November 16, 2020

Southern Illinois Power Cooperative (SIPC) is posting the Corrective Action Report, the Groundwater Monitoring Report, and the Closure Plan in draft form. While these reports represent the best possible information available at the time of posting, all three reports are under review by the Illinois Environmental Protection Agency and are being or will be updated as necessary.

DRAFT

Emery Pond

Closure Plan

Marion Power Plant Southern Illinois Power Cooperative Marion, Williamson County, Illinois

March 29, 2019 revised October 29, 2020





Table of Contents

| 1. Introduction | |
|------------------------------------------------------|----|
| 2. Definitions | 5 |
| 3. CCR Removal Activities | 6 |
| 3.1 CCR Removal | 6 |
| 3.2 Erosion and Sediment Control Measures | 6 |
| 3.3 Emery Pond Unwatering | 6 |
| 3.4 CCR Sediment Dewatering | 7 |
| 3.5 CCR Sediment Sampling | 7 |
| 3.6 Riprap Excavation | |
| 3.7 CCR Sediment Excavation | |
| 3.8 CCR Management During Closure and Transportation | 8 |
| 3.9 Permanent Dewatering System | |
| 3.10 FGD Loadout Area | |
| 3.11 Permanent Stabilization of Disturbed Areas | |
| 4. Construction Activities | 9 |
| 4.1 Description | |
| 4.2 Base Grading | |
| 4.3 Composite Liner System | 10 |
| 4.4 Discharge Structure Rehabilitation | |
| 4.5 Operation and Maintenance | |
| 5. Construction Quality Assurance Procedures | |
| 5.1 Personnel | |
| 5.2 Construction Management Activities | |
| 5.3 Inspection Activities | |
| 5.4 Sampling and Analysis/Testing | |
| 5.5 CCR Sediment Excavation | |
| 5.6 Base Grade Construction | |
| 5.7 Composite Liner System Installation | |
| 6. Documentation | |
| 6.1 General | |
| 6.2 Daily Summary Reports | |
| 6.3 Photographic Documentation | |
| 6.4 Acceptance Report | |
| 7. Licensed Professional Signature/Seal | 14 |
| 8. References | 15 |

Appendices

Appendix A Construction Quality Assurance Program Forms

Appendix B Closure Plan Figures

Appendix C Construction Schedule

Appendix D Liner Equivalence Calculation

Appendix E Geotechnical Data

2



Abbreviations

BGS - below ground surface

CCR - Coal Combustion Residuals

CFR - Code of Federal Regulations

FGD - Flue-Gas Desulphurization

IAC - Illinois Administrative Code



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1. Introduction

The pond at issue, Emery Pond, is located near the northwestern shore of Lake of Egypt on the site of Southern Illinois Power Cooperative's (SIPC) power plant near Marion, Illinois (Site). SIPC has owned and operated a coal-fired power plant at the Site since 1963.

The Emery Pond is a less-than-1-acre detention pond located on the south side of the main stack at the power plant facility. The pond has received coal combustion residuals (CCR) and other non-CCR material in waste streams and in runoff that flows by gravity to the pond, particularly air heater wash, and other miscellaneous boiler and precipitator wastes. The pond is occasionally dredged due to the ongoing sediment carried into the pond via various plant and natural effluent streams. The pond is incised on the north, west and south sides, with a wide berm separating the pond from nearby Lake of Egypt to the east. This berm is approximately 140 feet in width at the crest, with a height of approximately 10 feet. The pond has a maximum volume of approximately 6.6 acre-feet. The pond is unlined and, therefore, does not meet the liner design criteria of the federal CCR Rule, 40 CFR 257.71.

Emery Pond is a significant hazard potential classification CCR surface impoundment, according to 40 CFR 257.73. The pond is exempt from the structural stability assessment and safety factor assessment requirements of 40 CFR 257.73 due to an impoundment height of less than 20 feet and impoundment volume of less than 20 acre-feet.

The original pond footprint was reduced around 2009 when a Flue-Gas Desulphurization (FGD) gypsum belt dewatering loadout facility was built on the western end of the existing pond. Direct push borings collected at the site indicate that the previous footprint beneath the FGD Loadout Area contains approximately 7,200 cubic yards of bed ash material. Direct push boring logs are included in Appendix D.

In the fall of 2020, SIPC plans to commence closure of the pond and adjacent FGD Loadout Area by removal of existing CCR. A new pond, designated as Storm Water Basin, will replace Emery Pond within the existing footprint. Construction activities are summarized as follows:

- The area currently occupied by Emery Pond will be closed to meet current Federal and State of Illinois regulations, and at Illinois EPA's request this plan and related plans have been prepared to align with the state CCR surface impoundment rule as currently proposed. For instance, Section 3.8 below addresses CCR transportation and management during closure activities in a manner consistent with the proposed state CCR rule. CCR materials currently contained in the pond will be removed and disposed of off-site. This closure plan will be implemented in connection with ongoing discussions between SIPC and Illinois EPA regarding resolution of claims that Emery Pond has caused exceedances of state groundwater standards. In that regard, it is expected that the closure activities described herein will decontaminate the source of such alleged exceedances, and thus contribute toward achieving relevant groundwater standards. See also the Corrective Action and Selected Remedy Plan submitted contemporaneously herewith.
- A new Storm Water Basin will be constructed within the existing footprint of Emery Pond to collect local drainage. Though it has been designed to meet the requirements of 40 CFR 257, the new basin will not meet the definition of a regulated CCR unit because it will no longer receive CCR. Nonetheless, the basin will be designed to meet the liner criteria for new CCR surface impoundments of 40 CFR 257.72 and the structural integrity criteria of 40 CFR 257.74. The basin will be constructed with a composite liner system meeting the federal requirements of 40 CFR 257.71. The Storm Water Basin will be permitted and operated as a water treatment device under 35 IAC 309, Subpart B.



- The FGD Loadout Area will be closed by removing surface FGD material and bed ash deposits.
 The area will be filled with compacted clean soil material and surfaced with crushed aggregate.
 This area, if closed in place, would have require approximately 5,900 square yards of final cover.
- The installation of a permanent dewatering system around the base of the basin liner system will
 provide protection from hydraulic pressures to the liner system and will collect groundwater in the
 vicinity of the new basin.
- Although SIPC maintains that an NPDES permit modification and construction permit are not needed with respect to the closure of Emery Pond and installation of the new Storm Water Basin, SIPC has submitted an NPDES permit modification application and a construction permit application to Illinois EPA per Illinois EPA request.

2. Definitions

Closed means placement of CCR in a CCR unit has ceased, and the owner or operator has completed closure of the CCR unit in accordance with applicable state and/or federal regulation, and has initiated post-closure care.

Coal combustion residuals (CCR) means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers.

CCR surface impoundment or impoundment means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR.

CCR unit means any CCR landfill, CCR surface impoundment, or lateral expansion of a CCR unit, or a combination of more than one of these units, based on the context of the paragraph(s) in which it is used. This term includes both new and existing units, unless otherwise specified.

Dewatering means removal of freely drained pore water from CCR sediments or soil.

Operator means the person(s) responsible for the overall operation of a CCR unit.

Qualified person means a person or persons trained to recognize specific appearances of structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit by visual observation and, if applicable, to monitor instrumentation. Qualified professional engineer means an individual who is licensed by a state as a Professional Engineer to practice one or more disciplines of engineering and who is qualified by education, technical knowledge, and experience to make the specific technical certifications required under this subpart. Professional engineers making these certifications must be currently licensed in the state where the CCR unit(s) is located.

Recognized and generally accepted good engineering practices means engineering maintenance or operation activities based on established codes, widely accepted standards, published technical reports, or a practice widely recommended throughout the industry. Such practices generally detail approved ways to perform specific engineering, inspection, or mechanical integrity activities.

Unwatering means removal of surface (free) water from a site.



3. CCR Removal Activities

Major removal activities include dewatering, contaminated riprap removal, CCR sediment removal, and minor re-grading. CCR removal will be performed in accordance with the construction quality assurance procedures described in Appendix A and documented by an Illinois-licensed professional engineer. Figures showing the Emery Pond Closure and Storm Water Basin design are included in Appendix B and an estimated construction schedule is included in Appendix C.

3.1 CCR Removal

Completion of the activities described below will result in closure of the Emery Pond through removal of CCR sediment. This closure plan includes construction quality assurance (CQA) procedures consistent with the construction requirements for permitted CCR units in Illinois.

In addition to CCR material contained within Emery Pond, FGD material on the ground surface and bed ash and other deposits buried beneath the FGD Loadout Area and within Emery Pond will be excavated and transported to one or more of the following permitted disposal facilities:

- Perry Ridge Landfill, Inc.
- Southern Illinois Regional Landfill, Inc.
- West End Disposal Facility

3.2 Erosion and Sediment Control Measures

Best management practices (BMPs) consisting of interim and permanent stabilization and structural features will be implemented at the site for erosion and sediment control. Perimeter control measures such as silt filter fences and/or storm drain inlet protection will be installed prior to excavation activities. Permanent stabilization practices include gravel surfacing of perimeter roadways. Permanent stabilization practices will be initiated as soon as practicable in portions of the site where construction activities have permanently ceased, or within seven days in portions of the site where construction activities have temporarily ceased (unless construction activity on those portions of the site will resume within 14 days). The gravel surfacing mixture described in Section 3.11 will be used for permanent stabilization.

Structural features include floating suction strainers (for dewatering pumps), silt filter fences, storm drain inlet protection, rock outlet protection, and rolled excelsior, straw bales, or aggregate ditch checks.

BMPs will be implemented and maintained until construction activities are completed and the site is stabilized.

3.3 Emery Pond Unwatering

Emery Pond must be unwatered for CCR sediment removal to be accomplished using conventional earthmoving equipment. Unwatering will be done using an existing pump station at the east end of the pond. This pump station transfers water from Emery Pond to Settling Pond B-3.

Once the pond is substantially unwatered, additional methods may be required to dewater the remaining sediment deposits. These options include various combinations of temporary sump pits and/or drainage trenches. The option selected must result in sufficient dewatering in a manner that



minimizes re-entrainment of solids and erosion at the discharge location(s). All dewatering activities must be conducted using appropriate best management practices (BMPs) for, and in compliance with the conditions of the Construction Permit. Installation of a permanent dewatering system is described in Section 3.9.

Unwatering of the Emery Pond is estimated to be completed within two (2) days. This is based on a total pumping volume and rate of 195 thousand gallons (at a pond operating water surface elevation of 509.0) and 120 thousand gallons per day, respectively.

3.4 CCR Sediment Dewatering

Dewatering of excavated CCR will be performed by laying out the wet material on perched drying pads within the pond and FGD storage area. Free water that drains out of the material will be directed to drain back into the pond for collection and pumping. The estimated dewatering volume is 587,000 gallons, assuming a free water volume of 25% within the CCR material. The CCR material will be hauled for disposal once sufficient free liquids have discharged to meets the Paint Filter Liquids Test criteria outlined in Section 3.5.

3.5 CCR Sediment Sampling

CCR sediment from the Emery Pond will be transported to a permitted facility for disposal. The sediment will be sampled and tested as necessary to satisfy disposal prequalification requirements. Sampling activities will be conducted in accordance with the construction quality assurance procedures in Section 4.4 of this Plan. Dewatering of sediment must be conducted such that the transported materials do not contain "free liquids" as defined by the Paint Filter Liquids Test (as referenced in 35 IAC 811.107(m)(3)(A)), prior to placement or transport.

3.6 Riprap Excavation

Stone riprap was placed in the Emery Pond to protect the side slopes from wave action and minimize erosion near the inlets and outlet. A total of approximately 600 cubic yards of riprap is present around the perimeter of the Emery Pond. It is visually apparent that CCR sediment has settled in, and adhered to, the portions of the riprap in contact with the pond water.

The riprap will be excavated and transported to a permitted facility for disposal.

3.7 CCR Sediment Excavation

Based on sampling activities, the CCR sediment material is a brown to gray color, very loose to loose consistency, non-cohesive silt to sand size ash and/or FGD material that is often cemented to various degrees. The underlying pond subgrade material is bedrock consisting of weathered shale or weathered sandstone. Bedrock depths measured at the Emery Pond site are found in Appendix D.

The CCR sediment is to be excavated using conventional earthmoving equipment such as a tracked excavator or loader. An estimated 3,500 cubic yards of sediment must be removed to reach the underlying subgrade surface. Sediment excavation will be conducted in accordance with the construction quality assurance procedures as directed by the site CQA Officer or his designee. Upon completion, removal will be certified as described in Section 5.3.



3.8 CCR Management During Closure and Transportation

CCR removed from the Site will be responsibly handled and transported in accordance with draft rule 35 IAC 845.740 as follows:

- 1) When transporting CCR by motor vehicle, manifests must be carried as specified in 35 IAC 809.
- 2) The Contractor transporting CCR off-site shall develop, and submit a CCR transportation plan for Owner approval, which shall include:
 - a) the frequency, time of day, and routes of CCR transportation;
 - b) measures to minimize noise, traffic, and safety concerns caused by the transportation of the CCR;
 - c) measures to limit fugitive dust from any transportation of CCR;
 - d) installation and use of a vehicle washing station;
 - e) a means of covering the CCR for any mode of CCR transportation, including conveyor belts; and
 - f) a requirement that, for transport by motor vehicle, the CCR is transported by a permitted special waste hauler pursuant to 35 IAC 809.201.
- 3) The Contractor must develop and implement on site dust controls, which must include:
 - a) A water spray or other commercial dust suppressant to suppress dust in CCR handling areas and haul roads: and
 - b) CCR must be handled to minimize airborne particulates and offsite particulate movement during any weather event or condition.
- 4) The Contractor must provide the following public notices:
 - a) signage must be posted at the property entrance warning of the hazards of CCR dust inhalation;
 and
 - b) when CCR is transported off-site, a written notice explaining the hazards of CCR dust inhalation, the transportation plan and tentative transportation schedule must be provided to units of local government through which the CCR will be transported.
- 5) The Contractor must take measures to prevent contamination of surface water, groundwater, soil, and sediments from the removal of CCR, including but not limited to the following:
 - a) CCR removed from the surface impoundment must be stored in a CCR storage pile.
 - b) CCR storage piles shall:
 - i) be tarped or constructed with wind barriers to suppress dust and to limit stormwater contact with storage piles;
 - ii) be periodically wetted or have periodic application of dust suppressants;
 - iii) have an impervious storage pad or geomembrane liner that is properly sloped to allow appropriate drainage;
 - iv) be tarped over the edge of the storage pad where possible;
 - v) be constructed with fixed and mobile berms where appropriate to reduce run-on and run-off of stormwater to and from the storage pile and minimize stormwater-CCR contact.
 - c) The Contractor shall incorporate general housekeeping procedures such as daily cleanup of CCR, tarping of trucks, maintaining the pad and equipment, and good practices during unloading and loading.
 - d) The Contractor must minimize the amount of time the CCR is exposed to precipitation and wind.



3.9 Permanent Dewatering System

Once the CCR Sediment Excavation is complete, earthwork to establish the base grade may commence. A permanent dewatering system (also referred to as the perimeter toe drain) will be installed around the perimeter of the excavated area to control groundwater levels prior to and during construction of the Storm Water Basin base grade (see Sheets C303, C304, and C305 in Appendix B for details and materials). The lowered groundwater elevation will facilitate construction by eliminating seeps and reducing hydraulic pressure during structural fill placement and soil liner construction. The dewatering system will be composed of a gravel-filled trench with a perforated pipe all wrapped with a geotextile filter. The piping system will drain to collection riser pipes placed at low points in the system, as dictated by bedrock elevations. Water will be pumped from the collection riser pipes to an existing pond discharge structure, where it will then be pumped to Settling Pond B-3.

The permanent dewatering system will remain in operation for the life of the new Storm Water Basin to prevent soil liner uplift.

3.10 FGD Loadout Area

Upon completion of CCR material excavation within the FGD Loadout, the excavation will be backfilled with compacted clean soil material. The surface will receive a layer of crushed limestone for the plant to utilize for non-CCR related purposes. The entire FGD Loadout area will be sloped to drain toward the proposed Storm Water Basin to prevent surface water run-off.

3.11 Permanent Stabilization of Disturbed Areas

The perimeter roadway currently surrounding Emery Pond will be permanently stabilized with gravel surfacing. Gravel surfacing material will be crushed limestone coarse aggregate placed on disturbed areas to minimize wind and water erosion. The coarse aggregate mixture will be Illinois Department of Transportation (IDOT) Gradation CA-6. The perimeter roadway will be graded to drain toward the pond at a slope between 2 and 4 percent.

4. Construction Activities

Major construction activities include establishing the base grade, installation of a composite liner system and structural modifications to the pond discharge structure. Construction activities will be performed in accordance with the construction quality assurance procedures described in a subsequent section of this plan and documented by an Illinois-licensed professional engineer.

Figures showing the proposed Storm Water Basin design are included in Appendix B. In accordance with Appendix C, construction activities are scheduled to conclude in November.

4.1 Description

The new Storm Water Basin pond will not be used for CCR treatment, storage, or disposal. In that regard, SIPC and Illinois EPA have agreed that the expected waste streams to the new basin, as described in connection with the application for a construction permit under 35 IAC 309, Subpart B (water treatment device), are not regulated CCR waste streams. Nonetheless, as a compromise and as part of the resolution of the asserted groundwater claims, the new basin will be designed to meet the CCR impoundment requirements of 40 CFR 257.100. The proposed Storm Water Basin will be constructed by re-grading the pond base and side slopes and installing a composite liner system.



4.2 Base Grading

The base grade for the Storm Water Basin will be constructed using the following design criteria. The bottom surface of the pond will be established by removal of the upper 2 feet of weathered bedrock material to create a stable base. The interior slopes of the pond will be constructed using compacted earth fill materials to create uniform side slopes with a maximum slope of 2.5H:1V.

4.3 Composite Liner System

After completion of the base grade, a composite liner system will be installed in compliance with 40 CFR 257.72. The composite liner will consist of two components; an upper component consisting of, at a minimum, a 60-mil high density polyethylene (HDPE) geomembrane liner (GM), and a lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 5 × 10⁻⁶ centimeters per second (cm/sec) as determined by Hanson's Alternative Liner Calculation located in Appendix D. The GM or upper liner component will be installed in direct and uniform contact with the compacted soil or lower liner component. Construction of the composite liner system is expected to take two weeks.

Existing drainage piping that discharge into Emery Pond will be inspected for integrity and repaired and/or extended as necessary to match the proposed basin geometry. The pipes will be sealed where they intersect the liner system using generally accepted engineering practices.

