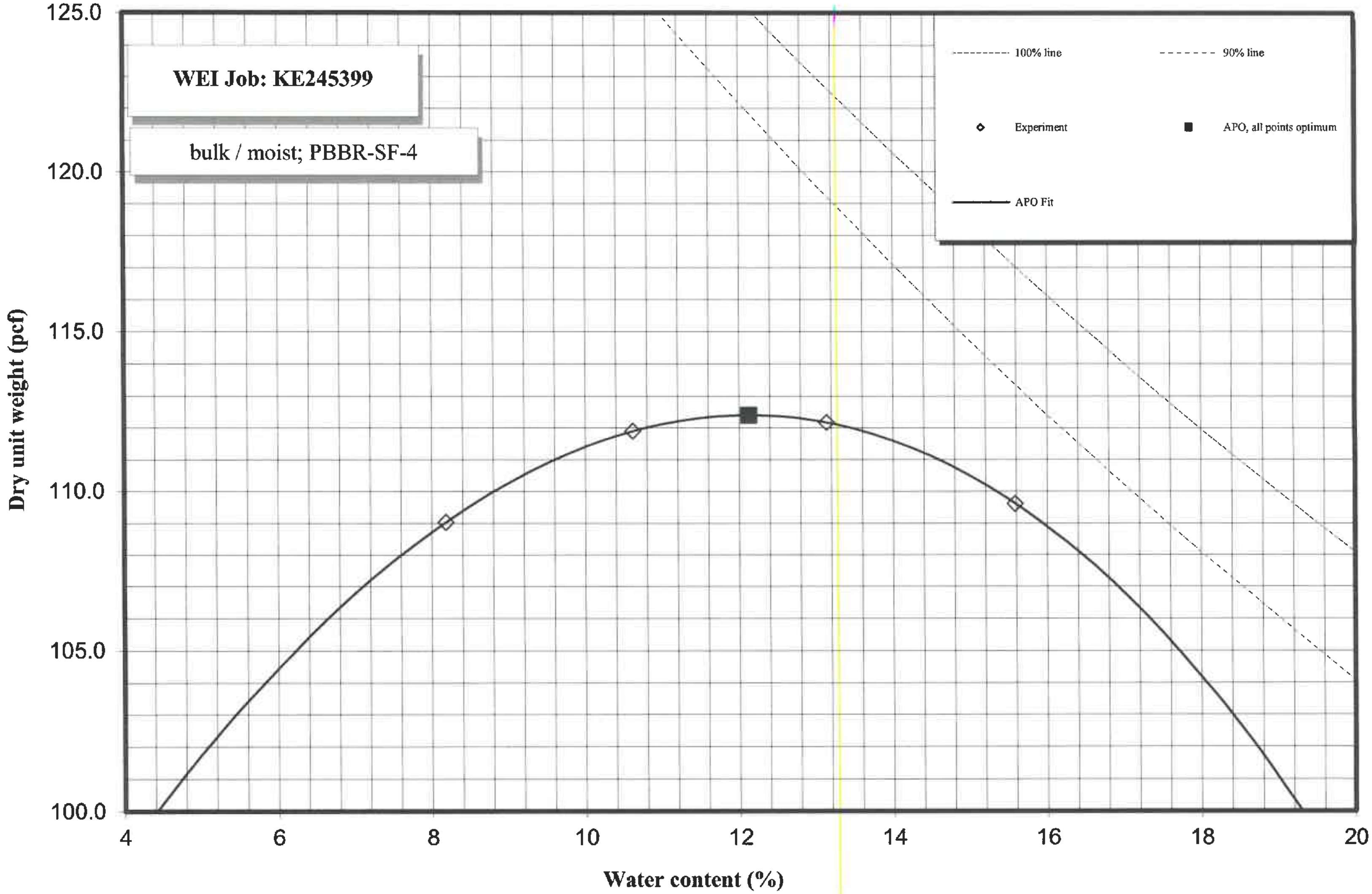

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LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557, Method A

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: KE245399
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: circular
As Received Water Content: 7.18%

Analyst Name: L. Varzaru
Date Received: 8/23/2024
Date Tested: 9/4/2024
Soil Sample ID/Location: PBBR-SF-5
Sample Description: Brown Poorley Graded SAND (SP)
Total Mass (g): 9549.3
3/4 sieve mass (g): 0
3/8 sieve mass (g): 0
#4 sieve mass (g): 11.2 removed

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
6001	169.3	157.2	31.2	9.6
	170.4	158.3	31.1	9.5
	188.0	174.0	30.3	9.7
6084	189.7	172.8	30.9	11.9
	181.6	165.7	31.0	11.8
	170.0	155.3	31.3	11.9
6124	216.0	193.0	31.3	14.2
	202.5	181.0	31.0	14.3
	218.0	194.6	31.1	14.3
6122	175.6	155.7	30.3	15.9
	192.7	170.5	31.3	16.0
	142.9	127.5	31.4	16.0

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
6001	9.6	109.3
6084	11.9	112.1
6124	14.3	112.0
6122	16.0	110.3

Mold ID = 2
Volume of Mold = 941 cm³
Mass of mold M_m = 4194.70 g
Estimated specific gravity G_s = 2.65

ASTM
Optimum moisture (%) = **13.0**
Maximum dry unit weight (pcf) = **112.4**

Prepared by: Date: 9/17/2024

Checked by: Date: 9/17/2024

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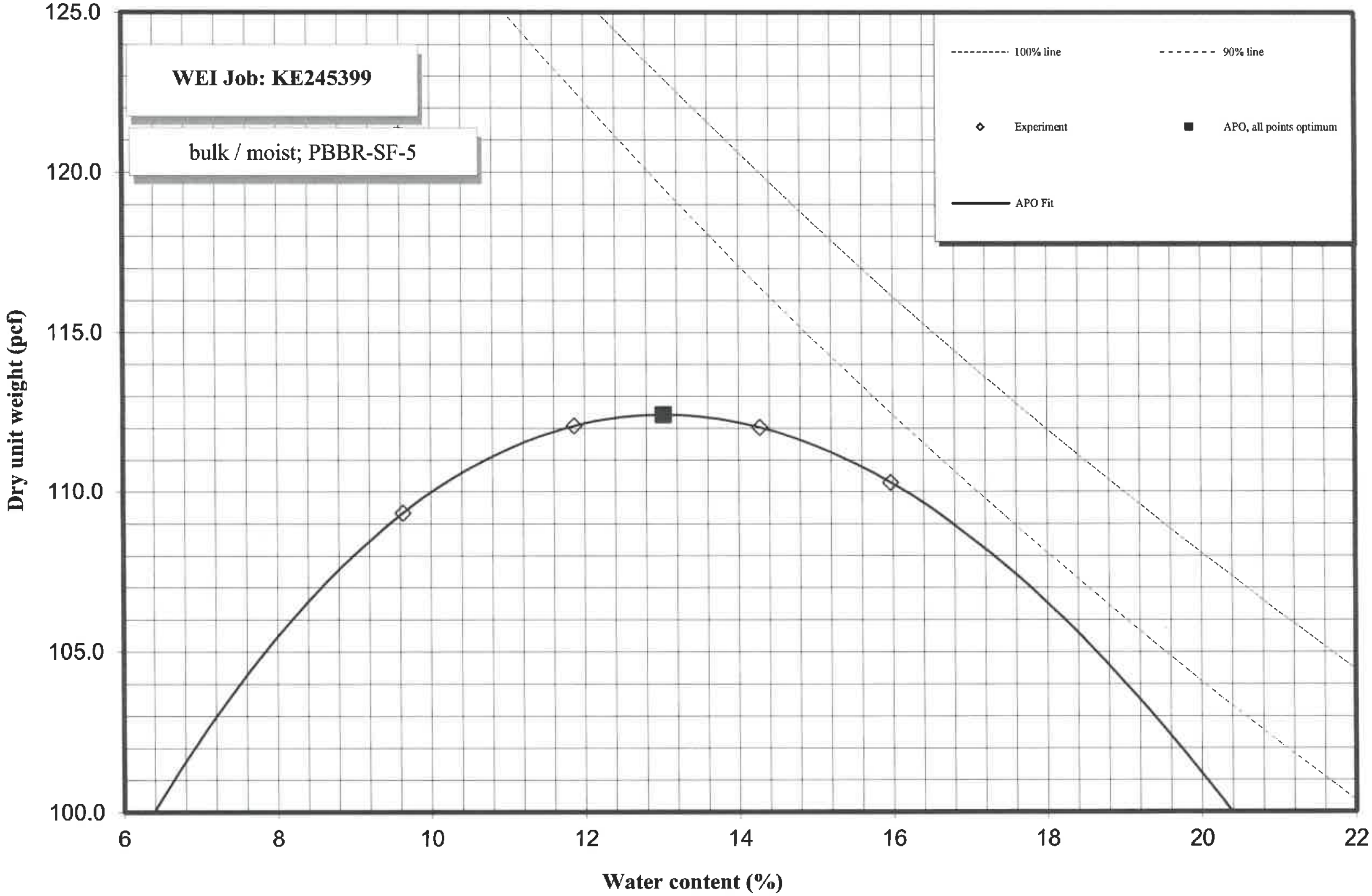
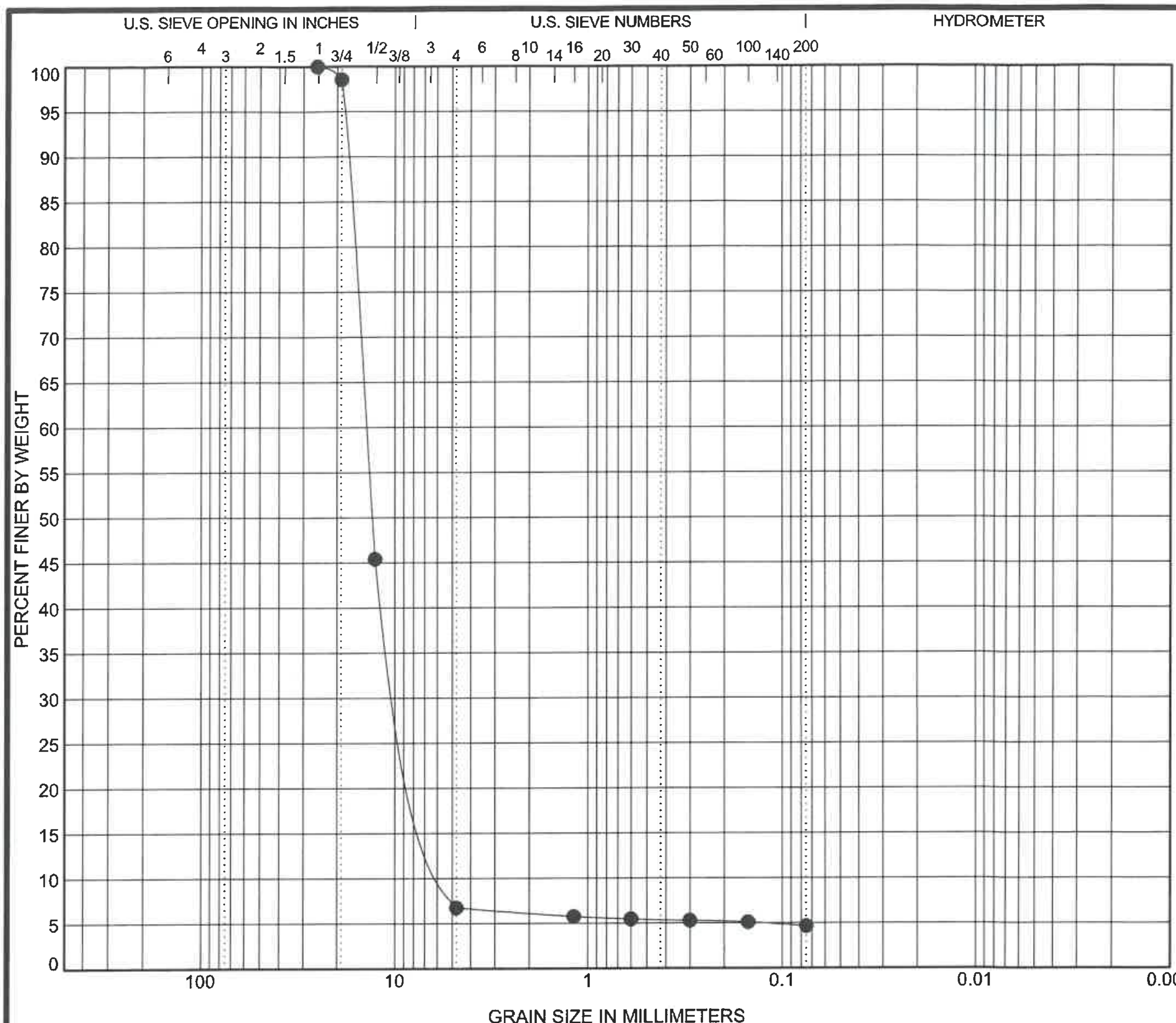
MOISTURE--DENSITY RELATIONSHIP
ASTM D 1557, Method A, Modified Effort





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● PBBR-CAB-1#1	0.0 ft	**POORLY GRADED GRAVEL(GP)**	**NP**	**NP**	**NP**	**1.01**	**2.75**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PBBR-CAB-1#1	0.0 ft	**25.4**	**14.185**	**8.581**	**5.16**	**93.3**	**2.1**	**4.7**	

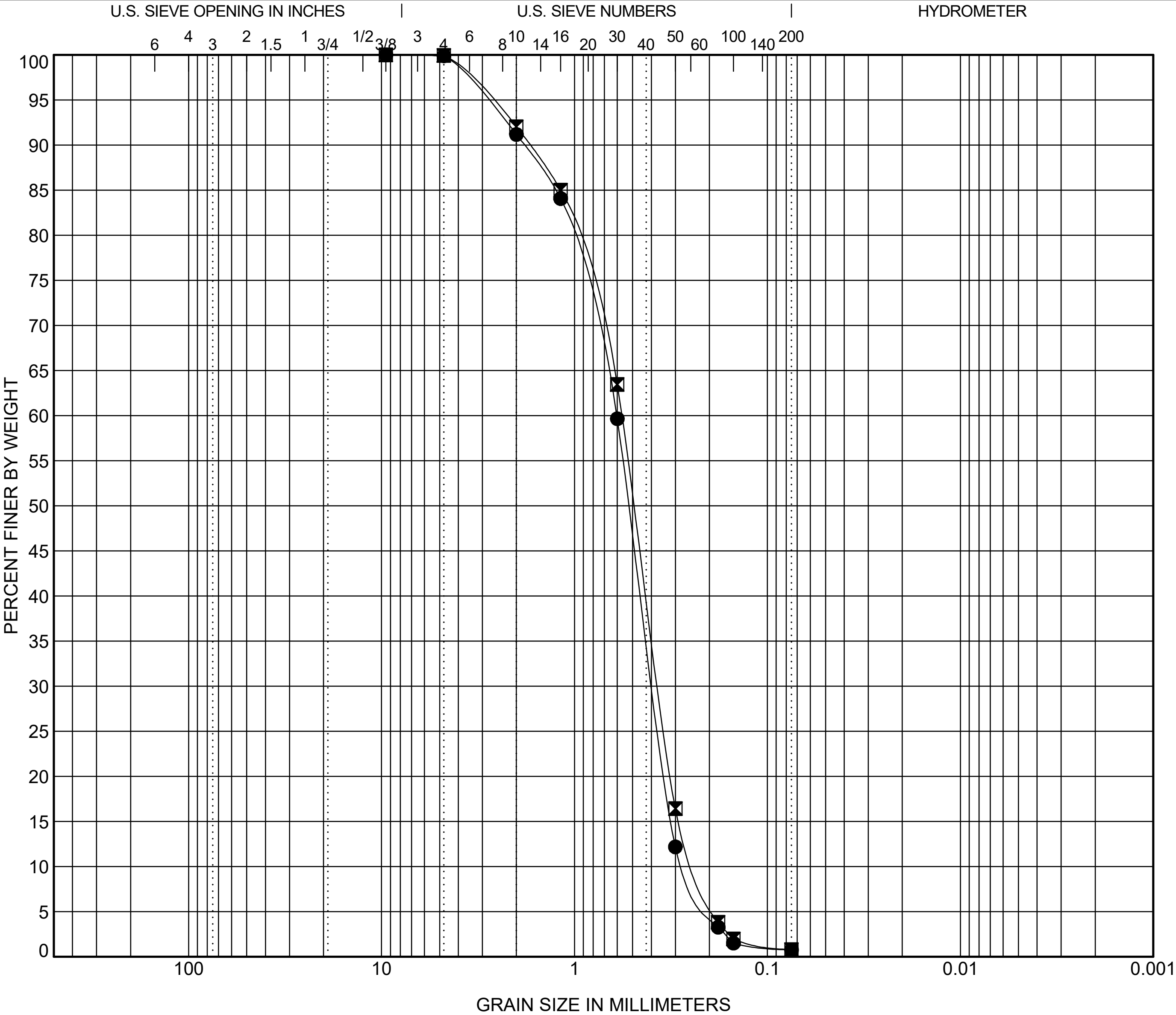
WEI SINCE 1982
Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	**PBBR-SAND-1#1**	**0.0 ft**	**POORLY GRADED SAND(SP)**	**NP**	**NP**	**NP**	**0.94**	**2.29**
⧗	**PBBR-SAND-2#1**	**0.0 ft**	**POORLY GRADED SAND(SP)**	**NP**	**NP**	**NP**	**1.02**	**2.47**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**PBBR-SAND-1#1**	**0.0 ft**	**9.5**	**0.606**	**0.389**	**0.265**	**0.1**	**99.1**	**0.8**	
⧗	**PBBR-SAND-2#1**	**0.0 ft**	**9.5**	**0.57**	**0.366**	**0.231**	**0.1**	**99.1**	**0.8**	

WEI GRAIN SIZE USCS KE245399.GPJ US LAB.GDT 10/11/24

WEI
SINCE 1982
Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148
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GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
AASHTO T 215 / ASTM D2434

Client: Civil and Environmental Consultants
Project: Powerton Bypass Retrofit
Analyst Name: M. Snider
WEI Project #: KE245399
Test Date: 10/1/2024
Soil Sample ID: PBBR-SAND-01
Sample Description: Brown, Poorly-graded SAND (SP)

Specific gravity G_s = *2.65*
Specimen dry mass M_d = *729.46* g
Specimen height H = *12.97* cm
Specimen diameter D = *6.35* cm
Piezometer tap distance L = *6.35* cm
Initial void ratio e = 0.49
Dry unit weight g_d = 17.42 kN/m^3
110.93 lbs/ft^3

Trial	1	2	3	4	5
Piezometer level distance (cm) Dh	*6.70*	*6.90*	*6.30*	*6.40*	*6.40*
Duration of sampling (s) t	*60*	*60*	*60*	*60*	*60*
Mass of water collected & container (g) M_{wc}	*294.8*	*290.6*	*288.9*	*291.4*	*290.7*
Mass of container (g) Mc	*168.4*	*168.4*	*169.1*	*168.6*	*169.1*
Water temperature (^oC)	*23.5*	*31.1*	*29.7*	*29.8*	*29*
Hydraulic gradient i	1.1	1.1	1.0	1.0	1.0
Discharge velocity (cm/s) v	0.067	0.064	0.063	0.065	0.064
Permeability at test temperature (cm/s) k_T	0.0630	0.0592	0.0636	0.0641	0.0635
Permeability at 20^oC (cm/s) k	0.0580	0.0461	0.0510	0.0513	0.0518

Average permeability at test = 0.0627 cm/s 177.67 ft/day

Average permeability at 20^oC = 0.0516 cm/s 146.33 ft/day

Prepared by: Matt Ciapas Date: 10/11/2024
Checked by: Mickey Snider Date: 10/11/2024

Wang Engineering

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Phone (630) 953-9928
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PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
AASHTO T 215 / ASTM D2434

Client: Civil and Environmental Consultants
Project: Powerton Bypass Retrofit | **Analyst Name:** M. Snider
WEI Project #: KE245399 | **Test Date:** 10/1/2024
Soil Sample ID: PBBR-SAND-02 | **Sample Description:** Brown, Poorly-graded SAND (SP)

Specific gravity G_s =	*2.65*	
Specimen dry mass M_d =	*738.78*	g
Specimen height H =	*13.36*	cm
Specimen diameter D =	*6.35*	cm
Piezometer tap distance L =	*6.35*	cm
Initial void ratio e =	0.52	
Dry unit weight g_d =	17.12	kN/m^3
	109.04	lbs/ft^3

Trial	1	2	3	4	5
Piezometer level distance (cm) Dh	*8.80*	*9.10*	*9.10*	*9.40*	*9.40*
Duration of sampling (s) t	*60*	*60*	*60*	*60*	*60*
Mass of water collected & container (g) M_{wc}	*323.2*	*328.8*	*328.1*	*332.9*	*333.2*
Mass of container (g) Mc	*168.4*	*168.5*	*169.2*	*168.7*	*169.1*
Water temperature (^{o}C)	*25.1*	*25*	*25*	*25*	*24.8*
Hydraulic gradient i	1.4	1.4	1.4	1.5	1.5
Discharge velocity (cm/s) v	0.081	0.084	0.084	0.086	0.086
Permeability at test temperature (cm/s) k_T	0.0588	0.0589	0.0583	0.0584	0.0584
Permeability at 20^{o}C (cm/s) k	0.0522	0.0524	0.0519	0.0520	0.0522

Average permeability at test =	0.0585	cm/s	165.97	ft/day
Average permeability at 20^{o}C =	0.0521	cm/s	147.74	ft/day

Prepared by: *Matt Ciapas* Date: 10/11/2024

Checked by: *Mickey Snider* Date: 10/11/2024

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Lombard, Illinois 60148
Phone (630) 953-9928
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LABORATORY COMPACTION CHARACTERISTICS OF SOIL MODIFIED EFFORT

ASTM D1557 Method C / Coarse Particles Correction per ASTM D4718

Client: CEC
Project: Powerton Bypass Basin Retrofit
WEI Job: KE245399
Type/Condition: *bulk / moist*
Preparation method: dry
Rammer type: mechanical
Rammer face: wedge
As Received Water Content: 3.8%

Analyst Name: M. Ciapas
Date Sampled: 9/4/2024
Date Tested: 9/23/2024
Soil Sample ID/Location: PBBR-PWL-1
Sample Description: CA-6

Total Mass (g):	20275.8	
3/4 sieve mass (g):	5533.7	removed
3/8 sieve mass (g):	5695.9	replaced
#4 sieve mass (g):	2983.2	replaced

Mass of soil and mold (g)	Mass of can and wet soil (g) Mw	Mass of can and dry soil (g) Md	Mass of can (g) Mc	Water content (%)
11081	162.9	158.3	30.9	3.6
	147.9	143.7	30.1	3.7
	132.7	129.1	30.8	3.7
11308	156.2	149.5	31.2	5.7
	188.9	180.4	31.0	5.7
	157.6	150.7	31.4	5.8
11458	158.9	149.4	31.3	8.1
	145.2	136.8	31.1	7.9
	190.1	178.2	31.2	8.1
11477	239.5	221.3	31.4	9.6
	252.8	233.5	31.3	9.6
	221.3	204.6	31.3	9.7

Mass of soil and mold (g) M	Average water content (%) w	Dry unit weight (pcf) γ_d
11081	3.7	130.62
11308	5.7	134.38
11458	8.0	135.61
11477	9.6	134.14

Diameter of mold d = *6.000* in
Height of mold h = *4.579* in
Mass of mold M_m = *6480.5* g
Estimated specific gravity G_s = *2.76*

	Uncorrected	Coarse Correction
Optimum moisture (%) =	7.7	5.6
Maximum dry unit weight (pcf) =	135.7	144.5

Prepared by: _______ Date: 9/24/2024

Checked by: _______ Date: 9/24/2024

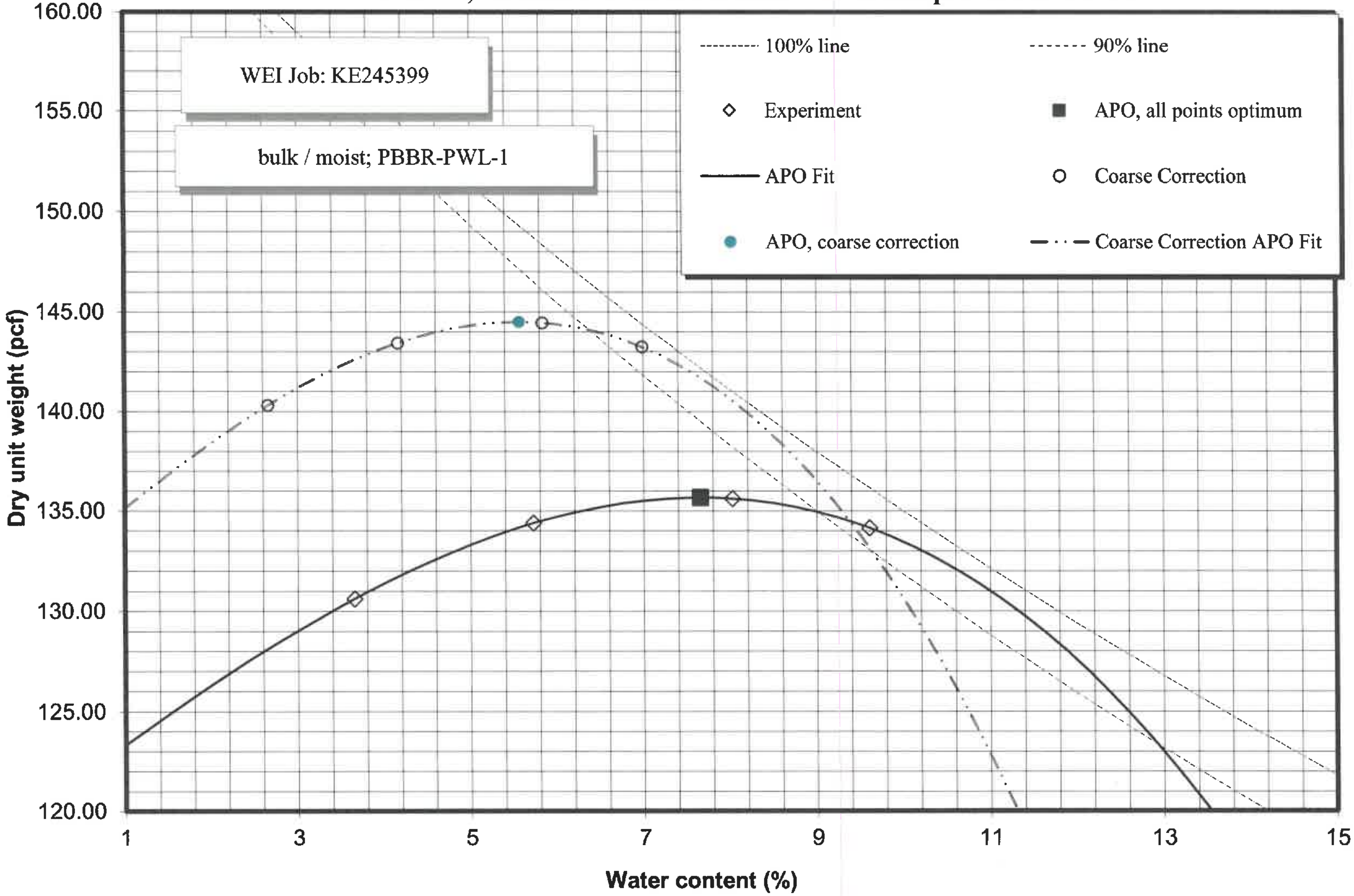
N:\Projects\2024\KE245399\Working Files\Laboratory-Field Data-Boring Logs\RPT_Wang_MAC_KE245399_PBBRPWL01_ASTMD1557CwD4718_20240924.xls

