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JUL 08 2015

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Long-Term Work Plan

**ROTARY DRILLING SUPPLY SITE, INC.
CRYSTAL CITY, MISSOURI**

**November 21, 2014
Revised January 16, 2015
Revised February 11, 2015
Revised June 12, 2015
Revised July 8, 2015**

**ROTARY DRILLING SUPPLY, INC.
Owner**

**GOODWIN BROTHERS CONSTRUCTION CO.
General Contractor**

**GOVERO LAND SERVICES, INC.
Civil Engineer/Surveyor**

SCI No. 2014-5129.20



SCI ENGINEERING, INC.

CONSULTANTS IN DEVELOPMENT,
DESIGN AND CONSTRUCTION
GEOTECHNICAL
ENVIRONMENTAL
NATURAL RESOURCES
CULTURAL RESOURCES
CONSTRUCTION SERVICES

July 8, 2015

Mr. Darriel F. Coleman
Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028

RE: Long-Term Work Plan (Revised)
Rotary Drilling Supply, Inc.
Crystal City, Missouri
SCI No. 2014-5129.20

Dear Mr. Coleman:

SCI Engineering, Inc. (SCI) is pleased to provide this *Long-Term Work Plan (LTWP)* for the above-referenced site. The plan was prepared as a requirement of the U.S. Environmental Protection Agency's (EPA) Administrative Order of Consent (AOC) RCRA-07-2012-0028. The plan is intended to describe the abatement of impacts due to the disposal of coal combustion residue (CCR) from the site to adjacent surface waters and describe mitigation of the impacted waterbodies.

SCI appreciates being of service to you on this project. Please contact us if you have any questions or comments regarding this report. We can be reached at (636) 949-8200.

Respectfully,

SCI ENGINEERING, INC.

Mary K. Weatherford, E.I.
Staff Scientist

Scott D. Harding, CPSS/SC
Vice President

MKW/SDH/tlw

Enclosure

C: Ms. Nicole Moran; U.S. Environmental Protection Agency
Mr. Adam Breeze; Breeze Law Firm
Mr. Larry Goodwin; Goodwin Brothers Construction Co.
Mr. Dan Govero; Govero Land Services, Inc.
Mr. Jerry Govero (Project Coordinator); Lachaize, LLC.

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Long-Term Work Plan

ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI

Owner/Permittee: Mr. Darriel F. Coleman
Rotary Drilling Supply, Inc.
1150 Truman Boulevard
PO Box 302
Crystal City, Missouri 63019

Contractor/Contact: Goodwin Brothers Construction Company
c/o Mr. Larry Goodwin
1766 Highway 67 South
PO Box 110
Crystal City, Missouri 63019

LTWP Prepared by: Mary K. Weatherford, E.I.
SCI Engineering, Inc.
650 Pierce Boulevard
O'Fallon, Illinois 62269

1.0 INTRODUCTION

This document is intended to assist Rotary Drilling Supply Inc. (Rotary Drilling) in complying with the U.S. Environmental Protection Agency's (EPA) Administrative Order of Consent (AOC) RCRA-07-2012-0028 through the development of an approved Long-Term Work Plan (LTWP). This LTWP is intended to describe how Rotary Drilling will minimize further migration of the coal combustion residue (CCR) that is on site while still allowing for future development of the site. The LTWP will include descriptions for clay cap implementation, creek channel realignment and piping, long-term surface water monitoring, as well as an inspection and maintenance plan. A *Vicinity and Topographic Map* is included as Figure 1.

2.0 PROJECT DESCRIPTION

The approximately 12-acre project site is located at 1150 South Truman Boulevard in Crystal City, Missouri. The property is currently the business location for Rotary Drilling and contains a large fill pad and one structure. A portion of the site was previously filled over the last 10+ years with CCR and other fill material to create the grades present at the time of this report. As part of an overall containment plan or what is referred to as the LTWP, the site will be graded to form stable slopes and capped with clay and shot rock to reduce infiltration, erosion and runoff. The lower portions of the slopes adjacent to the railroad tracks and tributary will be covered with a geotechnical fabric and riprap. Additionally, a portion of an unnamed tributary that is on site (as well as a portion off site and upstream) will be piped, as per the

AOC and a Nationwide Permit (NWP) (33 CFR 325), to reduce possible erosion of the embankment and exposure of the CCR.

2.1 Site Plan

The *Existing Conditions Site Map* is included as Figure 2 and depicts the general layout and topography of the site as well as the general site drainage patterns and slopes. Temporary stabilization on the site may be provided prior to implementation of the LTWP through the Best Management Practices (BMPs) proposed under the Short Term Work Plan (STWP).