4.4 Discharge Structure Rehabilitation

The existing sump discharge structure that currently pumps water from Emery Pond to the South Fly Ash Pond will remain in place. The structure will be inspected after CCR sediment excavation is complete. Any structural deficiencies noted during the inspection will be repaired and the existing wingwalls will be modified to conform with the proposed pond geometry. An intake extension will be installed into the structure to facilitate free drainage and stable pond side slopes. The extension will be constructed of precast box culvert sections which will be integrated to the existing open face of the pump station structure. The composite liner system will be mechanically connected to the discharge structure using batten strips to attach the HDPE geomembrane.

4.5 Operation and Maintenance

The Storm Water Basin will not operate as a CCR surface impoundment. Soil sediment, though, may accumulate within the new pond over time. Cleanout of the new pond using mechanical equipment could compromise that composite liner system, therefore the pond will be periodically cleaned using suction dredging or other non-damaging means.

5. Construction Quality Assurance Procedures

Closure of Emery Pond and construction of the Storm Water Basin will be monitored and documented in accordance with the requirements of the construction quality assurance (CQA) procedures described in the following sections. Performance of CQA activities will confirm that the construction activities are conducted in accordance with the plan through documenting that specified procedures are followed.



5.1 Personnel

Prior to initiation of construction activities, SIPC will designate an independent third-party CQA Officer (CQAO). The CQAO will be a professional engineer registered in the State of Illinois, who is a person other than the contractor or an employee of SIPC, and who will supervise and be responsible for all inspection, testing, and other activities required to be implemented as part of the CQA procedures. The CQAO will also be responsible for, and will provide direct supervision to, other engineers and/or engineering technicians (inspectors) who will perform the inspections, sampling, and testing required by the CQA program. The CQAO will assume responsibility for the performance of the inspections, sampling, and testing, as described more specifically below. The CQAO or his designated representative will be on-site full-time for all the activities specified herein.

5.2 Construction Management Activities

The General Contractor may, after exercising due diligence to locate required information, request from the Construction Manager, clarification, or interpretation of the contract documents. The General Contractor will make specific reference to the contract document in question and include estimates of any schedule or cost impacts that could possibly be associated with the request for information (RFI).

The General Contractor will initiate the RFI in a timely manner using Form CQAP1 - Request for Information. The Construction Manager will, with reasonable promptness, respond to the RFI on the same form and return a copy of the completed form to the party making the request as final disposition of the matter.

5.3 Inspection Activities

The CQAO or his designated representative will be present to observe and document the following activities:

- CCR Sediment Excavation
- Base Grade Earthwork
- Composite Liner System Installation
- Discharge Structure Modifications

As part of these inspection activities, the CQAO will certify that the CCR sediment excavation has been completed using the following language:

I hereby certify, as a Professional Engineer in the State of Illinois that to the best of my knowledge the removal of CCR was completed at the existing CCR surface impoundment known as Emery Pond, in general accordance with applicable state and/or federal regulations. The removal and final inspection were complete as of Month Day, 202x.

5.4 Sampling and Analysis/Testing

Representative CCR sediment material will be sampled and analyzed for the criteria on the Illinois EPA Bureau of Land Special Waste Preacceptance Form (LPC 680). This activity must be completed prior to transportation of the material to a permitted facility. Additional samples will be analyzed if the CQAO or the landfill operator identify or suspect any significant change in material. An independent laboratory will be responsible for the analyses.



Custody of samples and transfer from the sampling location to the independent laboratory will be established and documented using Form CQAP2 - Chain of Custody Record. The sampling party will enter sample descriptions (including proposed use), sampling dates and times, and types/quantities of samples on the form, including methods or types of testing to be carried out, and relinquish custody of the samples to the laboratory by signing and dating the form at the bottom. The samples will be shipped or delivered to the laboratory with a copy of the form. The sampling party will retain a copy for its records.

The independent laboratory will document receipt of the samples by signing and dating the form at the bottom and retaining a copy for its records. The laboratory will return a copy of the form to the sampling party and the CQAO with the submittal of test results.

The General Contractor will be responsible for the Paint Filter Liquids Testing prior to transport of the sediment to a permitted facility in accordance with IAC requirements. This testing can be completed in the field and will be observed and documented by the CQAO or designee. The CQAO or his designee will select the specific locations for sampling and testing exercising professional judgment to ensure that sampling and testing fairly represent the material. The results of the sampling and testing will be documented by the CQAO or his designated representative on Form CQAP3 - Daily Summary Report.

5.5 CCR Sediment Excavation

The CQAO or his designee will make observations necessary to identify areas requiring sediment removal. Those areas will be determined solely on these observations based on the previously described physical properties of the sediment and foundation materials. The CQAO will inform the General Contractor of areas requiring sediment removal. Upon removal of the sediment, the CQAO or his designee will attach appropriate documentation for the work to Form CQAP3 - Daily Summary Report.

5.6 Base Grade Construction

The CQAO or his designee will observe earth excavation and fill activities during the establishment of the Storm Water Basin base grade. Compaction of fill materials will be conducted to verify moisture and density.

Following base grade earthwork, the CQAO or the Construction Manager will direct a surveyor to record the grades. Elevations will be surveyed on a 100-foot grid pattern for the base grade. The points surveyed for side slopes will be at the top and toe. In addition, all breaks in grade will be surveyed. The points will be documented on record drawings furnished to the CQAO by the surveyor.

5.7 Composite Liner System Installation

The CQAO or his designee will observe placement of the compacted soil liner. Testing of fill materials will be conducted to verify moisture and density. Additional samples (thin wall tubes) will be obtained for verification of in place hydraulic conductivity.

Following the compacted soil liner construction, the CQAO or the Construction Manager will direct a surveyor to verify that the actual grades are in accordance with the design. Elevations will be surveyed on a 100-foot grid pattern for the top of the compacted soil liner to verify thickness. The points surveyed for side slopes will be at the top, midpoint, and toe. In addition, all breaks in grade will be surveyed. The points will be documented on record drawings furnished to the CQAO by the surveyor.



6. Documentation

SIPC's Project Manager and the CQAO will document that closure of the Emery Pond and construction of the Storm Water Basin are performed in accordance with the design. Documentation drawings depicting as-built conditions will accompany the documentation. All activities will be documented in accordance with the construction quality assurance procedures. CQA documentation will be retained by SIPC as part of the Storm Water Basin operating record. This operating record will be available for inspection by Illinois EPA upon request. The CQA documentation may also be submitted directly to Illinois EPA pursuant to regulation or permit requirements.

6.1 General

The CQAO will be responsible for the overall administration and control of the project CQA documents.

The CQAO will verify that a filing system is implemented that will include:

- Date,
- · Copy of the Closure Plan, updated as necessary,
- Photographic documentation,
- Survey measurements,
- Field and laboratory testing results,
- Daily summary reports including appropriate documentation, and
- Deficiency, nonconformity, and corrective action information.

Files will be updated with new data as such data become available. Documentation will be transmitted by the CQAO to SIPC and to any other parties designated by SIPC.

6.2 Daily Summary Reports

Each day of activity will be documented by a daily summary report. The report will be prepared by the CQAO or his designated representative and contain the following information:

- Date.
- Summary of weather conditions,
- Summary of locations where activity is occurring,
- · Equipment and personnel on the project,
- Summary of any meetings held and attendees, and
- Description of all materials used and references or results of inspections, sampling, and testing, and documentation.



6.3 Photographic Documentation

Construction documentation may be supported with photographs, as appropriate. Photographs may be utilized to document activities, project progress, and acceptability. Any photographs will be maintained by the CQAO. CQA personnel will note the location, date, time, and description of the activity for record photographs.

6.4 Acceptance Report

An acceptance report will be prepared. The acceptance report will provide written evidence that the CQA procedures were implemented as described and that the project proceeded in accordance with the design, plans, and specifications.

The following information will be included in the acceptance report:

- Documentation by the CQAO that the construction has been implemented in general accordance with the engineering design,
- Documentation drawings, and
- All daily summary reports.

The acceptance report will be prepared under the direction of the CQAO and will be forwarded to SIPC for distribution as SIPC deems appropriate.

7. Licensed Professional Signature/Seal

As a qualified professional engineer as defined by 40 CFR 257 Subpart D, I have personally examined and am familiar with this closure plan. Based on my inquiry of those individuals immediately responsible for obtaining the information contained therein, I believe that the information is true, accurate and complete. I certify that The Closure Plan for Marion Power Station Emery Pond meets the requirements set forth in the applicable state and/or federal regulation.

Seal:

| David B. Hoots, P.E. | |
|-----------------------------------|--|
| Hanson Professional Services Inc. | |
| 1525 South Sixth Street | |
| Springfield, IL 62703-2886 | |
| (217) 788-2450 | |
| Registration No. 062-055737 | |
| | |

| | Expires 11/30/2021 |
|------------|------------------------------|
| Signature: | Date: <u>29 October 2020</u> |



8. References

- US EPA, 2015. "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule 40 CFR Parts 257 and 261", Environmental Protection Agency in <u>Federal Register</u>, April 17, 2015, Vol. 80, No. 74. US Government Printing Office, Washington, D.C., 201 pp.
- US EPA, 2018. "Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One 40 CFR Part 257", Environmental Protection Agency in <u>Federal Register</u>, July 30, 2018, Vol. 83, No. 146. US Government Printing Office, Washington, D.C., 22 pp.





Appendix A

Construction Quality Assurance Program Forms





REQUEST FOR INFORMATION (Form CQAP1 - Revision 1)

| RFI #: C | DATE: |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| FROM: COMPANY: PHONE: FAX: | TO:, CQA Officer PHONE: FAX: |
| RE: | |
| CHECK CATEGORY: | |
| ☐ Information not shown on contract documents: ☐ Interpretation Requirements ☐ Conflict in Requirements ☐ Coordination Problem ☐ Other Category | Contract Drawing Reference: Shop Drawing Reference: Specification Reference: Possible Cost Impact: Possible Time Impact: Describe: |
| DESCRIPTION (Use Attached Sheets as Necessary) | |
| CC: RFI File | ATTACHMENTS: Yes No |
| | PONSE eets as Necessary) |
| | |
| DATE: | RESPONSE BY: |

Chain of Custody Record

(Form CQAP2 - Revision 1)

Emery Pond Closure & Storm Water Basin Construction Plans SIPC Marion Power Plant, Williamson Co., Illinois

| Client | Southern Illi | nois Power Co | mpany | | | Ana | alysis a | nd/or M | 1ethod | Reques | ted | | |
|-----------------------|--------------------|------------------|-------------------|--------------|----------------------------------|----------|----------|----------|----------|--------|--------|------------|---------------------|
| Address | 11543 Lake o | of Egypt Road | | | p | | | | | | | | |
| City, State Zip Code | Marion, IL | 62959 | | | ıeste | | | | | | | | |
| Phone / Facsimile No. | (618) 964-144 | 48 / (618) 964 | -1867 | | Requ | | | | | | | | |
| Client Project | | | | | hod | | | | | | | P. | 1 01 2 |
| Location | | | | | Met | | | | | | | Rema | rks or Observations |
| Sampler(s) / Phone | | / | | | Analysis and/or Method Requested | | | | | | | | |
| Turnaround Time | Standard [] R | aush [] Date Re | quired: | | sis aı | | | | | | | | |
| P.O. # or Invoice To | | | | | naly | | | | | | | | |
| Contact Person | | | | | ∢ | | | | | | | | |
| Sample Description | | pling | Sample | # of | | | | | • | | | | |
| Sumple Bescription | Date | Time | Type ¹ | Containers | | | I | T . | <u> </u> | | | | |
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| (1) Sample | Type: $S = Soil$; | GM = Geomen | nbrane; GT | C = Geotexti | ile; GC | L = Ge | osynthe | etic Cla | y Linei | ; DM | = Drai | nage Media | ; O = Other |
| Relinquished | d By | Date | Time | | Red | ceived l | Ву | | I | Date | | Time | Method of Shipment |
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| Special Instructions: | | | | | | | | | | | | | |
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DAILY SUMMARY REPORT (Form CQAP3 - Revision 1)

| 1. SUMMARY OF WEATHER CONDITIONS: | Date: |
|-----------------------------------------------------|---------------------------------------------------------|
| AM Conditions: | AM Temperature: |
| PM Conditions: | PM Temperature: |
| 2. LOCATIONS WHERE CONSTRUCTION IS OCCURRING: | |
| Location 1: East North | Location 2: East North |
| Location 3: East North | Location 4: East North |
| Other Description: | |
| 3. EQUIPMENT & PERSONNEL ON SITE: | |
| Equipment: | |
| Personnel: | |
| Visitors: | |
| 4. SUMMARY OF MEETINGS HELD/ATTENDEES: | |
| ☐ None ☐ See Sheet 2 of 2 | See Attached Meeting Minutes |
| 5. MATERIALS USED & TESTING OR OBSERVATION RESULTS | : : |
| Materials Used: Culvert Pipe Foundation | on Fill Stockpiled Soil Subgrade Soil |
| ☐ Riprap ☐ Other: | |
| Testing and/or Observation Results: | ne See Attached |
| Calibration Records for Equipment: None | ☐ See Attached |
| | |
| | |
| Prepared By: | |
| · · · — | (Signature of CQA Officer or Designated Representative) |
| | |
| | |
| | (Signature) |
| Original Report/Attachments To: Document Controller | Copies to: |



| Emery Pond, Marion Power Plant, Will | Emery Pond, Marion Power Plant, Williamson Co., Illinois | | | |
|--------------------------------------|----------------------------------------------------------|-------|--|--|
| | DAILY SUMMARY REPORT | | | |
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| ADDITIONAL NOTES: | | Date: | | |
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Appendix B

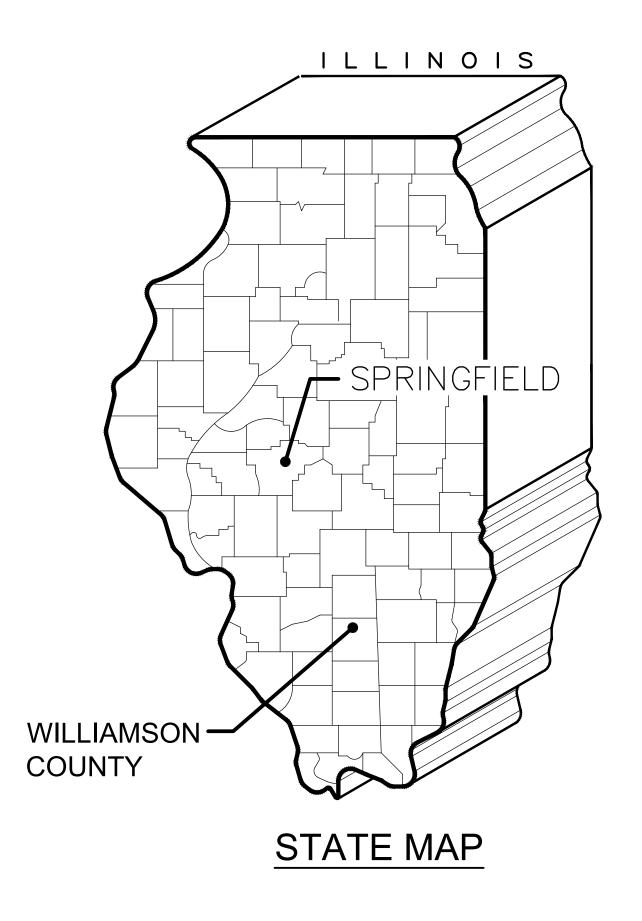
Closure Plan Figures

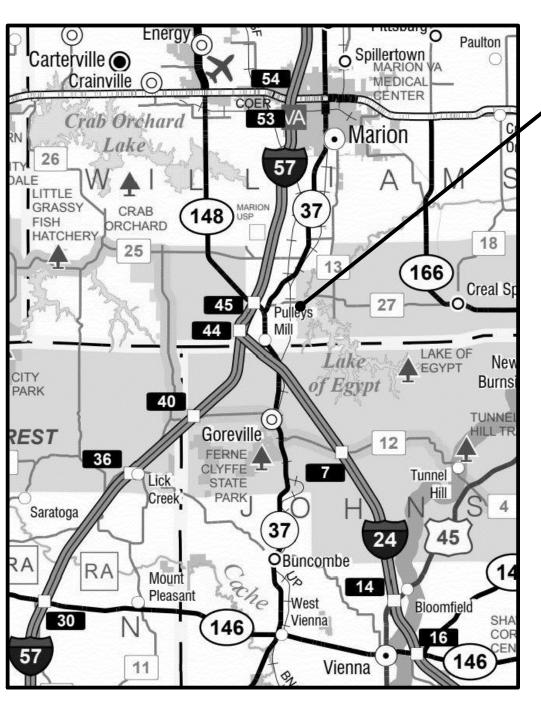


EMERY POND CLOSURE & STORM WATER BASIN CONSTRUCTION PLANS

MARION POWER PLANT WILLIAMSON COUNTY, ILLINOIS

ISSUED FOR REVIEW - 07/14/2020





INDEX OF SHEETS

G001 COVER SHEET & INDEX OF SHEETS

GENERAL CIVIL NOTES EMERY POND CLOSURE PLAN

STORM WATER BASIN PLAN STORM WATER BASIN GRADING & LAYOUT PLAN

C104 FGD AREA GRADING & LAYOUT PLAN

GRADING CONTROL POINTS

EXCAVATION CROSS SECTIONS

C302 EXCAVATION CROSS SECTIONS

GRADING CROSS SECTIONS

C304 GRADING CROSS SECTIONS

TYPICAL SECTIONS & DETAILS

C306 PUMP STATION INTAKE EXTENSION

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EMERY POND CLOSURE & STORM WATER CONSTRUCTION **PLANS**



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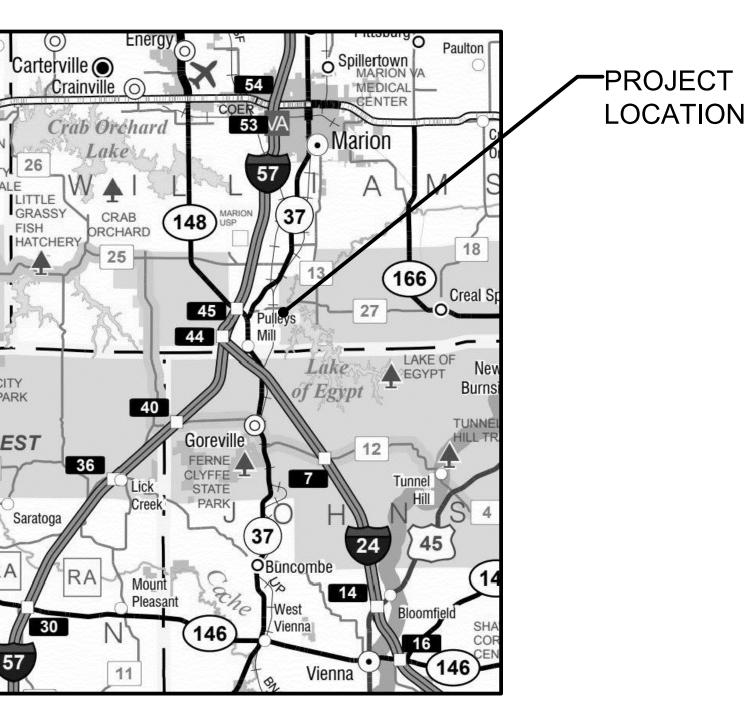
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TITLE & INDEX OF SHEETS