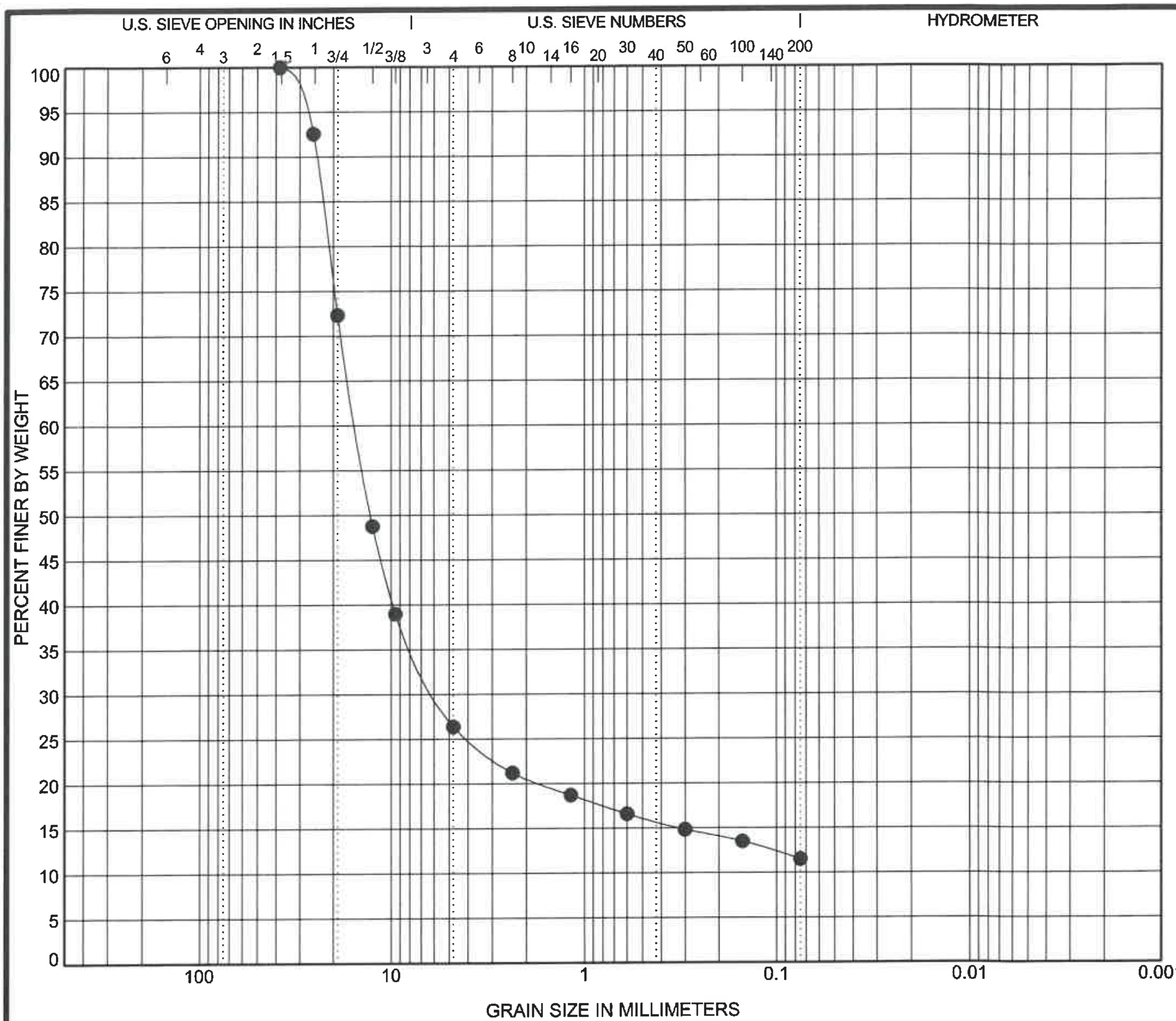
AASHTO ACCREDITATION PROGRAM

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

MOISTURE--DENSITY RELATIONSHIP
MODIFIED EFFORT
ASTM 1557 , Method C/Coarse Particles Correction per ASTM D4718





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● PBBR-PWL-1#1	0.0 ft	**POORLY GRADED GRAVEL with SILT(GP-GM)**	**NP**	**NP**	**NP**	**49.42**	**342.61**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PBBR-PWL-1#1	0.0 ft	**38.1**	**15.261**	**5.796**		**73.6**	**14.9**	**11.5**	

WEI GRAIN SIZE USCS KE245399.GPJ US LAB.GDT 9/24/24

WEI
SINCE 1982
Wang Engineering, Inc.
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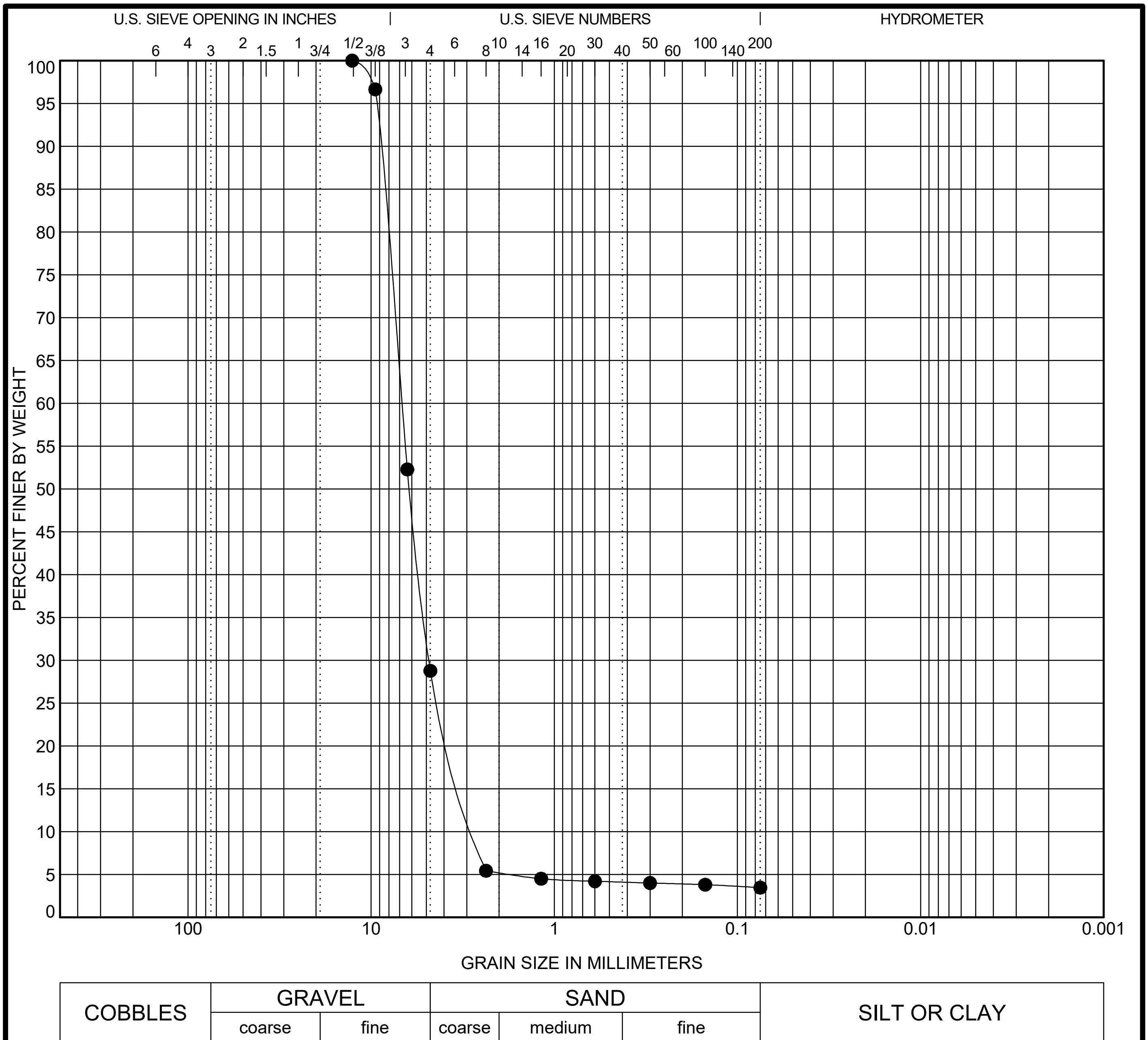
Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399



Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● PBBR-RB-1#1	0.0 ft	**POORLY GRADED GRAVEL with SAND(GP)**	**NP**	**NP**	**NP**	**1.26**	**2.52**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PBBR-RB-1#1	0.0 ft	**12.7**	**6.811**	**4.822**	**2.706**	**71.2**	**25.3**	**3.5**	

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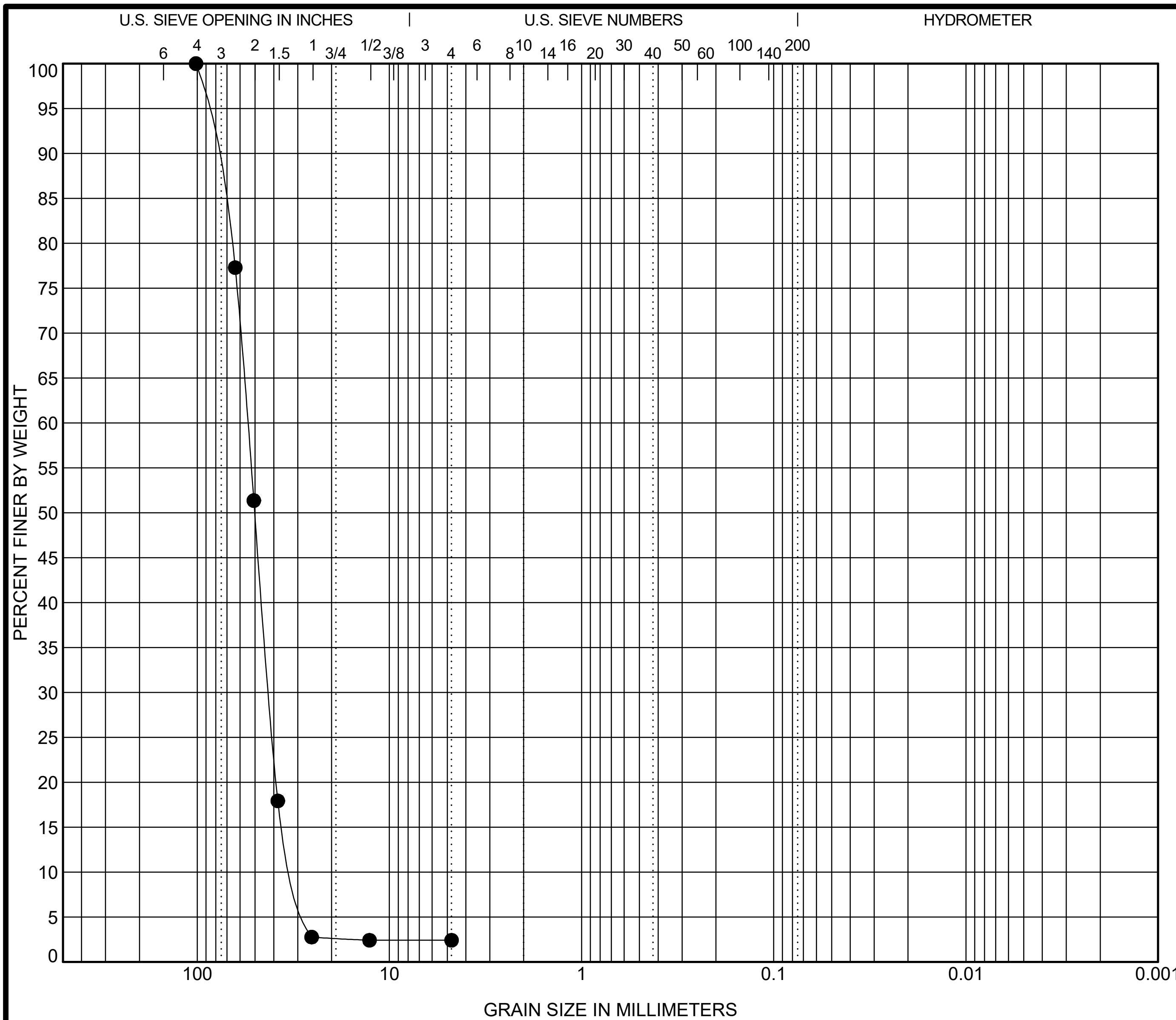
GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
● PBBR-RR-1#1	0.0 ft		NP	NP	NP	1.06	1.78

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PBBR-RR-1#1	0.0 ft	101.6	54.721	42.271	30.821	82.9			

WEI SINCE 1982
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GRAIN SIZE DISTRIBUTION

Project: Powerton Bypass Basin Retrofit

Location: Perkin, IL

Number: KE245399

APPENDIX G

COMPOSITE LINER ACCEPTANCE

APPENDIX G-1

GEOSYNTHETIC CLAY LINER MATERIAL CERTIFICATIONS

Date: 11-Jun-2024
Purchase Order: 24058-2_R1
ORDER NUMBER: 55088705

CLEANAIR AND WATER SYSTEM
123 ELM ST
PO BOX 337
DOUSMAN,WI,53118-0337

To Whom It May Concern:

Please find the enclosed Manufacturing Quality Assurance/Manufacturing Quality Control (MQA/MQC) test data package for Geosynthetic Clay Liner (GCL) shipments to CLEANAIR AND WATER SYSTEM .

Questions regarding this information should be directed to CETCO® Technical Services at eptechservices@cetco.com.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Lovell Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME:	
CUSTOMER P.O.:	24058-2_R1
ORDER NUMBER:	55088705
PREPARED FOR:	CLEANAIR AND WATER SYSTEM

CONTENTS:

- Product Certifications
- GCL Order Packing List and MQA Tracking Form
- GCL Manufacturing Quality control test data
- Bentonite clay certification
- Raw Material Test results

PREPARED BY: NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO®
AMERICAN COLLOID COMPANY
92 HIGHWAY 37
LOVELL, 82431, WY
Telephone: 800-322-1159
Email: Ryan.Nicholls@mineralstech.com

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 24058-2_R1
ORDER NUMBER: 55088705
PREPARED FOR: CLEANAIR AND WATER SYSTEM

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR RESISTEX® U5 DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	1x10-9 - cm/s
ASTM D5890	Bentonite Free Swell	50 tons	24 - ml
ASTM D5891	Bentonite Fluid Loss	50 tons	18 - ml
ASTM D6496	GCL Peel Strength	40,000 sq ft (4,000 sq m)	3.5 - lbs/in
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s
ASTM D5993	Bentonite Mass/Area	40,000 sq ft (4,000 sq m)	.75 - lbs/sq ft
ASTM D6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 - lbs/in
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 - psf
ASTM D4643	GCL Moisture	40,000 sq ft (4,000 sq m)	35 - %

All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. An "*" indicates non-standard testing, frequency, or certified value .

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO® hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO® certifies Bentomat® to be essentially free of broken needless and fragments of needles that would negatively affect the performance of the final product.

Sincerely,

NICHOLLS, RYAN J
Quality Assurance Coordinator
CETCO® Lovell Plant

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 55088705

GCL								GEOTEXTILE			CLAY
RESISTEX® U5 DN								01-9514	01-8991		LP 66-BLK
Order	**GCL Lot#**	**GCL Roll#**	**Length**	**Width**	**Weight**	**Sq. ft**	**Roll # Tested**	**Cap1 Roll #**	**Base1 Roll #**		**Clay Lot #**
55088705	LL-23-2024	152	150	14.5	2650	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	153	150	14.5	3060	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	154	150	14.5	3105	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	155	150	14.5	3080	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	156	150	14.5	3045	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	157	150	14.5	3060	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	158	150	14.5	3010	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	159	150	14.5	3030	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	160	150	14.5	3025	2175	152	2027791482	J20696680		L-156-24-A
55088705	LL-23-2024	161	150	14.5	3050	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	162	150	14.5	3010	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	163	150	14.5	3005	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	164	150	14.5	2990	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	165	150	14.5	2950	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	166	150	14.5	2975	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	167	150	14.5	2990	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	168	150	14.5	2975	2175	152	2027788707	J20696680		L-156-24-A
55088705	LL-23-2024	169	150	14.5	2980	2175	152	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	170	150	14.5	3065	2175	170	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	171	150	14.5	3035	2175	170	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	172	150	14.5	2895	2175	170	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	173	150	14.5	2900	2175	170	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	174	150	14.5	2955	2175	170	2027791511	J20696680		L-156-24-A
55088705	LL-23-2024	175	150	14.5	2955	2175	170	2027791511	J20690197		L-156-24-A
55088705	LL-23-2024	176	150	14.5	2950	2175	170	2027791511	J20690197		L-156-24-A
55088705	LL-23-2024	177	150	14.5	2995	2175	170	2027788669	J20690197		L-156-24-A
					Total Sq Ft:	56550		Total Number of Rolls Certified: 26			

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 55088705 have been tested in our production facility lab.

Product	Lot# Tested	Roll# Tested	Mass Area	Grab Strength	Peel Strength	GCL Moisture		
		ASTM Test Method:	ASTM D5993	ASTM D6768	ASTM D6496	ASTM D4643		
		Required Value:	.75 - lbs/sq ft	50 - lbs/in	3.5 - lbs/in	35 - %		
RESISTEX® U5 DN	LL-23-2024	152	1.05	79.6	4.9	25.7		
RESISTEX® U5 DN	LL-23-2024	170	.95	79.6	3.6	25.9		

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 55088705 was tested in our production facility lab and yielded the following results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	ASTM D2216	ASTM D5890	ASTM D5891
Required Value:	12 - %	24 - ml	18 – ml
L-156-24-A	8.8	32	11.2

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 55088705 was manufactured with geotextiles which were tested and yielded the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-8991	J20696680	6.4	221
01-8991	J20690197	6.3	183.4

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
01-9514	2027791482	6.51	144.72
01-9514	2027788707	6.81	110.24
01-9514	2027791511	6.49	135.66
01-9514	2027788669	6	101.06

Certifications from our suppliers are on file at our production facility.

CETCO
Colloid Environmental Technologies Company LLC

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 24058-2_R1
ORDER NUMBER: 55088705
PREPARED FOR: CLEANAIR AND WATER SYSTEM

08/14/2024 S&L Comment:
Per Spec. P-1402, Section 319025, Table 319025-2, the maximum allowable index flux was specified as 2x10-9 m3/m2/sec. Because the reported index flux (1.6x10-9 m3/m2/sec) is less than the acceptance criterion specified in Spec. P-1402, this GCL material is acceptable.

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR RESISTEX® U5 DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D5887	GCL-Hydraulic Conductivity	250,000 sq ft	1x10-9 - cm/s
ASTM D5887	GCL-Index Flux	250,000 sq ft	1x10-8 - m3/m2/s

Product	Lot# Tested	Roll# Tested	Index Flux	Hydraulic Conductivity				
		ASTM Test Method:	ASTM D5887	ASTM D5887				
		Required Value:	1x10-8 m3/m2/s	1x10-9 cm/s				
RESISTEX® U5 DN	LL-23-2024	152	1.6x10-9	8.5x10-10				

08/14/2024 S&L Comment:
Per Spec. P-1402, Section 319025, Table 319025-2, the maximum allowable index flux was specified as 2x10-9 m3/m2/sec. Because the reported index flux (1.6x10-9 m3/m2/sec) is less than the acceptance criterion specified in Spec. P-1402, this GCL material is acceptable.

CETCO
Colloid Environmental Technologies Company LLC

REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.

CONTRACTOR: CAAW
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 8/14/2024

PRODUCT CERTIFICATIONS

PROJECT NAME:
CUSTOMER P.O.: 24058-2_R1
ORDER NUMBER: 55088705
PREPARED FOR: CLEANAIR AND WATER SYSTEM

The GCL Manufactured for the above-referenced order number is certified to meet the values listed in the tables

below: **GCL PROPERTY SPECIFICATIONS FOR RESISTEX® U5 DN**

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D6243	GCL Hydrated Internal Shear Strength	1,000,000 sq ft	500 – psf

Product	Lot# Tested	Roll# Tested	Hydrated Internal Shear Strength					
		ASTM Test Method:	ASTM D6243					
		Required Value:	500 - psf					
RESISTEX® U5 DN	LL-15-2024	3	841					

APPENDIX G-2

GEOSYNTHETIC CLAY LINER CONFORMANCE TESTING

CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-003
LAB ID NO.: L24-116-003-001
MATERIAL: CETCO Resistex U5 DN GCL
ROLL NO: 153

	SPECIMEN	TOTAL WT. AS REC'D grams	TOTAL WT. DRY grams	TOTAL WT. AS REC'D psf	TOTAL WT. DRY psf	WT. BACKING psf (1)	AS REC'D Bent Cont psf	DRY Bent Cont psf	MOISTURE CONTENT %	Bent Cont 12% m.c. psf
BENTONITE CONTENT	1	143.2	122.7	1.42	1.22	0.100	1.32	1.12	18	1.25
	2	159.9	135.8	1.59	1.35	0.100	1.49	1.25	19	1.40
	3	110.8	95.4	1.10	0.95	0.100	1.00	0.85	18	0.95
ASTM D5993	4	127.7	109.3	1.27	1.08	0.100	1.17	0.98	18	1.10
	5	147.1	130.7	1.46	1.30	0.100	1.36	1.20	14	1.34
							AVERAGE:	**1.08**	**17**	**1.21**

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVG	STD
PEEL STRENGTH	D 6496	MD-lbs/in	13.0	4.2	6.9	7.2	6.4	**7.5**	2.91
FLUID LOSS	D 5891	ml	14.0					**14.0**	
SWELL INDEX	D 5890	ml/2g	28.0					**28.0**	

	AS REC'D WEIGHT grams	DRY WEIGHT grams	MOISTURE CONTENT %
MOISTURE CONTENT ASTM D 4643	83.3	74.34	17

CHECKED BY: JLK DATE: 7/8/2024

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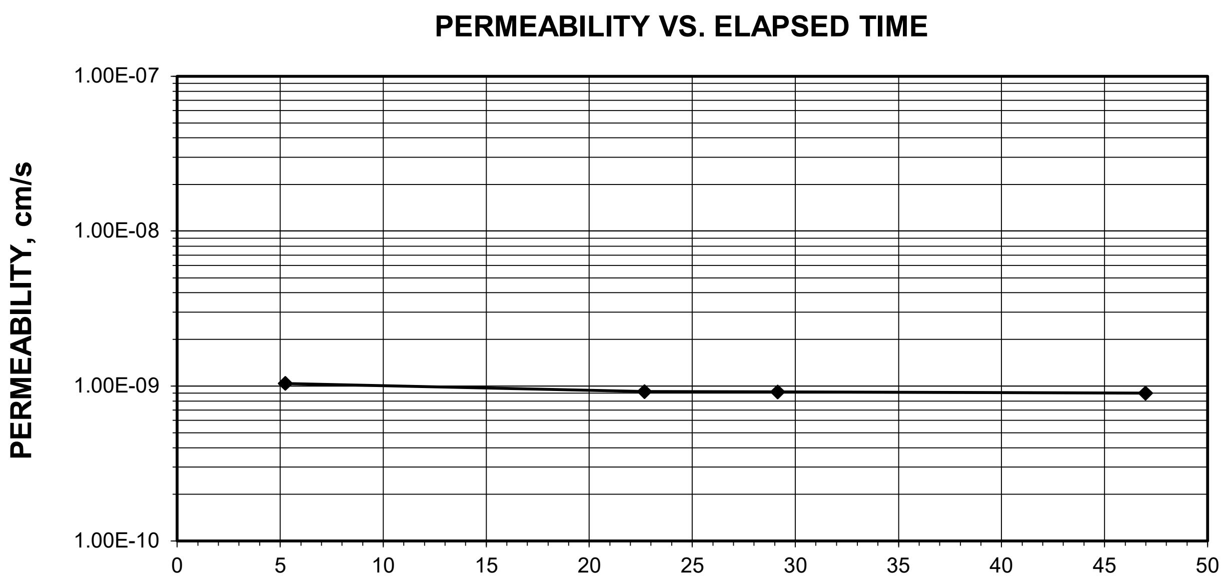
GCL INDEX FLUX & PERMEABILITY TEST

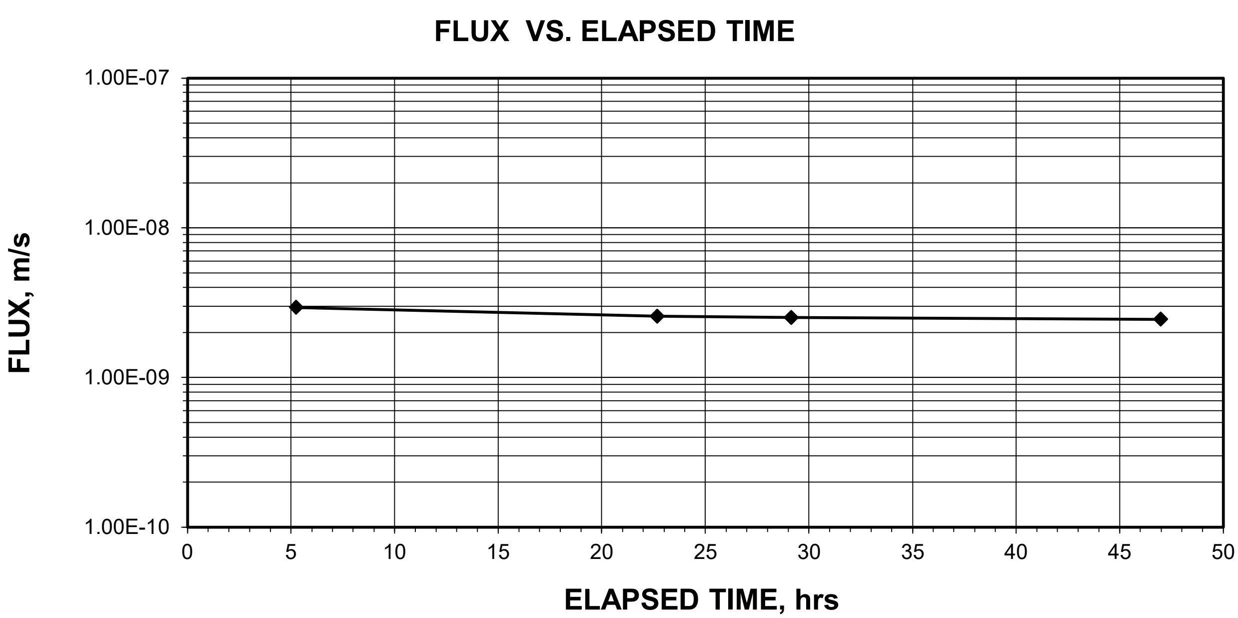
ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-001	Material:	CETCO Resistex U5 DN GCL
Client:	Clean Air And Water Systems, Inc.	Roll I.D.:	153
Client Project:	Powerton Generating Station	Lot No.:	NA
Project No.:	L24-116-003	Sample No.:	NA

AVERAGE FLUX = 2.51E-09 m/s

AVERAGE PERMEABILITY = 9.11E-10 cm/s @ 20°C





Checked By: JLK Date: 7/8/2024

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-001	Tested By: JO	Date: 6/25/2024
Client:	Clean Air And Water Systems, Inc.		
Client Project:	Powerton Generating Station	Checked By: JLK	Date: 7/8/2024
Project No.:	L24-116-003		
Material:	CETCO Resistex U5 DN GCL		
Roll I.D.:	153		
Lot No.:	NA		
Sample No.:	NA		
Permeant:	Deaired, Deionized Water		

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	24	43
Wt. of Tare & GCL[2] (gm.)	61.31	115.00
Wt. of Tare & Dry GCL[2] (gm.)	54.11	57.43
Wt. of Tare (gm.)	10.70	10.43
Wt. of Water (gm.)	7.20	57.57
Wt. of Dry GCL (gm.)[2]	43.41	47.00
GCL Moisture Content (%)	**16.6**	**122.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of GCL (gm.)[2]	61.70	117.75 (Calculated)
Clay Component Thickness 1 (in.)[1]	0.126	0.240
Clay Component Thickness 2 (in.)[1]	0.124	0.238
Clay Component Thickness 3 (in.)[1]	0.120	0.233
Average Clay Component Thickness (in.)	na	0.237
Average Clay Component Thickness (mm)	na	**6.020**
Specimen Dia. (in)	4.000	4.000
Specimen Area ($in.^2$)	12.57	12.57
Specimen Area (m^2)	0.00811	0.00811
Mass/Unit Area of GCL($gm./m^2$)[2]	7,608	14,519
Mass/Unit Area of GCL(psf)[2]	1.56	2.97
Mass/Unit Area of Dry GCL($gm./m^2$)[2]	6,526	
Mass/Unit Area of Dry GCL(psf)[2]	1.34	

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887

(SOP-G52)

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Lab ID No.:	L24-116-003-001
Client:	Clean Air And Water Systems, Inc.
Client Project:	Powerton Generating Station
Project No.:	L24-116-003
Material:	CETCO Resistex U5 DN GCL
Roll I.D.:	153
Sample No.:	NA

Pressure Heads (Constant)		**Final Sample Dimensions**	
Top Cap (psi)	75.0	Sample Length (cm), L	0.602
Bottom Cap (psi)	77.0	Sample Diameter (cm)	10.16
Cell (psi)	80.0	Sample Area (cm^2), A	**81.07**
Total Head (cm)	140.6	Inflow Burette Area (cm^2), a-in	0.912
		Outflow Burette Area (cm^2), a-out	0.912

AVERAGE FLUX = 2.51E-09 m/s

AVERAGE PERMEABILITY = 9.11E-10 cm/s @ 20°C

DATE (m-d-y)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	RATIO ΔIN / ΔOUT (3 readings)	TOTAL HEAD h (cm)	TEMP. (°C)	INCREMENTAL FLUX @ 20°C (m/sec)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
7/1/2024	0.0	0.0	0.0	NA	166.8	20.9	NA	NA
7/1/2024	5.3	0.4	0.5	NA	165.8	20.9	2.94E-09	1.04E-09
7/2/2024	22.7	1.8	1.7	1.06	163.0	20.8	2.56E-09	9.18E-10
7/2/2024	29.1	2.4	2.1	1.22	161.9	20.8	2.52E-09	9.14E-10
7/3/2024	47.0	3.7	3.3	1.19	159.1	20.8	2.45E-09	9.00E-10

08/14/2024 S&L Comment: The reported hydraulic conductivity (9.11E-10 cm/s) conforms to Specification P-1402, Table 319025-2 (1E-09 cm/s max.). Although the reported flux (i.e., liquid flow rate) (2.51E-09 m/s) appears to be greater than that specified in Specification P-1402, Table 319025-2 (2E-09 m/s), the GCL material provided complies with the Illinois CCR Rule's performance criterion for the lower component of a composite liner system per the calculations below.