3.0 LONG TERM WORK PLAN

The general conditions required by the AOC to be included in the LTWP are summarized on *Site Plan – Proposed Conditions* enclosed as Figure 3. The construction drawings prepared by Govero Land Services, Inc. are included as Appendix A.

3.1 Tributary Channel Realignment

The unnamed tributary to Platin Creek that flows between the site and an adjacent concrete plant (immediately south of the subject site) will be enclosed within a pipe. As per the AOC issued from the U.S. Environmental Protection Agency (EPA) for Rotary Drilling, the unnamed tributary to Platin Creek should be either piped or re-routed to protect from contact with CCR. Relocation of the tributary would not likely safeguard the CCR from lateral migration of the channel, therefore, approximately 410 LF of the unnamed tributary that is on Rotary Drilling property will be enclosed within a 48-inch High Density Polyethylene Pipe (HDPE). These impacts have been authorized by the U.S. Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) (33 CFR 325). A copy of the permit is attached as Appendix B. The USACE has allowed the channel upstream from the property boundary to be piped (included in the referenced NWP) as well and the work has been coordinated with the adjacent property owners. Piping will begin off site on the neighboring property and then continue on site at the southern property boundary and continue to the eastern property boundary. The pipe will be tied into an existing culvert at the edge of the railroad right-of-way. These activities will result in approximately 605 LF of stream impact. Inspections of the condition of the piped unnamed tributary realignment will be conducted at the same time and frequency of the clay cap inspections. Please refer to the Surface Water Monitoring and Cap Maintenance Plan (Appendix D) for a detailed description of the inspection requirements and activities. SCI understands that mitigation for the unnamed tributary has been completed with the mitigation purchase from the Shaw Nature Reserve Mitigation Bank. After the channel is piped, the area will be backfilled along the side and on top of the culvert.

3.2 Geotechnical Considerations

A geotechnical exploration was conducted by SCI Engineering, Inc. (SCI) to evaluate the subsurface conditions, evaluate the proposed slopes for stability, and provide limited recommendations related to the cover of the CCR as well as the potential development of the site. In accordance with the AOC, the site will be covered on the top and side slopes with a clay cap in order to eliminate stormwater contact and reduce migration of CCR into nearby surface waters. Acceptable materials for the proposed clay cap include low permeability materials, such as lean clay (CL) or fat clay (CH), with a permeability of less than or equal to 1×10^{-6} centimeters per second. The clay cap is recommended to be at least 24 inches thick and should be placed and compacted as described in the *Geotechnical Report dated November 21, 2014, revised January 16, 2015*, included as Appendix C in section 4.4, pages 6-8.

As part of the clay cap, and to create a barrier marker for future developments, the top of the site shall be covered with a 1-foot thick layer of shot rock. The shot rock shall have a maximum dimension of 6 inches. Additionally, the slopes will be covered with a combination of a clay cap, geotechnical fabric, and riprap beginning at elevation 412.7 feet and extending down to the toe of the slope. This combination will increase stabilization and reduce the potential for erosion during both storm and flooding events. Deed restrictions shall prevent any excavation or development below the layer of shot rock in order to prevent penetration into the CCR. The maintenance plan for the clay cap is described Appendix D.

3.3 Surface Water Monitoring and Cap Maintenance Plan

The purpose of the Surface Water Monitoring and Cap Maintenance Plan is to outline the guidelines and standards of the LTWP as required by paragraph 50 and Attachment A of the AOC. The Surface Water Monitoring Plan will include a Quality Assurance Project Plan (QAPP), a Sampling and Analysis Plan (SAP), and a Cap Maintenance Plan (CMP), that detail the LTWP sampling procedures and data quality requirements. The Surface Water Monitoring and Cap Maintenance Plan is included as Appendix D.

3.4 Erosion, Destabilization, and Flooding Controls

The site shall be graded in order to prevent water from collecting in low areas of the site. For future developments, site drainage should be provided to reduce surface water infiltration around the perimeter of the buildings and beneath the floor slabs. Additionally, all grades should be sloped away from the buildings. Roof and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill of the buildings. An interim sediment basin is proposed in the southeast corner of the clay cap and will be removed upon completion of the LTWP. The bottom of this basin shall not penetrate the protective clay cap. This basin will serve as a catchment for sediments collected stormwater

runoff during construction activities.

A permanent stormwater detention basin is planned near the southeast corner of the site near the piped tributary. Grading and installation of the stormwater detention basin is discussed further in the Appendix A. Rock bedding will not be used for the outlet piping of the stormwater detention basin. Instead, the outlet pipe will be placed on a cohesive soil subgrade, shaped to fit the pipe barrel, and the trench backfilled with properly compacted cohesive soil. Alternatively, the trench can be backfilled to the springline of the pipe with lean concrete or flowable fill. Concrete anti-seepage collars will also be used to reduce seepage around the pipe.