SHEET TITLE

G001



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GENERAL CIVIL NOTES

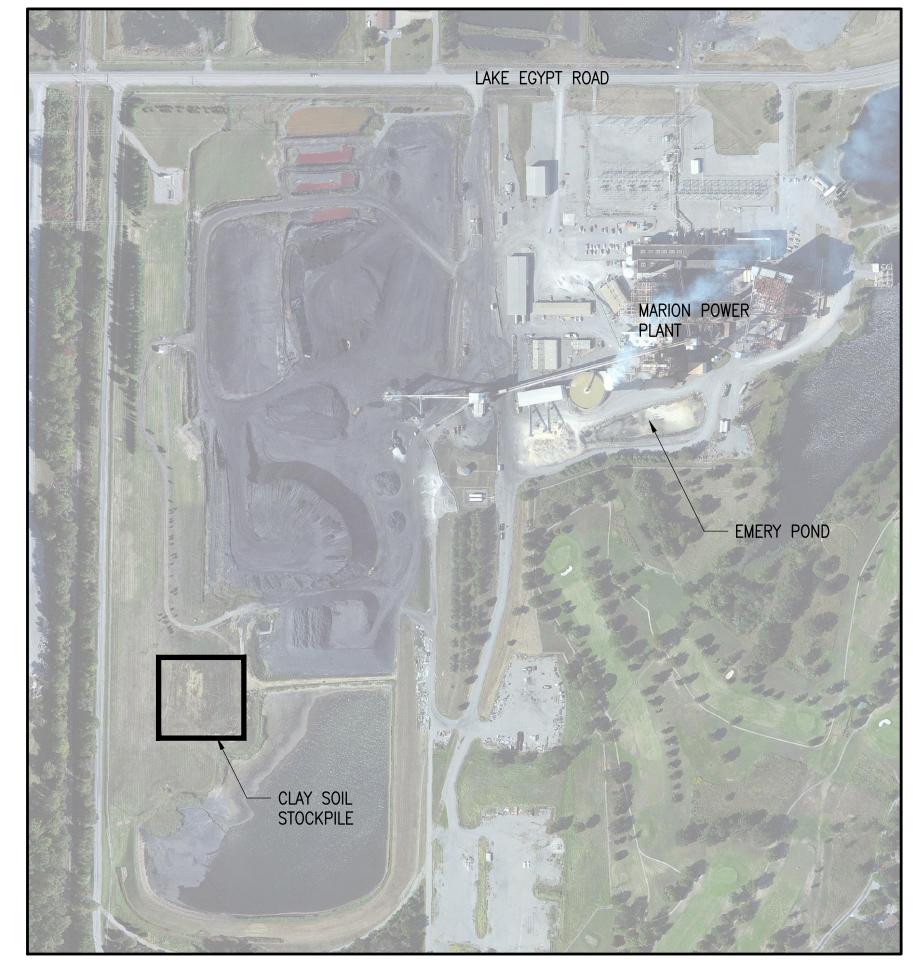
C001

GENERAL NOTES

- 1. "IDOT STANDARD SPECIFICATIONS", WHERE REFERENCED IN THE PLANS OR TECHNICAL SPECIFICATIONS, REFERS TO THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" ADOPTED APRIL 1, 2016, PUBLISHED BY THE ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT).
- 2. ALL REINFORCEMENT BARS SHALL CONFORM TO ASTM A615, GRADE 60.
- 3. ALL SECTIONS, DETAILS, AND NOTES SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS ELSEWHERE. UNLESS OTHERWISE SHOWN.
- 4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE STARTING WORK. IF CONDITIONS VARY FROM THOSE INDICATED ON THE DRAWINGS, THE OWNER SHALL BE NOTIFIED AND NO WORK SHALL BE DONE IN THE AREA WITHOUT HIS APPROVAL.
- 5. SCALE FOR THE DRAWINGS IS FOR GENERAL INFORMATION ONLY. LOCATIONS AND DIMENSIONS SHALL BE TAKEN AS SHOWN AND NOT SCALED.
- 6. WHERE SPECIFIED, IDOT SPECIFICATIONS ARE SPECIFIED, THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", ADOPTED APRIL 1, 2016 SHALL APPLY.
- 7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN EXISTING FIELD CONDITIONS BEFORE BIDDING ON THIS PROJECT, ORDERING MATERIALS, OR BEGINNING CONSTRUCTION.
- 8. CONTRACTOR'S WORK ACTIVITIES SHALL BE RESTRICTED TO AREAS WITHIN THE LIMITS OF CONSTRUCTION. CONTRACTOR'S ACTIVITIES AND VEHICLES SHALL NOT BE ALLOWED OUTSIDE OF THESE LIMITS UNLESS APPROVED BY THE OWNER.
- 9. ALL ROCK AND DEBRIS SHALL BE DISPOSED OF OUT OF THE EMERY POND AREA IN A LOCATION DESIGNATED ON THE PLANS.
- 10. DISTURBED EARTH SURFACES SHALL BE SEEDED PER THE PROJECT SPECIFICATIONS.
- 11. CONTRACTOR IS RESPONSIBLE FOR THE SITE RESTORATION WITHIN THE LIMITS OF CONSTRUCTION.
- 12. ALL HDPE GEOMEMBRANE SHALL BE TEXTURED.
- 13. CUSHION GEOTEXTILES SHALL MEET THE REQUIREMENTS OF GEOSYNTHETIC RESEARCH INSTITUTE (GRI) SPECIFICATION GRI-GT12(a) "TEST METHODS AND PROPERTIES FOR NONWOVEN GEOTEXTILES USED AS PROTECTION (OR CUSHIONING) MATERIALS FOR THE MASS/UNIT AREA SPECIFIED.ON THE PLANS. THE MINIMUM OVERLAP BETWEEN ADJACENT PANELS SHALL BE 24 INCHES.
- 14. TEMPORARY EROSION CONTROL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH IDOT STANDARD DRAWING 280001-07 TEMPORARY EROSION CONTROL SYSTEMS. AND ARTICLE 280 OF THE IDOT STANDARD SPECIFICATIONS.
- 15. PRECAST BOX CULVERTS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM C1577—SPECIFICATION FOR PRECAST REINFORCED CONCRETE MONOLITHIC BOX SECTIONS FOR CULVERTS, STORM DRAINS, AND SEWERS DESIGNED ACCORDING TO AASHTO LRFD. PRECAST BOX CULVERT SECTIONS SHALL HAVE PREFORMED RUBBER JOINTS IN ACCORDANCE WITH ASTM C 1677—11A STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE BOX, USING RUBBER GASKETS.
- 16. PRECAST BOX CULVERTS SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 540 OF THE IDOT STANDARD SPECIFICATIONS, ALL SECTIONS SHALL BE MECHANICALLY TIED TOGETHER USING IDOT STANDARD 540-22 MECHANICAL JOINTS FOR CONCRETE PIPE AND BOX CULVERTS. ALL BOX CULVERT SECTIONS SHALL BE EXTERNALLY WATERPROOFED WITH SEALING BANDS PER ASTM C 877-SPECIFICATION FOR EXTERNAL SEALING BANDS FOR CONCRETE PIPE. MANHOLES AND PRECAST BOX SECTIONS.
- 17. ALL OPEN EXCAVATION WORK SHALL BE PERFORMED IN ACCORDANCE WITH OSHA 29 CFR 1926, SUBPART P— "EXCAVATIONS". THE SUBCONTRACTOR SHALL DESIGNATE A QUALIFIED "COMPETENT PERSON" AS DEFINED IN OSHA SECTION 1926.650(b) PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION ACTIVITIES.

SURVEY AND LAYOUT

- 1. THE DESIGN PLANS INCLUDED WERE BASED UPON A HORIZONTAL COORDINATE SYSTEM BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD83), ILLINOIS STATE PLANE EAST ZONE AND VERTICAL ELEVATIONS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING ANY PROPERTY MONUMENTS THAT BECOME DAMAGED OR DESTROYED DURING CONSTRUCTION ACTIVITIES.
- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER ALIGNMENT (VERTICAL AND HORIZONTAL) AT ALL INTERFACES BETWEEN NEW AND EXISTING WORK TO ASSURE PROPER INSTALLATION AND USAGE.



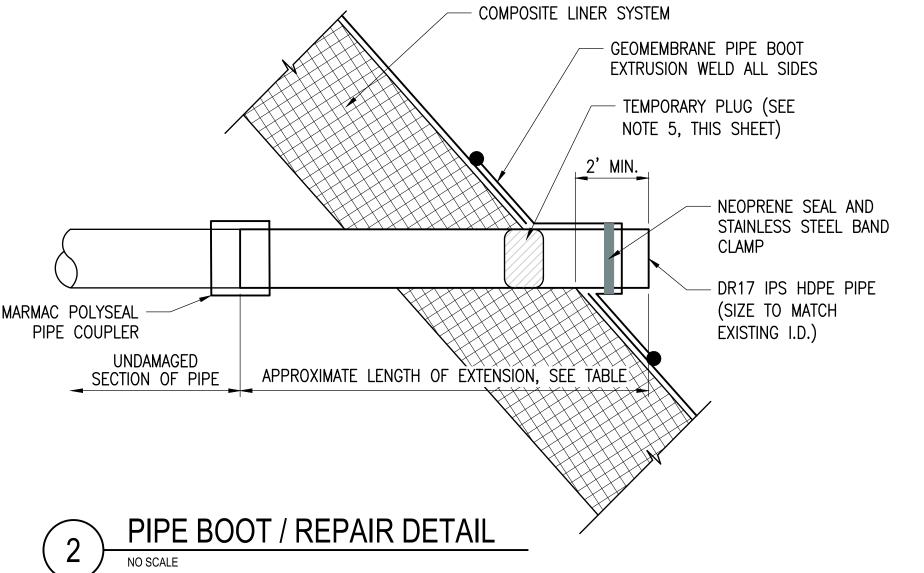




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| PIPE BOOT REPAIR DATA | | | | | | | |
|-----------------------|----------|----------|------------------|--|--|--|--|
| PIPE ID | DIAMETER | MATERIAL | EXTENSION LENGTH | | | | |
| Α | 24" | HDPE | 5.52 FT | | | | |
| В | 12" | PVC | 12.92 Ft | | | | |
| С | 12" | HDPE | 7.87 Ft | | | | |
| D | 24" | CMP | 20.02 FT | | | | |
| Е | 24" | HDPE | 11.82 FT | | | | |
| F | 12" | PVC | 5.17 FT | | | | |
| G | 12" | PVC | 4.35 FT | | | | |
| Н | 24" | HDPE | 9.90 FT | | | | |
| I | 12" | PVC | 5.92 FT | | | | |

APPROXIMATELY 205 L.F.



- 2. SEE SHEET C305 FOR TYPICAL SECTIONS.
- 3. EXISTING INFLOW PIPES SHALL BE REPAIRED AND EXTENDED THROUGH THE PROPOSED COMPOSITE LINER PER DETAIL 2 OF THIS SHEET. DAMAGED PIPING THAT IS REMOVED SHALL BE DISPOSED OF IN A LEGAL MANNER AS CONTAMINATED CCR MATERIALS.
- 4. PROPOSED PIPES TO BE REPLACED AND PIPE EXTENSIONS SHALL MATCH THE GRADE OF THE EXISTING PIPING.
- 5. CONTRACTOR SHALL INSTALL TEMPORARY PLUGS INSIDE OF ALL INCOMING PIPES TO PREVENT DISCHARGE DURING CONSTRUCTION. CONTRACTOR SHALL MAINTAIN OPERATION OF THE PLUGS DURING THE DURATION OF THE PROJECT. THE TEMPORARY PLUGS SHALL BE REMOVED UPON COMPLETION OF THE PROJECT.
- 6. CCR MATERIAL EXCAVATED FROM EMERY POND MAY BE PILED ON THE EXISTING FGD STOCKPILE AREA FOR FINAL DEWATERING. ALL SURFACE WATER THAT COMES INTO CONTACT WITH THIS CCR MATERIAL SHALL BE DIRECTED BACK INTO EMERY POND DURING DEWATERING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION OF ANY TEMPORARY BERMS AND/OR GRADING REQUIRED TO MAINTAIN SURFACE WATER FLOW INTO EMERY POND.
- 7. THE PLANT MAY ELECT TO PARTIALLY EXCAVATE CCR MATERIAL PRIOR TO CONTRACTOR MOBILIZATION. CCR EXCAVATION AND DISPOSAL PERFORMED BY THE CONTRACTOR WILL BE DONE BASED ON A TIME AND MATERIALS BASIS.

LEGEND

MONITORING WELL LOCATION

EXISTING DRAINAGE OR PROCESS WATER PIPING

EXISTING PUMP STATION DISCHARGE PIPING

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EMERY POND CLOSURE & STORM WATER CONSTRUCTION **PLANS**



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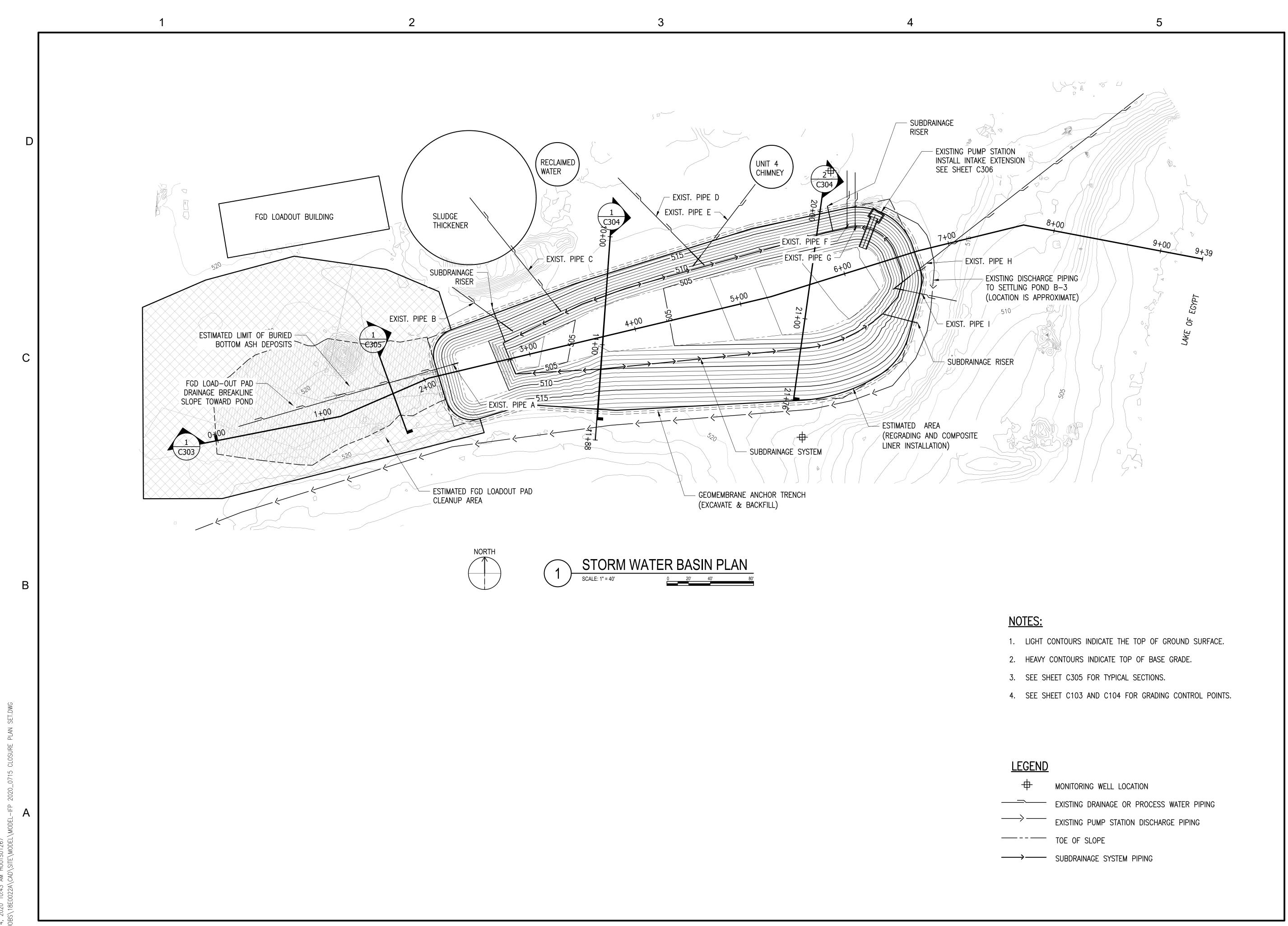
EMERY POND CLOSURE PLAN