Notes 4 and 5 for Table 319025-2 state that the specified flux is based on (1) a 7-mm-thick GCL and (2) a hydraulic head of 2 psi, i.e., 140.6 cm. Per this test report, the supplied GCL is 6-mm thick. Moreover, using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3), the effective hydraulic head for this test was 165.3 cm (> 140.6 cm):

$q_{GCL} = k_{GCL}((h/t_{GCL}+1)$, or $h = t_{GCL}((q_{GCL}/k_{GCL})-1) = (0.602 \text{ cm})*[(2.51E-07 \text{ cm/s})/(9.11E-10 \text{ cm/s})-1] = 165.3 \text{ cm}$

To be acceptable as the lower component of the retrofitted Bypass Basin's composite liner system, the supplied GCL must have an liquid flow rate less than or equal to two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec. 35 Ill. Adm. Code 845.400(c)(2). The liquid flow rate comparison between this GCL and two feet (61.0 cm) of compacted soil with a hydraulic conductivity of 1E-07 cm/sec must be made using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3). The flow rate through compacted soil (q_{soil}) that is two-feet thick (t_{soil} = 61.0 cm), that has a hydraulic conductivity of 1E-07 cm/sec (k_{soil}), and that is subject to the effective hydraulic head applied during this test (h = 165.3 cm) is:

$q_{soil} = k_{soil}((h/t_{soil})+1)$
$= (1E-07 \text{ cm/sec})*[(165.3 \text{ cm})/(61.0 \text{ cm})+1]*(1 \text{ m} / 100 \text{ cm})$
$= 3.71E-09 \text{ m/sec}$

Because the reported flow rate for the GCL (q_{GCL} = 2.51E-09 m/sec) is less than the calculated flow rate through two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec subject to the same hydraulic head (q_{soil} = 3.71E-09 m/sec), the supplied GCL complies with 35 Ill. Adm. Code 845.400(c)(2) and is acceptable for use as the lower component of the retrofitted Bypass Basin's composite liner system.

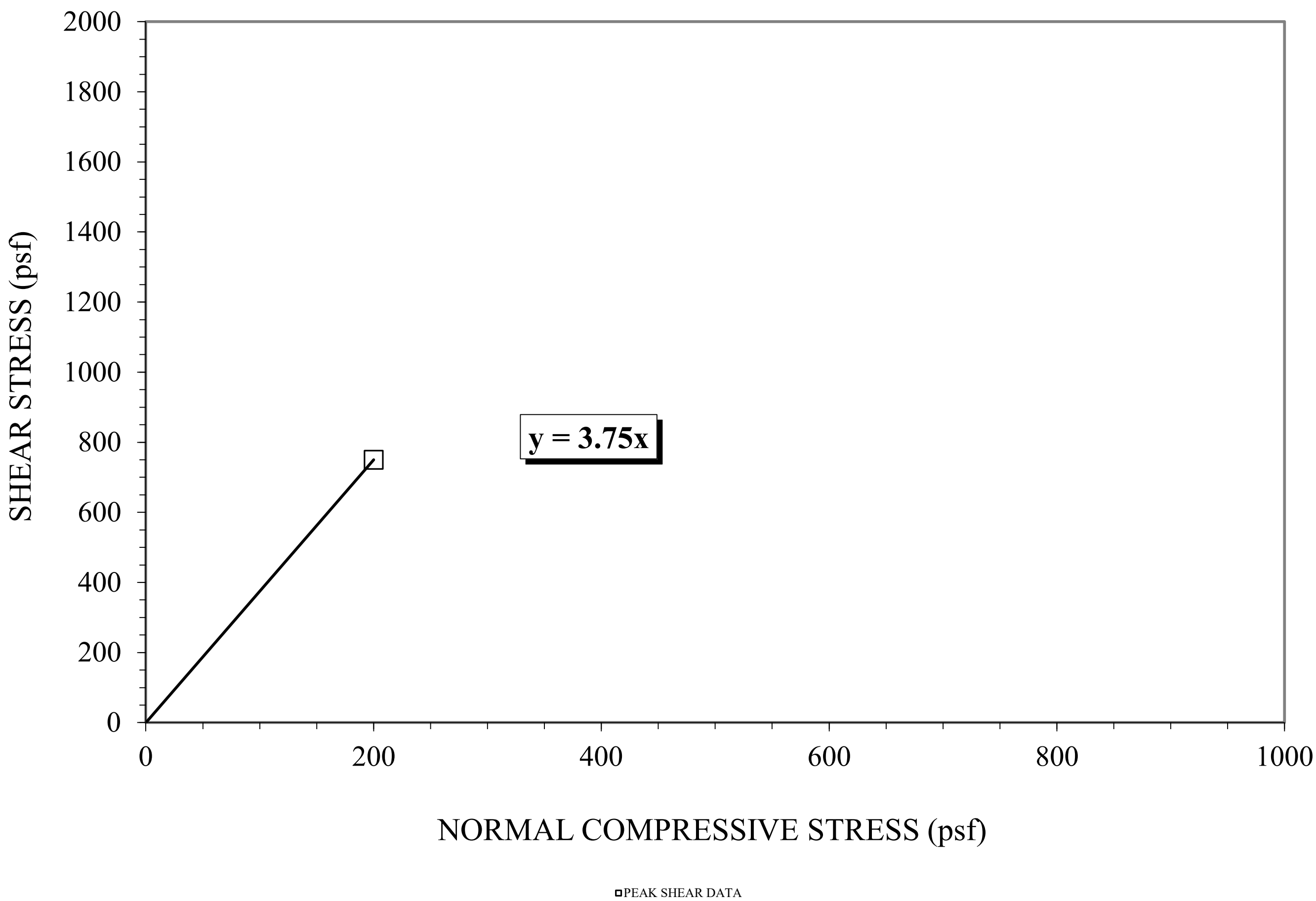
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 153 (L24-116-003-001)

INTERFACE : **Internal Shear of GCL**

		PEAK SHEAR
FRICTION ANGLE (deg) :	**Φ =**	**75.1**
COEFFICIENT OF FRICTION :	**=**	**3.750**
ADHESION [Calculated] (psf):	**a =**	**0**

NOTES:
1.) The GCL was loaded, inundated with water & seated for 24 hours prior to shearing.
2.) The peak friction angle was calculated using linear regression on the peak data point through the origin.



APPROVED BY : RO DATE : 7/8/2024

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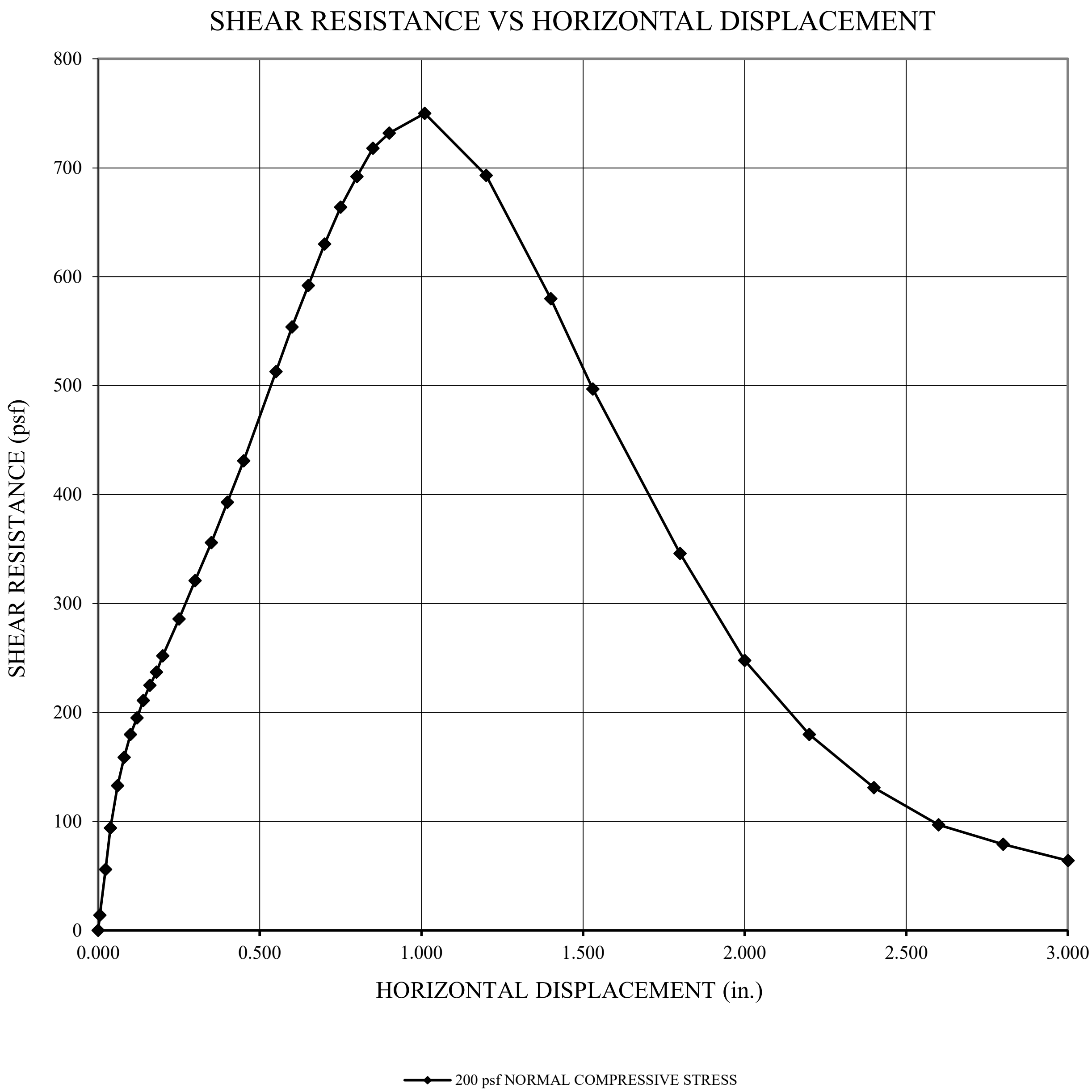
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 153 (L24-116-003-001)

INTERFACE : **Internal Shear of GCL**



APPROVED BY : RO DATE : 7/8/2024

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INTERFACE FRICTION TEST RESULTS
ASTM D6243

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CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.S: CETCO Resistex U5 DN GCL, Roll # 153 (L24-116-003-001)

INTERFACE : **Internal Shear of GCL**

STRAIN RATE (in / min) : 0.04
DIRECT SHEAR UNIT: Durham Geo
PLACEMENT CONDITION: Inundated
NORMAL LOAD: Platten Weight

NORMAL LOAD (psf)		200	NORMAL LOAD (psf)			NORMAL LOAD (psf)		
PEAK SHEAR STRESS (psf)		750	PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)		
PEAK SECANT ANGLE (deg)		75.1	PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)		
RESIDUAL SHEAR (psf)		64	RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)		
RESID. SECANT ANGLE (deg)		17.7	RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)		
HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)
0.000	0	0						
0.005	14	14						
0.023	56	56						
0.038	94	94						
0.060	133	133						
0.080	159	159						
0.100	180	180						
0.120	195	195						
0.140	211	211						
0.160	225	225						
0.180	237	237						
0.200	252	252						
0.250	286	286						
0.300	321	321						
0.350	356	356						
0.400	393	393						
0.450	431	431						
0.550	513	513						
0.600	554	554						
0.650	592	592						
0.700	630	630						
0.750	664	664						
0.800	692	692						
0.850	718	718						
0.900	732	732						
1.010	750	750						
1.200	693	693						
1.400	580	580						
1.530	497	497						
1.800	346	346						
2.000	248	248						
2.200	180	180						
2.400	131	131						
2.600	97	97						
2.800	79	79						
3.000	64	64						

APPROVED BY : RO DATE : 7/8/2024

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-003
LAB ID NO.: L24-116-003-002
MATERIAL: CETCO Resistex U5 DN GCL
ROLL NO: 162

	SPECIMEN	TOTAL WT. AS REC'D grams	TOTAL WT. DRY grams	TOTAL WT. AS REC'D psf	TOTAL WT. DRY psf	WT. BACKING psf (1)	AS REC'D Bent Cont psf	DRY Bent Cont psf	MOISTURE CONTENT %	Bent Cont 12% m.c. psf
BENTONITE CONTENT	1	116.4	100.2	1.16	0.99	0.100	1.06	0.89	18	1.00
	2	127.5	109.6	1.27	1.09	0.100	1.17	0.99	18	1.11
	3	145.0	121.2	1.44	1.20	0.100	1.34	1.10	21	1.23
ASTM D5993	4	154.5	130.3	1.53	1.29	0.100	1.43	1.19	20	1.34
	5	145.5	126.3	1.44	1.25	0.100	1.34	1.15	17	1.29
							AVERAGE:	**1.07**	**19**	**1.19**

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVG	STD
PEEL STRENGTH	D 6496	MD-lbs/in	5.8	8.8	6.6	10.4	9.6	**8.2**	1.74
FLUID LOSS	D 5891	ml	13.8					**13.8**	
SWELL INDEX	D 5890	ml/2g	27.0					**27.0**	

	AS REC'D WEIGHT grams	DRY WEIGHT grams	MOISTURE CONTENT %
MOISTURE CONTENT ASTM D 4643	82.68	73.98	16

CHECKED BY: JLK DATE: 7/8/2024

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GCL INDEX FLUX & PERMEABILITY TEST

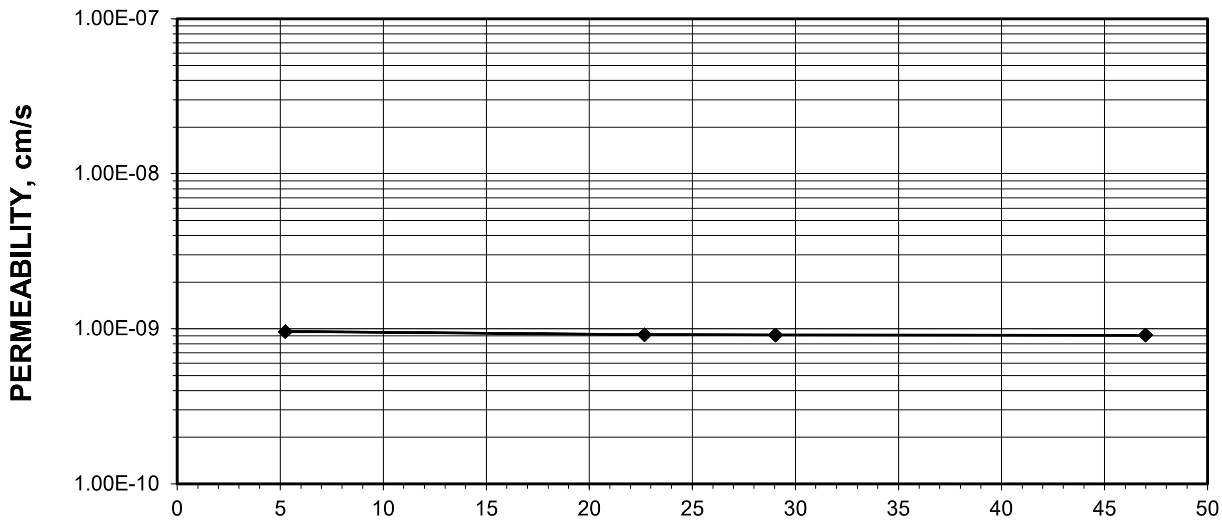
ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-002	Material:	CETCO Resistex U5 DN GCL
Client:	Clean Air And Water Systems, Inc.	Roll I.D.:	162
Client Project:	Powerton Generating Station	Lot No.:	NA
Project No.:	L24-116-003	Sample No.:	NA

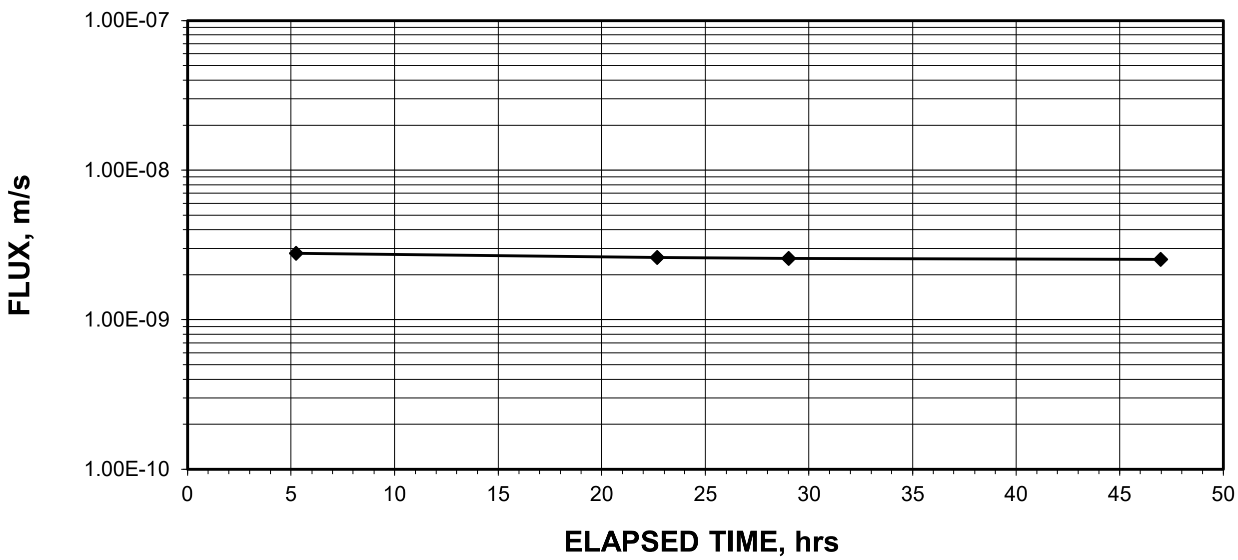
AVERAGE FLUX = 2.57E-09 m/s

AVERAGE PERMEABILITY = 9.13E-10 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME



FLUX VS. ELAPSED TIME



Checked By: JLK Date: 7/8/2024

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-002	Tested By: JO	Date: 6/25/2024
Client:	Clean Air And Water Systems, Inc.		
Client Project:	Powerton Generating Station	Checked By: JLK	Date: 7/8/2024
Project No.:	L24-116-003		
Material:	CETCO Resistex U5 DN GCL		
Roll I.D.:	162		
Lot No.:	NA		
Sample No.:	NA		

Permeant: Deaired, Deionized Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	92	82
Wt. of Tare & GCL[2] (gm.)	55.33	114.18
Wt. of Tare & Dry GCL[2] (gm.)	48.12	50.45
Wt. of Tare (gm.)	10.63	10.71
Wt. of Water (gm.)	7.21	63.73
Wt. of Dry GCL (gm.)[2]	37.49	39.74
GCL Moisture Content (%)	**19.2**	**160.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of GCL (gm.)[2]	52.25	114.10 (Calculated)
Clay Component Thickness 1 (in.)[1]	0.130	0.236
Clay Component Thickness 2 (in.)[1]	0.126	0.231
Clay Component Thickness 3 (in.)[1]	0.124	0.230
Average Clay Component Thickness (in.)	na	0.232
Average Clay Component Thickness (mm)	na	**5.901**
Specimen Dia. (in)	4.000	4.000
Specimen Area (in.^{2})	12.57	12.57
Specimen Area (m^2)	0.00811	0.00811
Mass/Unit Area of GCL(gm./m^2)[2]	6,443	14,069
Mass/Unit Area of GCL(psf)[2]	1.32	2.88
Mass/Unit Area of Dry GCL(gm./m^2)[2]	5,403	
Mass/Unit Area of Dry GCL(psf)[2]	1.11	

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-002
Client:	Clean Air And Water Systems, Inc.
Client Project:	Powerton Generating Station
Project No.:	L24-116-003
Material:	CETCO Resistex U5 DN GCL
Roll I.D.:	162
Sample No.:	NA

Pressure Heads (Constant)

Top Cap (psi)	75.0
Bottom Cap (psi)	77.0
Cell (psi)	80.0
Total Head (cm)	140.6

Final Sample Dimensions

Sample Length (cm), L	0.590
Sample Diameter (cm)	10.16
Sample Area (cm^2), A	**81.07**
Inflow Burette Area (cm^2), a-in	0.912
Outflow Burette Area (cm^2), a-out	0.912

AVERAGE FLUX = 2.57E-09 m/s

AVERAGE PERMEABILITY = 9.13E-10 cm/s @ 20°C

DATE (m-d-y)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	RATIO ΔIN / ΔOUT (3 readings)	TOTAL HEAD h (cm)	TEMP. (°C)	INCREMENTAL FLUX @ 20°C (m/sec)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
7/1/2024	0.0	0.0	0.0	NA	166.9	20.9	NA	NA
7/1/2024	5.3	0.4	0.5	NA	166.0	20.9	2.77E-09	9.62E-10
7/2/2024	22.7	1.9	1.6	1.19	163.1	20.8	2.61E-09	9.17E-10
7/2/2024	29.0	2.4	2.1	1.25	162.0	20.8	2.56E-09	9.12E-10
7/3/2024	47.0	3.8	3.3	1.12	159.1	20.8	2.53E-09	9.10E-10

08/14/2024 S&L Comment: The reported hydraulic conductivity (9.13E-10 cm/s) conforms to Specification P-1402, Table 319025-2 (1E-09 cm/s max.). Although the reported flux (i.e., liquid flow rate) (2.57E-09 m/s) appears to be greater than that specified in Specification P-1402, Table 319025-2 (2E-09 m/s), the GCL material provided complies with the Illinois CCR Rule's performance criterion for the lower component of a composite liner system per the calculations below.

Notes 4 and 5 for Table 319025-2 state that the specified flux is based on (1) a 7-mm-thick GCL and (2) a hydraulic head of 2 psi, i.e., 140.6 cm. Per this test report, the supplied GCL is 6-mm thick. Moreover, using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3), the effective hydraulic head for this test was 165.5 cm (> 140.6 cm):

$q_{GCL} = k_{GCL}((h/t_{GCL}+1)$, or $h = t_{GCL}((q_{GCL}/k_{GCL})-1)$ = (0.590 cm)*[(2.57E-07 cm/s)/(9.13E-10 cm/s)-1] = 165.5 cm

To be acceptable as the lower component of the retrofitted Bypass Basin's composite liner system, the supplied GCL must have an liquid flow rate less than or equal to two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec. 35 Ill. Adm. Code 845.400(c)(2). The liquid flow rate comparison between this GCL and two feet (61.0 cm) of compacted soil with a hydraulic conductivity of 1E-07 cm/sec must be made using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3). The flow rate through compacted soil (q_{soil}) that is two-feet thick (t_{soil} = 61.0 cm), that has a hydraulic conductivity of 1E-07 cm/sec (k_{soil}), and that is subject to the effective hydraulic head applied during this test (h = 165.5 cm) is:

$q_{soil} = k_{soil}((h/t_{soil})+1)$
= (1E-07 cm/sec)*[(165.5 cm)/(61.0 cm)+1]*(1 m / 100 cm)
= 3.71E-09 m/sec

Because the reported flow rate for the GCL (q_{GCL} = 2.57E-09 m/sec) is less than the calculated flow rate through two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec subject to the same hydraulic head (q_{soil} = 3.71E-09 m/sec), the supplied GCL complies with 35 Ill. Adm. Code 845.400(c)(2) and is acceptable for use as the lower component of the retrofitted Bypass Basin's composite liner system.

INTERFACE FRICTION TEST RESULTS
ASTM D6243

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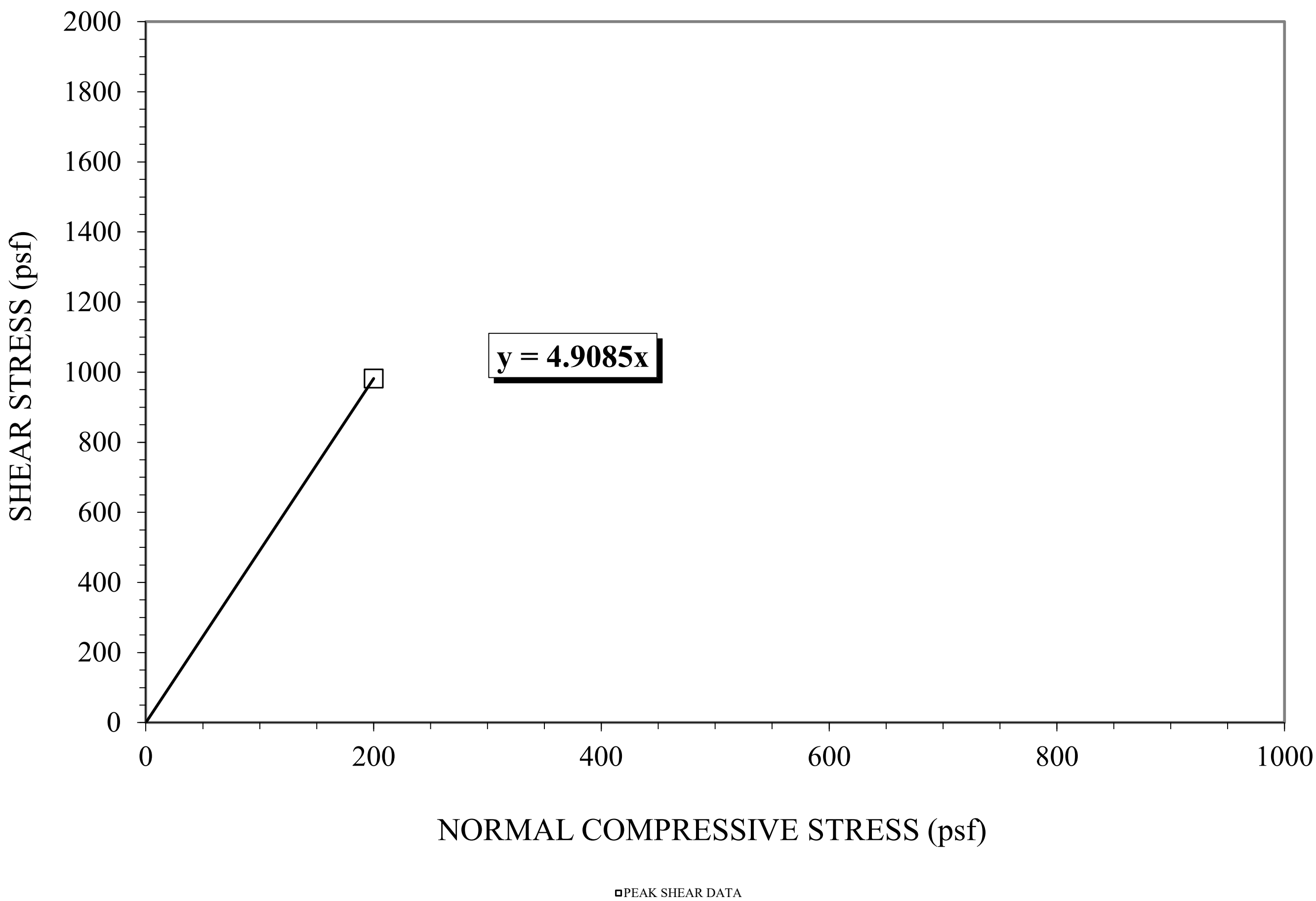
CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 162 (L24-116-003-002)

INTERFACE : **Internal Shear of GCL**

		PEAK SHEAR
FRICTION ANGLE (deg) :	**Φ =**	**78.5**
COEFFICIENT OF FRICTION :	**=**	**4.909**
ADHESION [Calculated] (psf):	**a =**	**0**

NOTES: 1.) The GCL was loaded, inundated with water & seated for 24 hours prior to shearing.
2.) The peak friction angle was calculated using linear regression on the peak data point through the origin.