Appropriate erosion and sediment control measures, such as proper contouring during site grading activities, the installation of siltation fences, and/or inlet protection, shall be used during construction to prevent eroded materials from being carried onto adjacent properties or waterbodies. Depending on the length of time the subgrade is exposed and the amount of siltation that occurs, it may be necessary to periodically remove materials collected by the sediment control systems. Timely sodding and/or seeding of sloped surfaces will help reduce this potential problem.

3.5 Schedule of Work to be Performed

An estimated project schedule to implement the LTWP is included in Table 1.

Table 1 – Estimated Project Schedule

Activity	Anticipated Date of Initiation	Anticipated Date of Completion
Submit draft LTWP to USEPA	NOVEMBER 2014	NOVEMBER 2014
Receive comments from USEPA	DECEMBER 2014	DECEMBER 2014
Submit final LTWP to USEPA	FEBRUARY 2015	FEBRUARY 2015
Receive comments from USEPA	MAY 2015	MAY 2015
Submit revised LTWP to USEPA	JUNE 2015	NA
Receive Approved LTWP from USEPA	JULY 2015	NA
Implementation of LTWP	JULY/AUG 2015	DECEMBER 2015
Initial first quarterly sampling	JANUARY 2016	JANUARY 2016
Submit annual report	DECEMBER 2016	DECEMBER 2016

3.6 Environmental Covenant

Once executed, the site will operate under the Environmental Covenant included in the AOC as Attachment B. The Environmental Covenant prohibits excavation or disturbance of the cap without EPA approval. This ensures that the underlying CCR will not be exposed and also requires the regular maintenance of the cap to prevent off-site migration of CCR constituents.

3.7 Wetland Mitigation

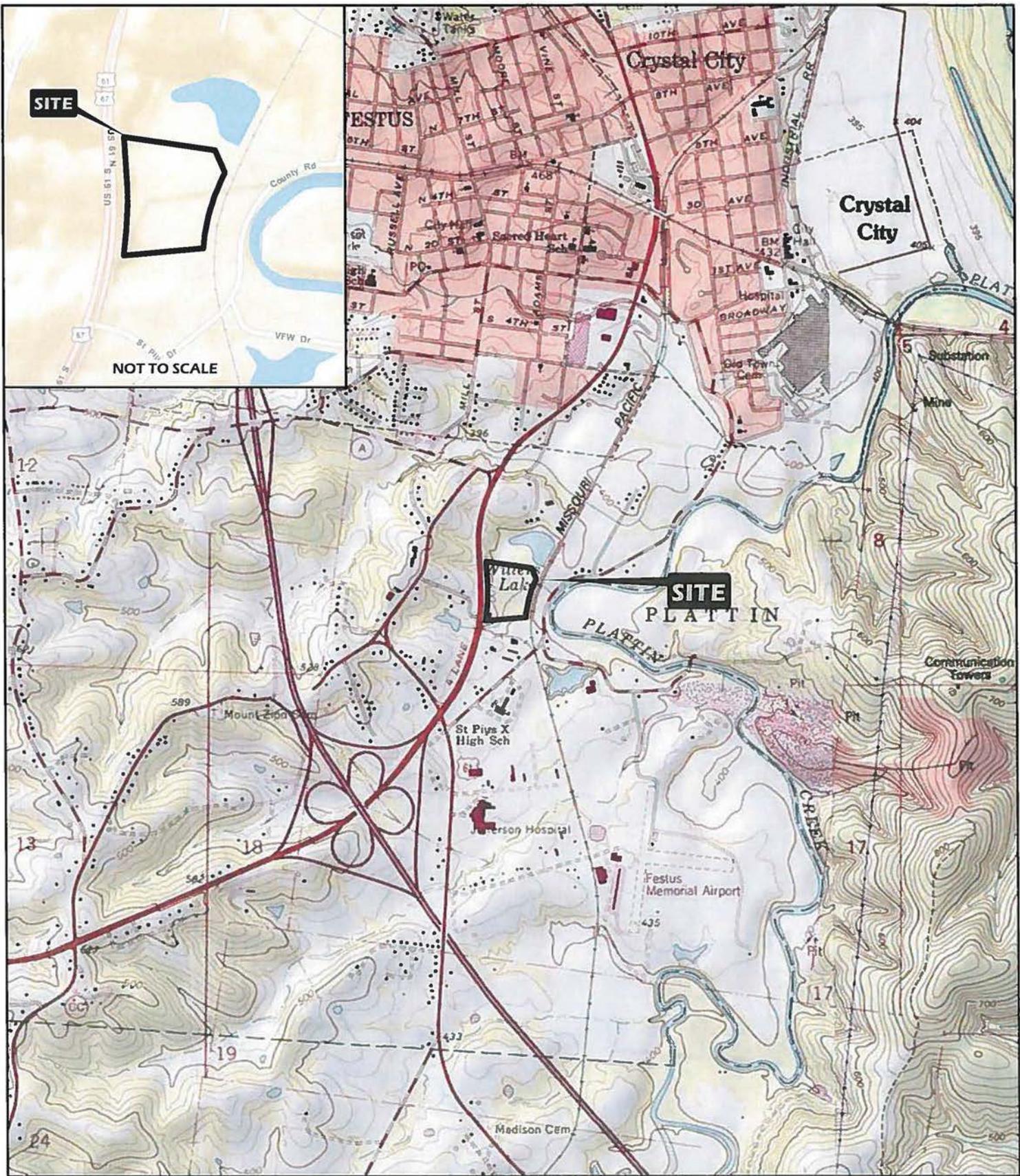
Wetland mitigation for impacts to Willers Lake, the on-site wetland and the proposed impacts to the unnamed tributary on site has been completed with the mitigation purchase from the Shaw Nature Reserve Mitigation Bank. This mitigation purchase has been documented and approved by the USACE to satisfy all mitigation requirements.