SHEET TITLE

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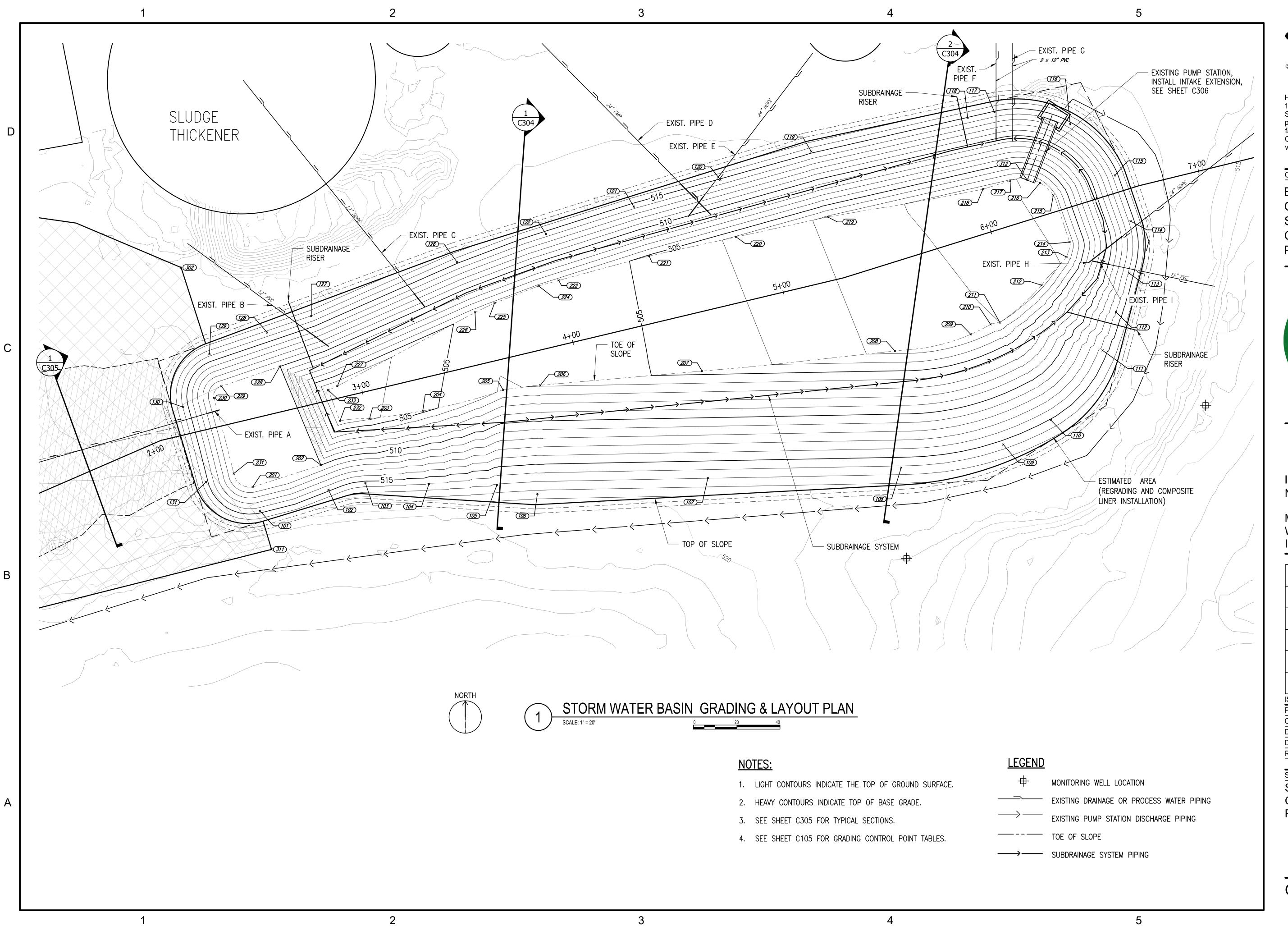


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STORM WATER BASIN PLAN





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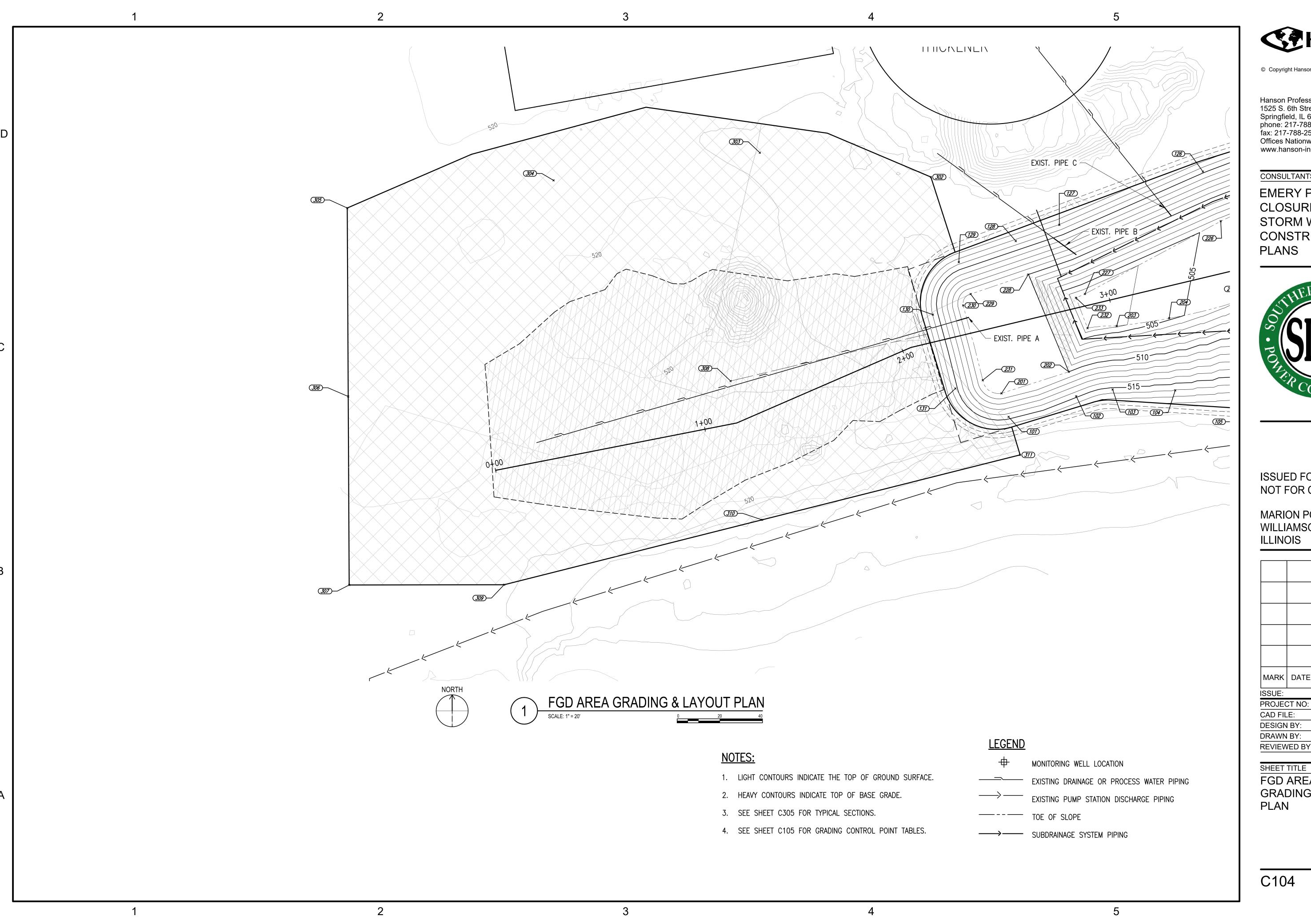
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STORM WATER BASIN GRADING & LAYOUT PLAN





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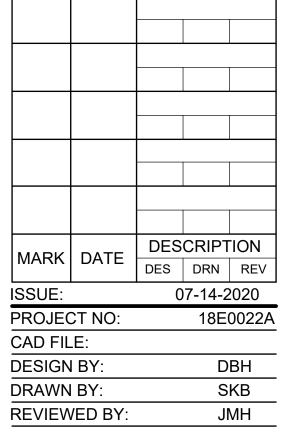
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FGD AREA **GRADING & LAYOUT** PLAN

| GRADING CONTROL POINTS | | | | | |
|------------------------|-----------|-----------|-----------|--------------|--|
| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION | |
| 101 | 347064.26 | 804362.27 | 514.61 | TOP OF SLOPE | |
| 102 | 347073.91 | 804393.97 | 514.79 | TOP OF SLOPE | |
| 103 | 347077.11 | 804411.04 | 515.33 | TOP OF SLOPE | |
| 104 | 347076.68 | 804440.38 | 516.09 | TOP OF SLOPE | |
| 105 | 347076.21 | 804471.85 | 517.11 | TOP OF SLOPE | |
| 106 | 347072.15 | 804490.55 | 518.41 | TOP OF SLOPE | |
| 107 | 347079.40 | 804569.33 | 516.98 | TOP OF SLOPE | |
| 108 | 347084.22 | 804658.72 | 516.20 | TOP OF SLOPE | |
| 109 | 347094.89 | 804705.92 | 515.48 | TOP OF SLOPE | |
| 110 | 347106.23 | 804727.89 | 515.11 | TOP OF SLOPE | |
| 111 | 347138.39 | 804751.80 | 514.42 | TOP OF SLOPE | |
| 112 | 347156.19 | 804757.99 | 513.97 | TOP OF SLOPE | |
| 113 | 347174.00 | 804764.18 | 514.21 | TOP OF SLOPE | |
| 114 | 347198.10 | 804764.74 | 514.35 | TOP OF SLOPE | |
| 115 | 347219.25 | 804757.53 | 514.46 | TOP OF SLOPE | |
| 116 | 347242.91 | 804736.88 | 514.66 | TOP OF SLOPE | |
| 117 | 347248.51 | 804701.84 | 514.85 | TOP OF SLOPE | |
| 118 | 347245.84 | 804689.41 | 514.92 | TOP OF SLOPE | |
| 119 | 347230.32 | 804617.14 | 515.30 | TOP OF SLOPE | |
| 120 | 347217.28 | 804575.08 | 514.85 | TOP OF SLOPE | |

| GRADING CONTROL POINTS | | | | |
|------------------------|-----------|-----------|-----------|--------------|
| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
| 121 | 347204.80 | 804535.09 | 514.35 | TOP OF SLOPE |
| 122 | 347192.14 | 804494.54 | 514.46 | TOP OF SLOPE |
| 126 | 347179.25 | 804453.34 | 515.26 | TOP OF SLOPE |
| 127 | 347154.25 | 804386.03 | 516.95 | TOP OF SLOPE |
| 128 | 347146.67 | 804365.63 | 516.70 | TOP OF SLOPE |
| 129 | 347136.75 | 804338.93 | 516.37 | TOP OF SLOPE |
| 130 | 347112.17 | 804326.76 | 515.94 | TOP OF SLOPE |
| 131 | 347077.56 | 804337.31 | 515.38 | TOP OF SLOPE |
| 201 | 347075.27 | 804358.92 | 510.00 | TOE OF SLOPE |
| 202 | 347085.38 | 804390.48 | 510.00 | TOE OF SLOPE |
| 203 | 347106.82 | 804412.94 | 503.81 | TOE OF SLOPE |
| 204 | 347110.47 | 804437.54 | 504.74 | TOE OF SLOPE |
| 205 | 347120.17 | 804474.67 | 506.10 | TOE OF SLOPE |
| 206 | 347122.29 | 804491.90 | 505.88 | TOE OF SLOPE |
| 207 | 347128.84 | 804566.66 | 504.60 | TOE OF SLOPE |
| 208 | 347138.14 | 804655.81 | 502.70 | TOE OF SLOPE |
| 209 | 347145.81 | 804690.91 | 502.19 | TOE OF SLOPE |
| 210 | 347150.42 | 804700.05 | 502.05 | TOE OF SLOPE |
| 211 | 347151.28 | 804704.35 | 502.00 | TOE OF SLOPE |
| 212 | 347168.51 | 804723.61 | 501.63 | TOE OF SLOPE |

| | GRADING CONTROL POINTS | | | | |
|---------|------------------------|-----------|-----------|--------------|--|
| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION | |
| 213 | 347181.56 | 804735.13 | 502.20 | TOE OF SLOPE | |
| 214 | 347188.49 | 804736.55 | 502.43 | TOE OF SLOPE | |
| 215 | 347210.03 | 804729.02 | 502.60 | TOE OF SLOPE | |
| 216 | 347215.77 | 804722.89 | 502.46 | TOE OF SLOPE | |
| 217 | 347216.83 | 804709.07 | 501.85 | TOE OF SLOPE | |
| 218 | 347212.88 | 804696.48 | 501.43 | TOE OF SLOPE | |
| 219 | 347200.07 | 804624.67 | 502.83 | TOE OF SLOPE | |
| 220 | 347190.79 | 804582.48 | 503.84 | TOE OF SLOPE | |
| 221 | 347182.03 | 804542.19 | 504.81 | TOE OF SLOPE | |
| 222 | 347170.72 | 804500.39 | 505.59 | TOE OF SLOPE | |
| 224 | 347168.18 | 804491.07 | 505.75 | TOE OF SLOPE | |
| 225 | 347160.26 | 804470.75 | 505.66 | TOE OF SLOPE | |
| 226 | 347155.99 | 804461.71 | 505.34 | TOE OF SLOPE | |
| 227 | 347121.86 | 804398.06 | 503.13 | TOE OF SLOPE | |
| 228 | 347130.97 | 804371.46 | 510.00 | TOE OF SLOPE | |
| 229 | 347121.81 | 804344.48 | 510.00 | TOE OF SLOPE | |
| 230 | 347116.50 | 804340.97 | 510.00 | TOE OF SLOPE | |
| 231 | 347081.48 | 804350.18 | 510.00 | TOE OF SLOPE | |
| 232 | 347105.85 | 804399.25 | 503.29 | TOE OF SLOPE | |
| 233 | 347120.07 | 804393.82 | 503.00 | TOE OF SLOPE | |

| POINT # | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|---------|-----------|-----------|-----------|-------------------------|
| | | | | |
| 302 | 347176.67 | 804325.84 | 518.84 | FGD PAD LIMIT |
| 303 | 347188.06 | 804245.66 | 518.76 | FGD PAD LIMIT |
| 304 | 347175.11 | 804148.95 | 519.13 | FGD PAD LIMIT |
| 305 | 347162.15 | 804052.24 | 519.50 | FGD PAD LIMIT |
| 306 | 347073.80 | 804052.69 | 519.86 | FGD PAD LIMIT |
| 307 | 346985.45 | 804053.14 | 520.23 | FGD PAD LIMIT |
| 308 | 347081.06 | 804231.94 | 519.45 | FGD PAD BREAKLINE |
| 309 | 346985.57 | 804125.78 | 520.78 | FGD PAD LIMIT |
| 310 | 347016.00 | 804246.71 | 521.29 | FGD PAD LIMIT |
| 311 | 347046.43 | 804367.65 | 521.80 | FGD PAD LIMIT |
| 312 | 347217.06 | 804716.99 | 505.57 | INVERT, 6'W BOX CULVERT |



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EMERY POND CLOSURE & STORM WATER CONSTRUCTION **PLANS**



ISSUED FOR REVIEW NOT FOR CONSTRUCTION

MARION POWER PLANT WILLIAMSON CO. ILLINOIS

| MARK | DATE | DESCRIPTION | | | |
|-----------|---------|-------------|-----|-----|--|
| IVIZALATA | | DES | DRN | REV | |
| ISSUE: | | 07-14-2020 | | | |
| PROJEC | CT NO: | 18E0022A | | | |
| CAD FILE: | | | | | |
| DESIGN | IBY: | DBH | | | |
| DRAWN | BY: | SKB | | | |
| REVIEW | /ED BY: | | J | MH | |
| | | | | | |

GRADING CONTROL POINTS

C105

SHEET TITLE

HANSON

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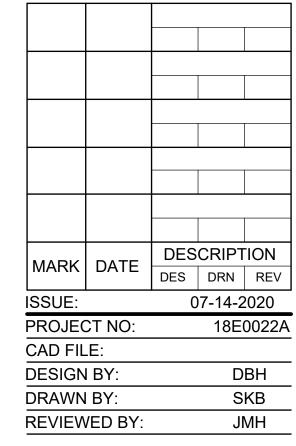
CONSULTANTS

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SHEET TITLE

EXCAVATION CROSS SECTIONS

C301

2



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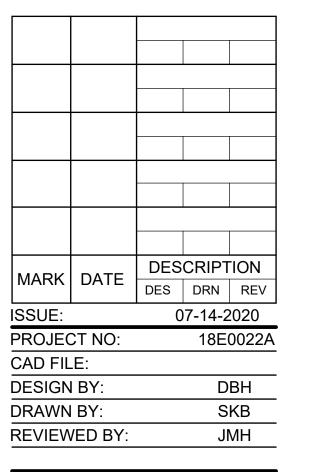
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CONSTRUCTION
PLANS



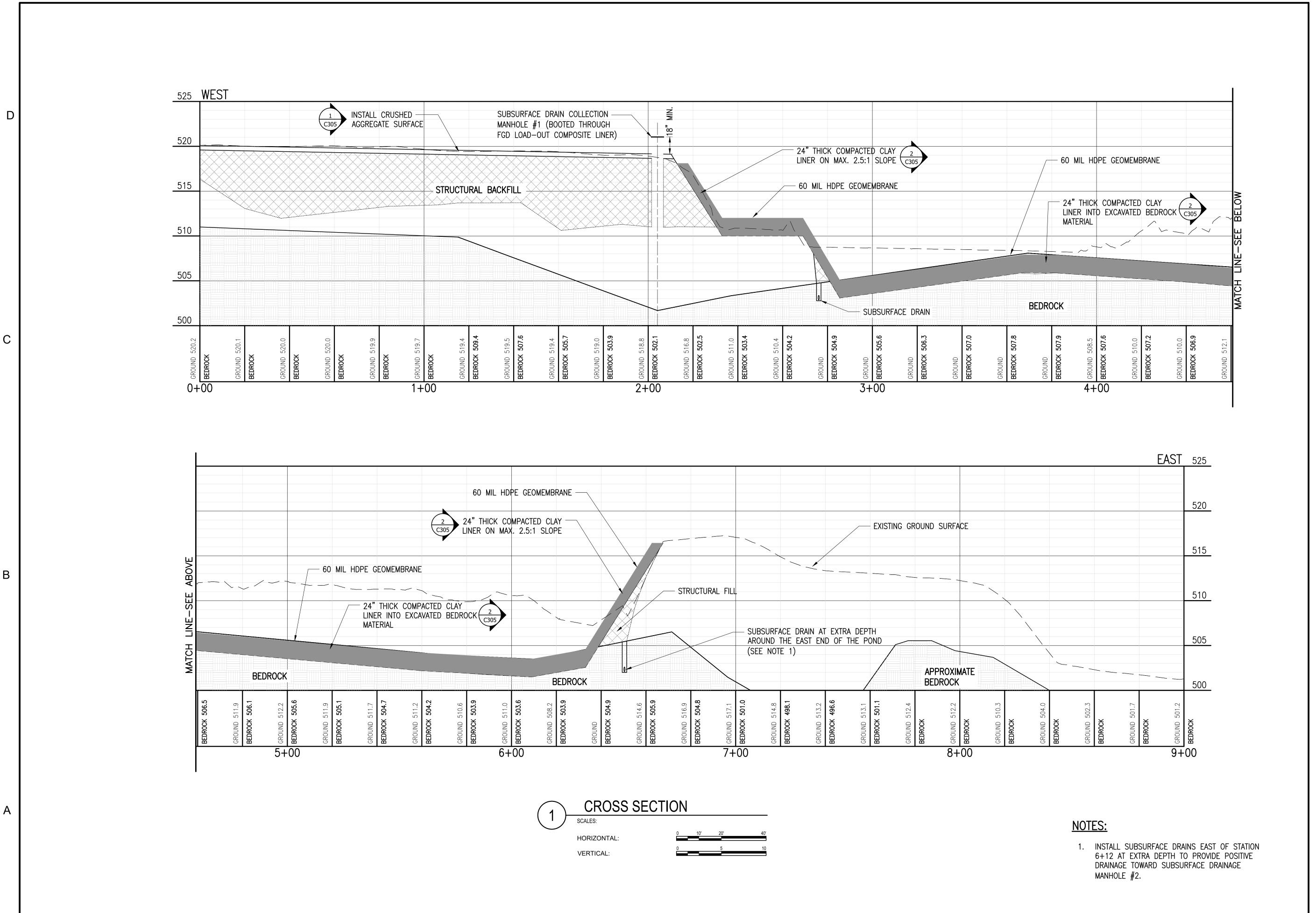
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SHEET TITLE