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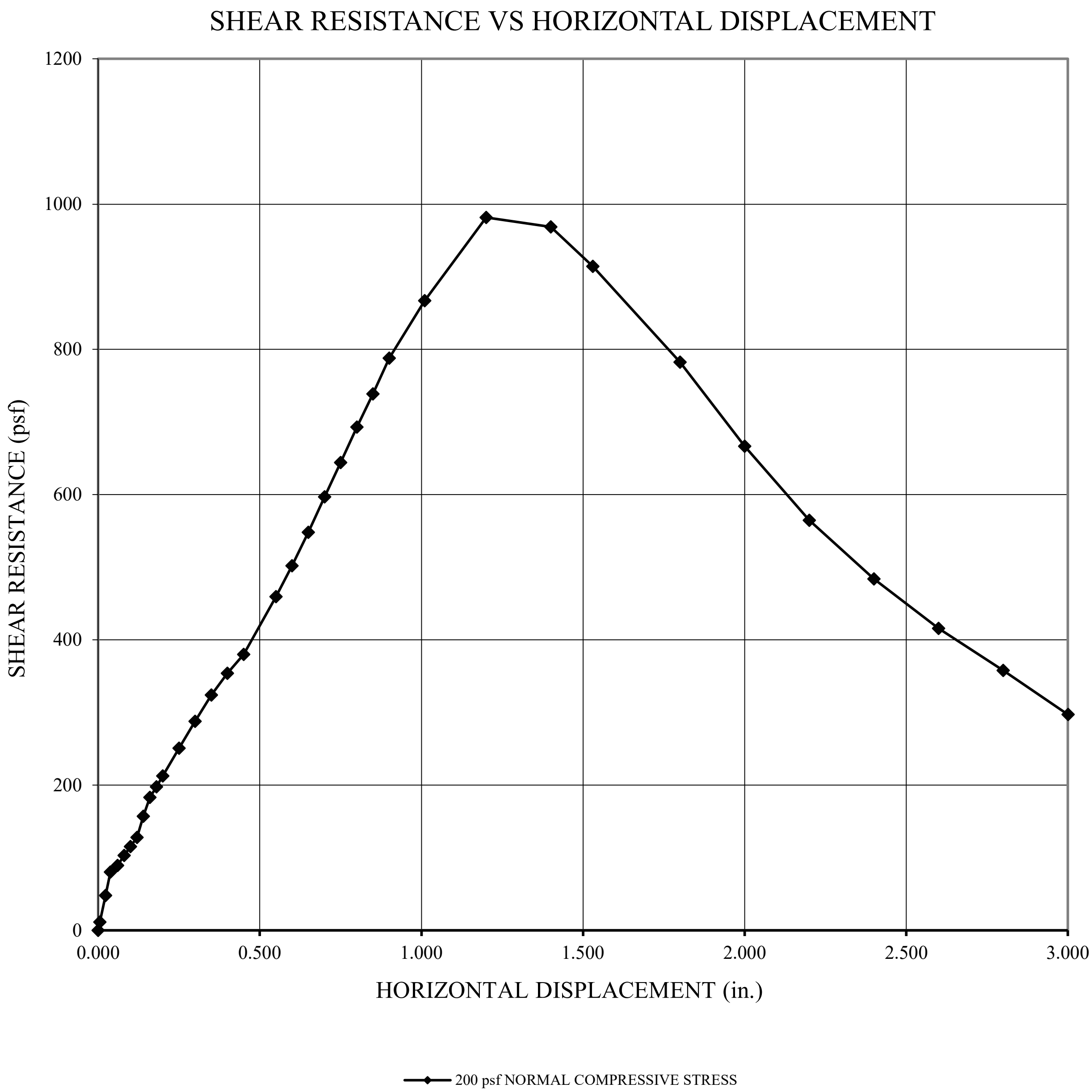
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 162 (L24-116-003-002)

INTERFACE : **Internal Shear of GCL**



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INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.S: CETCO Resistex U5 DN GCL, Roll # 162 (L24-116-003-002)

INTERFACE : **Internal Shear of GCL**

STRAIN RATE (in / min) : 0.04
DIRECT SHEAR UNIT: Durham Geo
PLACEMENT CONDITION: Inundated
NORMAL LOAD: Platten Weight

NORMAL LOAD (psf)	200	NORMAL LOAD (psf)		NORMAL LOAD (psf)	
PEAK SHEAR STRESS (psf)	982	PEAK SHEAR STRESS (psf)		PEAK SHEAR STRESS (psf)	
PEAK SECANT ANGLE (deg)	78.5	PEAK SECANT ANGLE (deg)		PEAK SECANT ANGLE (deg)	
RESIDUAL SHEAR (psf)	297	RESIDUAL SHEAR (psf)		RESIDUAL SHEAR (psf)	
RESID. SECANT ANGLE (deg)	56.1	RESID. SECANT ANGLE (deg)		RESID. SECANT ANGLE (deg)	

HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)
0.000	0	0						
0.005	12	12						
0.023	48	48						
0.038	80	80						
0.060	90	90						
0.080	103	103						
0.100	116	116						
0.120	128	128						
0.140	157	157						
0.160	183	183						
0.180	198	198						
0.200	213	213						
0.250	251	251						
0.300	288	288						
0.350	324	324						
0.400	354	354						
0.450	380	380						
0.550	460	460						
0.600	502	502						
0.650	548	548						
0.700	597	597						
0.750	644	644						
0.800	693	693						
0.850	739	739						
0.900	788	788						
1.010	867	867						
1.200	982	982						
1.400	969	969						
1.530	914	914						
1.800	783	783						
2.000	667	667						
2.200	565	565						
2.400	484	484						
2.600	416	416						
2.800	358	358						
3.000	297	297						

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-003
LAB ID NO.: L24-116-003-003
MATERIAL: CETCO Resistex U5 DN GCL
ROLL NO: 171

	SPECIMEN	TOTAL WT. AS REC'D grams	TOTAL WT. DRY grams	TOTAL WT. AS REC'D psf	TOTAL WT. DRY psf	WT. BACKING psf (1)	AS REC'D Bent Cont psf	DRY Bent Cont psf	MOISTURE CONTENT %	Bent Cont 12% m.c. psf
BENTONITE CONTENT	1	105.8	90.5	1.05	0.90	0.100	0.95	0.80	19	0.89
	2	148.1	124.8	1.47	1.24	0.100	1.37	1.14	20	1.27
	3	106.7	91.1	1.06	0.90	0.100	0.96	0.80	19	0.90
ASTM D5993	4	162.1	137.3	1.61	1.36	0.100	1.51	1.26	19	1.41
	5	142.7	122.7	1.42	1.22	0.100	1.32	1.12	18	1.25
							AVERAGE:	**1.02**	**19**	**1.15**

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVG	STD
PEEL STRENGTH	D 6496	MD-lbs/in	4.1	2.2	11.7	2.4	3.8	**4.8**	3.51
FLUID LOSS	D 5891	ml	14.2					**14.2**	
SWELL INDEX	D 5890	ml/2g	29.0					**29.0**	

	AS REC'D WEIGHT grams	DRY WEIGHT grams	MOISTURE CONTENT %
MOISTURE CONTENT ASTM D 4643	84.5	74.86	18

CHECKED BY: JLK DATE: 7/8/2024

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GCL INDEX FLUX & PERMEABILITY TEST

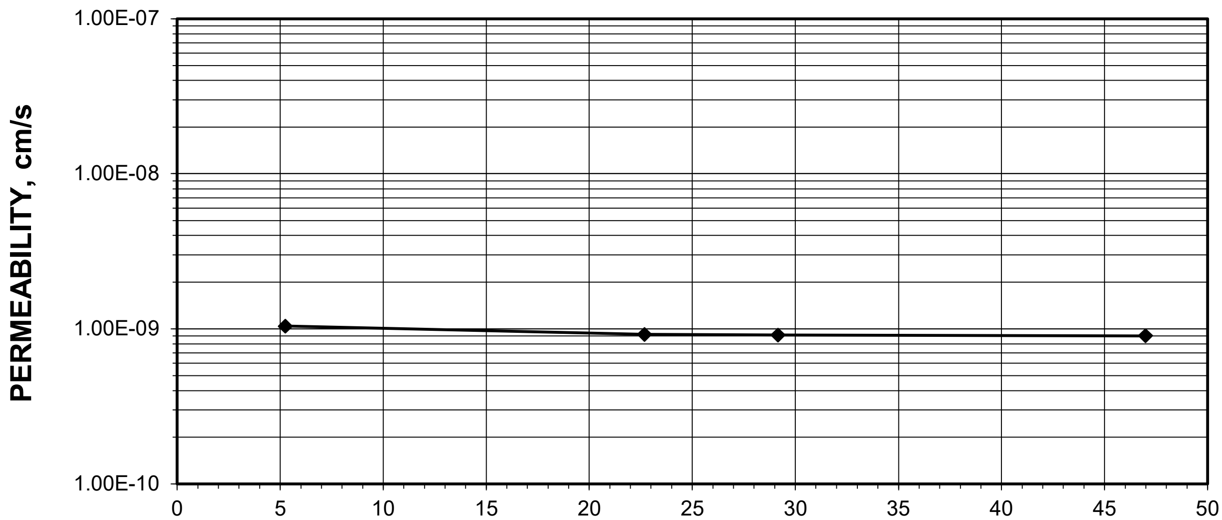
ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-003	Material:	CETCO Resistex U5 DN GCL
Client:	Clean Air And Water Systems, Inc.	Roll I.D.:	171
Client Project:	Powerton Generating Station	Lot No.:	NA
Project No.:	L24-116-003	Sample No.:	NA

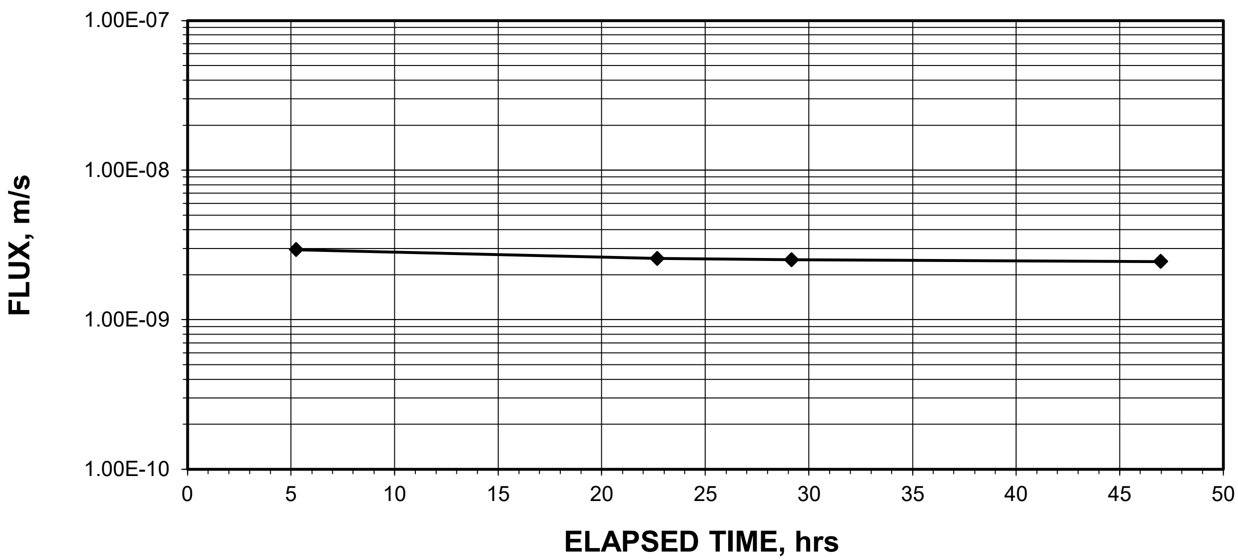
AVERAGE FLUX = 2.51E-09 m/s

AVERAGE PERMEABILITY = 9.12E-10 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME



FLUX VS. ELAPSED TIME



Checked By: JLK Date: 7/8/2024

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-003	Tested By: JO	Date: 6/25/2024
Client:	Clean Air And Water Systems, Inc.		
Client Project:	Powerton Generating Station	Checked By: JLK	Date: 7/8/2024
Project No.:	L24-116-003		
Material:	CETCO Resistex U5 DN GCL		
Roll I.D.:	171		
Lot No.:	NA		
Sample No.:	NA		

Permeant: Deaired, Deionized Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	11	49
Wt. of Tare & GCL[2] (gm.)	65.40	136.44
Wt. of Tare & Dry GCL [2] (gm.)	57.95	70.78
Wt. of Tare (gm.)	10.49	10.52
Wt. of Water (gm.)	7.45	65.66
Wt. of Dry GCL (gm.) [2]	47.46	60.26
GCL Moisture Content (%)	**15.7**	**109.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of GCL (gm.) [2]	68.97	124.57 (Calculated)
Clay Component Thickness 1 (in.) [1]	0.134	0.239
Clay Component Thickness 2 (in.) [1]	0.130	0.238
Clay Component Thickness 3 (in.) [1]	0.127	0.236
Average Clay Component Thickness (in.)	na	0.238
Average Clay Component Thickness (mm)	na	**6.037**
Specimen Dia. (in)	4.000	4.000
Specimen Area (in.^{2})	12.57	12.57
Specimen Area (m^2)	0.00811	0.00811
Mass/Unit Area of GCL(gm./m^2) [2]	8,504	15,360
Mass/Unit Area of GCL(psf) [2]	1.74	3.14
Mass/Unit Area of Dry GCL(gm./m^2) [2]	7,350	
Mass/Unit Area of Dry GCL(psf) [2]	1.50	

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-003-003
Client:	Clean Air And Water Systems, Inc.
Client Project:	Powerton Generating Station
Project No.:	L24-116-003
Material:	CETCO Resistex U5 DN GCL
Roll I.D.:	171
Sample No.:	NA

Pressure Heads (Constant)

Top Cap (psi)	75.0
Bottom Cap (psi)	77.0
Cell (psi)	80.0
Total Head (cm)	140.6

Final Sample Dimensions

Sample Length (cm), L	0.604
Sample Diameter (cm)	10.16
Sample Area (cm^2), A	**81.07**
Inflow Burette Area (cm^2), a-in	0.912
Outflow Burette Area (cm^2), a-out	0.912

AVERAGE FLUX = 2.51E-09 m/s

AVERAGE PERMEABILITY = 9.12E-10 cm/s @ 20°C

DATE (m-d-y)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	RATIO ΔIN / ΔOUT (3 readings)	TOTAL HEAD h (cm)	TEMP. (°C)	INCREMENTAL FLUX @ 20°C (m/sec)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
7/1/2024	0.0	0.0	0.0	NA	167.0	20.9	NA	NA
7/1/2024	5.3	0.5	0.4	NA	166.0	20.9	2.94E-09	1.04E-09
7/2/2024	22.7	1.9	1.6	1.19	163.2	20.8	2.56E-09	9.20E-10
7/2/2024	29.2	2.3	2.2	1.03	162.1	20.8	2.51E-09	9.13E-10
7/3/2024	47.0	3.7	3.3	1.06	159.3	20.8	2.45E-09	9.02E-10

08/14/2024 S&L Comment: The reported hydraulic conductivity (9.12E-10 cm/s) conforms to Specification P-1402, Table 319025-2 (1E-09 cm/s max.). Although the reported flux (i.e., liquid flow rate) (2.51E-09 m/s) appears to be greater than that specified in Specification P-1402, Table 319025-2 (2E-09 m/s), the GCL material provided complies with the Illinois CCR Rule's performance criterion for the lower component of a composite liner system per the calculations below.

Notes 4 and 5 for Table 319025-2 state that the specified flux is based on (1) a 7-mm-thick GCL and (2) a hydraulic head of 2 psi, i.e., 140.6 cm. Per this test report, the supplied GCL is 6-mm thick. Moreover, using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3), the effective hydraulic head for this test was 165.6 cm (> 140.6 cm):

$q_{GCL} = k_{GCL}((h/t_{GCL}+1)$, or $h = t_{GCL}((q_{GCL}/k_{GCL})-1)$ = (0.604 cm)*[(2.51E-07 cm/s)/(9.12E-10 cm/s)-1] = 165.6 cm

To be acceptable as the lower component of the retrofitted Bypass Basin's composite liner system, the supplied GCL must have an liquid flow rate less than or equal to two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec. 35 Ill. Adm. Code 845.400(c)(2). The liquid flow rate comparison between this GCL and two feet (61.0 cm) of compacted soil with a hydraulic conductivity of 1E-07 cm/sec must be made using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3). The flow rate through compacted soil (q_{soil}) that is two-feet thick (t_{soil} = 61.0 cm), that has a hydraulic conductivity of 1E-07 cm/sec (k_{soil}), and that is subject to the effective hydraulic head applied during this test (h = 165.6 cm) is:

$q_{soil} = k_{soil}((h/t_{soil})+1)$
= (1E-07 cm/sec)*[(165.6 cm)/(61.0 cm)+1]*(1 m / 100 cm)
= 3.71E-09 m/sec

Because the reported flow rate for the GCL (q_{GCL} = 2.51E-09 m/sec) is less than the calculated flow rate through two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec subject to the same hydraulic head (q_{soil} = 3.71E-09 m/sec), the supplied GCL complies with 35 Ill. Adm. Code 845.400(c)(2) and is acceptable for use as the lower component of the retrofitted Bypass Basin's composite liner system.

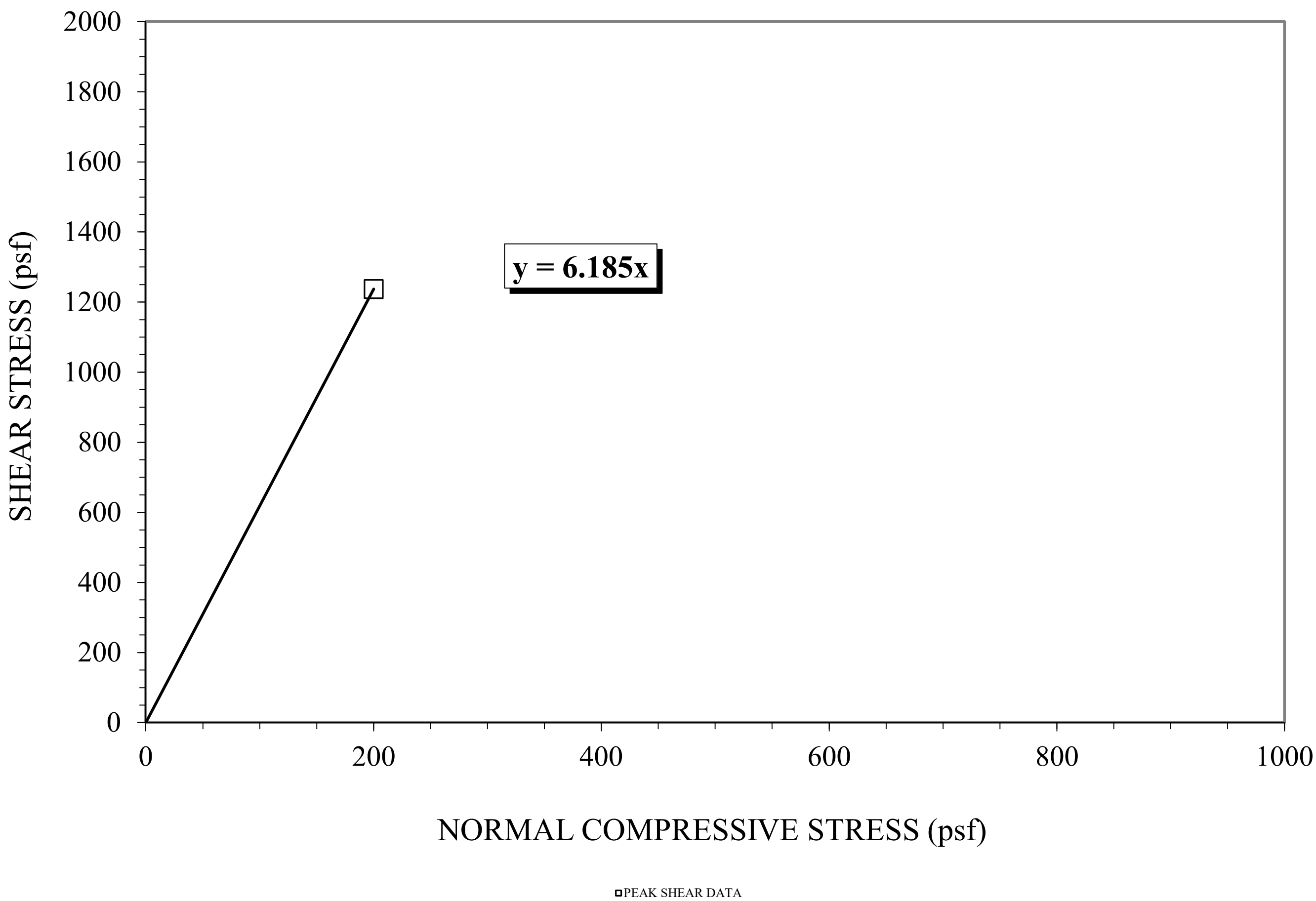
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 171 (L24-116-003-003)

INTERFACE : **Internal Shear of GCL**

		PEAK SHEAR
FRICTION ANGLE (deg) :	**Φ =**	**80.8**
COEFFICIENT OF FRICTION :	**=**	**6.185**
ADHESION [Calculated] (psf):	**a =**	**0**

NOTES: 1.) The GCL was loaded, inundated with water & seated for 24 hours prior to shearing.
2.) The peak friction angle was calculated using linear regression on the peak data point through the origin.



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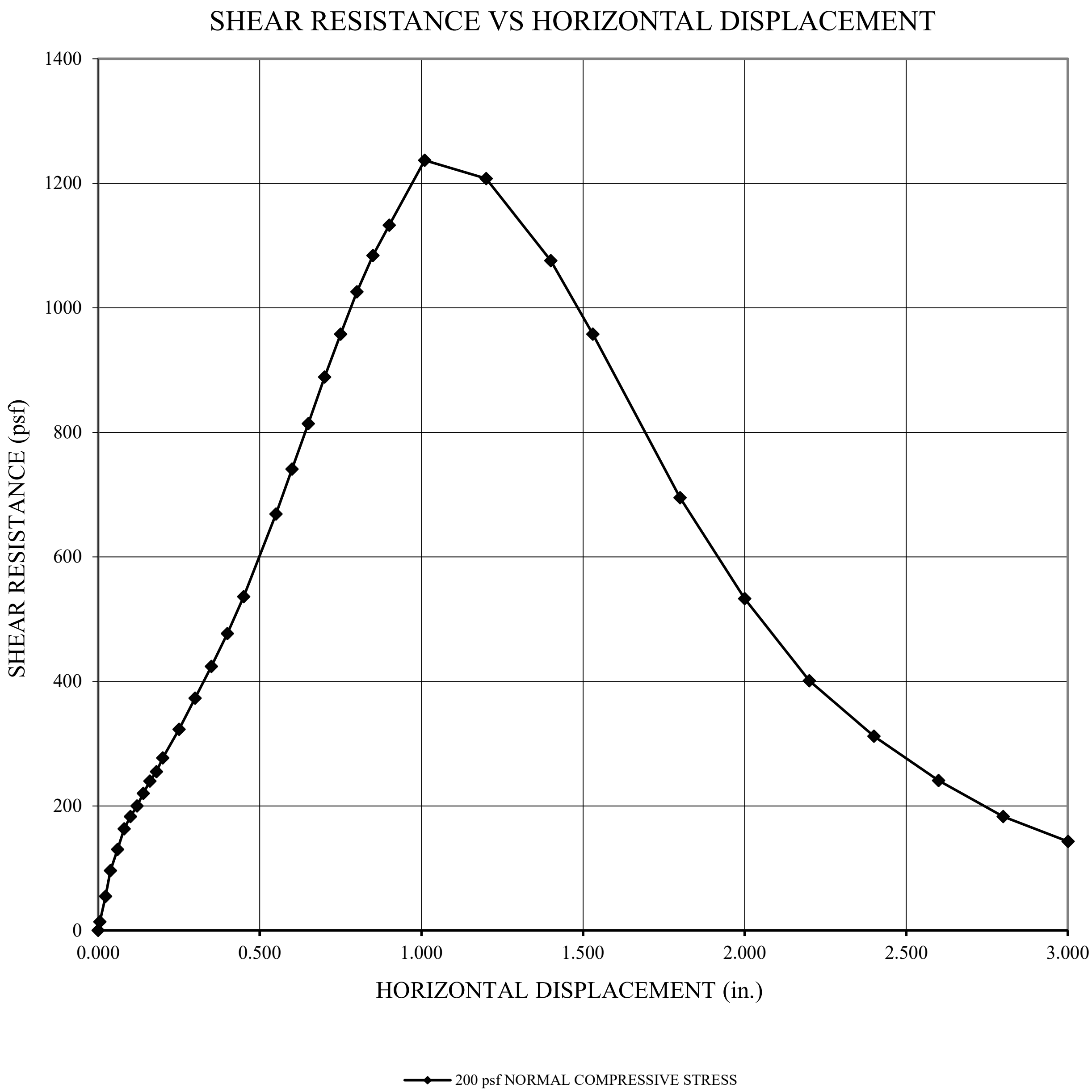
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 171 (L24-116-003-003)

INTERFACE : **Internal Shear of GCL**



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INTERFACE FRICTION TEST RESULTS
ASTM D6243

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CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-003
LAB I. D. NO.S: CETCO Resistex U5 DN GCL, Roll # 171 (L24-116-003-003)

INTERFACE : **Internal Shear of GCL**

STRAIN RATE (in / min) : 0.04
PLACEMENT CONDITION: Inundated
DIRECT SHEAR UNIT: Durham Geo
NORMAL LOAD: Platten Weight

NORMAL LOAD (psf)		200	NORMAL LOAD (psf)			NORMAL LOAD (psf)		
PEAK SHEAR STRESS (psf)		1237	PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)		
PEAK SECANT ANGLE (deg)		80.8	PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)		
RESIDUAL SHEAR (psf)		143	RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)		
RESID. SECANT ANGLE (deg)		35.6	RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)		
HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)
0.000	0	0						
0.005	14	14						
0.023	55	55						
0.038	96	96						
0.060	130	130						
0.080	163	163						
0.100	183	183						
0.120	200	200						
0.140	220	220						
0.160	240	240						
0.180	255	255						
0.200	277	277						
0.250	323	323						
0.300	373	373						
0.350	424	424						
0.400	477	477						
0.450	536	536						
0.550	669	669						
0.600	741	741						
0.650	814	814						
0.700	889	889						
0.750	958	958						
0.800	1026	1026						
0.850	1084	1084						
0.900	1133	1133						
1.010	1237	1237						
1.200	1208	1208						
1.400	1076	1076						
1.530	958	958						
1.800	695	695						
2.000	533	533						
2.200	401	401						
2.400	312	312						
2.600	241	241						
2.800	183	183						
3.000	143	143						

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CONFORMANCE TEST RESULTS

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CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-001
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: 2027788669
White Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO.										AVG	STD
			1	2	3	4	5	6	7	8	9	10		
MASS/UNIT AREA	D 5261	oz/sy	5.51	5.64	6.34	6.79	7.36	6.50	5.74	5.96	6.23	7.03	**6.31**	**0.584**

CHECKED BY: JLK DATE: 6/28/2024

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-002
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: J20696680
Black Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	7.27	6.09	6.32	6.79	6.77	6.74	6.94	6.10	6.44	6.64	**6.61**	**0.357**

CHECKED BY: JLK DATE: 6/28/2024

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CONFORMANCE TEST RESULTS

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CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-003
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: 2027788707
White Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	6.30	6.52	6.80	6.42	5.86	5.54	5.89	5.92	6.02	6.23	**6.15**	**0.354**

CHECKED BY: JLK DATE: 6/28/2024

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-004
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: J20696680
Black Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO.										AVG	STD
			1	2	3	4	5	6	7	8	9	10		
MASS/UNIT AREA	D 5261	oz/sy	6.26	6.44	6.19	6.36	6.89	6.77	7.63	5.60	7.22	7.40	**6.68**	**0.592**