4.0 SUMMARY

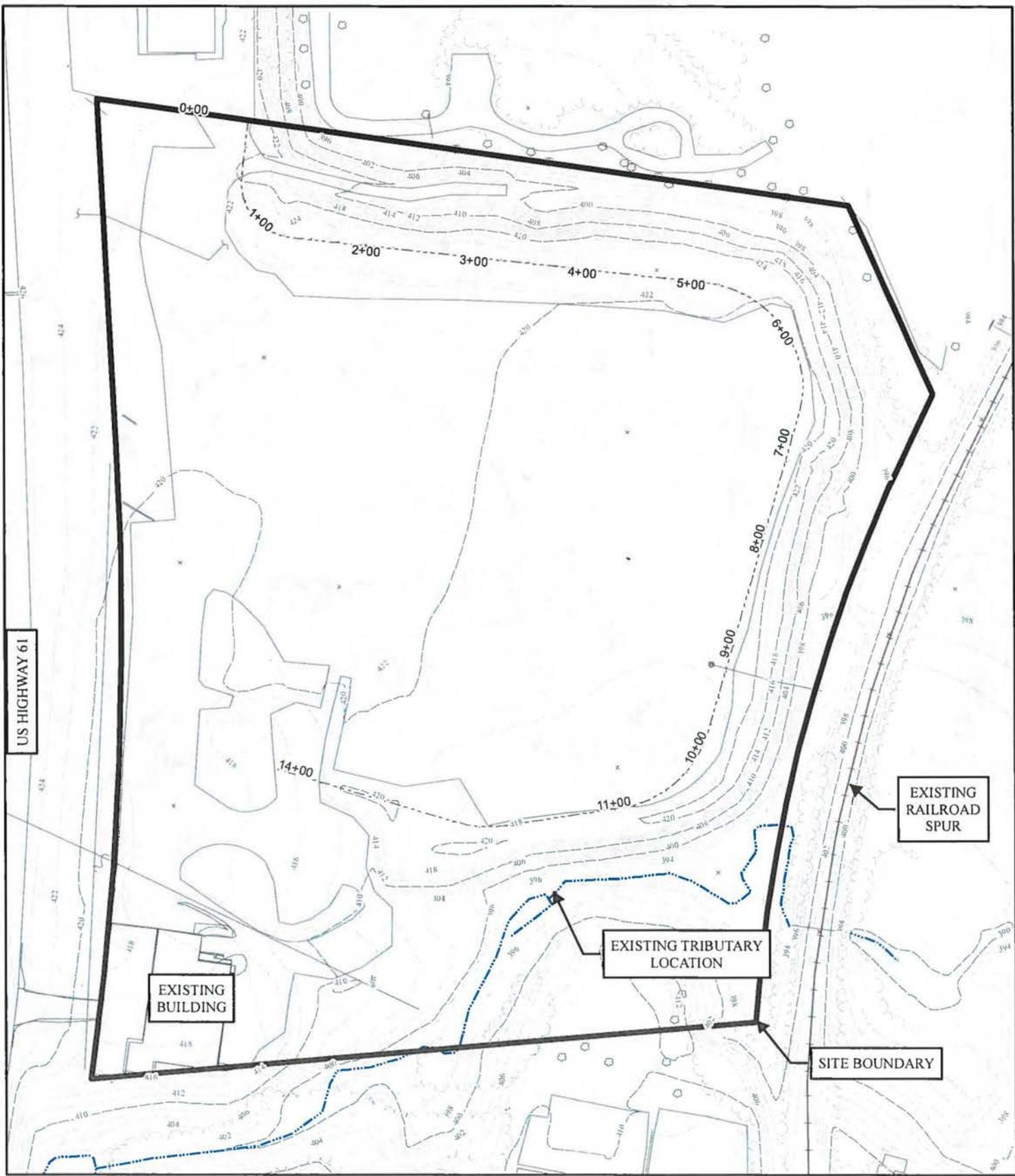
This Work Plan was developed to assist Rotary Drilling Supply, Inc. in complying with EPA's AOC. Personnel selected for the inspection, maintenance and sampling responsibilities should be qualified and trained in all practices necessary. Should the inspector determine that a control measure is not functioning properly, it may become necessary to alter the control measures being used. All updates or changes to the LTWP will be documented on the site plan by the inspector and/or site supervisor and provided to EPA for comment and approval.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of the Rotary Drilling Supply, Inc. SCI is not responsible for independent conclusions or recommendations made by others. Furthermore, written consent must be provided by SCI should anyone wish to excerpt or rely on the contents of this report. The findings of this report are valid as of the present date of the assessment. SCI provides no guarantee that the provided recommendations and/or observations will prevent erosion or provide complete stability within the site. Un-stabilized soil, either natural or man-made, is dynamic in nature, and will always have the capacity to erode. SCI's site recommendations and inspections do not protect you from potential regulatory or permit violations. The decision to issue or deny a permit or work plan, as well as to issue or not issue permit violations or stipulated penalties under the AOC is the sole authority of the EPA. Please be aware that the EPA has the right to perform inspections of your construction site at any time.