EXCAVATION CROSS SECTIONS



2

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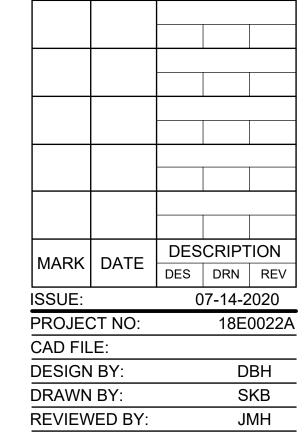
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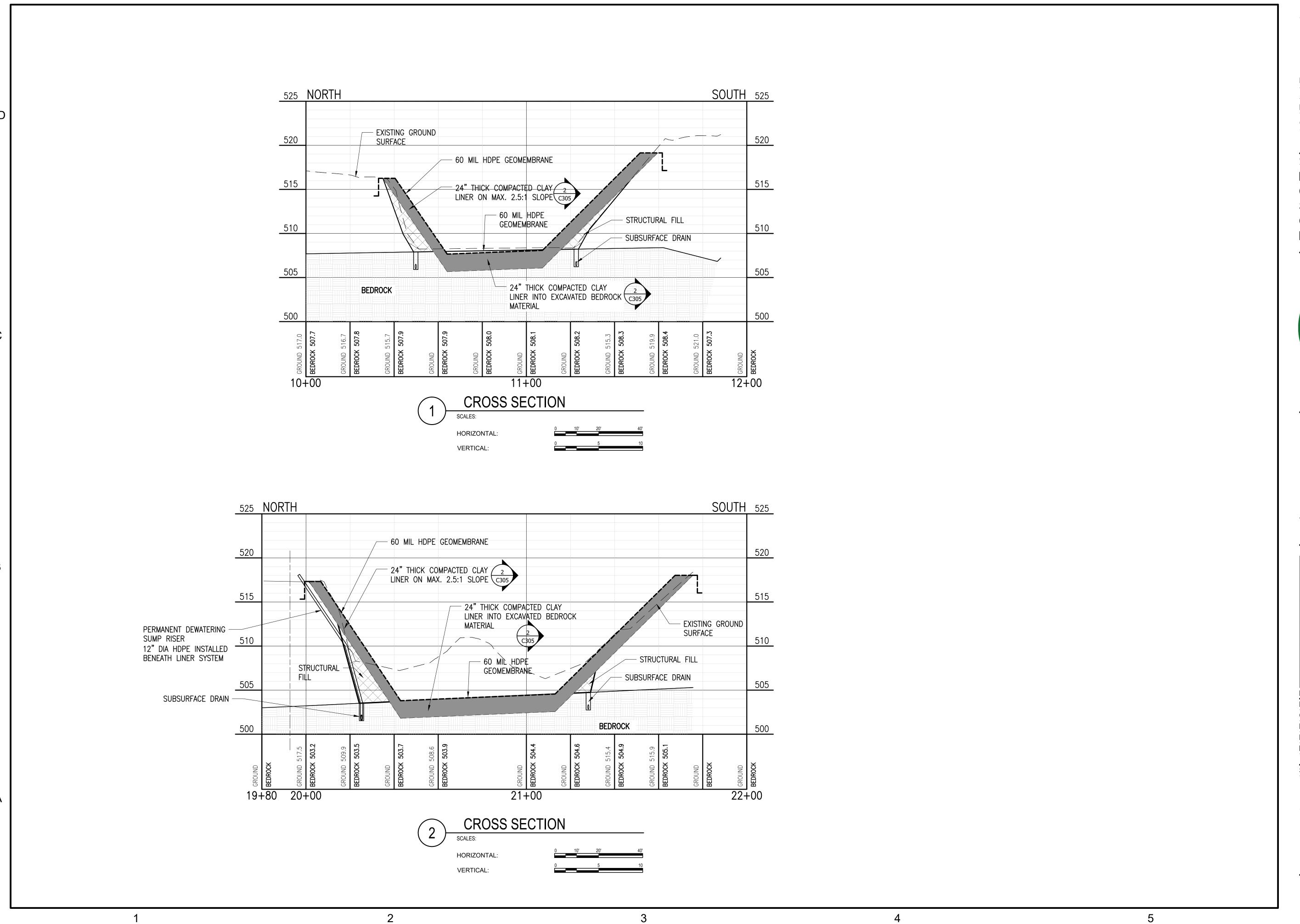
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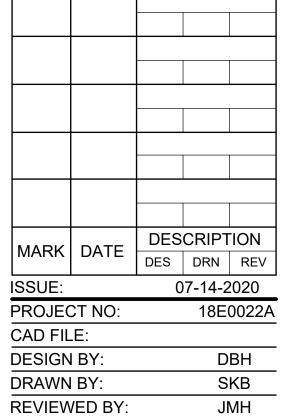
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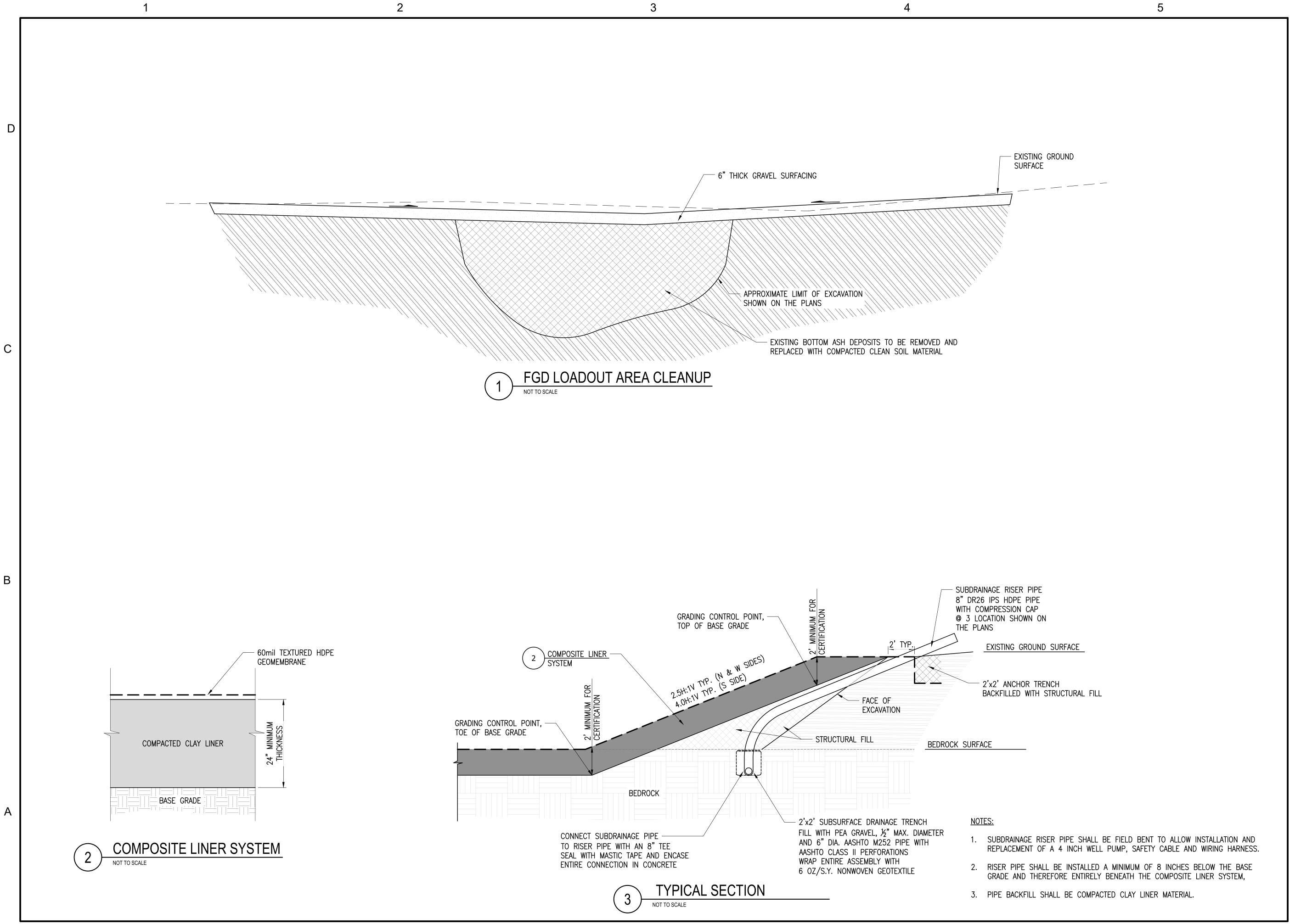
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SHEET TITLE

GRADING CROSS SECTIONS



2

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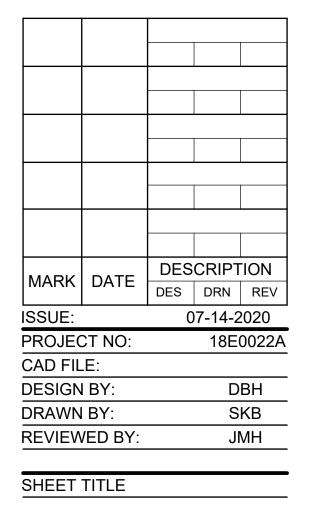
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TYPICAL SECTIONS

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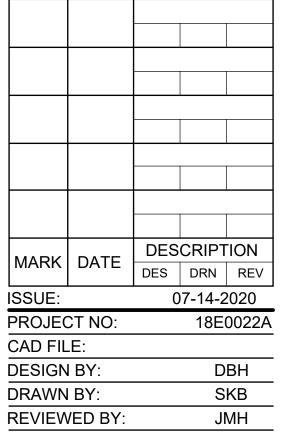
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EMERY POND CLOSURE & STORM WATER CONSTRUCTION **PLANS**



ISSUED FOR REVIEW NOT FOR CONSTRUCTION

MARION POWER PLANT WILLIAMSON CO. **ILLINOIS**



PUMP STATION INTAKE EXTENSION

2



Appendix C

Construction Schedule





Table C-1. Construction Schedule

| | Activities | Week | | | | | | | | | | | | | | | |
|----|------------------------------------------------------------------------------|------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| | Activities | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1 | Submit notification to the Illinois Environmental Protection Agency | | | | | | | | | | | | | | | | |
| 2 | Implement and Maintain BMP Erosion and Sediment Control Measures | | | | | | | | | | | | | | | | |
| 3 | Unwater Emery Pond | | | | | | | | | | | | | | | | |
| 4 | Continue unwatering/dewatering as necessary to conduct excavation activities | | | | | | | | | | | | | | | | |
| 5 | Install process water and drainage bypass pumping system | | | | | | | | | | | | | | | | |
| 6 | Sample CCB sediment | | | | | | | | | | | | | | | | |
| 7 | Initial Dewatering | | | | | | | | | | | | | | | | |
| 8 | Excavate riprap | | | | | | | | | | | | | | | | |
| 9 | Excavate CCR sediment, FGD & Bottom Ash | | | | | | | | | | | | | | | | |
| 10 | Install subsurface drainage system | | | | | | | | | | | | | | | | |
| 10 | Earthwork to establish retrofitted pond base grade | | | | | | | | | | | | | | | | |
| 11 | Install low permeability clay liner | | | | | | | | | | | | | | | | |
| 12 | Install HDPE Geomembrane | | | | | | | | | | | | | | | | |
| 13 | Conduct Construction Quality Assurance | | | | | | | | | | | | | | | | |
| 14 | Finalize retrofit documentation | | | | | | | | | | | | | | | | |



Appendix D

Liner Equivalence Calculation





| TO: | Wendell Watson, Southern Illinois Power Cooperative |
|----------|-----------------------------------------------------|
| FROM: | Rhonald Hasenyager, P.G., R.G. |
| DATE: | 20 August 2020 |
| SUBJECT: | Liner Equivalence Calculation for Storm Water Basin |

As part of our pre-construction processes, Hanson has had recompacted permeability tests (after ASTM D-5084) run for two proposed liner construction borrow materials. The results of these tests showed that this proposed material was not capable of recompacting to a hydraulic conductivity of at least 1×10^{-7} cm/sec.

Under 40 CFR 257.70 (and proposed 35 IAC 845.400), there is an alternative composite liner calculation. This calculation compares a 2-foot thick, recompacted, soil liner with hydraulic conductivity of 1 x 10^{-7} cm/sec to a representative composite liner (60 mil HDPE plus 2-foot thick, recompacted soil liner with some greater hydraulic conductivity). Hanson performed this calculation using Giroud's (1997) calculation for evaluating geomembrane defects during construction.

Hanson's calculations (attached) show that the soil-only liner has a leakage rate of 3.5×10^{-9} m/sec. The Giroud calculations for the three types of defects showed for 10 defects per acre, the composite liner performed with the following leakage rates:

- 2. Rectangular Defects......9.3 x 10⁻¹⁰ m/sec, and
- 3. Infinitely Long Defects.........6.4 x 10⁻¹⁰ m/sec

All three defect calculations produce leakage rates that are lower than the soil-only liner, therefore meeting the requirements of an equivalent 40 CFR 257.70 composite liner system.



By: RWH Date: 8/11/2020 Chkd: JMH Date: 8/14/2020

Darcy's Law Liner Leakage Calculations¹

Liner thickness (m) --
$$t_1 := 2ft = 0.61 \text{ m}$$

Head on liner (m) --
$$h_1 := 60$$
in = 1.52 m

Representitive area (m²) --
$$A_1 := 4046.856$$
m²

Liner hydraulic conductivity (m/s) --
$$k_{\parallel} := 1 \times 10^{-7} \frac{\text{cm}}{\text{s}} = 1 \times 10^{-9} \frac{\text{m}}{\text{s}}$$

Leakage Calculations

Gradient (m/m) --
$$i := \frac{\left(h_{l} + t_{l}\right)}{t_{l}} = 3.5 \cdot \frac{m}{m}$$

Leakage rate (in m³/s/m²) --
$$q := k_{||} i = 3.5 \times 10^{-9} \frac{m}{s}$$

Leakage flux (in m³/s) -- Q :=
$$q \cdot A_1 = 1.416 \times 10^{-5} \frac{m^3}{s}$$

¹ after 40 CFR 257.70(c) Equation 1.



By: RWH Date: 8/11/2020 Chkd: JMH Date: 8/14/2020

Giroud (1997) Composite Liner Leakage Calculations

Number of defects per area (#) -- n := 10

Area of geomembrane (m^2) -- $A_n := 4046.856$

Liner thickness (m) -- $t_S := 0.61$

Head on liner (m) -- h := 1.52

Liner hydraulic conductivity (m/s) -- $k_S := 5 \times 10^{-8}$

Liner contact quality (select one)

Good Poor

Circular Defect Leakage Calculations

Circular defect diameter (m) -- d := 0.01

 $\text{Leakage from circular defect --} \qquad \textbf{Q}_{c} := \textbf{n} \cdot \textbf{0.976} \cdot \textbf{C}_{q0} \cdot \left[1 + \textbf{0.1} \cdot \left(\frac{\textbf{h}}{t_{s}} \right)^{0.95} \right] \cdot \textbf{d}^{0.2} \cdot \textbf{h}^{0.9} \cdot \textbf{k}_{s}^{0.74}$

Volumetric flow (in m³/s) -- $Q_C = 5.825 \times 10^{-6}$

Leakage rate (in m³/s/m²) -- $q_C := \frac{Q_C}{A_D} = 1.439 \times 10^{-9}$

Rectangular Defect Leakage Calculations

Rectangular defect side length & width (m) --

b := 0.001 B := 0.01

 $\begin{aligned} & \text{Leakage from square defect:} \\ & Q_r := \left[n \cdot C_{q0} \cdot \left[1 + 0.1 \cdot \left(\frac{h}{t_s} \right)^{0.95} \right] \cdot b^{0.2} \cdot h^{0.9} \cdot k_s^{0.74} \right] + \left[n \cdot C_{qi} \cdot \left[1 + 0.2 \cdot \left(\frac{h}{t_s} \right)^{0.95} \right] \cdot (B - b) \cdot b^{0.1} \cdot h^{0.45} \cdot k_s^{0.87} \right] \end{aligned}$

Volumetric flow (in m³/s) -- $Q_r = 3.784 \times 10^{-6}$

Leakage rate (in m³/s/m²) -- $\frac{Q_{\Gamma}}{A_{\Omega}} = 9.351 \times 10^{-10}$

Infinitely Long Defect Leakage Calculations

Width of defect (m) -- W := 0.01

 $\text{Leakage from square defect --} \qquad \text{Q}_L := \ n \cdot \text{C}_{\mbox{qi}} \cdot \left[1 + \ 0.2 \cdot \left(\frac{\mbox{h}}{\mbox{t}_S} \right)^{.95} \right] \cdot \mbox{w}^{0.1} \cdot \mbox{h}^{0.45} \cdot \mbox{k}_S^{0.87}$

Volumetric flow (in m³/s) -- $Q_L = 2.601 \times 10^{-6}$

Leakage rate (in m³/s/m²) -- $q_L := \frac{Q_L}{A_Q} = 6.426 \times 10^{-10}$

Giroud, J.P., 1997, "Equations for Calculating the Rate of Liquid Migration Through Composite Liners Due to Geomembrane Defects", Geosynthetics International, Industrial Fabrics Association International, St. Paul, MN, Vol. 4, Nos. 3-4, pp. 335-348.