CHECKED BY: JLK DATE: 6/28/2024

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CONFORMANCE TEST RESULTS

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CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-005
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: 2027791482
White Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO.										AVG	STD
			1	2	3	4	5	6	7	8	9	10		
MASS/UNIT AREA	D 5261	oz/sy	6.46	6.33	6.36	6.14	6.12	5.73	5.57	6.83	5.73	7.16	**6.24**	**0.475**

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CONFORMANCE TEST RESULTS

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CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-004
LAB ID NO.: L24-116-004-006
MATERIAL: CETCO Resistex U5 DN GCL
SAMPLE NO: J20696680
Black Textile Component

TEST	ASTM METHOD	UNITS	SPECIMEN NO.										AVG	STD
			1	2	3	4	5	6	7	8	9	10		
MASS/UNIT AREA	D 5261	oz/sy	7.06	6.69	5.61	5.40	6.62	6.67	6.10	6.12	6.27	7.12	**6.37**	**0.542**

CHECKED BY: JLK DATE: 6/28/2024

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-006
LAB ID NO.: L24-116-006-001
MATERIAL: CETCO Resistex U5 DN GCL
ROLL NO: 163

	SPECIMEN	TOTAL WT. AS REC'D grams	TOTAL WT. DRY grams	TOTAL WT. AS REC'D psf	TOTAL WT. DRY psf	WT. BACKING psf (1)	AS REC'D Bent Cont psf	DRY Bent Cont psf	MOISTURE CONTENT %	Bent Cont 12% m.c. psf
BENTONITE CONTENT	1	143.9	126.4	1.43	1.25	0.100	1.33	1.15	15	1.29
	2	102.6	90.9	1.02	0.90	0.100	0.92	0.80	14	0.90
	3	142.6	124.3	1.41	1.23	0.100	1.31	1.13	16	1.27
ASTM D5993	4	160.6	140.5	1.59	1.39	0.100	1.49	1.29	15	1.45
	5	119.5	108.6	1.19	1.08	0.100	1.09	0.98	11	1.09
							AVERAGE:	**1.07**	**14**	**1.20**

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVG	STD
TENSILE STRENGTH	D 6768	MD-lbs/in	99.2	90.4	93.7	93.2	98.1	**94.9**	3.28
PEEL STRENGTH	D 6496	MD-lbs/in	8.7	9.2	2.7	4.9	7.0	**6.5**	2.43

CHECKED BY: JLK DATE: 9/17/2024

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REVIEWED FOR DESIGN INPUT/CONSTRUCTION
POWERTON BYPASS BASIN RETROFIT PROJECT
MIDWEST GENERATION, LLC / SARGENT & LUNDY

1. ☑ No exception taken. Proceed with fabrication or construction in accordance with specifications.
2. ☐ Revise as noted and resubmit. Proceed in accordance with specifications after incorporating noted revisions.
3. ☐ Does not meet specification requirements. Revise and resubmit. Hold fabrication and/or construction.
4. ☐ For information only.
5. ☐ Voided / Superseded

NOTE: **ANY ACTION SHOWN ABOVE IS SUBJECT TO THE TERMS OF THE CONTRACT WITHOUT WAIVING ANY CONTRACTOR OBLIGATIONS INCLUDING DESIGN AND DETAILING.**

CONTRACTOR: Clean Air & Water Systems
BY: Tom Dehlin (S&L)
PROJECT NO.: A12661.181
DATE: 9/23/2024

GCL INDEX FLUX & PERMEABILITY TEST

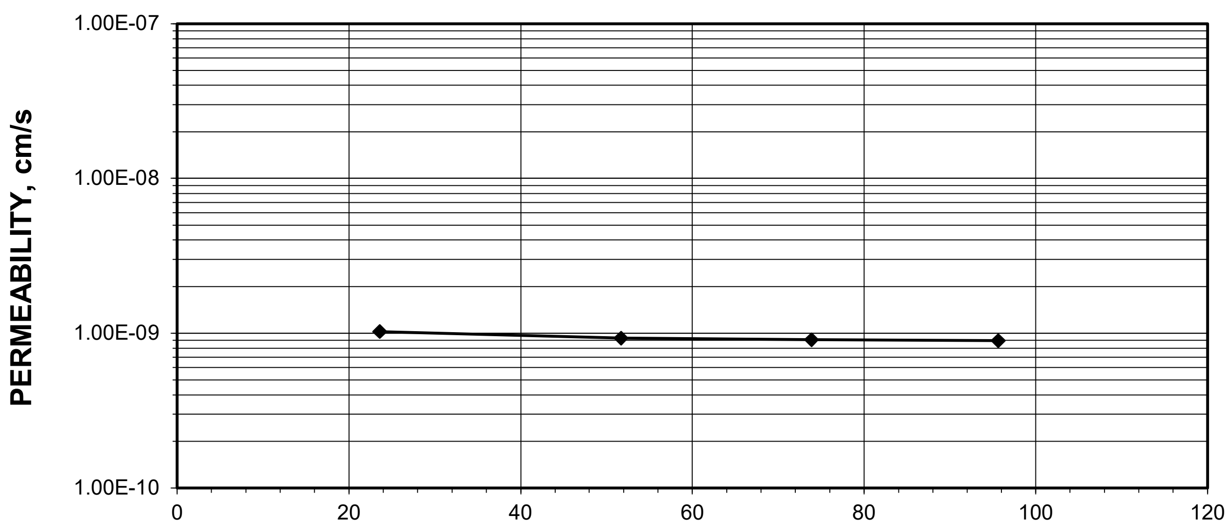
ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-006-001	Material:	CETCO Resistex U5 DN GCL
Client:	Clean Air And Water Systems, Inc.	Roll I.D.:	163
Client Project:	Powerton Generating Station	Lot No.:	NA
Project No.:	L24-116-006	Sample No.:	NA

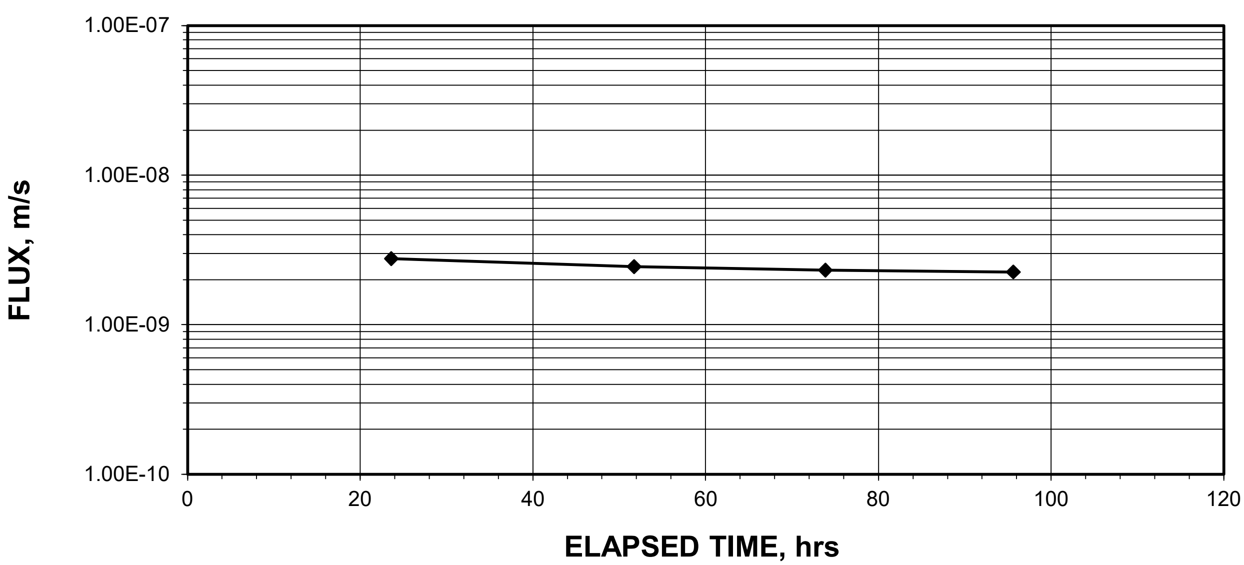
AVERAGE FLUX = 2.33E-09 m/s

AVERAGE PERMEABILITY = 9.10E-10 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME



FLUX VS. ELAPSED TIME



Checked By: JLK Date: 9/17/2024

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-006-001	Tested By: JO	Date: 9/9/2024
Client:	Clean Air And Water Systems, Inc.		
Client Project:	Powerton Generating Station	Checked By: JLK	Date: 9/17/2024
Project No.:	L24-116-006		
Material:	CETCO Resistex U5 DN GCL		
Roll I.D.:	163		
Lot No.:	NA		
Sample No.:	NA		
Permeant:	Deaired, Deionized Water		

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	14	59
Wt. of Tare & GCL[2] (gm.)	40.57	143.95
Wt. of Tare & Dry GCL [2] (gm.)	37.96	71.55
Wt. of Tare (gm.)	10.68	10.64
Wt. of Water (gm.)	2.61	72.40
Wt. of Dry GCL (gm.) [2]	27.28	60.91
GCL Moisture Content (%)	**9.6**	**118.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of GCL (gm.) [2]	68.19	136.21 (Calculated)
Clay Component Thickness 1 (in.) [1]	0.123	0.249
Clay Component Thickness 2 (in.) [1]	0.120	0.246
Clay Component Thickness 3 (in.) [1]	0.118	0.244
Average Clay Component Thickness (in.)	na	0.246
Average Clay Component Thickness (mm)	na	**6.257**
Specimen Dia. (in)	4.000	4.000
Specimen Area ($in.^2$)	12.57	12.57
Specimen Area (m^2)	0.00811	0.00811
Mass/Unit Area of GCL($gm./m^2$) [2]	8,408	16,795
Mass/Unit Area of GCL(psf) [2]	1.72	3.44
Mass/Unit Area of Dry GCL($gm./m^2$) [2]	7,674	
Mass/Unit Area of Dry GCL(psf) [2]	1.57	

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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geotechnical & geosynthetic testing

Lab ID No.: L24-116-006-001
Client: Clean Air And Water Systems, Inc.
Client Project: Powerton Generating Station
Project No.: L24-116-006
Material: CETCO Resistex U5 DN GCL
Roll I.D.: 163
Sample No.: NA

Pressure Heads (Constant)	
Top Cap (psi)	75.0
Bottom Cap (psi)	77.0
Cell (psi)	80.0
Total Head (cm)	140.6

Final Sample Dimensions	
Sample Length (cm), L	0.626
Sample Diameter (cm)	10.16
Sample Area (cm^2), A	**81.07**
Inflow Burette Area (cm^2), a-in	0.871
Outflow Burette Area (cm^2), a-out	0.895

AVERAGE FLUX = 2.33E-09 m/s

AVERAGE PERMEABILITY = 9.10E-10 cm/s @ 20°C

DATE (m-d-y)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	RATIO ΔIN / ΔOUT (3 readings)	TOTAL HEAD h (cm)	TEMP. (°C)	INCREMENTAL FLUX @ 20°C (m/sec)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/12/2024	0.0	0.0	0.0	NA	167.7	20.7	NA	NA
9/13/2024	23.6	2.2	1.6	NA	163.4	20.8	2.76E-09	1.03E-09
9/14/2024	51.7	4.2	3.6	1.17	158.9	20.8	2.44E-09	9.28E-10
9/15/2024	73.9	5.8	5.0	1.06	155.5	20.8	2.32E-09	9.06E-10
9/16/2024	95.6	7.3	6.4	1.09	152.2	20.8	2.24E-09	8.95E-10

09/23/2024 S&L Comment: The reported hydraulic conductivity (9.10E-10 cm/s) conforms to Specification P-1402, Table 319025-2 (1E-09 cm/s max.). Although the reported flux (i.e., liquid flow rate) (2.33E-09 m/s) appears to be greater than that specified in Specification P-1402, Table 319025-2 (2E-09 m/s), the GCL material provided complies with the Illinois CCR Rule's performance criterion for the lower component of a composite liner system per the calculations below.

Notes 4 and 5 for Table 319025-2 state that the specified flux is based on (1) a 7-mm-thick GCL and (2) a hydraulic head of 2 psi, i.e., 140.6 cm. Per this test report, the supplied GCL is 6.26-mm thick. Moreover, using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3), the effective hydraulic head for this test was 159.7 cm (> 140.6 cm):

$q_{GCL} = k_{GCL}((h/t_{GCL}+1)$, or $h = t_{GCL}((q_{GCL}/k_{GCL})-1)$ = (0.626 cm)*[(2.33E-07 cm/s)/(9.10E-10 cm/s)-1] = 159.7 cm

To be acceptable as the lower component of the retrofitted Bypass Basin's composite liner system, the supplied GCL must have an liquid flow rate less than or equal to two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec. 35 Ill. Adm. Code 845.400(c)(2). The liquid flow rate comparison between this GCL and two feet (61.0 cm) of compacted soil with a hydraulic conductivity of 1E-07 cm/sec must be made using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3). The flow rate through compacted soil (q_{soil}) that is two-feet thick (t_{soil} = 61.0 cm), that has a hydraulic conductivity of 1E-07 cm/sec (k_{soil}), and that is subject to the effective hydraulic head applied during this test (h = 159.7 cm) is:

$q_{soil} = k_{soil}((h/t_{soil})+1)$
= (1E-07 cm/sec)*[(159.7 cm)/(61.0 cm)+1]*(1 m / 100 cm)
= 3.62E-09 m/sec

Because the reported flow rate for the GCL (q_{GCL} = 2.33E-09 m/sec) is less than the calculated flow rate through two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec subject to the same hydraulic head (q_{soil} = 3.62E-09 m/sec), the supplied GCL complies with 35 Ill. Adm. Code 845.400(c)(2) and is acceptable for use as the lower component of the retrofitted Bypass Basin's composite liner system.

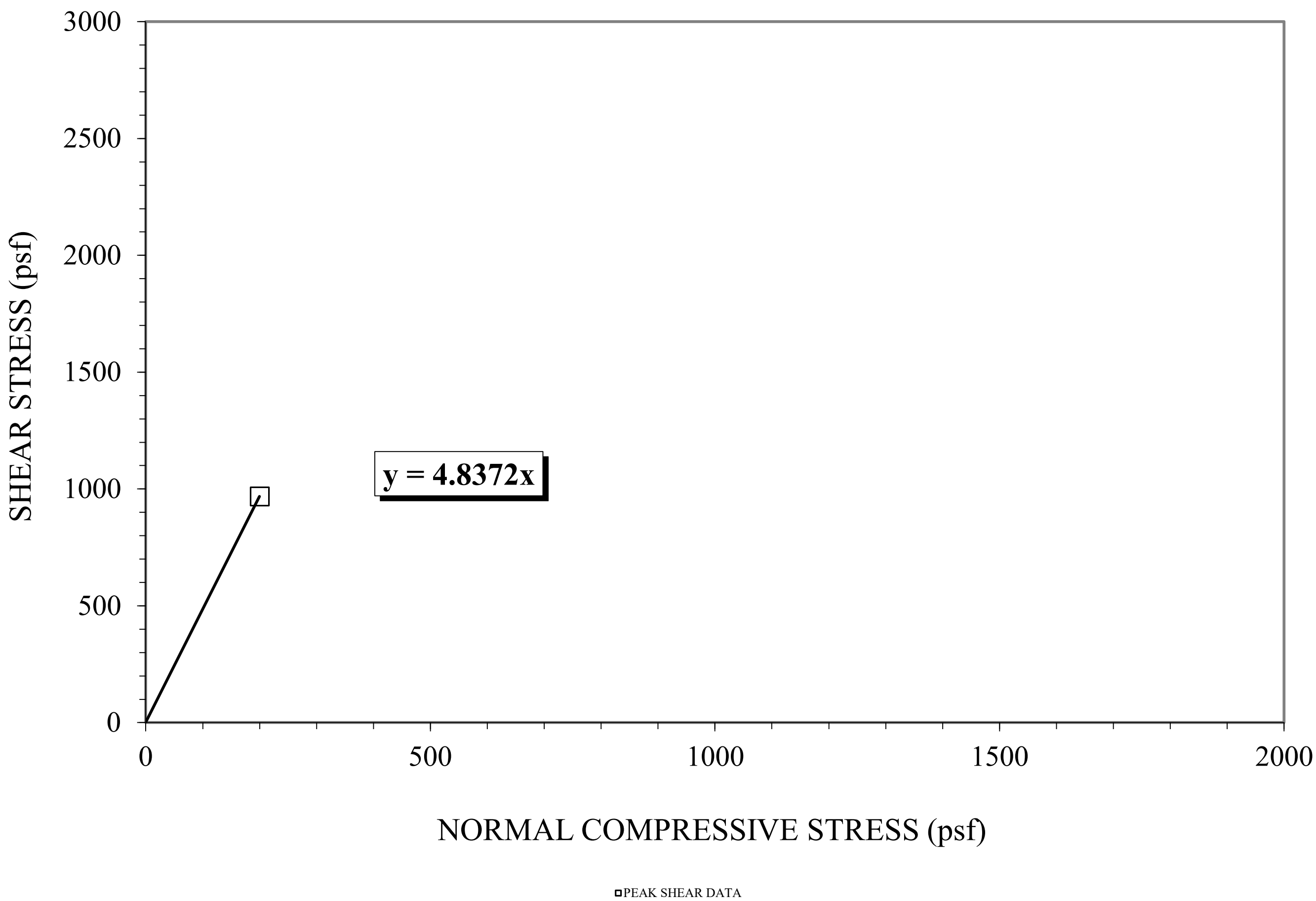
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 163 (L24-116-006-001)

INTERFACE : **Internal Shear of GCL**

	PEAK SHEAR	
FRICTION ANGLE (deg) :	**Φ =**	**78.3**
COEFFICIENT OF FRICTION :	**=**	**4.837**
ADHESION [Calculated] (psf):	**a =**	**0**

NOTES: 1.) The GCL was loaded, inundated with water & seated for 24 hours prior to shearing.
2.) The peak friction angle was calculated using linear regression on the peak data point through the origin.



APPROVED BY : RO DATE : 9/19/2024

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INTERFACE FRICTION TEST RESULTS
ASTM D6243

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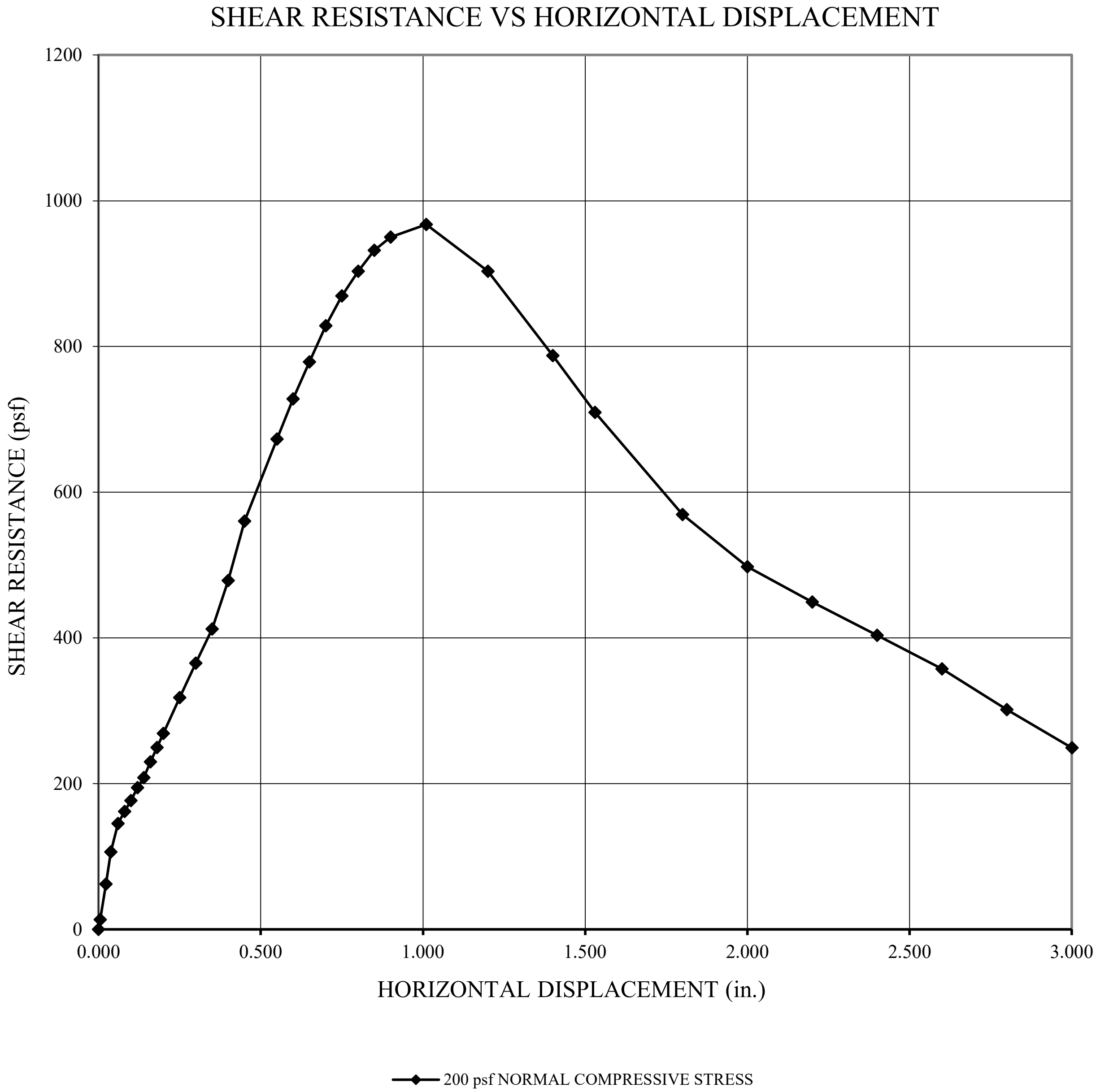
CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 163 (L24-116-006-001)

INTERFACE : **Internal Shear of GCL**



APPROVED BY : RO DATE : 9/19/2024

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INTERFACE FRICTION TEST RESULTS
ASTM D6243

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CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.S: CETCO Resistex U5 DN GCL, Roll # 163 (L24-116-006-001)

INTERFACE : **Internal Shear of GCL**

STRAIN RATE (in / min) : 0.04
PLACEMENT CONDITION: Inundated
DIRECT SHEAR UNIT: Durham Geo
NORMAL LOAD: Platten Weight

NORMAL LOAD (psf)		200	NORMAL LOAD (psf)			NORMAL LOAD (psf)		
PEAK SHEAR STRESS (psf)		967	PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)		
PEAK SECANT ANGLE (deg)		78.3	PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)		
RESIDUAL SHEAR (psf)		249	RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)		
RESID. SECANT ANGLE (deg)		51.3	RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)		
HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)
0.000	0	0						
0.005	13	13						
0.023	62	62						
0.038	107	107						
0.060	146	146						
0.080	162	162						
0.100	177	177						
0.120	194	194						
0.140	208	208						
0.160	230	230						
0.180	250	250						
0.200	269	269						
0.250	318	318						
0.300	366	366						
0.350	412	412						
0.400	479	479						
0.450	560	560						
0.550	673	673						
0.600	728	728						
0.650	779	779						
0.700	829	829						
0.750	870	870						
0.800	904	904						
0.850	932	932						
0.900	950	950						
1.010	967	967						
1.200	903	903						
1.400	788	788						
1.530	710	710						
1.800	570	570						
2.000	498	498						
2.200	450	450						
2.400	404	404						
2.600	358	358						
2.800	302	302						
3.000	249	249						

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DATE : 9/19/2024

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-006
LAB ID NO.: L24-116-006-002
MATERIAL: CETCO Resistex U5 DN GCL
ROLL NO: 172

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVG	STD
TENSILE STRENGTH	D 6768	MD-lbs/in	110.3	118.2	115.2	134.6	122.1	**120.1**	8.24

CHECKED BY: JLK DATE: 9/17/2024

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GCL INDEX FLUX & PERMEABILITY TEST

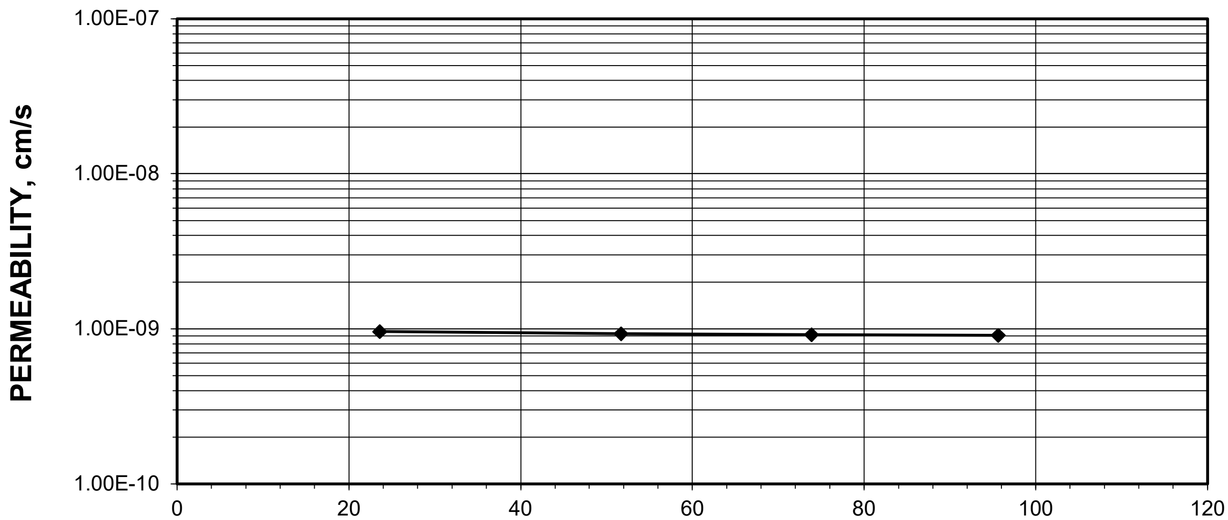
ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-006-002	Material:	CETCO Resistex U5 DN GCL
Client:	Clean Air And Water Systems, Inc.	Roll I.D.:	172
Client Project:	Powerton Generating Station	Lot No.:	NA
Project No.:	L24-116-006	Sample No.:	NA

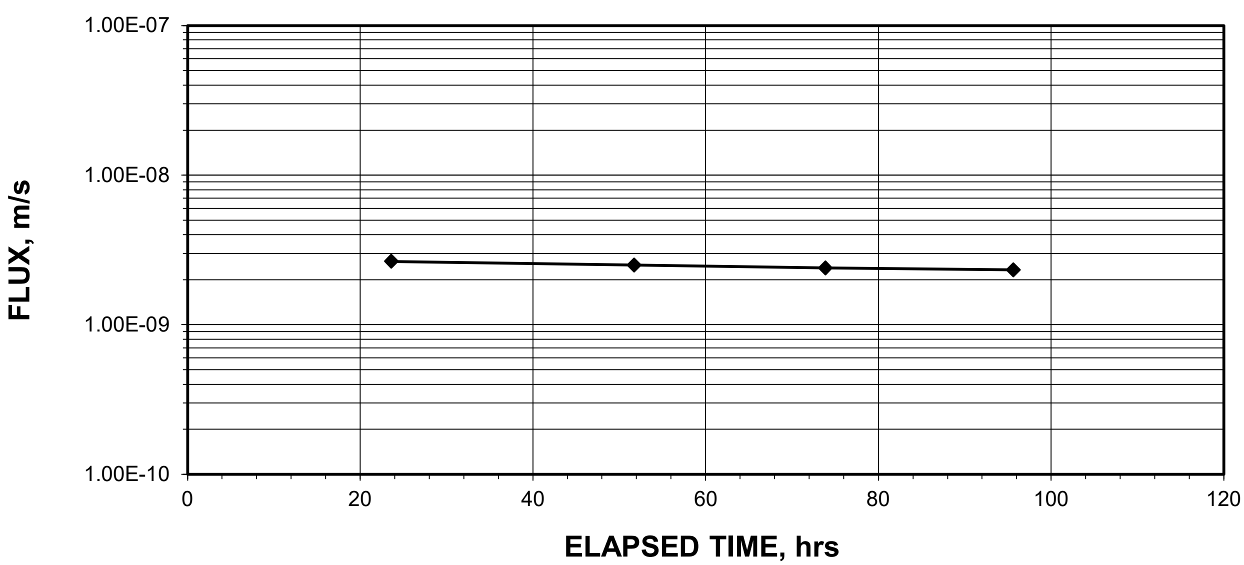
AVERAGE FLUX = 2.41E-09 m/s

AVERAGE PERMEABILITY = 9.18E-10 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME



FLUX VS. ELAPSED TIME



Checked By: JLK Date: 9/17/2024

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

Lab ID No.:	L24-116-006-002	Tested By: JO	Date: 9/9/2024
Client:	Clean Air And Water Systems, Inc.		
Client Project:	Powerton Generating Station	Checked By: JLK	Date: 9/17/2024
Project No.:	L24-116-006		
Material:	CETCO Resistex U5 DN GCL		
Roll I.D.:	172		
Lot No.:	NA		
Sample No.:	NA		

Permeant: Deaired, Deionized Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	92	75
Wt. of Tare & GCL[2] (gm.)	55.88	110.75
Wt. of Tare & Dry GCL[2] (gm.)	49.21	53.15
Wt. of Tare (gm.)	10.66	10.48
Wt. of Water (gm.)	6.67	57.60
Wt. of Dry GCL (gm.)[2]	38.55	42.67
GCL Moisture Content (%)	**17.3**	**135.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of GCL (gm.)[2]	58.16	116.51 (Calculated)
Clay Component Thickness 1 (in.)[1]	0.126	0.244
Clay Component Thickness 2 (in.)[1]	0.124	0.240
Clay Component Thickness 3 (in.)[1]	0.120	0.239
Average Clay Component Thickness (in.)	na	0.241
Average Clay Component Thickness (mm)	na	**6.121**
Specimen Dia. (in)	4.000	4.000
Specimen Area (in.^{2})	12.57	12.57
Specimen Area (m^2)	0.00811	0.00811
Mass/Unit Area of GCL(gm./m^2)[2]	7,171	14,366
Mass/Unit Area of GCL(psf)[2]	1.47	2.94
Mass/Unit Area of Dry GCL(gm./m^2)[2]	6,114	
Mass/Unit Area of Dry GCL(psf)[2]	1.25	

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.