	PROJECT NAME ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI		GENERAL NOTES/LEGEND USGS TOPOGRAPHIC MAP FESTUS, MISSOURI QUADRANGLE DATED 1964, PHOTO REVISED 1984 SELMA, ILLINOIS - MISSOURI QUADRANGLE DATED 1993 10' CONTOURS		 SCALE 1" = 2000' FIGURE 1
	VICINITY AND TOPOGRAPHIC MAP				
DRAWN BY CHECKED BY	RCV MKW	DATE 06/2015	JOB NUMBER 2014-5129.20		



PROJECT NAME			
ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI			
EXISTING CONDITIONS SITE MAP			
DRAWN BY	RCV	DATE	JOB NUMBER
CHECKED BY	MKW	06/2015	2014-5129.20

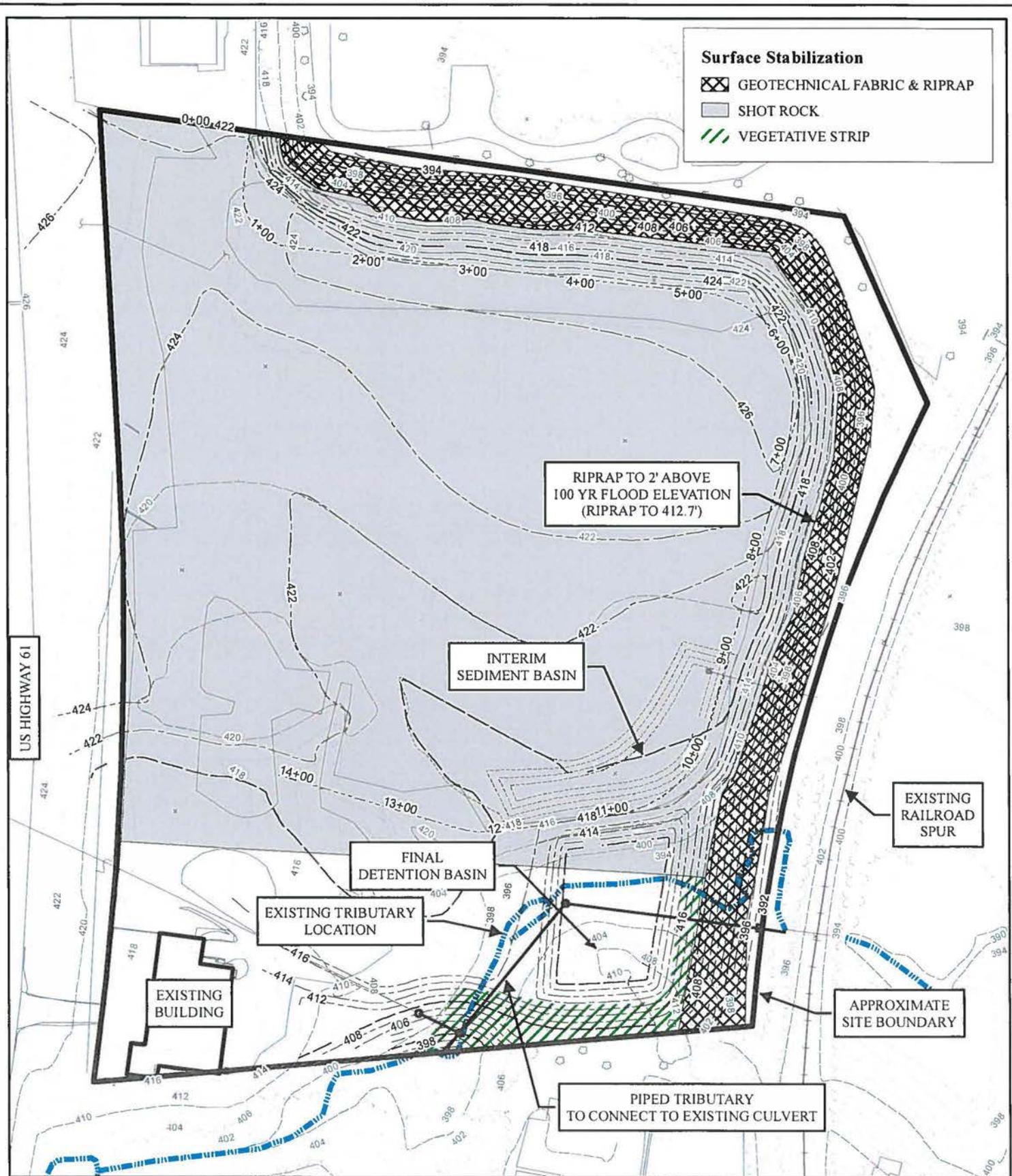
GENERAL NOTES/LEGEND

UNDATED PLAN PROVIDED ELECTRONICALLY ON 10/07/2014 BY GOVERNO LAND SERVICES. DIMENSIONS AND LOCATIONS ARE APPROXIMATE, ACTUAL MAY VARY. DRAWING SHALL NOT BE USED OUTSIDE THE CONTEXT OF THE REPORT FOR WHICH IT WAS GENERATED.

North arrow pointing North (N), South (S), East (E), and West (W).

SCALE 1" = 120'

FIGURE 2



PROJECT NAME ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI			
SITE PLAN - PROPOSED CONDITIONS			
DRAWN BY	RCV	DATE	JOB NUMBER
CHECKED BY	MKW	06/2015	2014-5129.20

GENERAL NOTES/LEGEND

100 YEAR FLOODPLAIN ELEVATION DETERMINED AS 410.7 BY GOVERO LAND SERVICES ON A PLAN DATED 12/31/2014.

DIMENSIONS AND LOCATIONS ARE APPROXIMATE. ACTUAL MAY VARY. DRAWING SHALL NOT BE USED OUTSIDE THE CONTEXT OF THE REPORT FOR WHICH IT WAS GENERATED.

SCALE 1" = 120'
 FIGURE 3

Appendix A

GOVERO GRADING PLANS

GENERAL NOTES:

- THE UNDERGROUND UTILITIES HAVE BEEN PLOTTED FROM READILY AVAILABLE RECORDS. BUT THE ACCURACY AND COMPLETENESS OF SUCH IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXISTENCE AND LOCATION OF ANY UTILITIES NOT SHOWN AND TO PROTECT SUCH UTILITIES DURING CONSTRUCTION. THE OWNER WILL NOT BE RESPONSIBLE FOR THE COST OF PROTECTION, REPAIR OR REPLACEMENT OF ANY STRUCTURE, PIPE LINE, CONDUIT, SERVICE CONNECTION ETC., ABOVE AND BELOW GROUND WHICH MAY BE BROKEN OR DAMAGED BY INDIVIDUAL CONTRACTORS DURING CONSTRUCTION.
- ALL FILL UNDER PROPOSED STORM AND SANITARY SEWER LINES AND/OR PAVED AREAS INCLUDING TRENCH BACKFILLS WITHIN AND OFF THE ROAD RIGHT-OF-WAY SHALL BE COMPACTED TO 95 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST (A.A.S.H.O. T-99 (ASTM D-698)). ALL TESTS SHALL BE VERIFIED BY A GEOTECHNICAL ENGINEER.
- ALL EMBANKMENT TO BE COMPACTED TO MINIMUM OF 90 PERCENT (STANDARD PROCTOR). ALL TESTS SHALL BE VERIFIED BY A GEOTECHNICAL ENGINEER.
- MAXIMUM SLOPE = 2 UNITS HORIZONTAL/1 VERTICAL. (EARTH SLOPES ONLY)
- SOFT OR SPONGY EARTH, MULCH, MUD, UNCONSOLIDATED EARTH FILL, UNSUITABLE FILL SUCH AS DECAYED VEGETABLE OR ORGANIC MATTER, OR SOFT, FRITABLE UNCONSOLIDATED MATERIALS SUCH AS ASHES OR RUSTED CANS, OR ANY OTHER MATERIALS UNSUITABLE AS A FIRM BASE FOR THE PIPE OR SEWER OR STRUCTURE SHALL BE REMOVED AND REPLACED WITH COMPACTED CRUSHED LIMESTONE.
- GRANULAR BACKFILL SHALL BE PLACED AT LOCATIONS INDICATED ON THE PLANS FROM THE LEVEL SIX INCHES ABOVE THE TOP OF THE PIPE TO THE SUBGRADE ELEVATION OF THE PAVEMENT. ALL GRANULAR BACKFILL MATERIALS SHALL BE COMPACTED BY WATER JETTING.
- BACKFILLING IN TRENCHES WHERE GRANULAR BACKFILL IS NOT SPECIFIED SHALL CONSIST OF JOB-EXCAVATED EARTH THOROUGHLY COMPACTED TO THE DENSITY OF THE ADJACENT UNDISTURBED EARTH. SAID MATERIAL SHALL BE FREE OF DEBRIS, ORGANIC MATTER, PERISHABLE COMPRESSIBLE MATERIALS, AND SHALL CONTAIN NO STONES OR FRAGMENTS OF ROCK LARGER THAN SIX INCHES IN DIMENSION. CARE SHALL BE TAKEN THAT STONES AND LUMPS ARE KEPT SEPARATE AND WELL DISTRIBUTED, AND THAT VOIDS ARE COMPLETELY FILLED WITH THE MATERIALS. THE BACKFILL MATERIALS SHALL BE PLACED IN LAYERS NOT EXCEEDING NINE INCHES BEFORE COMPACTION.
- CONTRACTOR MAY EXCAVATE THE UPPER PART OF SEWER TRENCHES WITH SLOPING SIDES ABOVE A LEVEL ONE FOOT ABOVE THE TOP OF THE PIPE. TRENCH EXCAVATION BELOW THIS LEVEL SHALL BE CARRIED OUT WITH VERTICAL SIDES.
- ALL UTILITY TRENCHES UNDER PAVEMENT SHALL BE BACKFILLED WITH 1" CLEAN CRUSHED STONE.
- PRECAST MANHOLES SHALL CONFORM TO ASTM-478.
- ALL SANITARY AND STORM SEWERS SHALL MEET ALL SPECIFICATIONS AND INSTALLATION REQUIREMENTS OF THE LOCAL GOVERNING AUTHORITY.
- ALL SEWERS WITHOUT ELEVATIONS FURNISHED BY THE ENGINEER WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL STREETS SHALL MEET ALL SPECIFICATIONS AND INSTALLATION REQUIREMENTS OF THE LOCAL GOVERNING AUTHORITY.
- STORM SEWER PIPING: ALL PIPE TO BE SMOOTH WALL POLYETHYLENE (ADS N-12, HANCOCK HI-0, OR EQUIVALENT) OR REINFORCED CONCRETE PIPE CL 3 OR ABOVE (CL MUST BE APPROVED BY ENGINEER). OTHER PIPE MAY BE USED WITH APPROVAL BY ENGINEER. ALL PIPE MUST BE APPROVED BY THE LOCAL GOVERNING AUTHORITY.
- ALL DISTURBED AREAS TO BE SEEDED AND STRAWED IMMEDIATELY UPON THE COMPLETION OF GRADING OR CESSATION FOR MORE THAN 14 DAYS. SEEDING AND STRAWING SHALL BE DELAYED IN IMMEDIATE AREA OF BUILDING CONSTRUCTION WHERE SUCH CONSTRUCTION IS INITIATED IMMEDIATELY FOLLOWING GRADING.
- A PRE-CONSTRUCTION MEETING SHALL BE HELD ON THE SITE WITH THE PROPER INSPECTOR PRIOR TO ANY CLEARING, GRADING, OR CONSTRUCTION.
- DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS BEFORE CONSTRUCTION BEGINS.
- WHEN APPLICABLE, ANY CHANGE TO EXISTING OFFSITE IMPROVEMENTS SHALL BE REPLACED WITH IN-KIND MATERIALS.