Appendix E

Geotechnical Data



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/28/2019

Finish: 2/28/2019 WEATHER: Rainy, cold (lo 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

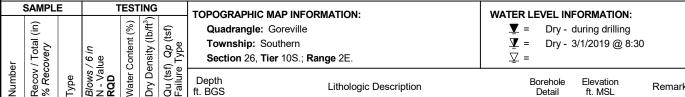
Eng/Geo: R. Hasenyager

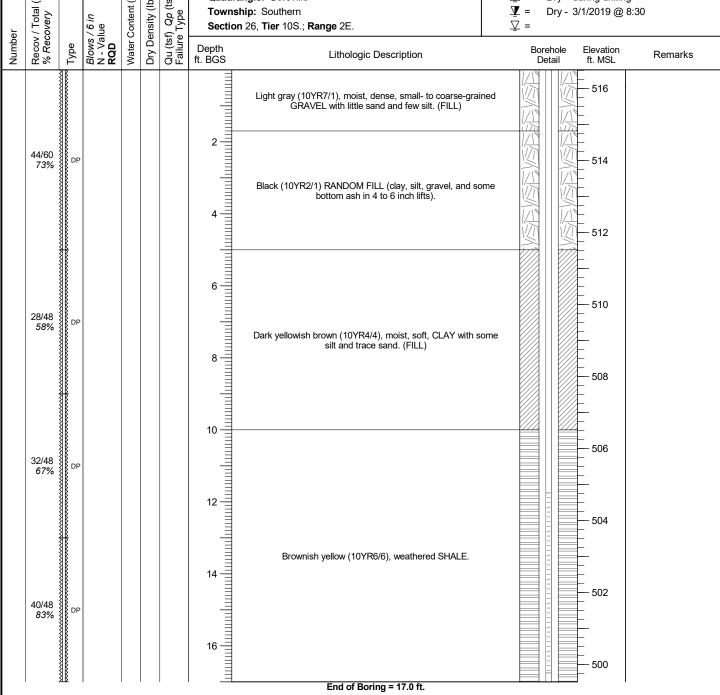
BOREHOLE ID: DP-1a

Well ID: DP-1a

Surface Elev: 516.52 ft. MSL Completion: 17.00 ft. BGS Station: 347,214.45N

804,768.52E





NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/28/2019**

Finish: 2/28/2019 WEATHER: Rainy, cold (lo 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

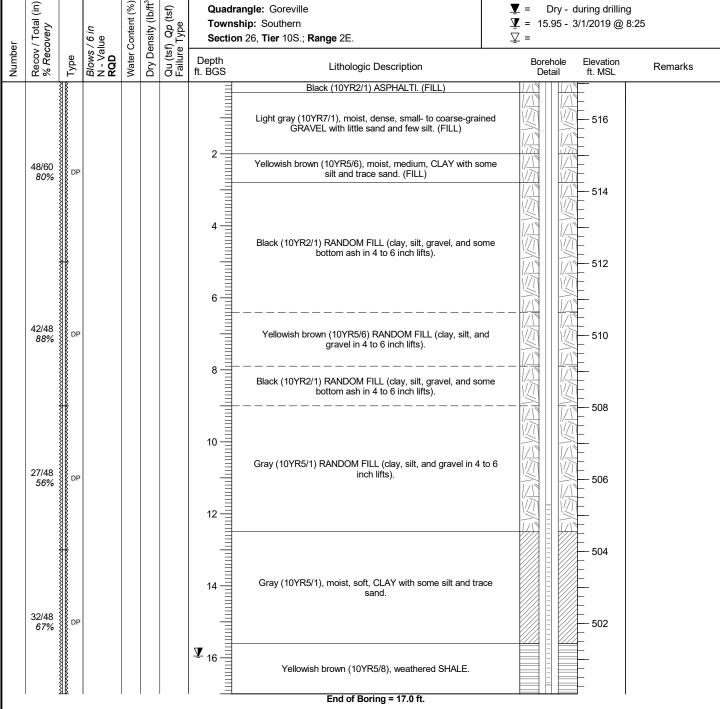
FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-1b Well ID: DP-1b

> Surface Elev: 517.05 ft. MSL Completion: 17.00 ft. BGS Station: 347,220.35N 804,792.89E

SAMPLE TESTING TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: Ξ Quadrangle: Goreville ▼ = Dry - during drilling) Qp (tsf) Type Ψ = 15.95 - 3/1/2019 @ 8:25 Township: Southern Section 26, Tier 10S.; Range 2E.



NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A DATES: Start: 2/28/2019

Finish: 2/28/2019
WEATHER: Rainy, cold (lo 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards
Helper: S Guy

Eng/Geo: R. Hasenyager

POPEHOLE ID: DR 10

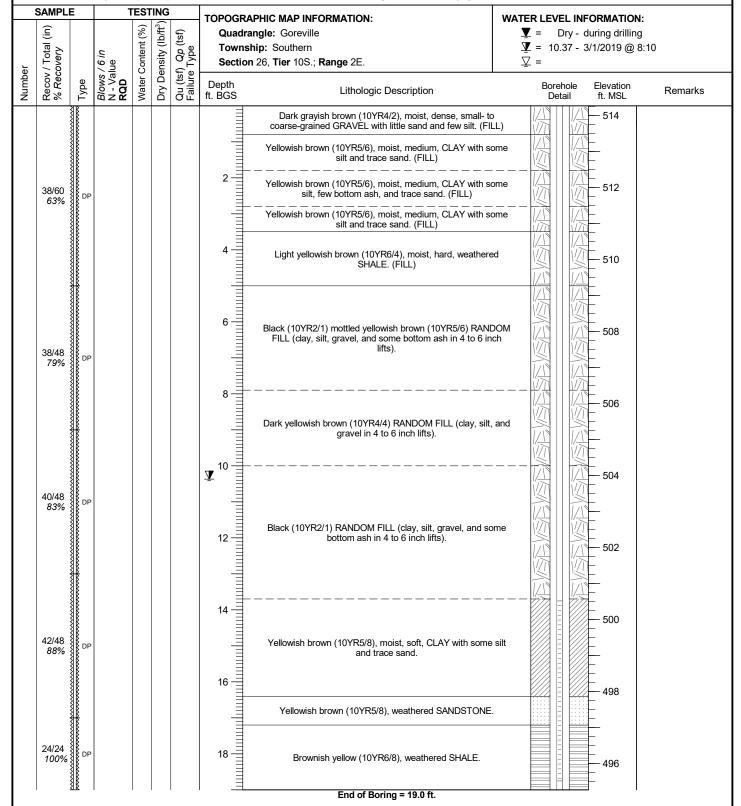
BOREHOLE ID: DP-1c **Well ID:** DP-1c

 Surface Elev:
 514.27 ft. MSL

 Completion:
 19.00 ft. BGS

 Station:
 347,226.27N

804,817.11E



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/28/2019

Finish: 2/28/2019
WEATHER: Rainy, cold (lo 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

POPEUOI E ID: DD 1d

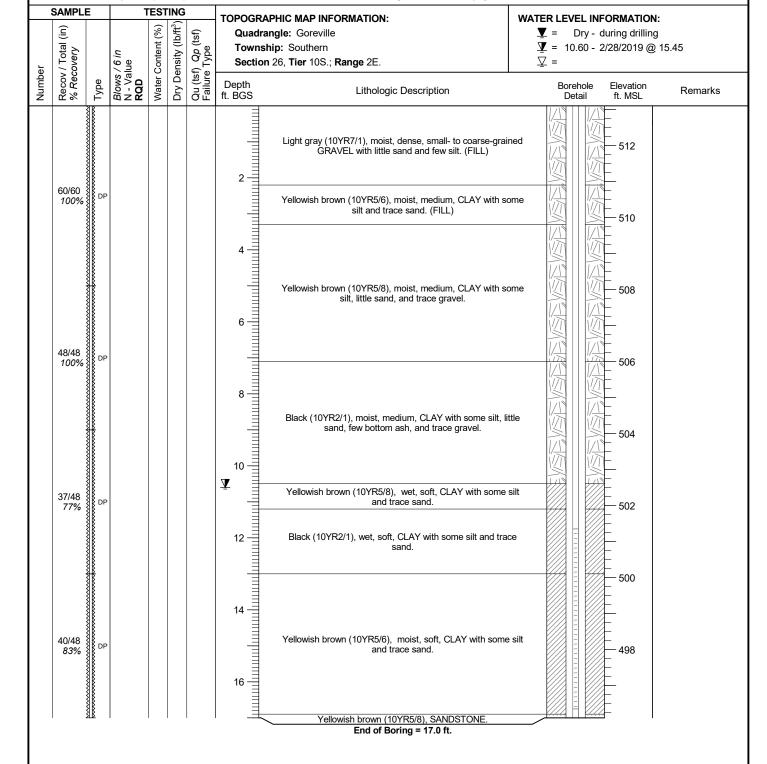
BOREHOLE ID: DP-1d **Well ID:** DP-1d

 Surface Elev:
 513.11 ft. MSL

 Completion:
 17.00 ft. BGS

 Station:
 347,232.30N

804,841.00E



CLIENT: Southern Illinois Power Cooperative

TESTING

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/28/2019

SAMPLE

Ξ

Finish: 2/28/2019 WEATHER: Rainy, cold (lo 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

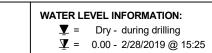
BOREHOLE ID: DP-1e Well ID: DP-1e

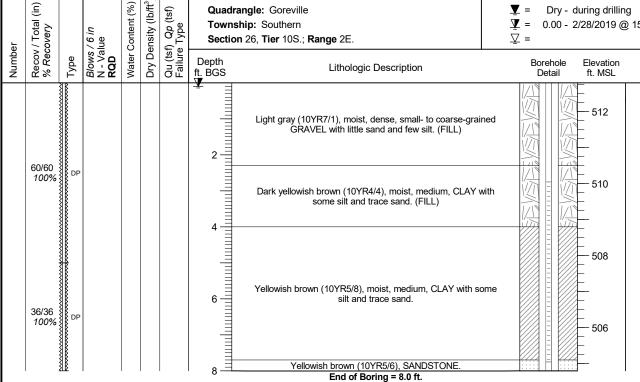
Surface Elev: 512.80 ft. MSL Completion: 8.00 ft. BGS

Station: 347,238.19N

804,865.50E

Remarks





TOPOGRAPHIC MAP INFORMATION:

Quadrangle: Goreville

Township: Southern

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/26/2019

Finish: 2/26/2019
WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards
Helper: S Guy

Eng/Geo: R. Hasenyager



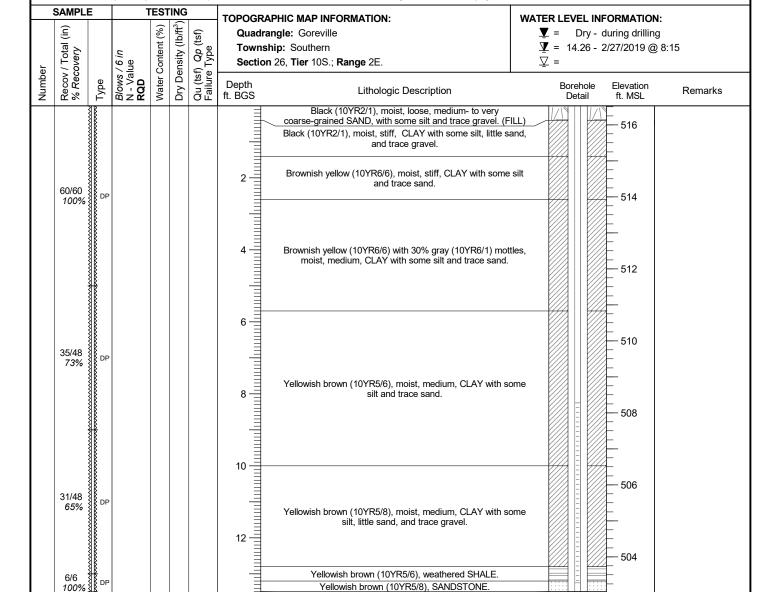
BOREHOLE ID: DP-2a
Well ID: DP-2a

 Surface Elev:
 516.53 ft. MSL

 Completion:
 13.50 ft. BGS

 Station:
 347,133.62N

804,750.03E



End of Boring = 13.5 ft.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/26/2019**

SAMPLE

Ξ

Finish: 2/26/2019 WEATHER: Ptly cloudy, mild (hi 40's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

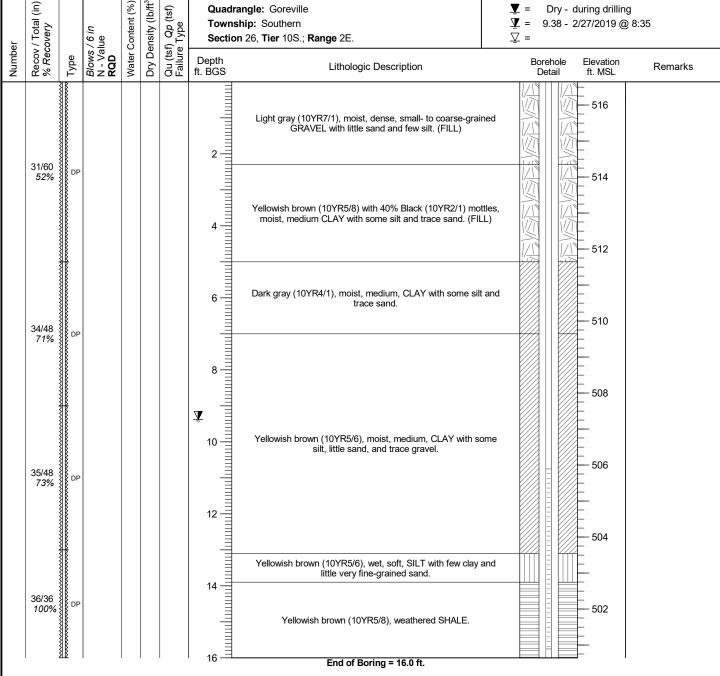
BOREHOLE ID: DP-2b

Well ID: DP-2b

Surface Elev: 516.65 ft. MSL Completion: 16.00 ft. BGS Station: 347,117.86N

804,780.56E

TESTING TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: Quadrangle: Goreville Dry - during drilling) Qp (tsf) Type ▼ = **▼** = 9.38 - 2/27/2019 @ 8:35 Township: Southern



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/26/2019

Finish: 2/26/2019
WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards
Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-2c

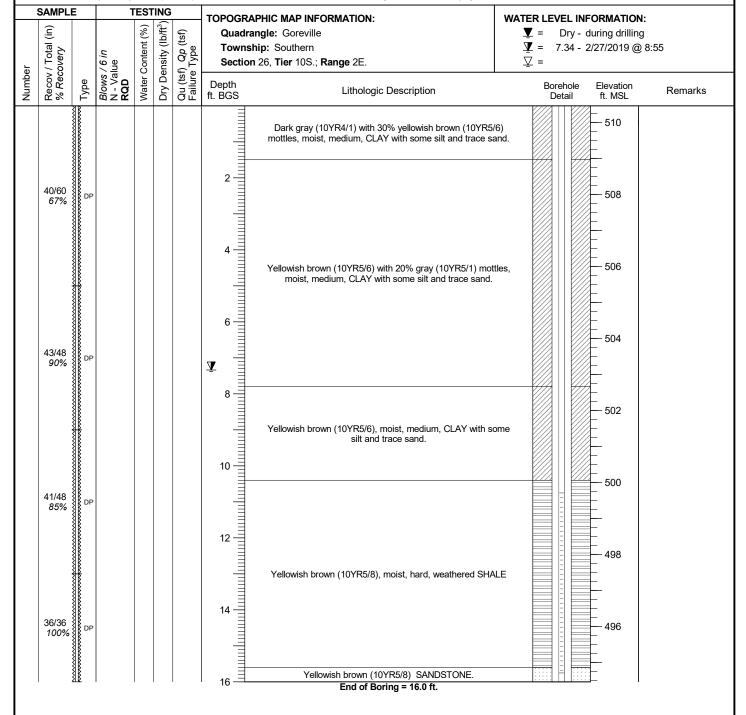
Well ID: DP-2c

 Surface Elev:
 510.46 ft. MSL

 Completion:
 16.00 ft. BGS

 Station:
 347,106.55N

804,802.49E



CLIENT: Southern Illinois Power Cooperative

TESTING

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/26/2019

SAMPLE

Finish: 2/26/2019

WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

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BOREHOLE ID: DP-2d Well ID: DP-2d

 Surface Elev:
 508.64 ft. MSL

 Completion:
 15.50 ft. BGS

 Station:
 347,095.26N

804,823.89E

| SAMPLE TESTING | | | 1 | TOPOGRA | PHIC MAP INFORMATION: | WATER LEVEL INFORMATION: | | |
|-------------------------------|-------|----------------------------------|-------------------|----------------------|--------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recov / Total (in) % Recovery | | / 6 <i>in</i> lue | Water Content (%) | Dry Density (lb/ft³) | f) Qp (tsf) Type | Townsl | ngle: Goreville nip: Southern 26, Tier 10S.; Range 2E. | $\underline{\underline{Y}}$ = 13.00 - during drilling $\underline{\underline{Y}}$ = 1.35 - 2/26/2019 @ 17:10 $\underline{\underline{\nabla}}$ = |
| Recov / 7 % Recov | Type | Blows / 6 in N - Value RQD | Water (| Dry De | Qu (tsf) Qp (t Failure Type | Depth ft. BGS | Lithologic Description | Borehole Elevation Remarks Detail ft. MSL |
| 53/60 88% | DP | | | | | ¥ 2 | Very dark gray (10YR3/1), moist, dense, small- to coarse-grained GRAVEL with little sand and few silt. (FIL Yellowish brown (10YR5/6), moist, medium, CLAY with so silt and trace sand. | 506 |
| | DP | | | | | 8 = 10 = 10 | Yellowish brown (10YR5/8), moist, medium, CLAY with so silt, little sand, and trace gravel. | |
| 29/30 97% | DP DP | | | | | 12 | Yellowish brown (10YR5/8), weathered SHALE. | 496 |
| 97% | | | | | | | Yellowish brown (10YR5/8) SANDSTONE. | 494 |

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/26/2019

Finish: 2/26/2019
WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager



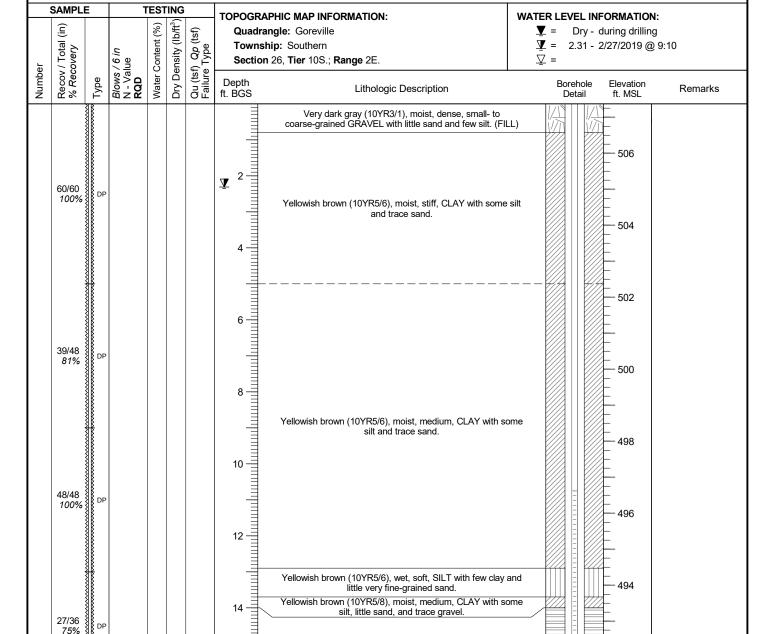
BOREHOLE ID: DP-2e Well ID: DP-2e

 Surface Elev:
 507.37 ft. MSL

 Completion:
 16.00 ft. BGS

 Station:
 347,083.66N

804,847.08E



Yellowish brown (10YR5/8), weathered SHALE.