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GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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Lab ID No.:	L24-116-006-002
Client:	Clean Air And Water Systems, Inc.
Client Project:	Powerton Generating Station
Project No.:	L24-116-006
Material:	CETCO Resistex U5 DN GCL
Roll I.D.:	172
Sample No.:	NA

Pressure Heads (Constant)

Top Cap (psi)	75.0
Bottom Cap (psi)	77.0
Cell (psi)	80.0
Total Head (cm)	140.6

Final Sample Dimensions

Sample Length (cm), L	0.612
Sample Diameter (cm)	10.16
Sample Area (cm^2), A	**81.07**
Inflow Burette Area (cm^2), a-in	0.871
Outflow Burette Area (cm^2), a-out	0.895

AVERAGE FLUX = 2.41E-09 m/s

AVERAGE PERMEABILITY = 9.18E-10 cm/s @ 20°C

DATE (m-d-y)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	RATIO ΔIN / ΔOUT (3 readings)	TOTAL HEAD h (cm)	TEMP. (°C)	INCREMENTAL FLUX @ 20°C (m/sec)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/12/2024	0.0	0.0	0.0	NA	167.6	20.7	NA	NA
9/13/2024	23.6	2.0	1.7	NA	163.5	20.8	2.65E-09	9.62E-10
9/14/2024	51.7	4.1	3.7	1.09	158.9	20.8	2.50E-09	9.31E-10
9/15/2024	73.9	5.7	5.2	1.06	155.3	20.8	2.40E-09	9.15E-10
9/16/2024	95.6	7.3	6.5	1.16	152.0	20.8	2.32E-09	9.09E-10

09/23/2024 S&L Comment: The reported hydraulic conductivity (9.18E-10 cm/s) conforms to Specification P-1402, Table 319025-2 (1E-09 cm/s max.). Although the reported flux (i.e., liquid flow rate) (2.41E-09 m/s) appears to be greater than that specified in Specification P-1402, Table 319025-2 (2E-09 m/s), the GCL material provided complies with the Illinois CCR Rule's performance criterion for the lower component of a composite liner system per the calculations below.

Notes 4 and 5 for Table 319025-2 state that the specified flux is based on (1) a 7-mm-thick GCL and (2) a hydraulic head of 2 psi, i.e., 140.6 cm. Per this test report, the supplied GCL is 6.12-mm thick. Moreover, using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3), the effective hydraulic head for this test was 160.1 cm (> 140.6 cm):

$q_{GCL} = k_{GCL}((h/t_{GCL}+1)$, or $h = t_{GCL}((q_{GCL}/k_{GCL})-1)$ = (0.612 cm)*[(2.41E-07 cm/s)/(9.18E-10 cm/s)-1] = 160.1 cm

To be acceptable as the lower component of the retrofitted Bypass Basin's composite liner system, the supplied GCL must have an liquid flow rate less than or equal to two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec. 35 Ill. Adm. Code 845.400(c)(2). The liquid flow rate comparison between this GCL and two feet (61.0 cm) of compacted soil with a hydraulic conductivity of 1E-07 cm/sec must be made using the flow rate equation derived from Darcy's Law for gravity flow through porous media that is presented in 35 Ill. Adm. Code 845.400(c)(3). The flow rate through compacted soil (q_{soil}) that is two-feet thick (t_{soil} = 61.0 cm), that has a hydraulic conductivity of 1E-07 cm/sec (k_{soil}), and that is subject to the effective hydraulic head applied during this test (h = 160.1 cm) is:

$q_{soil} = k_{soil}((h/t_{soil})+1)$
= (1E-07 cm/sec)*[(160.1 cm)/(61.0 cm)+1]*(1 m / 100 cm)
= 3.62E-09 m/sec

Because the reported flow rate for the GCL (q_{GCL} = 2.41E-09 m/sec) is less than the calculated flow rate through two feet of compacted soil with a hydraulic conductivity of 1E-07 cm/sec subject to the same hydraulic head (q_{soil} = 3.62E-09 m/sec), the supplied GCL complies with 35 Ill. Adm. Code 845.400(c)(2) and is acceptable for use as the lower component of the retrofitted Bypass Basin's composite liner system.

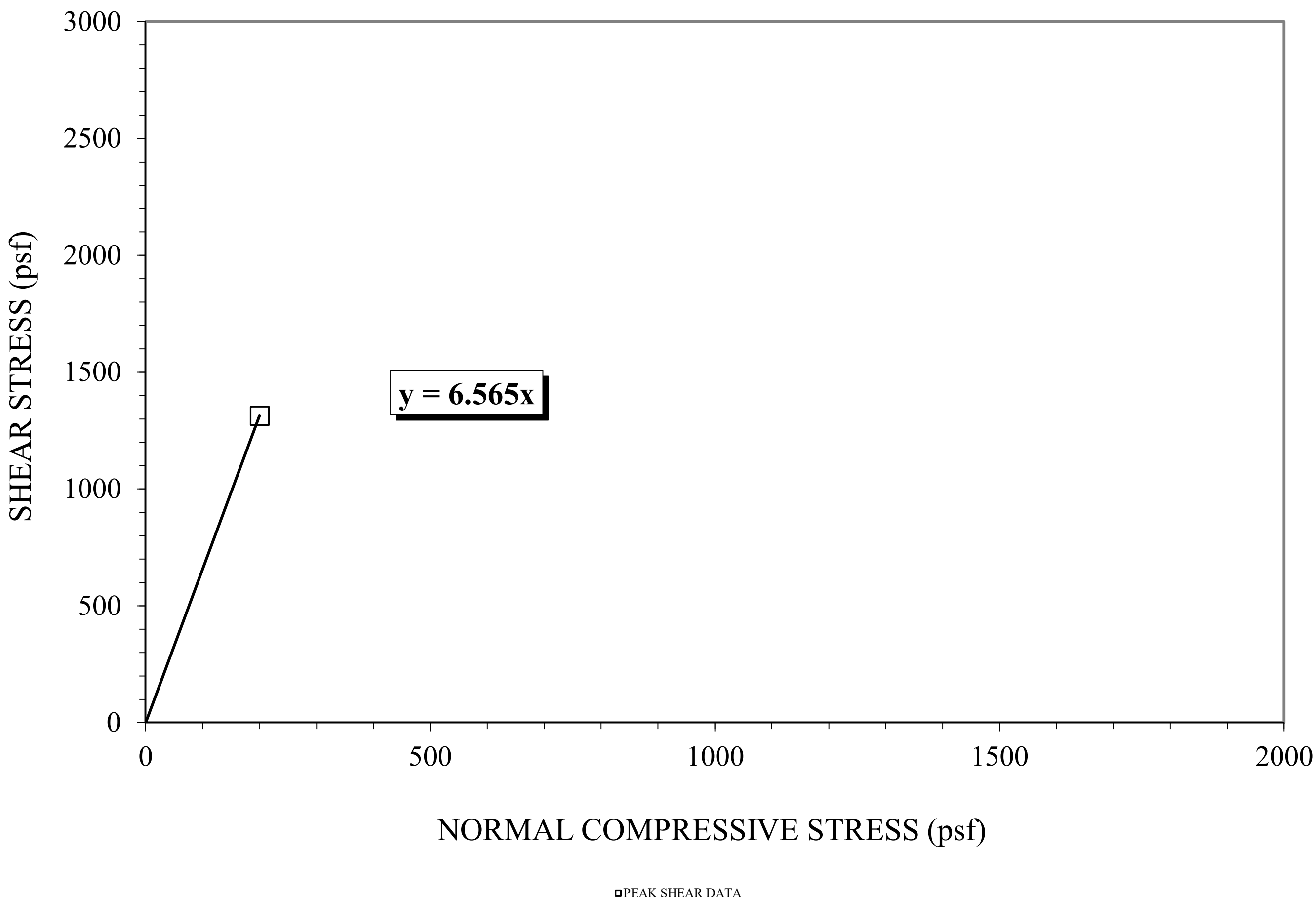
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 172 (L24-116-006-002)

INTERFACE : **Internal Shear of GCL**

		PEAK SHEAR	
FRICTION ANGLE (deg) :	**Φ**	=	**81.3**
COEFFICIENT OF FRICTION :		=	**6.565**
ADHESION [Calculated] (psf):	**a**	=	**0**

NOTES: 1.) The GCL was loaded, inundated with water & seated for 24 hours prior to shearing.
2.) The peak friction angle was calculated using linear regression on the peak data point through the origin.



APPROVED BY : RO DATE : 9/19/2024

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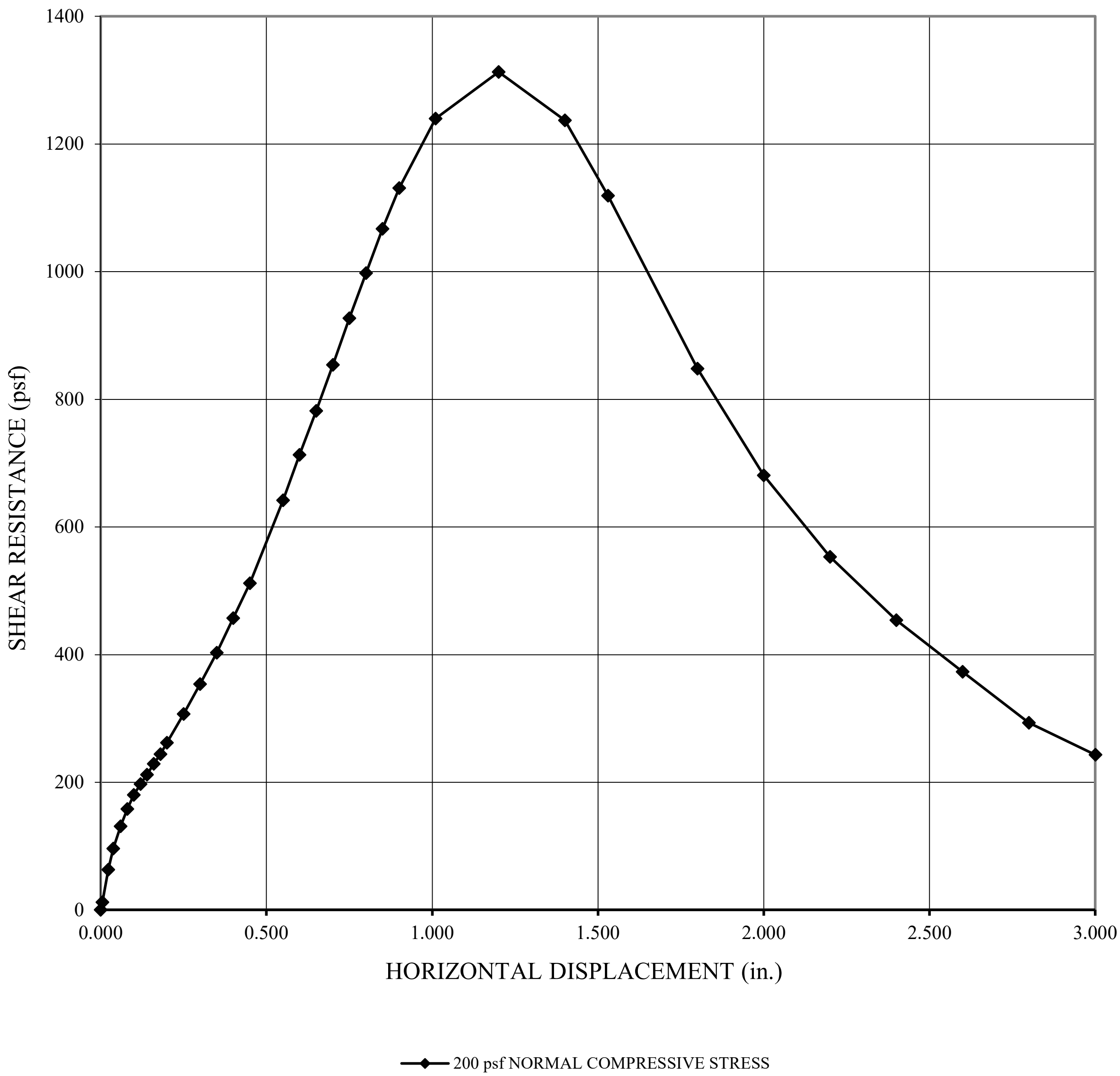
INTERFACE FRICTION TEST RESULTS
ASTM D6243

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.: CETCO Resistex U5 DN GCL, Roll # 172 (L24-116-006-002)

INTERFACE : **Internal Shear of GCL**

SHEAR RESISTANCE VS HORIZONTAL DISPLACEMENT



PAGE 2 OF 3 APPROVED BY : RO DATE : 9/19/2024

INTERFACE FRICTION TEST RESULTS
ASTM D6243

geotechnics
geotechnical & geosynthetic testing

CLIENT : Clean Air and Water Systems, LLC
CLIENT PROJECT : Powerton Generating Station
PROJECT NO. : L24-116-006
LAB I. D. NO.S: CETCO Resistex U5 DN GCL, Roll # 172 (L24-116-006-002)

INTERFACE : **Internal Shear of GCL**

STRAIN RATE (in / min) : 0.04
DIRECT SHEAR UNIT: Durham Geo
PLACEMENT CONDITION: Inundated
NORMAL LOAD: Platten Weight

NORMAL LOAD (psf)		200	NORMAL LOAD (psf)			NORMAL LOAD (psf)		
PEAK SHEAR STRESS (psf)		1313	PEAK SHEAR STRESS (psf)			PEAK SHEAR STRESS (psf)		
PEAK SECANT ANGLE (deg)		81.3	PEAK SECANT ANGLE (deg)			PEAK SECANT ANGLE (deg)		
RESIDUAL SHEAR (psf)		243	RESIDUAL SHEAR (psf)			RESIDUAL SHEAR (psf)		
RESID. SECANT ANGLE (deg)		50.5	RESID. SECANT ANGLE (deg)			RESID. SECANT ANGLE (deg)		
HORIZONTAL			HORIZONTAL			HORIZONTAL		
DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)	DISPLACE. (in.)	SHEAR FORCE (lbs)	STRESS (psf)
0.000	0	0						
0.005	12	12						
0.023	63	63						
0.038	96	96						
0.060	131	131						
0.080	158	158						
0.100	180	180						
0.120	197	197						
0.140	212	212						
0.160	229	229						
0.180	244	244						
0.200	262	262						
0.250	307	307						
0.300	354	354						
0.350	403	403						
0.400	457	457						
0.450	512	512						
0.550	642	642						
0.600	713	713						
0.650	782	782						
0.700	854	854						
0.750	927	927						
0.800	998	998						
0.850	1067	1067						
0.900	1131	1131						
1.010	1240	1240						
1.200	1313	1313						
1.400	1237	1237						
1.530	1119	1119						
1.800	848	848						
2.000	681	681						
2.200	553	553						
2.400	454	454						
2.600	373	373						
2.800	293	293						
3.000	243	243						

APPROVED BY : RO
DATE : 9/19/2024

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APPENDIX G-3

HDPE GEOMEMBRANE CERTIFICATION

Product:	**60-HD-11-BLK-BLK-GRI-STD-24.00**
Project :	**MWG Powerton Station, IL**
Customer:	**Clean Air And Water Systems, LLC**
Cust PO:	**24058-1**

QC'd By: Malkesh Patel
Date: **May 9, 2024**

We hereby certify the following test results for the above referenced product/project :

Count	Roll Number	Area (sq ft)	Gross Weight (lb)	Thickness MAV (mil)	Thickness MIN (mil)	Asperity Height (mil)		Tensile at Yield (ppi)		Elong at Yield (%)		Tensile at Break (ppi)		Elong at Break (%)		Tear Resistance (lb)		Punct Resist (lb)	Density (g/cc)	Carbon Black (%)	CB Disp (Views in Cat 1 or 2)	Resin OIT (Minute)	Resin Lot #
				ASTM D 5994	ASTM D 5994	ASTM D 7466		ASTM D 6693		ASTM D 6693		ASTM D 6693		ASTM D 6693		ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 4218	ASTM D 5596	ASTM D8117	
						Side A	Side B	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD						
01	3119002713	12,000.00	3936	57	55	23	21	163	161	17	18	177	190	477	501	52	55	149	0.949	2.4	10	200	PRB821140
02	3119002714	12,000.00	3940	59	58	23	22	163	161	17	18	177	190	477	501	52	55	149	0.949	2.4	10	200	PRB821140
03	3119002715	12,000.00	3950	58	55	25	25	154	153	17	19	195	198	560	540	52	57	149	0.946	2.4	10	200	PRB821140
04	3119002716	12,000.00	3940	58	54	23	21	151	161	18	17	213	181	570	518	52	56	149	0.948	2.5	10	200	PRB821140
05	3119002717	12,000.00	3956	60	56	22	22	151	161	18	17	213	181	570	518	52	56	149	0.948	2.5	10	200	PRB821140

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529

Phone: 706-336-7000
Fax: 706-336-7007
E-Mail:contact@skaps.com

Chevron Phillips Chemical Company LP

CoA Date: 03/15/2024

Certificate of Analysis

Shipped To: SKAPS
571 Industrial Park Way
COMMERCE GA 30529-1326
USA

Recipient: ARORA
Fax:

Delivery #: 81105682
PO #: 30131240037
Weight: 185700.000 LB
Ship Date: 03/15/2024
Package: BULK
Mode: Hopper Car
Car #: CPCX814521
Seal No: 377011

Product:
MARLEX K306 POLYETHYLENE in Bulk

Lot Number: PRB821140

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.080	g/10min
HLMI Flow Rate	ASTM D1238	11.80	g/10min
Density	D1505 or D4883	0.9380	g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Steven Beck

Steven Beck
Quality Systems Coordinator

For CoA questions contact Leslie Dziamara at +1-832-813-4806

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Ph: (706) 336-7000
Fax: (706) 336-7007

July 26, 2024

Luke Kabel
Clean air and Water Systems
10315 W. Prairie Lake Rd
Juniata, NE 68955

Ref: MWG Powerton Station, IL

SKAPS Industries certifies that the resin used in the manufacturing of the geomembrane for the reference project shall meet the requirement of the specification.

SKAPS Industries certifies the geomembrane supplied to the reference project shall meet the requirement of the specification. No post- consumer resin has been added during the manufacturing of the geomembrane. The geomembrane shall be free of per- and polyfluoalkyl substances.

SKAPS Industries certifies that the Extrudate welding material furnished shall be of the same resin or compatible compound as the geomembrane.

Malkesh Patel
Malkesh Patel
SKAPS Industries

APPENDIX G-4

HDPE GEOMEMBRANE CONFORMANCE TESTING

CONFORMANCE TEST RESULTS

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geotechnical & geosynthetic testing

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-001
LAB ID NO.: L24-116-001-001
MATERIAL: SKAPS HD-60T2 Geomembrane
ROLL NO: 3119002713

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	59	59	59	61	59		
			60	61	61	62	62	**60**	1.19
DENSITY	D 1505	g/cc	0.9476	0.9472	0.9470			**0.9473**	0.0002
CARBON BLACK CONTENT	D 4218	%	2.56	2.51				**2.53**	0.024
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	150.7	155.5	155.5	152.4	158.2		
			151.3	149.6	155.2	144.8	144.7		
			143.8	148.7	146.7	151.5	146.9	**150.4**	4.31
TEAR RESISTANCE	D 1004	MD-lbs	57.1	59.9	63.2	63.5	64.7		
			58.9	57.9	56.8	66.3	60.9	**60.9**	3.18
		CD-lbs	57.6	59.9	55.7	60.6	59.2		
			55.3	57.8	57.0	60.1	61.0	**58.4**	1.93
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	164	163	163	174	166	**166**	4.15
		CD-ppi	158	164	164	177	173	**167**	6.88
STRENGTH AT BREAK		MD-ppi	209	212	213	204	215	**211**	3.81
		CD-ppi	185	195	190	190	158	**184**	12.99
ELONGATION AT YIELD		MD%	17	17	17	17	17	**17**	0.28
Lo = 1.3"		CD%	14	16	18	14	16	**15**	1.28
ELONGATION AT BREAK		MD%	560	570	560	500	560	**550**	25.30
Lo = 2.0"		CD%	530	550	540	490	410	**500**	51.22

CHECKED BY: JLK DATE: 5/29/2024

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CONFORMANCE TEST RESULTS

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geotechnical & geosynthetic testing

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-001
LAB ID NO.: L24-116-001-002
MATERIAL: SKAPS HD-60T2 Geomembrane
ROLL NO: 3119002714

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	59 57	63 61	59 60	61 61	58 60	**60**	1.64

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CONFORMANCE TEST RESULTS

geotechnics
geotechnical & geosynthetic testing

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-001
LAB ID NO.: L24-116-001-003
MATERIAL: SKAPS HD-60T2 Geomembrane
ROLL NO: 3119002715

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	60	58	58	58	51		
			59	63	63	60	61	**59**	3.24
DENSITY	D 1505	g/cc	0.9485	0.9480	0.9478			**0.9481**	0.0003
CARBON BLACK CONTENT	D 4218	%	2.54	2.53				**2.53**	0.003
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	145.8	144.5	144.0	147.5	148.9		
			149.4	148.8	151.7	145.4	143.7		
			143.8	150.3	140.5	144.7	141.4	**146.0**	3.17
TEAR RESISTANCE	D 1004	MD-lbs	56.0	58.0	59.9	60.3	60.4		
			57.1	56.2	60.6	61.5	59.8	**59.0**	1.88
		CD-lbs	55.3	52.3	58.0	58.8	59.2		
			51.7	55.6	57.2	51.1	59.2	**55.8**	3.01
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	163	164	167	166	169	**166**	2.25
		CD-ppi	170	168	168	178	174	**172**	3.84
STRENGTH AT BREAK		MD-ppi	219	231	247	221	218	**227**	11.05
		CD-ppi	188	130	134	137	202	**158**	30.22
ELONGATION AT YIELD		MD%	17	17	18	17	17	**17**	0.63
Lo = 1.3"		CD%	15	13	15	16	14	**15**	0.77
ELONGATION AT BREAK		MD%	590	600	640	580	560	**590**	26.53
Lo = 2.0"		CD%	520	250	380	110	560	**360**	167.64

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-001
LAB ID NO.: L24-116-001-004
MATERIAL: SKAPS HD-60T2 Geomembrane
ROLL NO: 3119002716

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	58 58	61 58	60 59	57 61	60 58	**59**	1.34

CHECKED BY: JLK DATE: 5/29/2024

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CONFORMANCE TEST RESULTS

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geotechnical & geosynthetic testing

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-001
LAB ID NO.: L24-116-001-005
MATERIAL: SKAPS HD-60T2 Geomembrane
ROLL NO: 3119002717

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	59	59	58	60	60		
			60	58	60	62	59	**60**	1.12
DENSITY	D 1505	g/cc	0.9481	0.9478	0.9474			**0.9478**	0.0003
CARBON BLACK CONTENT	D 4218	%	2.45	2.38				**2.41**	0.036
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	141.4	151.1	143.3	144.3	150.1		
			139.9	151.9	156.3	145.6	147.2		
			149.4	141.6	148.3	140.2	141.9	**146.2**	4.76
TEAR RESISTANCE	D 1004	MD-lbs	54.0	57.1	58.7	59.4	57.6		
			51.5	56.9	58.6	58.9	55.9	**56.9**	2.36
		CD-lbs	49.2	51.9	50.5	51.6	55.2		
			50.5	57.5	55.2	54.6	53.9	**53.0**	2.52
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	166	156	174	172	168	**167**	6.39
		CD-ppi	172	166	178	175	174	**173**	4.07
STRENGTH AT BREAK		MD-ppi	208	197	206	208	216	**207**	6.03
		CD-ppi	195	130	140	194	144	**160**	28.11
ELONGATION AT YIELD		MD%	17	17	17	17	17	**17**	0.23
Lo = 1.3"		CD%	15	15	17	16	15	**16**	0.76
ELONGATION AT BREAK		MD%	540	530	510	540	570	**540**	19.39
Lo = 2.0"		CD%	540	220	300	530	230	**360**	142.35

CHECKED BY: JLK DATE: 5/29/2024

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APPENDIX G-5

GEOCOMPOSITE CERTIFICATION

May 9, 2024

Customer: Clean Air & Water Systems
Customer P.O.#: 24058-1
Project: MWG Poweton Station, IL
Product: TN 330-2-8

We hereby certify that the TN 330-2-8 drainage geocomposite, meets or exceeds the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	300	MAV[6]
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lbs/in	75	MAV
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	MAV
Compression Strength	ASTM D 6364	psi	120	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity[1]	ASTM D 4716	m^2/sec	2.9×10^{-3}	MAV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	8.0	MARV[5]
Grab Strength	ASTM D 4632	lbs	200	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trap Tear Strength	ASTM D 4533	lbs	80	MARV
CBR Puncture	ASTM D 6241	lbs	430	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2		MARV
Permittivity	ASTM D 4491	sec^{-1}	0.2	MARV
AOS	ASTM D 4751	US Sieve	80	MaxARV
UV Resistance (Certify Only)	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1. *Transmissivity measured using water at 21 $\pm$ 2 ^{o} C (70 $\pm$ 4 ^{o} F) with a gradient of 0.03 and a confining pressure of 1,200 psf between steel plates after 15 minutes.*
2. *Condition 190/2.16*
3. *Geotextile and Geonet properties are prior to lamination.*
4. *Geotextile data is provided by the supplier.*
5. *MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.*
6. *Minium average value*

Quality Approval

Malkesh Patel

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com

Product: TN 330-2-8
Project : MWG Poweton Station, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet						
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Compressive Strength (lbs/in2)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"								
142271010001	3.80	3.53	3.25 x 10^{-3}	CCBX 058840	0.9524	272	324	2.58	99	
142271010002				CCBX 058840	0.9524					
142271010003				CCBX 058840	0.9524					
142271010004				CCBX 058840	0.9524					
142271010005	2.92	3.25	2.98 x 10^{-3}	CCBX 058840	0.9527	268	319	2.50	104	
142271010006				CCBX 058840	0.9527					
142271010007				CCBX 058840	0.9527					
142271010008				CCBX 058840	0.9527					
142271010009				CCBX 058840	0.9527					
142271010010	3.77	2.61	3.14 x 10^{-3}	CCBX 058840	0.9523	270	323	2.56	101	
142271010011				CCBX 058840	0.9523					
142271010012				CCBX 058840	0.9523					
142271010013				CCBX 058840	0.9523					
142271010014				CCBX 058840	0.9523					
142271010015	3.73	3.45	3.04 x 10^{-3}	CCBX 058840	0.9525	266	321	2.65	105	
142271010016				CCBX 058840	0.9525					
142271010017				CCBX 058840	0.9525					
142271010018				CCBX 058840	0.9525					
142271010019				CCBX 058840	0.9525					
142271010020	3.25	2.97	3.19 x 10^{-3}	CCBX 058840	0.9528	262	318	2.53	102	
142271010021				CCBX 058840	0.9528					
142271010022				CCBX 058840	0.9528					
142271010023				CCBX 058840	0.9528					
142271010024				CCBX 058840	0.9528					

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

POLYETHYLENE RESIN CERTIFICATION

Customer Name : Clean Air & Water Systems
Project Name : MWG Poweton Station, IL
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 330-2-8

We hereby certify the following test results for the above referenced product/project:

Resin Manufacturer	Resin Lot Number	Property	Test Method	Units	Resin Manufacturer Value	Tested Value*
Osterman and Company	CCBX 058840	Density	ASTM D1505	g/cm^3	0.9500	0.9478
		Melt flow Index	ASTM D1238(a)	g/10 min	0.25	0.18

(a) Condition 190/2.16

* Data from SKAPS Quality Control

571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com

Geotextile Certification

Product: **TN 330-2-8**
Project : **MWG Poweton Station, IL**

We hereby certify the following test results for the above referenced product/project :

GEOCOMP ROLL#	FABRIC SIDE	WEIGHT oz/yd^2	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	PERM-ITY sec^{-1}
142271010001	Side A	8.33	230	66	235	81	102	116	696	80	1.36
	Side B	8.40	228	75	236	77	101	114	681	80	1.34

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529
Ph: (706) 336-7000
Fax: (706) 336-7007

July 26, 2024

Luke Kabel
Clean air and Water Systems
10315 W. Prairie Lake Rd
Juniata, NE 68955

Ref: MWG Powerton Station, IL

SKAPS Industries certifies that the drainage geocomposite shall be free of per- and polyfluoalkyl substances.

Malkesh Patel
Malkesh Patel
SKAPS Industries

APPENDIX G-6

GEOCOMPOSITE CONFORMANCE TESTING

CONFORMANCE TEST RESULTS

geotechnics
geotechnical & geosynthetic testing

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-002
LAB ID NO.: L24-116-002-001
MATERIAL: SKAPS TN330-2-8 Geocomposite
ROLL NO: 0142271010001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	4.1	8.0	6.9	5.4	10.8	**7.04**	2.287
	SIDE"B"	MD-lb/in	5.4	10.6	10.7	11.2	10.3	**9.64**	2.139
			1		2				
TRANSMISSIVITY*	D 4716	m2/s	3.20E-03		3.14E-03			**3.17E-03**	
Flow Rate/Unit Width		gpm/ft	1.55		1.52			**1.53**	
10,000 psf;grad 0.1									
15 min seat									

* PLATE / GEOCOMPOSITE / PLATE

CHECKED BY: JLK DATE: 5/28/2024

G:\Synthetics\2024 Synthetics\116 CAAWS - Powerton Generating Station\[L24-116-002-001.xls]Sheet1 L24-116-002-001 5/28/2024

<u>08/05/2024 S&L Comment:</u> This test was performed at a hydraulic gradient of 0.10 and a normal pressure of 10,000 psf instead of a hydraulic gradient of 0.03 and a normal pressure of 1,260 psf, as specified in Specification P-1402, Table 319020-2. However, because there is a direct relationship between flow rate and hydraulic gradient, the reported flow rate at a hydraulic gradient of 0.10 may be converted to a flow rate at a hydraulic gradient of 0.03 as follows:

Flow Rate (i = 0.03) = Flow Rate (i = 0.10) * (0.03 / 0.10) = (1.53 gpm/ft) * (0.3) = 0.46 gpm/ft > 0.42 gpm/ft

The preceding flow rate is representative of a flow rate at a hydraulic gradient of 0.03 at a normal pressure of 10,000 psf. Because flow rate through a drainage geocomposite will decrease with increasing normal pressure, the calculated flow rate is a conservative (i.e., lower) estimate of the flow rate through the drainage geocomposite at a normal pressure of 1,260 psf. Therefore, it has been demonstrated that the drainage geocomposite material proposed for use in the Bypass Basin Retrofit Project conforms to Specification P-1402, complies with 35 Ill. Adm. Code 845.420(a)(4)(B), and is acceptable for use on this project.

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CONFORMANCE TEST RESULTS

CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-002
LAB ID NO.: L24-116-002-002
MATERIAL: SKAPS TN330-2-8 Geocomposite
ROLL NO: 0142271010009

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	7.7	9.4	7.8	4.7	5.8	**7.06**	1.657
	SIDE"B"	MD-lb/in	13.4	12.4	10.3	11.6	8.1	**11.14**	1.859
			1		2				
TRANSMISSIVITY*	D 4716	m2/s	3.35E-03		3.23E-03			**3.29E-03**	
Flow Rate/Unit Width		gpm/ft	1.62		1.56			**1.59**	
10,000 psf;grad 0.1									
15 min seat									

* PLATE / GEOCOMPOSITE / PLATE

CHECKED BY: JLK DATE: 5/28/2024

G:\Synthetics\2024 Synthetics\116 CAAWS - Powerton Generating Station\[L24-116-002-002.xls]Sheet1 (2) L24-116-002-002 5/28/2024

08/05/2024 S&L Comment: This test was performed at a hydraulic gradient of 0.10 and a normal pressure of 10,000 psf instead of a hydraulic gradient of 0.03 and a normal pressure of 1,260 psf, as specified in Specification P-1402, Table 319020-2. However, because there is a direct relationship between flow rate and hydraulic gradient, the reported flow rate at a hydraulic gradient of 0.10 may be converted to a flow rate at a hydraulic gradient of 0.03 as follows:

Flow Rate (i = 0.03) = Flow Rate (i = 0.10) * (0.03 / 0.10) = (1.59 gpm/ft) * (0.3) = 0.48 gpm/ft > 0.42 gpm/ft

The preceding flow rate is representative of a flow rate at a hydraulic gradient of 0.03 at a normal pressure of 10,000 psf. Because flow rate through a drainage geocomposite will decrease with increasing normal pressure, the calculated flow rate is a conservative (i.e., lower) estimate of the flow rate through the drainage geocomposite at a normal pressure of 1,260 psf. Therefore, it has been demonstrated that the drainage geocomposite material proposed for use in the Bypass Basin Retrofit Project conforms to Specification P-1402, complies with 35 Ill. Adm. Code 845.420(a)(4)(B), and is acceptable for use on this project.

CONFORMANCE TEST RESULTS

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CLIENT: CAAWS, LLC
CLIENT PROJECT: Powerton Generating Station
PROJECT NO.: L24-116-002
LAB ID NO.: L24-116-002-003
MATERIAL: SKAPS TN330-2-8 Geocomposite
ROLL NO: 0142271010017

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	1.9	6.2	2.4	7.0	3.1	**4.13**	2.080
	SIDE"B"	MD-lb/in	8.1	6.7	4.2	5.5	6.2	**6.12**	1.286
			1		2				
TRANSMISSIVITY*	D 4716	m2/s	3.20E-03		3.14E-03			**3.17E-03**	
Flow Rate/Unit Width		gpm/ft	1.55		1.52			**1.53**	
10,000 psf;grad 0.1									
15 min seat									

* PLATE / GEOCOMPOSITE / PLATE

CHECKED BY: JLK DATE: 5/28/2024

G:\Synthetics\2024 Synthetics\116 CAAWS - Powerton Generating Station\[L24-116-002-003.xls]Sheet1 L24-116-002-003 5/28/2024

08/05/2024 S&L Comment: This test was performed at a hydraulic gradient of 0.10 and a normal pressure of 10,000 psf instead of a hydraulic gradient of 0.03 and a normal pressure of 1,260 psf, as specified in Specification P-1402, Table 319020-2. However, because there is a direct relationship between flow rate and hydraulic gradient, the reported flow rate at a hydraulic gradient of 0.10 may be converted to a flow rate at a hydraulic gradient of 0.03 as follows:

Flow Rate (i = 0.03) = Flow Rate (i = 0.10) * (0.03 / 0.10) = (1.53 gpm/ft) * (0.3) = 0.46 gpm/ft > 0.42 gpm/ft

The preceding flow rate is representative of a flow rate at a hydraulic gradient of 0.03 at a normal pressure of 10,000 psf. Because flow rate through a drainage geocomposite will decrease with increasing normal pressure, the calculated flow rate is a conservative (i.e., lower) estimate of the flow rate through the drainage geocomposite at a normal pressure of 1,260 psf. Therefore, it has been demonstrated that the drainage geocomposite material proposed for use in the Bypass Basin Retrofit Project conforms to Specification P-1402, complies with 35 Ill. Adm. Code 845.420(a)(4)(B), and is acceptable for use on this project.

APPENDIX H

COMPOSITE LINER INSTALLATION FORMS AND TESTING RESULTS

APPENDIX H-1

SUBGRADE ACCEPTANCE FORM

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SURFACE PREPARATION FOR GEOMEMBRANE INSTALLATION

PROJECT NAME: MWG Powerton Bypass Basin Retrofit - 24058

LOCATION: 13082 E Manito Rd, Pekin, Illinois 61554

JOB NUMBER: 24058 CLIENT:

AREA ACCEPTED: Whole Area

COMMENTS:

INSTALLER: The undersigned authorized representative of CAAW Systems certifies that he or she has visually inspected the subgrade surface of the area described above and has found the surface to be acceptable for installation of the geosynthetic materials.

CAAW Systems shall be responsible for the integrity of finished geosynthetic material until completion of the installation or demobilization from site.

This certification is based on observations of the subgrade surface conditions only. CAAW Systems has made no sub-terrain inspections or tests and makes no representations or warranties as to the conditions that may exist below the surface of the subgrade.

CERTIFICATE APPROVED BY:

	Installers Acceptance		Inspectors Acceptance
Company:	Clean Air And Water Systems, LLC	Company:	CEC
By:	Andy Khamarlorn	By:	Alexander Brush
Title:	Superintendent	Title:	Staffing Consultants
Date:	August 23, 2024	Date:	August 23, 2024

APPENDIX H-2

PANEL DEPLOYMENT LOGS

Appendix H-2
Panel Deployment Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME:	Powerton Bypass Basin Retrofit	**CEC PROJECT:**	343-014
CEC	Alec Bush	**MANUFACTURER:**	SKAPS Industries
MATERIAL DESCRIPTION:	60 mil Textured HDPE Geomembrane	**INSTALLER:**	Clean Air and Water Systems (CAAWS)

DATE	TIME	PANEL NUMBER	MFG. ROLL NUMBER	PANEL DIMENSIONS WIDTH (ft)	LENGTH (ft)	AREA (sf)	SUBBASE CONDITION
8/21/2024	12:56	P1	3119002715	23.5	287	6,745	Accepted by CAAWS
8/21/2024	14:51	P2	3119002715	23.5	66	1,551	Accepted by CAAWS
8/21/2024	15:55	P3	3119002715	23.5	57	1,340	Accepted by CAAWS
8/21/2024	16:05	P4	3119002715	23.5	26	611	Accepted by CAAWS
8/21/2024	16:08	P5	3119002715	23.5	28	658	Accepted by CAAWS
8/21/2024	16:20	P6	3119002715	23.5	51	1,199	Accepted by CAAWS
8/21/2024	16:35	P7	3118002716	23.5	56	1,316	Accepted by CAAWS
8/21/2024	16:50	P8	3118002716	23.5	38	893	Accepted by CAAWS
8/21/2024	17:00	P9	3118002716	23.5	51	1,199	Accepted by CAAWS
8/22/2024	14:08	P10	3118002716	23.5	67	1,575	Accepted by CAAWS
8/22/2024	14:13	P11	3118002716	23.5	69	1,622	Accepted by CAAWS
8/22/2024	14:15	P12	3118002716	23.5	68	1,598	Accepted by CAAWS
8/22/2024	14:26	P13	3118002716	23.5	69	1,622	Accepted by CAAWS
8/22/2024	15:05	P14	3118002716	23.5	71	1,669	Accepted by CAAWS
8/22/2024	15:15	P15	3118002717	23.5	73	1,716	Accepted by CAAWS
8/22/2024	15:30	P16	3118002717	5	77	385	Accepted by CAAWS
8/22/2024	16:00	P17	3118002717	23.5	77	1,810	Accepted by CAAWS
8/23/2024	8:45	P18	3118002717	23.5	41	964	Accepted by CAAWS
8/23/2024	8:55	P19	3118002717	23.5	62	1,457	Accepted by CAAWS
8/23/2024	9:05	P20	3118002717	23.5	39	917	Accepted by CAAWS
8/23/2024	9:10	P21	3118002717	23.5	45	1,058	Accepted by CAAWS
8/23/2024	9:13	P22	3118002717	23.5	16	376	Accepted by CAAWS
8/23/2024	10:16	P23	3118002717	23.5	151	3,549	Accepted by CAAWS
8/23/2024	10:23	P24	3118002714	23.5	79	1,857	Accepted by CAAWS
8/23/2024	13:08	P25	3118002714	23.5	67	1,575	Accepted by CAAWS
8/23/2024	13:18	P26	3118002714	23.5	23	541	Accepted by CAAWS
8/23/2024	13:24	P27	3118002714	23.5	65	1,528	Accepted by CAAWS
8/23/2024	13:30	P28	3118002714	23.5	28	658	Accepted by CAAWS
8/23/2024	13:35	P29	3118002714	23.5	67	1,575	Accepted by CAAWS
8/23/2024	13:40	P30	3118002714	23.5	68	1,598	Accepted by CAAWS
8/23/2024	13:43	P31	3118002714	23.5	69	1,622	Accepted by CAAWS
8/23/2024	13:46	P32	3118002714	23.5	67	1,575	Accepted by CAAWS
8/23/2024	13:50	P33	3118002713	23.5	66	1,551	Accepted by CAAWS
8/23/2024	13:52	P34	3118002713	23.5	63	1,481	Accepted by CAAWS
8/23/2024	14:00	P35	3118002713	23.5	61	1,434	Accepted by CAAWS
			APPROXIMATE TOTAL SQUARE FOOTAGE:			**52,814**	

APPENDIX H-3

PANEL SEAMING LOG

Appendix H-3
Panel Seaming Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC TECHNICIAN(S): Alec Bush
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane

CEC PROJECT: 343-014
MANUFACTURER: SKAPS Industries
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE SEAMED	SEAM LENGTH (FT)	SEAMER ID	DEVICE NO.	TEMP. SETTING	SPEED SETTING	SEAM START TIME	SEAM END TIME	DESTRUCT SAMPLE ID	DESTRUCT SAMPLE LOC.
3/1	8/21/2024	56	JD	74	850	500	16:14	16:27		
4/3	8/21/2024	29	DD	72	850	500	16:17	16:22		
5/4	8/21/2024	26	DD	72	850	400	16:24	16:30		
5/2	8/21/2024	27	DD	72	850	500	16:34	16:37		
4/2	8/21/2024	8	DD	72	850	500	16:37	16:38		
3/2	8/21/2024	34.5	DD	72	850	400	16:07	16:15	D-2	49' FROM SEOS
7/1	8/21/2024	43	JD	74	850	500	16:40	16:47	D-1/D-5	16' FROM SEOS
6/7	8/21/2024	15	DD	72	850	500	17:06	17:07		
8/7	8/21/2024	36	DD	72	850	500	16:58	17:02		
9/8	8/21/2024	29	DD	72	850	400	17:15	17:22		
9/6	8/21/2024	31	JD	74	850	500	17:08	17:15		
9/6	8/21/2024	15	JD	74	850	500	17:15	17:20		
10/2	8/22/2024	68	JD	74	850	500	14:10	14:19		
11/10	8/22/2024	69	DD	72	850	500	14:15	14:24		
11/1	8/22/2024	23	DD	72	850	500	14:51	14:55		
10/1	8/22/2024	23	DD	72	850	400	14:55	14:58		
12/11	8/22/2024	69	JD	74	850	500	14:04	14:35		
12/1	8/22/2024	23	DD	72	850	500	14:47	14:51		
13/12	8/22/2024	70	DD	72	850	500	14:26	14:37		
13/1	8/22/2024	23	DD	72	850	500	14:42	14:47		
14/13	8/22/2024	71	JD	74	850	500	15:10	15:19		

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Appendix H-3
Panel Seaming Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC TECHNICIAN(S): Alec Bush
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
CEC PROJECT: 343-014
MANUFACTURER: SKAPS Industries
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE SEAMED	SEAM LENGTH (FT)	SEAMER ID	DEVICE NO.	TEMP. SETTING	SPEED SETTING	SEAM START TIME	SEAM END TIME	DESTRUCT SAMPLE ID	DESTRUCT SAMPLE LOC.
14/1	8/22/2024	23	DD	72	850	500	15:48	15:52		
15/14	8/22/2024	71	DD	72	850	500	15:24	15:35	D-4	20' FROM WEOS
15/1	8/22/2024	23	DD	72	850	500	15:44	15:48		
16/15	8/22/2024	72	JD	74	850	500	15:36	15:47		
16/1	8/23/2024	5	DD	72	850	400	10:01	10:02		
17/16	8/22/2024	29	DD	72	850	400	16:22	16:30		
17/1	8/23/2024	15	DD	72	850	400	9:58	10:01		
18/17	8/23/2024	6	DD	72	850	400	9:53	9:54		
18/19	8/23/2024	16	DD	72	850	400	9:49	9:53		
21/18	8/23/2024	40	JD	74	850	500	9:11	9:17	D-3/D-6	21' FROM WEOS
22/21	8/23/2024	15	DD	72	850	400	9:17	9:20		
22/20	8/23/2024	15	DD	72	850	400	9:26	9:30		
20/21	8/23/2024	26	DD	72	850	400	9:33	9:40		
20/19	8/23/2024	36	JD	74	850	500	9:27	9:35		
19/17	8/23/2024	24	DD	72	850	400	9:43	9:47		
19/1	8/23/2024	60	JD	74	850	500	9:39	9:49		
24/1	8/23/2024	78	JD	74	850	500	10:44	10:53		
23/1	8/23/2024	150	JD	74	850	500	10:24	10:44		
24/23	8/23/2024	26	DD	72	850	400	10:29	10:34		
23/7	8/23/2024	23	DD	72	850	400	10:42	10:47		
29/30	8/23/2024	66	DD	72	850	500	13:50	13:59		

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Appendix H-3
Panel Seaming Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE SEAMED	SEAM LENGTH (FT)	SEAMER ID	DEVICE NO.	TEMP. SETTING	SPEED SETTING	SEAM START TIME	SEAM END TIME	DESTRUCT SAMPLE ID	DESTRUCT SAMPLE LOC.
27/29	8/23/2024	62	JD	74	850	500	13:40	13:49		
28/27	8/23/2024	26	DD	72	850	500	13:32	13:35		
26/25	8/23/2024	20	DD	72	850	500	13:23	13:26		
25/24	8/23/2024	47	JD	74	850	500	13:23	13:26		
30/31	8/23/2024	66	JD	74	850	500	13:59	14:09		
31/32	8/23/2024	67	DD	72	850	500	14:05	14:16		
32/33	8/23/2024	65	JD	74	850	500	14:17	14:25		
33/34	8/23/2024	60	DD	72	850	500	14:23	14:30		
34/35	8/23/2024	58	JD	74	850	500	14:30	14:38	D-8	9' FROM WEOS
35/23	8/23/2024	23	DD	72	850	500	14:41	14:46		
34/23	8/23/2024	24	DD	72	850	500	14:46	14:50		
33/23	8/23/2024	23	DD	72	850	500	14:50	14:53	D-7	12' FROM SEOS
32/23	8/23/2024	23	DD	72	850	500	14:53	14:57		
31/23	8/23/2024	23	DD	72	850	500	14:57	15:01		
30/23	8/23/2024	23	DD	72	850	500	15:01	15:06		
29/23	8/23/2024	3	DD	72	850	500	15:06	15:06		
29/24	8/23/2024	20	DD	72	850	500	15:06	15:09		
27/24	8/23/2024	8	DD	72	850	500	15:09	15:10		
28/26	8/23/2024	20	DD	72	850	400	15:21	15:24		
26/27	8/23/2024	8	DD	72	850	400	15:24	15:26		
25/27	8/23/2024	27	DD	72	850	400	15:26	15:30		

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

APPENDIX H-4

SEAM TESTING LOG

Appendix H-4
Seam Testing Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofi
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE TESTED	START TIME	FINISH TIME	INITIAL PRESSURE	FINAL PRESSURE	MONITOR ID (CEC Rep)	TECHNICIAN ID (CAAWS Rep)	RESULTS (P/F)	TEST LOCATION
2/3	8/21/2024	16:07	16:12	30	30	ASB	SS	P	ELOS
4/2	8/21/2024	16:42	16:47	30	29	ASB	SS	P	ELOS
5/2	8/21/2024	16:49	16:54	30	30	ASB	SS	P	ELOS
5/4	8/21/2024	16:48	16:53	30	30	ASB	SS	P	ELOS
4/3	8/21/2024	16:43	16:48	30	30	ASB	SS	P	ELOS
3/1	8/21/2024	16:45	16:50	30	30	ASB	SS	P	ELOS
7/1	8/21/2024	17:15	17:20	30	30	ASB	SS	P	SEOS TO 41'
7/1	8/23/2024	10:50	10:55	30	30	ASB	SS	P	41' TO NEOS
8/7	8/21/2024	17:19	17:24	30	30	ASB	SS	P	ELOS
9/8	8/21/2024	17:25	17:30	30	30	ASB	SS	P	ELOS
6/7	8/21/2024	17:18	17:23	30	30	ASB	SS	P	ELOS
9/6	8/21/2024	17:18	17:23	30	30	ASB	SS	P	WEOS TO 15'
9/6	8/21/2024	17:31	17:36	30	30	ASB	SS	P	15' TO EEOS
13/12	8/22/2024	14:40	14:45	30	29	SSS	SS	P	ELOS
12/11	8/22/2024	14:39	14:44	30	30	SSS	SS	P	ELOS
11/10	8/22/2024	14:27	14:32	30	30	SSS	SS	P	ELOS
10/2	8/22/2024	14:26	14:31	30	30	SSS	SS	P	ELOS
13/1	8/22/2024	15:05	15:10	30	30	SSS	SS	P	ELOS
12/1	8/22/2024	15:06	15:11	30	30	SSS	SS	P	ELOS
11/1	8/22/2024	15:07	15:12	30	30	SSS	SS	P	ELOS
10/1	8/22/2024	15:09	15:14	30	30	SSS	SS	P	ELOS

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Civil & Environmental Consultants, Inc.

PROJECT NAME: Powerton Bypass Basin Retrofi
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE TESTED	START TIME	FINISH TIME	INITIAL PRESSURE	FINAL PRESSURE	MONITOR ID (CEC Rep)	TECHNICIAN ID (CAAWS Rep)	RESULTS (P/F)	TEST LOCATION
14/1	8/22/2024	15:57	16:02	30	30	SSS	SS	P	ELOS
15/1	8/22/2024	15:55	16:00	30	30	SSS	SS	P	ELOS
15/14	8/22/2024	15:37	15:42	30	30	SSS	SS	P	ELOS
14/13	8/22/2024	15:32	15:37	30	30	SSS	SS	P	ELOS
16/15	8/22/2024	15:52	15:57	30	30	SSS	SS	P	ELOS
17/16	8/22/2024	16:33	16:38	30	30	SSS	SS	P	ELOS
16/1	8/23/2024	10:20	10:25	30	30	SSS	SS	P	ELOS
17/1	8/23/2024	10:18	10:23	30	30	SSS	SS	P	ELOS
19/17	8/23/2024	10:09	10:14	30	30	SSS	SS	P	ELOS
19/1	8/23/2024	10:07	10:12	30	30	SSS	SS	P	ELOS
18/17	8/23/2024	10:35	10:40	30	30	SSS	SS	P	ELOS
18/19	8/23/2024	10:32	10:37	30	30	SSS	SS	P	SEOS TO 6'
18/19	8/23/2024	10:33	10:38	30	30	SSS	SS	P	6' TO NEOS
21/18	8/23/2024	9:35	9:40	30	30	SSS	SS	P	ELOS
20/19	8/23/2024	9:41	9:46	30	30	SSS	SS	P	ELOS
20/21	8/23/2024	9:50	9:55	30	30	SSS	SS	P	ELOS
22/21	8/23/2024	9:59	10:04	30	30	SSS	SS	P	ELOS
22/20	8/23/2024	9:57	10:02	30	30	SSS	SS	P	ELOS
19/1	8/23/2024	10:07	10:12	30	30	ASB	SS	P	ELOS

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Appendix H-4
Seam Testing Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

Civil & Environmental Consultants, Inc.

PROJECT NAME: Powerton Bypass Basin Retrofi
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE TESTED	START TIME	FINISH TIME	INITIAL PRESSURE	FINAL PRESSURE	MONITOR ID (CEC Rep)	TECHNICIAN ID (CAAWS Rep)	RESULTS (P/F)	TEST LOCATION
24/1	8/23/2024	10:58	11:03	30	30	ASB	SS	P	ELOS
24/23	8/23/2024	10:39	10:44	30	30	ASB	SS	P	ELOS
23/1	8/23/2024	10:57	11:02	30	30	ASB	SS	P	ELOS
29/24	8/23/2024	15:43	15:48	30	30	ASB	SS	P	ELOS
27/24	8/23/2024	15:44	15:49	30	30	ASB	SS	P	ELOS
25/24	8/23/2024	14:20	14:25	30	30	ASB	SS	P	ELOS
25/24	8/23/2024	14:26	14:31	30	30	ASB	SS	P	NEOS TO 28'
26/25	8/23/2024	14:28	14:33	30	30	ASB	SS	P	28' TO SEOS
26/27	8/23/2024	15:50	15:55	30	30	ASB	SS	P	ELOS
25/27	8/23/2024	15:51	15:56	30	30	ASB	SS	P	ELOS
26/28	8/23/2024	0:01	15:56	30	30	ASB	SS	P	ELOS
28/27	8/23/2024	14:31	14:36	30	30	ASB	SS	P	ELOS
27/29	8/23/2024	14:36	14:41	30	30	ASB	SS	P	ELOS
29/30	8/23/2024	14:40	14:45	30	30	ASB	SS	P	ELOS
30/31	8/23/2024	14:44	14:49	30	30	ASB	SS	P	ELOS
30/23	8/23/2024	15:37	15:42	30	30	ASB	SS	P	ELOS
31/23	8/23/2024	15:33	15:38	30	30	ASB	SS	P	ELOS
31/32	8/23/2024	14:47	14:52	30	30	ASB	SS	P	ELOS
32/23	8/23/2024	15:28	15:33	30	30	ASB	SS	P	ELOS
32/33	8/23/2024	15:22	15:27	30	30	ASB	SS	P	ELOS

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Appendix H-4
Seam Testing Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofi
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

SEAM ID	DATE TESTED	START TIME	FINISH TIME	INITIAL PRESSURE	FINAL PRESSURE	MONITOR ID (CEC Rep)	TECHNICIAN ID (CAAWS Rep)	RESULTS (P/F)	TEST LOCATION
33/23	8/23/2024	15:20	15:25	30	30	ASB	SS	P	ELOS
33/34	8/23/2024	15:11	15:16	30	30	ASB	SS	P	ELOS
34/23	8/23/2024	14:59	15:04	30	30	ASB	SS	P	ELOS
34/35	8/23/2024	14:51	14:56	30	30	ASB	SS	P	ELOS
35/23	8/23/2024	14:56	15:01	30	30	ASB	SS	P	ELOS
23/7	8/23/2024	10:51	10:56	30	30	ASB	SS	P	ELOS

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

APPENDIX H-5

EXTRUSION WELDS AND REPAIR LOG

Appendix H-5
Extrusion Welder Seams, Testing and Repair Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

REPAIR ID	SEAM OR PANEL DESCRIPTION	LOCATION	WELDER ID	MACHINE ID	BARREL TEMP/ PREHEAT SETTING	REPAIR TYPE	APPROXIMATE SIZE (FT X	DATE WELDED	DATE VACUUM TESTED	RESULTS (P/F)
R-1	P2	BOOT	NL	88	550/550	BOOT	3 x 6	8/22/2024	8/22/2024	P
R-2	8/7/6/9	28' FROM SEOS	NL	88	550/550	PATCH	1 x 4	8/22/2024	8/22/2024	P
R-3	9/6	17' FROM EEOS	NL	88	550/550	PATCH	1 x 3	8/22/2024	8/22/2024	P
R-4	4/2/3	27' FROM SEOS	NL	88	550/550	PATCH	2 x 2	8/22/2024	8/22/2024	P
R-5	2/3	6' FROM SEOS	NL	88	550/550	BEAD	0.5 x 0	8/22/2024	8/22/2024	P
R-6	2/3	11' FROM SEOS	NL	88	550/550	BEAD	1 x 0	8/22/2024	8/22/2024	P
R-7	P4		NL	88	550/550	BEAD	23 x 0	8/22/2024	8/22/2024	P
R-8	5/2	24' FROM WEOS	NL	88	550/550	PATCH	1 x 1	8/22/2024	8/22/2024	P
R-9	5/2	WEOS	NL	88	550/550	CAP	4 x 8	8/22/2024	8/22/2024	P
R-10	7/1	16' FROM SEOS	NL	88	550/550	PATCH	1 x 5	8/22/2024	8/22/2024	P
R-11	P5	10' FROM SEOS	NL	88	550/550	BEAD	0.5 x 0	8/22/2024	8/22/2024	P
R-12	3/2	7' FROM NEOS	NL	88	550/550	PATCH	2 x 4	8/22/2024	8/22/2024	P
R-13	9/6	15' FROM EEOS	NL	88	550/550	BEAD	1 x 0	8/22/2024	8/22/2024	P
R-14	1/3/2/10	67' FROM WEOS	NL	88	550/550	PATCH	2 x 4	8/23/2024	8/23/2024	P
R-15	1/10/11	67' FROM WEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-16	1/11/12	67' FROM WEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-17	1/12/13	67' FROM WEOS	NL	88	550/550	PATCH	1 x 2	8/23/2024	8/23/2024	P
R-18	1/13/14	67' FROM WEOS	NL	88	550/550	PATCH	2 x 3	8/23/2024	8/23/2024	P
R-19	1/14/15	67' FROM WEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-20	1/15/16	76' FROM NEOS	NL	88	550/550	PATCH	2 x 2	8/23/2024	8/23/2024	P
R-21	14/15	WEOS	NL	88	550/550	CAP	5 x 16	8/23/2024	8/23/2024	P
R-22	13/14	WEOS	NL	88	550/550	CAP	6 x 7	8/23/2024	8/23/2024	P

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Civil & Environmental Consultants, Inc.