End of Boring = 16.0 ft.

492

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/26/2019

Finish: 2/26/2019
WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

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BOREHOLE ID: DP-2f **Well ID**: DP-2f

 Surface Elev:
 506.32 ft. MSL

 Completion:
 15.50 ft. BGS

 Station:
 347,071.83N

804,869.56E

| SAMPLE TESTING | | | | ING | | TOPOGRA | PHIC MAP INFORMATION: | WATER LEVEL INFORMATION: | | | | |
|----------------------------------|------|----------------------------------|-------------------|----------------------|------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Recov / Total (in) % Recovery | | Blows / 6 in N - Value RQD | Water Content (%) | Dry Density (lb/ft³) | Qu (tsf) <i>Qp</i> (tsf) Failure Type | Quadra Townsł | ngle: Goreville nip: Southern 26, Tier 10S.; Range 2E. | $\underline{\Psi}$ = Dry - during drilling $\underline{\Psi}$ = 3.55 - 2/27/2019 @ 9:25 $\underline{\nabla}$ = | | | | |
| Reco % Re | Type | Blows N - Vg RQD | Water | Dry D | Qu (ts Failur | Depth ft. BGS | Lithologic Description | Borehole Elevation Detail ft. MSL Remarks | | | | |
| 60/60 100% | P P | | | | | 2 | Very dark gray (10YR3/1), moist, dense, small- to coarse-grained GRAVEL with little sand and few silt. (FIL Gray (10YR5/1), moist, medium, CLAY with some silt at trace sand. | 504 | | | | |
| 44/48 92% | DP | | | | | 8 | Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mot moist, medium CLAY with some silt and trace sand. Dark yellowish brown (10YR4/6), wet, medium dense, ve | ery AOS | | | | |
| 45/48 94% | | | | | | 10 | fine- to medium-grained SAND with few clay and silt. Yellowish brown (10YR5/6), moist, medium, CLAY with so silt and trace sand. | 496 | | | | |
| 28/30 93% | DP | | | | | 14 | Light yellowish brown (10YR6/4) SANDSTONE. | 492 | | | | |

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/26/2019**

Finish: 2/26/2019

WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

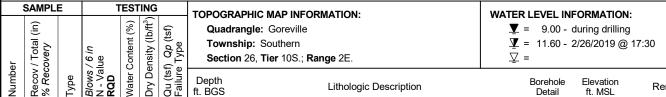
Eng/Geo: R. Hasenyager

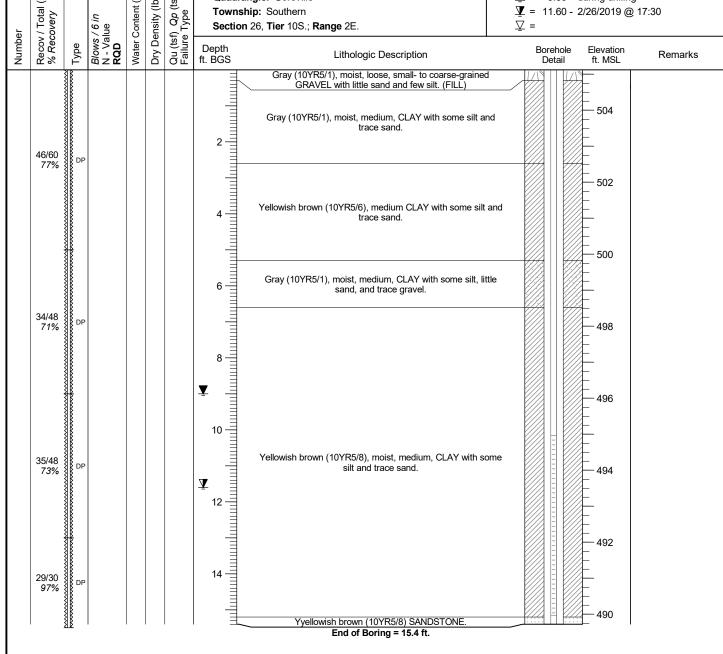
HANSON

BOREHOLE ID: DP-2g Well ID: DP-2g

Surface Elev: 505.12 ft. MSL Completion: 15.40 ft. BGS

> 347,060.68N Station: 804,891.97E





CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/26/2019**

Finish: 2/26/2019

WEATHER: Ptly cloudy, mild (hi 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

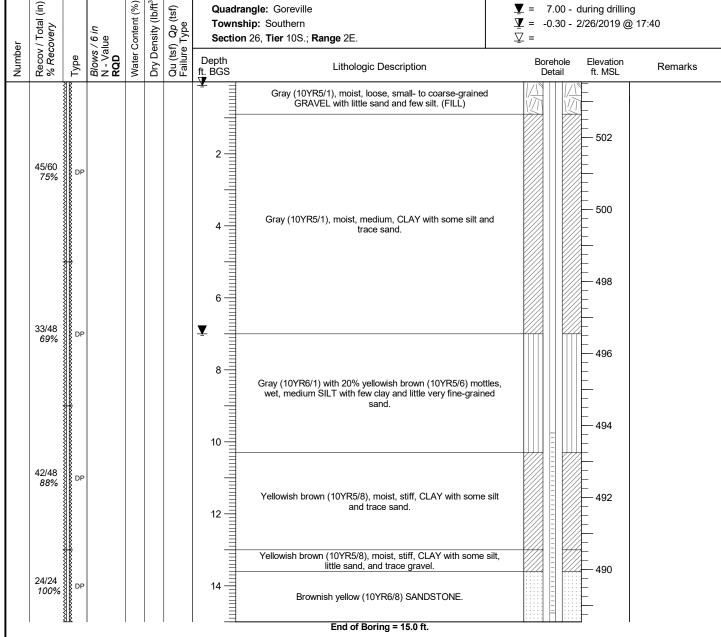
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-2h Well ID: DP-2h

> Surface Elev: 503.54 ft. MSL Completion: 15.00 ft. BGS Station: 347,048.55N

> > 804,916.15E





NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019

Finish: 2/25/2019
WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-3a

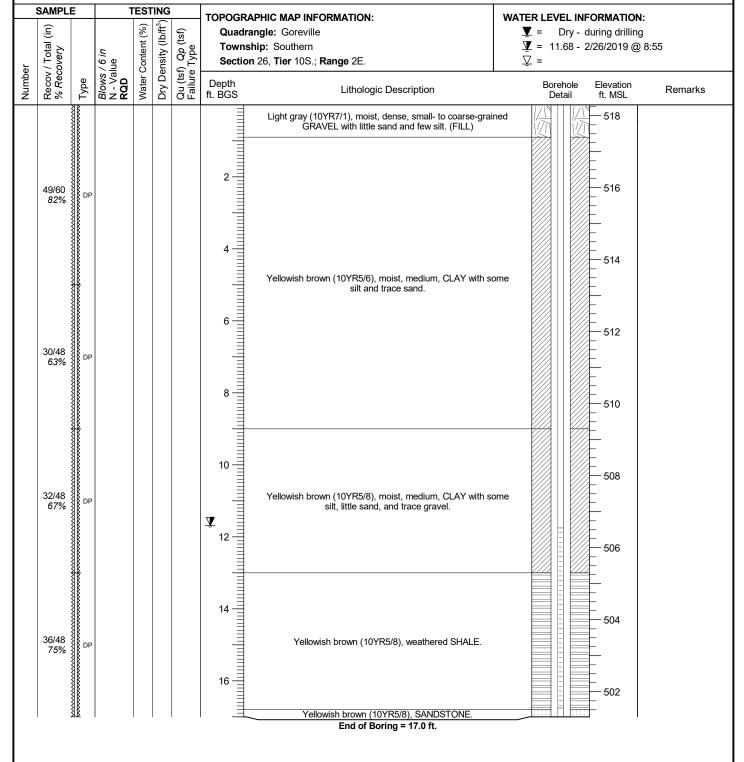
Well ID: DP-3a

 Surface Elev:
 518.30 ft. MSL

 Completion:
 17.00 ft. BGS

 Station:
 347.076.80N

804,653.12E



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019 WEATHER: Sunny cool (hi 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy



BOREHOLE ID: DP-3b Well ID: DP-3b

> Surface Elev: 518.15 ft. MSL Completion: 19.00 ft. BGS Station: 347,052.67N

| WEATHER: Sunny, cool (hi 30's) | | | | | 30's |) | | Eng/Geo: R. Hasenyager | | | | | | |
|--------------------------------|----------------------------|------|-----------------------------------------------|---------|----------------------|----------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--|--|--|--|--|
| | ecov / Total (in) Recovery | | u | (%) | Dry Density (lb/ft³) | Qp (tsf) Fype | Quadra Townsh | PHIC MAP INFORMATION: ngle: Goreville nip: Southern 26, Tier 10S.; Range 2E. | WATER LEVEL INFORMATION: ▼ = Dry - during drilling ▼ = 10.63 - 2/26/2019 @ 9:15 ▽ = | | | | | |
| Number | Recov % Rec | Type | <i>Blows / 6 i</i> N - Value RQD | Water (| Dry De | Qu (tsf) Failure ⁻ | Depth ft. BGS | Lithologic Description | Borehole Elevation Remarks Detail ft. MSL | | | | | |
| | 60/60 | DP | | | | | 2 | Black (10YR2/1), moist, soft, CLAY with some silt and tra- sand. Yellowish brown (10YR5/6), moist, medium, CLAY with so- silt and trace sand. | | | | | | |
| | 100% | | | | | | 4 | | 514 | | | | | |
| | 48/48 | DP | | | | | | Yellowish brown (10YR5/6), moist, medium, SILT with fe clay, and trace very fine-grained sand. | ew | | | | | |

10 508 Ā 39/48 Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt and trace sand. Yellowish brown (10YR5/8), moist, medium, CLAY with some 506 silt, little sand, and trace gravel. Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt and trace sand. 504 Yellowish brown (10YR5/8), moist, medium, CLAY with some 42/48 silt, little sand, and trace gravel. DP 88% Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt 502 and few very fine-grained sand. Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt and trace sand. 23/24 96% 500 Light yellowish brown (10YR6/4) SANDSTONE Yellowish brown (10YR5/8), weathered SHALE. End of Boring = 19.0 ft.

NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

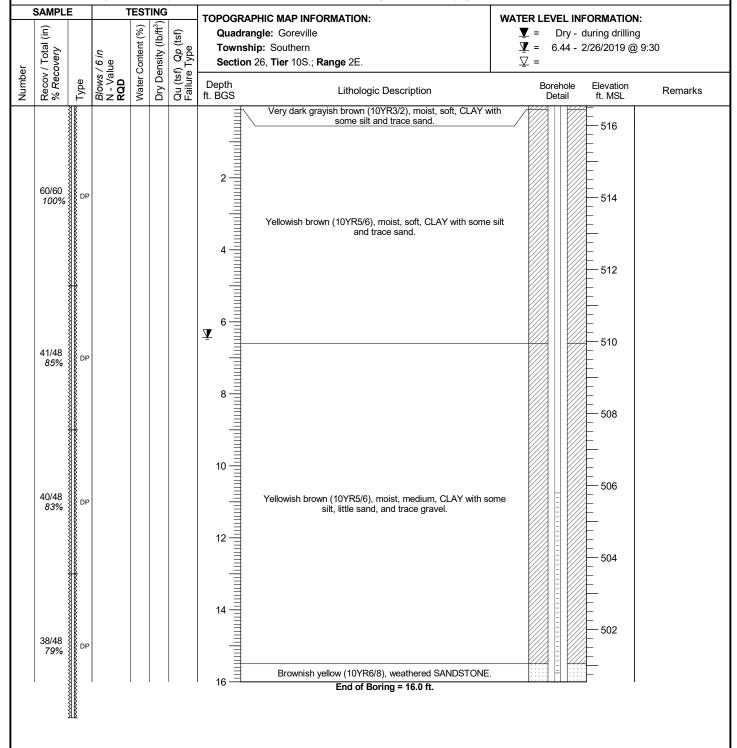
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-3c

Well ID: DP-3c

Surface Elev: 516.55 ft. MSL Completion: 16.00 ft. BGS Station: 347,027.84N

804,658.41E



CLIENT: Southern Illinois Power Cooperative

TESTING

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

SAMPLE

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

▼ = Dry - during drilling

BOREHOLE ID: DP3d

Completion:

Station:

Well ID: DP3d

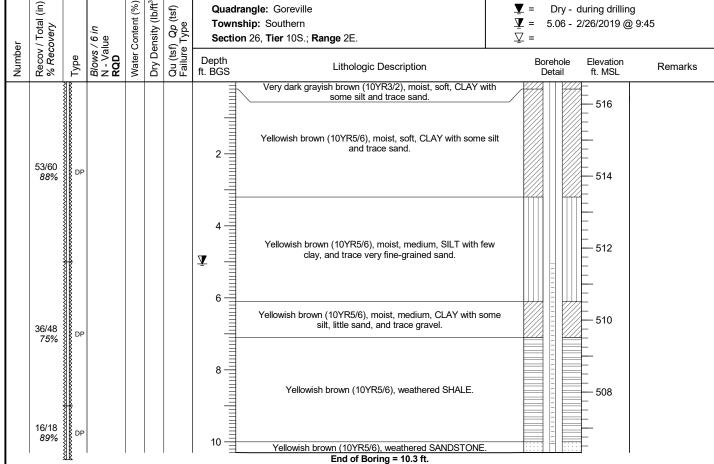
Surface Elev: 516.62 ft. MSL

10.30 ft. BGS

347,002.83N

804,660.29E





CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/25/2019**

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

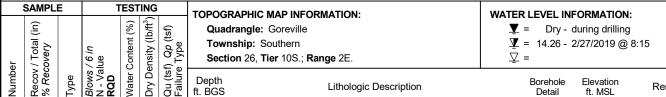
FIELD STAFF: Driller: J Edwards Helper: S Guy

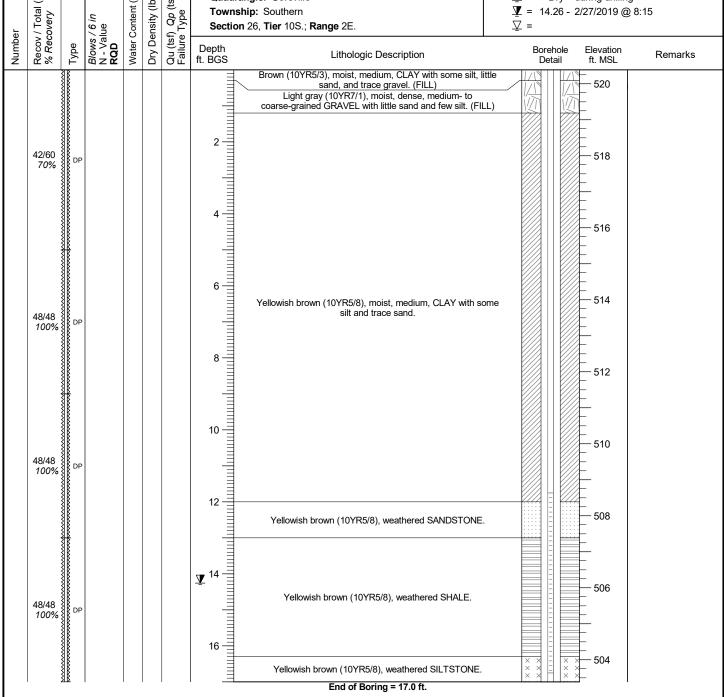
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-4a Well ID: DP-4a

Surface Elev: 520.39 ft. MSL Completion: 17.00 ft. BGS

> Station: 347,065.72N 804,472.12E





CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager



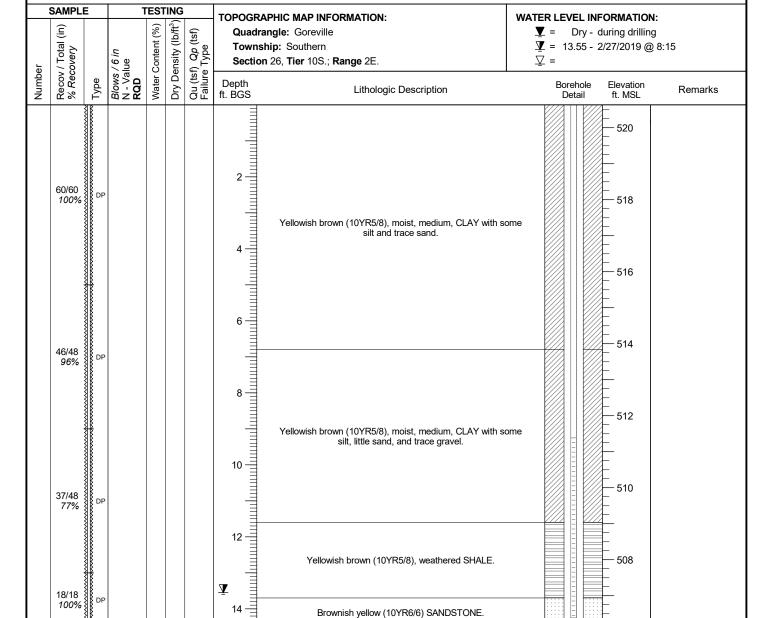
BOREHOLE ID: DP-4b
Well ID: DP-4b

 Surface Elev:
 520.64 ft. MSL

 Completion:
 14.50 ft. BGS

 Station:
 347,040.46N

804,473.43E



End of Boring = 14.5 ft.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019 WEATHER: Sunny, cool (hi 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

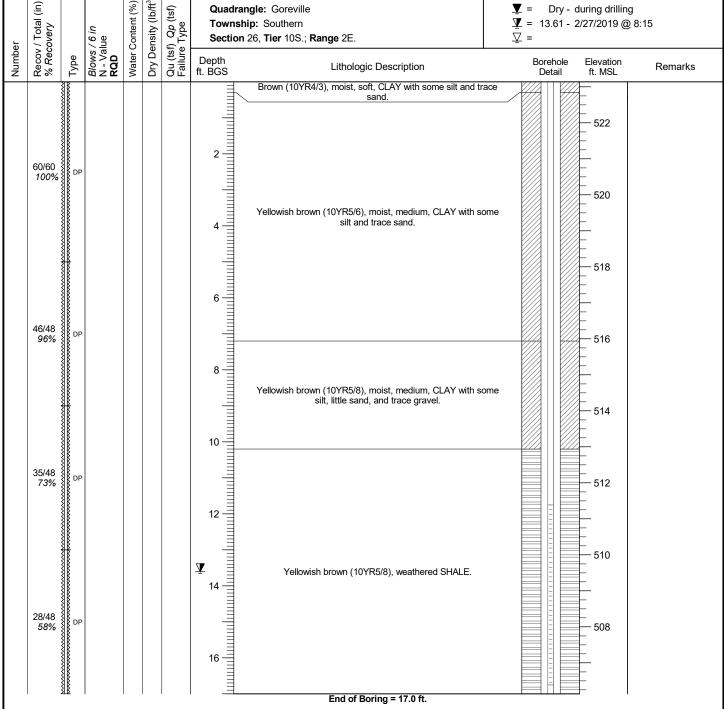
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-4c Well ID: DP-4c

Surface Elev: 523.14 ft. MSL 17.00 ft. BGS Completion: Station: 347,016.05N

804,473.64E

SAMPLE TESTING TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: Ξ) Qp (tsf) Type Quadrangle: Goreville ▼ = Dry - during drilling **▼** = 13.61 - 2/27/2019 @ 8:15 Township: Southern Section 26, Tier 10S.; Range 2E.



NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/25/2019**

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

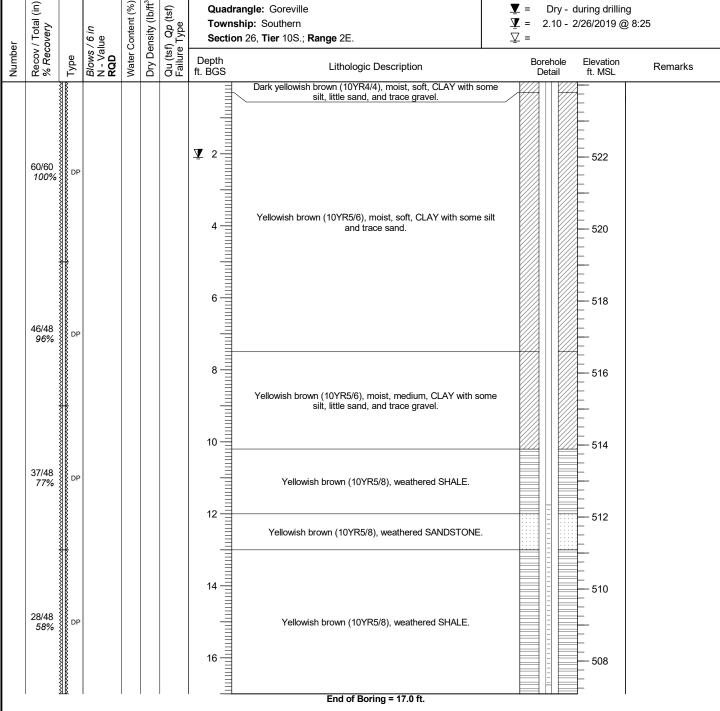
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-4d Well ID: DP-4d

> Surface Elev: 524.09 ft. MSL Completion: 17.00 ft. BGS Station: 346,999.74N

> > 804,474.16E





NOTE(S): Borehole sealed after sampling with granular bentonite.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/25/2019

Finish: 2/25/2019 WEATHER: Sunny, cool (hi 30's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager



BOREHOLE ID: DP-5a
Well ID: DP-5a

 Surface Elev:
 518.48 ft. MSL

 Completion:
 17.00 ft. BGS

 Station:
 347,096.77N

804,316.45E

| SA | MPLE | | Т | EST | ING | | TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: | | | | | |
|--------------------|-----------------------------------------|-----------------------------------------|----------------------------------|-------------------|----------------------|-----------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------|--|
| Recov / Total (in) | % Recovery | e | Blows / 6 in N - Value RQD | Water Content (%) | Dry Density (lb/ft³) | Qu (tsf) Qp (tsf) Failure Type | Quadrar Townsh | ngle: Goreville ip: Southern 26, Tier 10S.; Range 2E. | $\underline{\underline{Y}}$ = 15.00 - dur $\underline{\underline{Y}}$ = 6.62 - 2/2 $\underline{\underline{\nabla}}$ = | ing drilling | | |
| G | 2% | Туре | 80 N R | Wat | Dry | Qu Fail | ft. BGS | Lithologic Description | Detail | ft. MSL | Remarks | |
| 4 1 | 0/60 67% 8/48 100% | P P P | | | | | 2 | Very dark brown (10YR2/2), moist, dense, bottom ASH. (FIL | 15/15/15/15/15/15/15/15/15/15/15/15/15/1 | - 518 - 516 - 514 - 512 - 510 - 508 | | |
| | *************************************** | | | | | | 12 | Light brownish gray (10YR6/2), moist, dense, very fine-grain SAND with some silt. (FILL) | ned III | - 506 | | |
| 2 | 6/48 54% | DP | | | | | 14 = 16 = 16 | Very dark brown (10YR2/2), moist, dense, bottom ASH. (FIL | | - 504 | | |
| | WWW. | *************************************** | | | | | | | | - 502 | | |
| 1 | R | <u>P</u> | I | ı | 1 | l | | Very pale brown (10YR7/4), weathered SANDSTONE End of Boring = 17.0 ft. | | 1 | | |

CLIENT: Southern Illinois Power Cooperative

TESTING

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A

SAMPLE

DATES: Start: 2/25/2019

Finish: 2/25/2019

WEATHER: Sunny, cool (hi 30's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

TOPOGRAPHIC MAP INFORMATION:

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

WATER LEVEL INFORMATION:

▼ = Dry - during drilling

HANSON

BOREHOLE ID: DP-5b

Station:

Completion:

Well ID: DP-5b

Surface Elev: 519.57 ft. MSL

9.80 ft. BGS

347,061.40N

804,234.84E

Dry Density (lb/ft3 Ξ Water Content (%)) Qp (tsf) Type Quadrangle: Goreville Recov / Total (% Recovery Township: Southern **▼** = 7.02 - 2/26/2019 @ 8:05 *Blows / 6 in* N - Value **RQD** Section 26, Tier 10S.; Range 2E. Qu (tsf) Failure T Number Borehole Elevation Lithologic Description Remarks Yellow, (10YR7/6) wet, soft, GYPSUM (FILL) 518 49/60 B DP 82% 516 Very dark brown (10YR2/2), moist, dense, bottom ASH. (FILL) 514 48/48 <u>Ā</u> 512

> Yellowish brown (10YR5/8), weathered SANDSTONE End of Boring = 9.8 ft.

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/27/2019**

51/60

85%

34/48

6/6

DP

Finish: 2/27/2019

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Yellowish brown (10YR5/8), moist, medium, CLAY with some

silt and trace sand. (FILL)

Gray (10YR5/1), moist, medium, CLAY with some silt and trace sand. (FILL) Light gray (10YR7/1), moist, dense, small- to coarse-grained GRAVEL with little sand and few silt. (FILL)

Gray (10YR5/1), moist, medium, CLAY with some silt and trace sand.

Gray (10YR5/1), moist, soft, SILT with few clay and little very fine-grained sand.

Gray (10YR5/1), moist, medium, CLAY with some silt and trace sand.

Yellowish brown (10YR5/8), moist, medium, CLAY with some silt, little sand, and trace gravel.

Eng/Geo: R. Hasenyager

Well ID: DP-6a Surface Elev: 516.69 ft. MSL

BOREHOLE ID: DP-6a

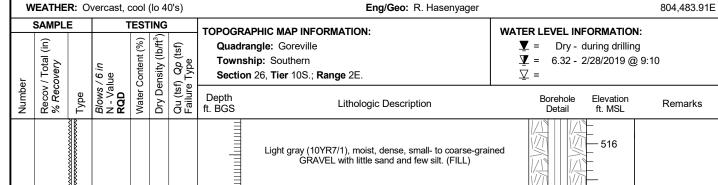
514

512

510

508

Completion: 9.50 ft. BGS Station: 347,227.38N



Yellowish brown (10YR5/6), SANDSTONE. End of Boring = 9.5 ft.

 $\overline{\mathbf{A}}$

CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/27/2019**

Finish: 2/27/2019 WEATHER: Overcast, cool (lo 40's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

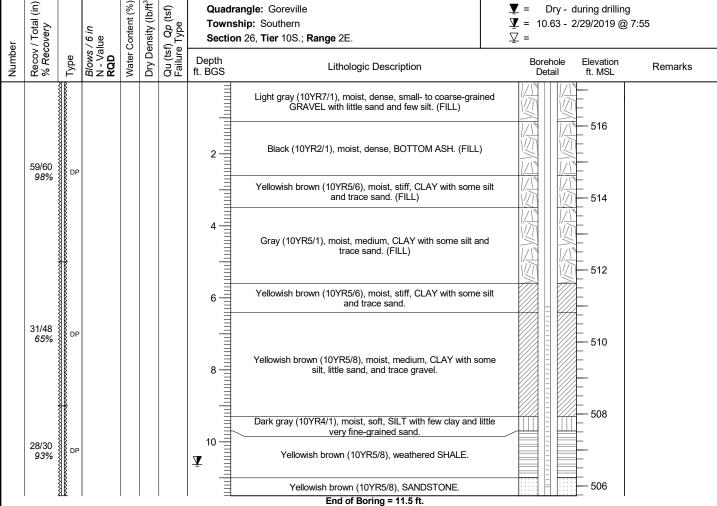
FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-6b Well ID: DP-6b

Surface Elev: 517.23 ft. MSL Completion: 11.50 ft. BGS Station: 347,252.51N 804,483.13E

SAMPLE TESTING TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: Ξ Quadrangle: Goreville ▼ = Dry - during drilling) Qp (tsf) Type **▼** = 10.63 - 2/29/2019 @ 7:55 Township: Southern Section 26, Tier 10S.; Range 2E.



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/27/2019

Finish: 2/27/2019 WEATHER: Overcast, cool (lo 40's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

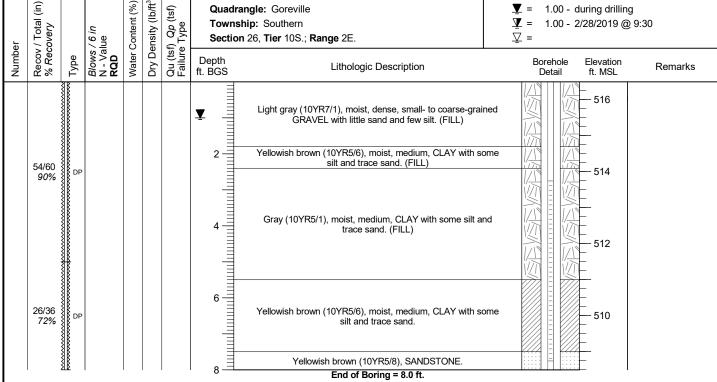
Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-6c Well ID: DP-6c

Surface Elev: 516.49 ft. MSL Completion: 8.00 ft. BGS Station: 347,277.30N

804,482.16E





CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/27/2019**

Finish: 2/27/2019

WEATHER: Overcast, cool (lo 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-7a

Station:

Completion:

Well ID: DP-7a

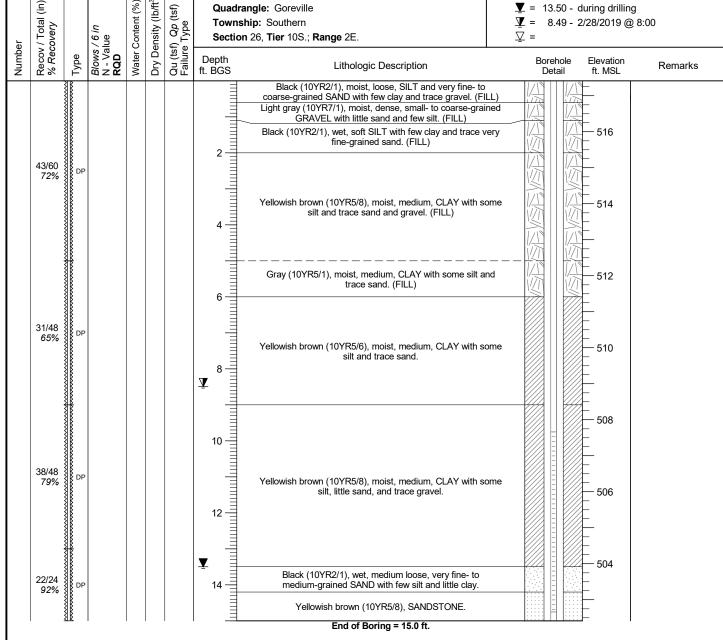
Surface Elev: 517.42 ft. MSL

15.00 ft. BGS

347,250.66N

804,677.61E





CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start: 2/27/2019**

Finish: 2/27/2019 WEATHER: Overcast, cool (lo 40's) CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards Helper: S Guy

Eng/Geo: R. Hasenyager

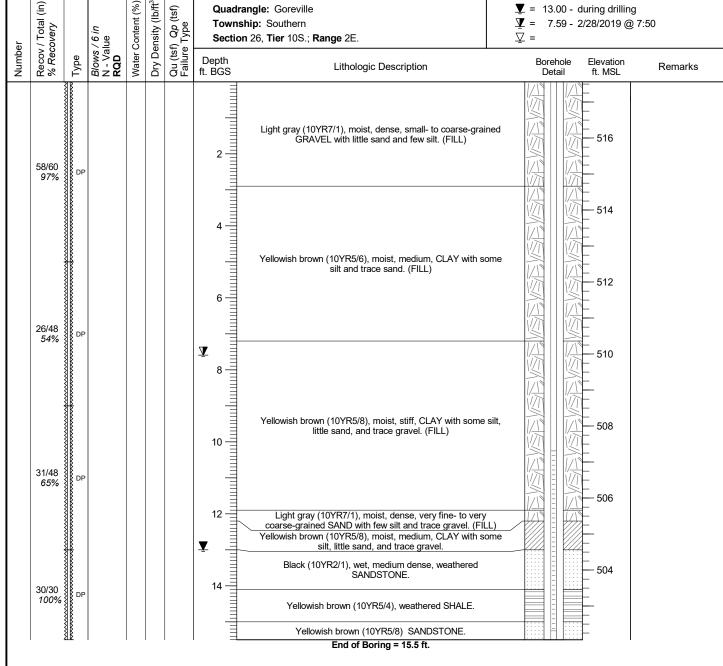
BOREHOLE ID: DP-7b

Well ID: DP-7b

Surface Elev: 517.56 ft. MSL Completion: 15.50 ft. BGS Station: 347,272.79N

804,688.58E

SAMPLE TESTING TOPOGRAPHIC MAP INFORMATION: WATER LEVEL INFORMATION: Ξ Quadrangle: Goreville \mathbf{Y} = 13.00 - during drilling) Qp (tsf) Type **▼** = 7.59 - 2/28/2019 @ 7:50 Township: Southern



CLIENT: Southern Illinois Power Cooperative

NOTE(S): Borehole sealed after sampling with granular bentonite.

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A **DATES: Start:** 2/27/2019

Finish: 2/27/2019
WEATHER: Overcast, cool (lo 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards
Helper: S Guy

Eng/Geo: R. Hasenyager

BOREHOLE ID: DP-7c

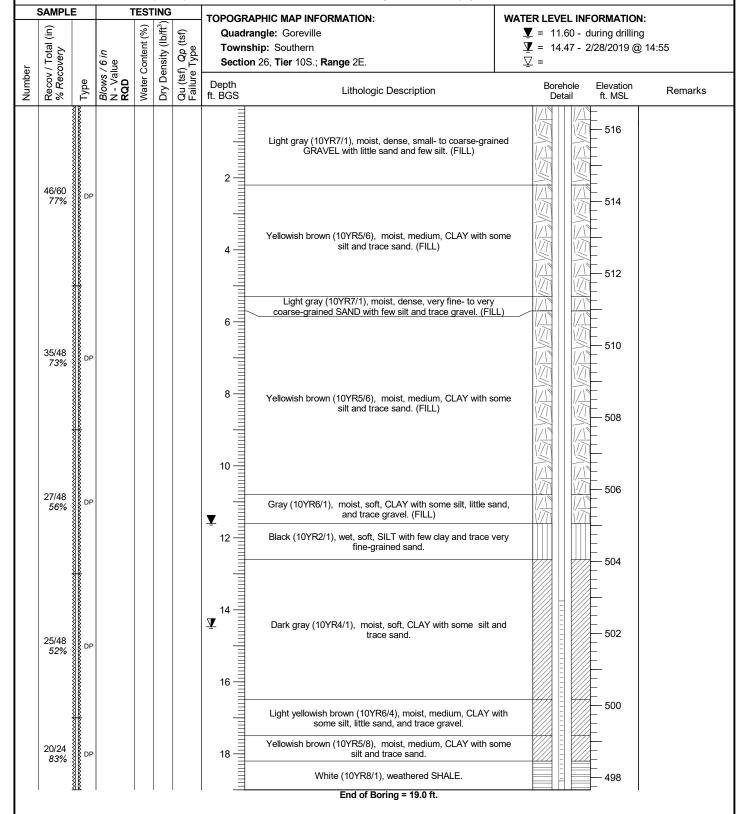
Well ID: DP-7c

 Surface Elev:
 516.65 ft. MSL

 Completion:
 19.00 ft. BGS

 Station:
 347,294.97N

804,701.22E



CLIENT: Southern Illinois Power Cooperative

Site: Emery Pond

Location: SIPC Marion Power Plant

Project: 18E0022A DATES: Start: 2/27/2019

Finish: 2/27/2019
WEATHER: Overcast, cool (lo 40's)

CONTRACTOR: Bulldog Drilling, Inc.

Rig mfg/model: AMS Power Probe 9500-VTR

Drilling Method: Direct Push

FIELD STAFF: Driller: J Edwards
Helper: S Guy

Eng/Geo: R. Hasenyager

HANSO

BOREHOLE ID: DP-7d **Well ID**: DP-7d

 Surface Elev:
 516.91 ft. MSL

 Completion:
 20.00 ft. BGS

 Station:
 347,317.15N

804,712.63E