Appendix H-5
Extrusion Welder Seams, Testing and Repair Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

REPAIR ID	SEAM OR PANEL DESCRIPTION	LOCATION	WELDER ID	MACHINE ID	BARREL TEMP/ PREHEAT SETTING	REPAIR TYPE	APPROXIMA TE SIZE (FT X	DATE WELDED	DATE VACUUM TESTED	RESULTS (P/F)
R-23	P12	BOOT	NL	88	550/550	BOOT	4 x 4	8/23/2024	8/23/2024	P
R-24	P6	10' FROM EEOS	NL	88	550/550	CAP	10 x 3	8/22/2024	8/26/2024	P
R-25	P6	29' FROM EEOS	NL	88	550/550	PATCH	2 x 4	8/22/2024	8/26/2024	P
R-26	1/16/17	71' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-27	1/17/19	54' FROM NEOS	NL	88	550/550	PATCH	2 x 3	8/23/2024	8/23/2024	P
R-28	17/18/19	55' FROM NEOS	NL	88	550/550	PATCH	2 x 2	8/23/2024	8/23/2024	P
R-29	19/18	BOOT	NL	88	550/550	BOOT	2 x 3	8/23/2024	8/23/2024	P
R-30	19/20/21/18	32' FROM NEOS	NL	88	550/550	CAP	6 x 2	8/23/2024	8/23/2024	P
R-31	14/15	21' FROM WEOS	NL	88	550/550	PATCH	1 x 4	8/23/2024	8/23/2024	P
R-32	16/17	36' FROM WEOS	NL	88	550/550	PATCH	4 x 4	8/24/2024	8/26/2024	P
R-33	18/17	36' FROM WEOS	NL	88	550/550	PATCH	4 x 4	8/24/2024	8/26/2024	P
R-34	18/21	22' FROM WEOS	NL	88	550/550	PATCH	2 x 4	8/23/2024	8/23/2024	P
R-35	21/22/20	5' FROM WEOS	NL	88	550/550	PATCH	2 x 3	8/23/2024	8/23/2024	P
R-36	P21	22' FROM WEOS	NL	88	550/550	BEAD	3 x 0	8/23/2024	8/23/2024	P
R-37	P21	32' FROM WEOS	NL	88	550/550	BEAD	2 x 0	8/23/2024	8/23/2024	P
R-38	1/23/24	73' FROM NEOS	NL	88	550/550	PATCH	2 x 2	8/23/2024	8/23/2024	P
R-39	1/23/7	49' FROM SEOS	NL	88	550/550	PATCH	1 x 2	8/24/2024	8/24/2024	P
R-40	1/7	40' FROM SEOS	NL	88	550/550	PATCH	1 x 2	8/24/2024	8/24/2024	P
R-41	6/7	40' FROM SEOS	NL	88	550/550	BOOT	4 x 3	8/23/2024	8/24/2024	P
R-42	1/7	13' FROM SEOS	NL	88	550/550	PATCH	1 x 4	8/24/2024	8/24/2024	P
R-43	34/35	189' FROM NEOS	NL	88	550/550	BOOT	3 x 2	8/23/2024	8/24/2024	P
R-44	P33	160' FROM NEOS	NL	88	550/550	BOOT	2 x 4	8/23/2024	8/23/2024	P

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Civil & Environmental Consultants, Inc.

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

REPAIR ID	SEAM OR PANEL DESCRIPTION	LOCATION	WELDER ID	MACHINE ID	BARREL TEMP/ PREHEAT SETTING	REPAIR TYPE	APPROXIMATE SIZE (FT X	DATE WELDED	DATE VACUUM TESTED	RESULTS (P/F)
R-45	P32	123' FROM NEOS	NL	88	550/550	BOOT	3 x 4	8/23/2024	8/23/2024	P
R-46	P27	44' FROM NEOS	NL	88	550/550	BOOT	4 x 4	8/23/2024	8/23/2024	P
R-47	25/24	21' FROM NEOS	NL	88	550/550	PATCH	1 x 4	8/23/2024	8/23/2024	P
R-48	18/21	WEOS	NL	88	550/550	CAP	4 x 17	8/23/2024	8/23/2024	P
R-49	28/27/26	13' FROM NEOS	NL	88	550/550	PATCH	2 x 3	8/23/2024	8/23/2024	P
R-50	25/24/27	39' FROM NEOS	NL	88	550/550	PATCH	2 x 3	8/23/2024	8/23/2024	P
R-51	27/24/29	48' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-52	23/24/29/30	73' FROM NEOS	NL	88	550/550	CAP	1 x 3	8/23/2024	8/23/2024	P
R-53	23/31/32	117' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/23/2024	P
R-54	23/32/33	140' FROM NEOS	NL	88	550/550	PATCH	1 x 2	8/23/2024	8/23/2024	P
R-55	23/33/34	165' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/24/2024	8/24/2024	P
R-56	23/34/35	189' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/24/2024	8/24/2024	P
R-57	18/21/R34	22' FROM WEOS	NL	88	550/550	PATCH	2 x 4	8/23/2024	8/23/2024	P
R-58	33/23	152' FROM NEOS	NL	88	550/550	PATCH	4 x 1	8/24/2024	8/24/2024	P
R-59	34/35	189' FROM NEOS	NL	88	550/550	PATCH	5 x 1	8/23/2024	8/24/2024	P
R-60	23/30/31	93' FROM NEOS	NL	88	550/550	PATCH	1 x 1	8/23/2024	8/24/2024	P
R-61	25/26/27	18' FROM NEOS	NL	88	550/550	PATCH	2 x 2	8/23/2024	8/23/2024	P
R-62	6/7/23/35	45' FROM SEOS	NL	88	550/550	CAP	5 x 7	8/24/2024	8/26/2024	P
R-63	P36	50' FROM SEOS	NL	88	550/550	PATCH	2 x 3	8/24/2024	8/26/2024	P
R-64	P36	34' FROM EEOS	NL	88	550/550	BEAD	6 x 0	8/24/2024	8/26/2024	P
R-65	P36	33' FROM EEOS	NL	88	550/550	BEAD	3 x 0	8/24/2024	8/26/2024	P
R-66	P36	10' FROM EOS	NL	88	550/550	PATCH	3 x 3	8/24/2024	8/26/2024	P

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

Appendix H-5
Extrusion Welder Seams, Testing and Repair Log
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

Civil & Environmental Consultants, Inc.

PROJECT NAME: Powerton Bypass Basin Retrofit
CEC PROJECT: 343-014
CEC TECHNICIAN(S): Alec Bush
MANUFACTURER: SKAPS Industries
MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane
INSTALLER: Clean Air and Water Systems (CAAWS)

REPAIR ID	SEAM OR PANEL DESCRIPTION	LOCATION	WELDER ID	MACHINE ID	BARREL TEMP/ PREHEAT SETTING	REPAIR TYPE	APPROXIMATE SIZE (FT X	DATE WELDED	DATE VACUUM TESTED	RESULTS (P/F)
R-67	36/6	EEOS	NL	88	550/550	CAP	10 x 4	8/24/2024	8/26/2024	P
R-68	P/CONCRETE	43' FROM EEOS	NL	88	550/550	PATCH	4 x 4	8/24/2024	8/26/2024	P
R-69	P18	31' FROM WEOS	NL	88	550/550	BEAD	2 x 0	8/24/2024	8/26/2024	P
R-70	P18	29' FROM WEOS	NL	88	550/550	BEAD	2 x 0	8/24/2024	8/26/2024	P
R-71	P16	31' FROM WEOS	NL	88	550/550	BEAD	2 x 0	8/24/2024	8/26/2024	P
R-72	P16	29' FROM WEOS	NL	88	550/550	BEAD	2 x 0	8/24/2024	8/26/2024	P
R-73	P16	5' FROM WEOS	NL	88	550/550	CAP	7 x 2	8/24/2024	8/26/2024	P
R-74	P17	WEOS	NL	88	550/550	BEAD	2 x 0	8/24/2024	8/26/2024	P
R-75	P17	WEOS	NL	88	550/550	PATCH	1 x 1	8/24/2024	8/26/2024	P

ELOS: Entire Length of Seam
EEOS: East Edge of Seam
WEOS: West Edge of Seam
NEOS: North Edge of Seam
SEOS: South Edge of Seam

APPENDIX H-6

LOAD CELL CALIBRATION CERTIFICATION AND TRIAL WELD RESULTS

Services Inc.
DEMTECH®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Calibration Apparatus:

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Pro-Cal unit, model TC-0100/A

Serial No: **22397**

		Dead Weight:		Reference Cell:	
A/D Module Model No:	T-029	W1	2	R1	2
A/D Module Serial No:	**315022397**	W2	152	R2	152
Channel No:	N/A	W3	302	R3	302

Indicator reading with no load: 0

Offse **-2.240760** Scale: **3.330220**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Marc Scott

Date: 10/16/23

Signature: Marc L Scott

DEMTECH Services Inc.

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **78998**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **419078998**

Channel No: N/A

Dead Weight:		Reference Cell:	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offse **-4.865128** Scale: **3.331517**

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Marc Scott

Date: 10/16/23

Signature: Marc Scott

Civil & Environmental Consultants, Inc.

Appendix H-6.2
Trial Weld Results
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit

CEC TECHNICIAN(S): Alec Bush

MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane

CEC PROJECT: 343-014

MANUFACTURER: SKAPS Industries

INSTALLER: Clean Air and Water Systems (CAAWS)

DATE	TIME	AMBIENT TEMP.	SEAMER INITIALS	MACHINE NUMBER	BARREL TEMP	PREHEAT SETTING	WEDGE TEMP	SPEED SETTING	PEEL VALUES					SHEAR VALUES					PASS/FAIL	COMMENTS
8/21/2024	2:32 PM	80	JD	74			850	500	104 / 98	98 / 106	104 / 102	108 / 100	117 / 108	162	159	157	160	157	PASS	S/S
8/21/2024	2:23 PM	80	DD	72			850	500	110 / 114	106 / 101	106 / 94	102 / 111	118 / 111	147	150	149	147	151	PASS	S/S
8/21/2024	2:24 PM	80	DD	72			850	500	114 / 118	125 / 104	123 / 113	106 / 98	124 / 129	168	169	168	164	167	PASS	S/T
8/21/2024	2:26 PM	80	DD	72			850	400	114 / 118	122 / 118	113 / 105	121 / 109	117 / 109	163	175	167	171	163	PASS	T/T
8/22/2024	7:53 AM	54	NL	88	550	550			146	135	138	144	147	186	179	175	181	176	PASS	EXT
8/22/2024	1:09 PM	82	JD	74			850	500	131 / 116	127 / 130	125 / 118	122 / 117	125 / 116	160	167	159	164	166	PASS	S/S
8/22/2024	1:16 PM	82	DD	72			850	500	106 / 102	128 / 106	104 / 106	103 / 101	99 / 103	163	154	167	158	157	PASS	S/S
8/22/2024	1:18 PM	82	DD	72			850	400	105 / 98	104 / 102	102 / 104	104 / 101	97 / 102	159	167	165	154	162	PASS	S/T
8/22/2024	1:17 PM	85	DD	72			850	400	119 / 121	124 / 107	122 / 114	114 / 117	118 / 119	173	177	169	174	172	PASS	T/T
8/23/2024	7:27 AM	54	NL	88	550	550			137	131	137	132	146	185	186	172	186	184	PASS	S/S
8/23/2024	7:54 AM	56	DD	72			850	500	111 / 112	111 / 98	103 / 105	112 / 113	103 / 97	179	182	178	182	177	PASS	S/S
8/23/2024	7:59 AM	56	JD	74			850	500	120 / 112	119 / 113	123 / 116	124 / 112	113 / 113	163	163	173	178	168	PASS	S/T
8/23/2024	7:52 AM	56	DD	72			850	400	99 / 107	102 / 112	103 / 106	104 / 105	105 / 112	177	173	172	177	174	PASS	T/T
8/23/2024	7:55 AM	56	DD	72			850	400	156 / 140	128 / 134	146 / 125	154 / 134	128 / 119	187	190	179	183	185	PASS	S/S
8/23/2024	1:09 PM	86	JD	74			850	500	109 / 127	104 / 116	115 / 121	114 / 114	110 / 126	157	164	167	159	165	PASS	S/S
8/23/2024	1:11 PM	86	DD	72			850	500	108 / 101	106 / 100	100 / 103	107 / 104	107 / 104	160	165	159	154	160	PASS	S/S
8/23/2024	1:10 AM	86	DD	72			850	400	130 / 128	133 / 134	130 / 131	124 / 127	129 / 129	166	174	168	171	172	PASS	T/T
8/23/2024	1:14 PM	86	DD	72			850	400	94 / 93	99 / 95	94 / 99	96 / 109	104 / 95	164	161	164	165	165	PASS	S/T

Civil & Environmental Consultants, Inc.

Appendix H-6.2
Trial Weld Results
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit

CEC PROJECT: 343-014

CEC TECHNICIAN(S): Alec Bush

MANUFACTURER: SKAPS Industries

MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane

INSTALLER: Clean Air and Water Systems (CAAWS)

DATE	TIME	AMBIENT TEMP.	SEAMER INITIALS	MACHINE NUMBER	BARREL TEMP	PREHEAT SETTING	WEDGE TEMP	SPEED SETTING	PEEL VALUES					SHEAR VALUES					PASS/FAIL	COMMENTS
8/23/2024	1:24 PM	86	NL	88	550	550			147	149	149	152	151	166	163	167	162	165	PASS	EXT
8/24/2024	7:16 AM	62	NL	88	550	550			125	131	128	135	134	175	188	176	174	174	PASS	EXT
8/24/2024	1:13 PM	92	NL	88	550	550			123	125	122	134	114	170	168	151	169	158	PASS	EXT

APPENDIX H-7

FIELD DESTRUCTIVE TEST LOG

Civil & Environmental Consultants, Inc.

Appendix H-7
Field Destructive Test Logs
2024 Powerton Bypass Basin Retrofit - Powerton Generating Station - Pekin, Illinois

PROJECT NAME: Powerton Bypass Basin Retrofit **CEC PROJECT:** 343-014

CEC TECHNICIAN(S): Alec Bush **MANUFACTURER:** SKAPS Industries

MATERIAL DESCRIPTION: 60 mil Textured HDPE Geomembrane **INSTALLER:** Clean Air and Water Systems (CAAWS)

SAMPLE #	DATE SEAMED	DATE TESTED	WELDER ID	MACHINE	WEDGE TEMP / SPEED	EXTRUDER BARREL / PREHEAT	SEAM NO. (TOP PANEL/ BOTTOM PANEL	TESTER ID	PEEL VALUES (ppi)					SHEAR VALUES (ppi)					PASS / FAIL	COMMENTS
D-1	8/21/2024	8/22/2024	JD	74	850 500		7/1	SS	121 110	118 114	112 108	118 99	119 131	189	177	192	191	186	PASS	S/S
D-2	8/21/2024	8/22/2024	DD	72	850 400		2/3	SS	136 120	134 122	138 134	155 119	135 128	180	204	179	190	189	PASS	T/T
D-3	8/23/2024	8/23/2024	JD	74	850 500		21/18	SS	114 113	112 100	112 120	106 117	117 106	151	152	149	154	150	PASS	S/S
D-4	8/22/2024	8/23/2024	DD	72	850 500		15/14	SS	107 96	110 99	105 101	114 96	110 104	156	153	153	152	152	PASS	S/S
D-5	8/22/2024	8/23/2024	NL	88		550 550	1/R-10	SS	117	100	120	121	96	155	156	154	152	160	PASS	EXT
D-6	8/23/2024	8/23/2024	NL	88		550 550	R-34/18	SS	161	156	159	154	147	175	171	169	167	168	PASS	EXT
D-7	8/23/2024	8/23/2024	DD	72	850 400		33/23	SS	159 137	150 132	155 134	135 146	146 137	160	161	160	163	162	PASS	S/T
D-8	8/23/2024	8/23/2024	JD	74	850 500		34/35	SS	110 107	116 107	115 115	118 103	116 107	161	163	157	162	161	PASS	S/S

APPENDIX H-8

DESTRUCT SAMPLE LABORATORY RESULTS

Date: 2024-08-24

Mail To:
Derek Dorsz
Civil and Environmental Consultants
1230 E Diehl Rd, Suite 200
Naperville , IL , 60563

Bill To:

Civil and Environmental Consultants
343-014

e-mail:
ddorsz@cecinc.com abush@cecinc.com djones@cecinc.com

Dear Dorsz,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Bypass Basin Retofit Powerton**
TRI Job Reference Number:	**81492**
Material(s) Tested:	(6) Heat Fusion Weld Seam(s) (2) Single Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:

AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Civil and Environmental Consultants
Project: Bypass Basin Retofit Powerton

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 81492

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	115	116	114	116	**116**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	112	117	118	125	111	**117**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	157	166	163	161	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	135	136	135	125	**133**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	145	138	153	151	139	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	162	164	165	161	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Civil and Environmental Consultants
Project: Bypass Basin Retofit Powerton

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 81492

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	126	127	133	124	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	125	127	120	120	130	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	163	157	156	157	158	**158**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	110	107	108	108	107	**108**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	127	127	116	117	122	**122**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	160	160	160	164	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Civil and Environmental Consultants
Project: Bypass Basin Retofit Powerton

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 81492

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	147	142	151	155	148	**149**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	142	142	144	148	143	**144**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	163	152	165	157	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Sample ID: DS-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	121	120	119	119	121	**120**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	122	111	128	128	120	**122**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	173	164	156	163	160	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS - SINGLE TRACK
TRI Client: Civil and Environmental Consultants
Project: Bypass Basin Retofit Powerton

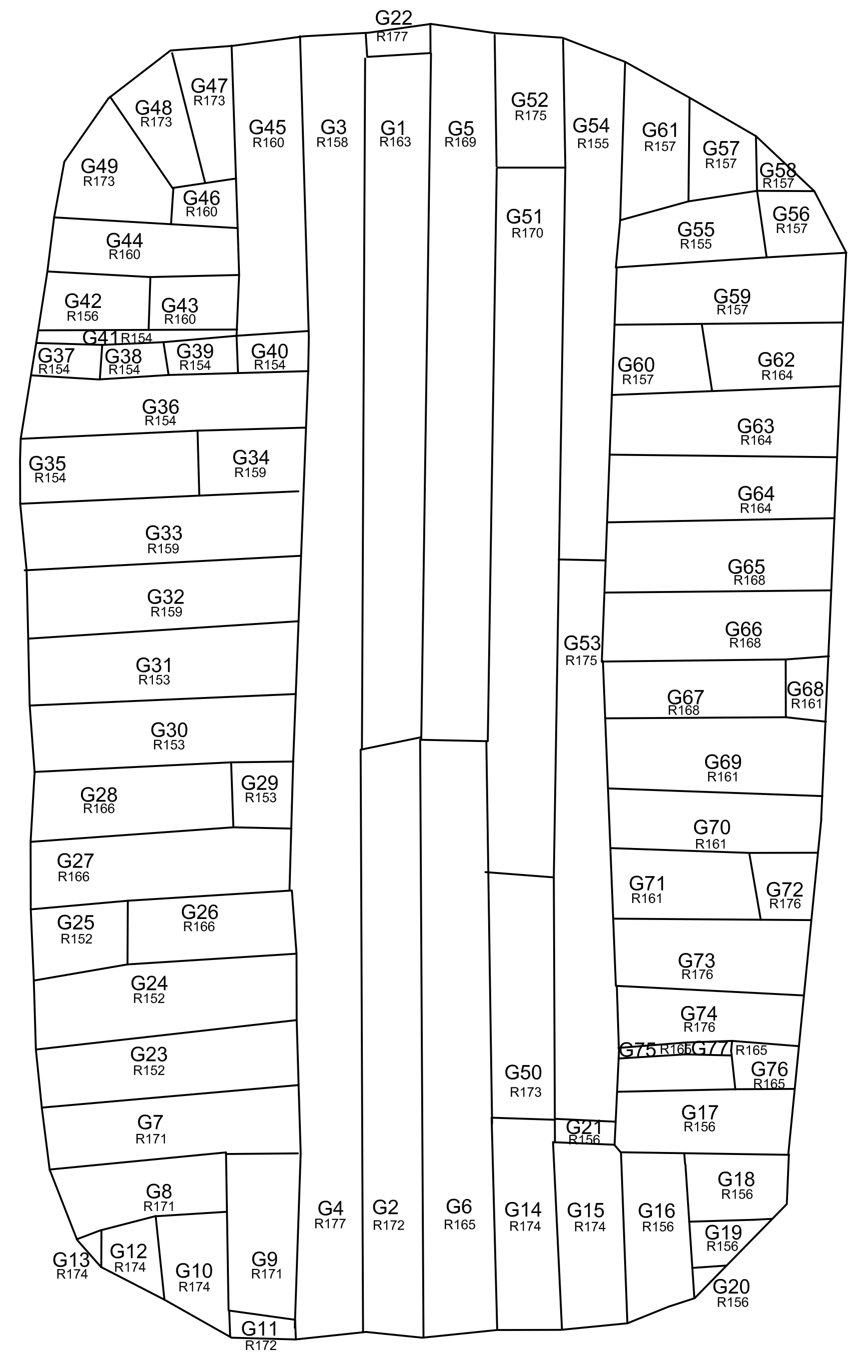
Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 81492

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-5 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	141	142	113	100	109	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	179	179	179	186	180	**181**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DS-6 | Weld: Single Extrusion						
Side: Peel						**Peel**
Peel Strength (ppi)	155	158	146	143	148	**150**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	174	169	175	175	169	**172**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

APPENDIX H-9

GEOSYNTHETIC CLAY LINER PANEL LAYOUT

NORTH



LEGEND

G## PANEL NUMBER

R## ROLL NUMBER

PANEL EDGE / FIELD SEAM

SCALE

0 20 40

DRAWN BY			
J.S.			
SCALE			
1" = 40'			
DATE			
8/29/24			
	#	REVISIONS	DATE

caaw
clean air and water systems

WWW.CAAWSYSTEMS.COM
123 ELM STREET PO BOX 337
DOUSMAN, WI 53118
262-965-4366

PROJECT NAME:
MWG POWERTON BYPASS BASIN RETROFIT

DRAWING NAME:
FINAL GCL ASBUILT DRAWING

LOCATION:
PEKIN, ILLINOIS

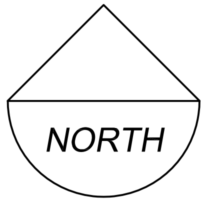
DRAWING NUMBER: AB-2

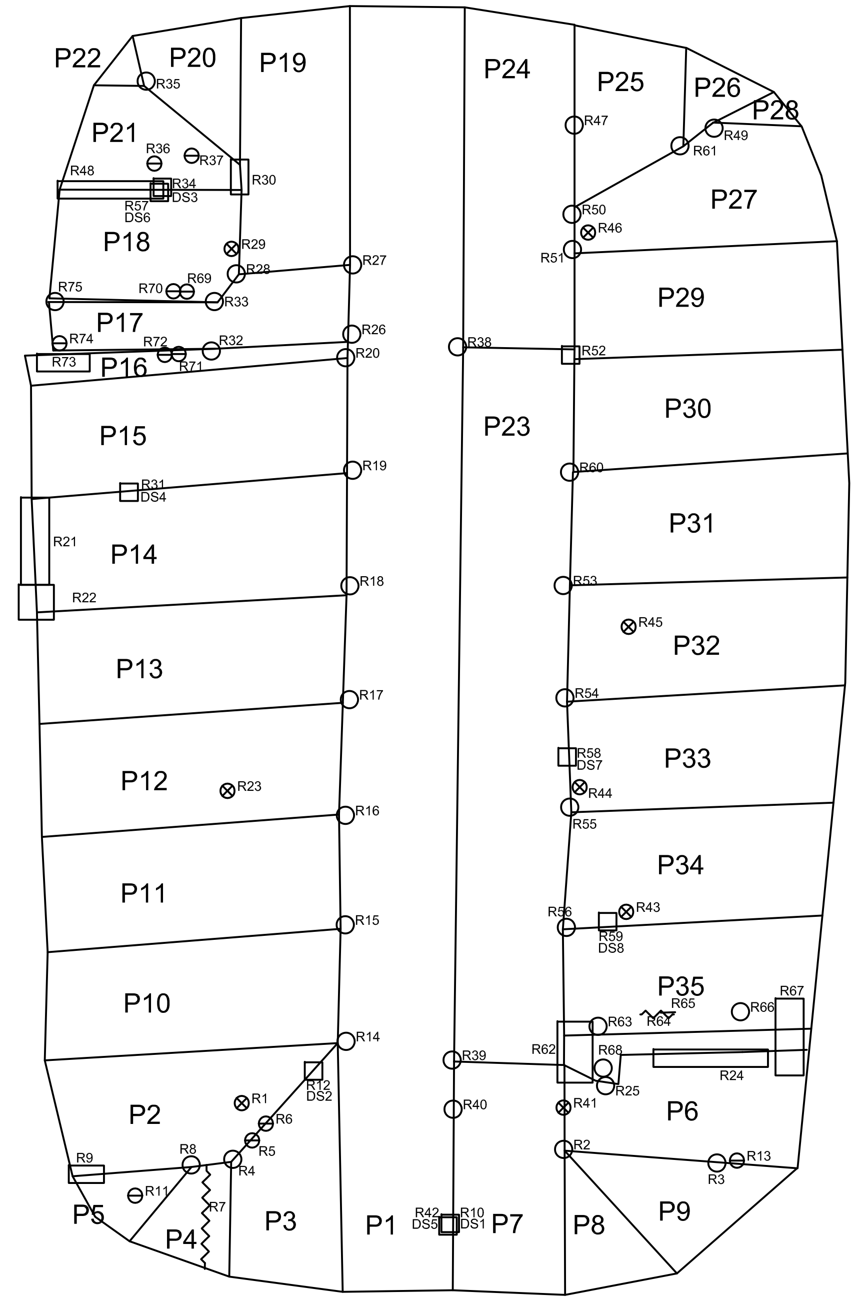
JOB#:

FILENAME: POWERTON GCL

APPENDIX H-10

HDPE PANEL LAYOUT

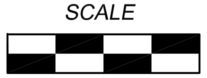




LEGEND

○R##	REPAIR - PATCH
□DS#	DESTRUCTIVE TEST
P###	PANEL NUMBER
□R##	REPAIR - CAP
⊖R##	REPAIR - BEAD
~~R##	REPAIR - EXTRUSION WELD
⊗	PIPE BOOT
———	PANEL EDGE / FIELD SEAM

SCALE



DRAWN BY	J.S.	
SCALE	1" = 40'	
DATE	8/29/24	
#	REVISIONS	DATE

clean air and water systems
WWW.CAAWSYSTEMS.COM
123 ELM STREET PO BOX 337
DOUSMAN, WI 53118
262-965-4366

PROJECT NAME: MWG POWERTON BYPASS BASIN RETROFIT	
DRAWING NAME: FINAL GEOMEMBRANE ASBUILT DRAWING	
LOCATION: PEKIN, ILLINOIS	DRAWING NUMBER: AB-1 / JOB#:
	FILENAME: POWERTON LINER