FILTER FABRIC SPEC
Fabric for use under rock blanket, dumped rock, rip rap, articulated concrete revetment, Geotextile shall be nonwoven polypropylene fibers.
Minimum Average Roll Values (MARV)
Mechanical Properties
Grab Tensile Strength ASTM D4632 300 Lbs.
Grab Tensile Elongation ASTM D4632 50%
Trapezoid Tear Strength ASTM D4633 115 Lbs.
Mullen Burst Strength ASTM D3789 980 psf
Puncture Strength ASTM D4833 175 Lbs.
UV Resistance After 500 Hrs. ASTM D4355 70% Strength (MARV)
Hydraulic Properties
Apparent Opening Size ASTM D4751 100 U.S.Sieve
Permittivity ASTM D4491 0.6/SEC

RIP-RAP SHALL BE MSD 5-ROCK BLANKET WITH THE FOLLOWING GRADATION % BY WEIGHT

SIZE	MAX	MIN
1/2"	90	70
3/8"	60	40
1/4"	30	10

The material for the 6 inch rock blanket shall be durable stone containing a combined total of not more than 10 percent of earth, sand, shale and non-durable rock. It is preferable that the material contain a large percentage of pieces as large as 4 inches with enough smaller pieces of various sizes to fill the larger voids.

The material for the clay cap shall be a minimum of 24 inches in thickness and consist of low permeability materials, such as lean clay (CL) or fat clay (CH), with permeability of less than or equal to 1×10^{-4} centimeters per second

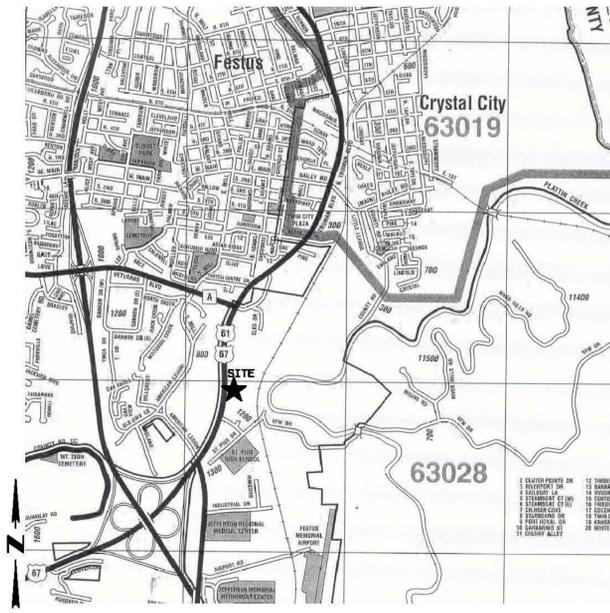


Site Remediation Plan

ROTARY DRILLING

A tract of land being part of U. S. Survey No. 1906,
Township 40 North, Range 6 East, City of Arnold
Jefferson County, Missouri

12.45 Total Acres



LOCATION MAP 1"=200'

SHEET INDEX

1	COVER SHEET
2	EX CONDITIONS
3	INTERMEDIATE GRADING & SWPPP PLAN
4	FINAL GRADING & SWPPP PLAN
5-9	BERM X-SECTIONS
10	SWPPP DETAILS
11	STORM PROFILES & DETAILS

FLOOD STATEMENT
A portion of this site is located in the 100 yr. Flood Plain according to the Flood Insurance Rate Map-Community-Panel No 29099C 0359E Effective Date April 5, 2006

Existing Topo is from Aerial Topography Provided By PhotoScience

Parcel No. 193.007.04001003

Elevations were determined using GPS and tied to USGS DATUM

Site Benchmark
Cut 1" on Rim of Storm Manhole Along Hwy 61-67
Elev=418.51

Legend of Symbols

- Benchmark
- ⊕ Fire Hydrant
- ⊕ Water Valve
- ⊕ Water Meter
- ⊕ Water Manhole
- ⊕ Gas Valve
- ⊕ Gas Meter
- ⊕ Propane Tank
- ⊕ Electric Pedestal
- ⊕ Electric Meter
- ⊕ Light Pole
- ⊕ Utility Pole
- ⊕ Transformer Pole
- ⊕ Cable TV Pedestal
- ⊕ Grated Inlet
- ⊕ Storm Manhole
- ⊕ Sanitary Manhole
- ⊕ Downspout
- ▲ Flared End Pipe
- ⊕ Telephone Pedestal/Marker
- Sign
- Bollard
- Cleanout

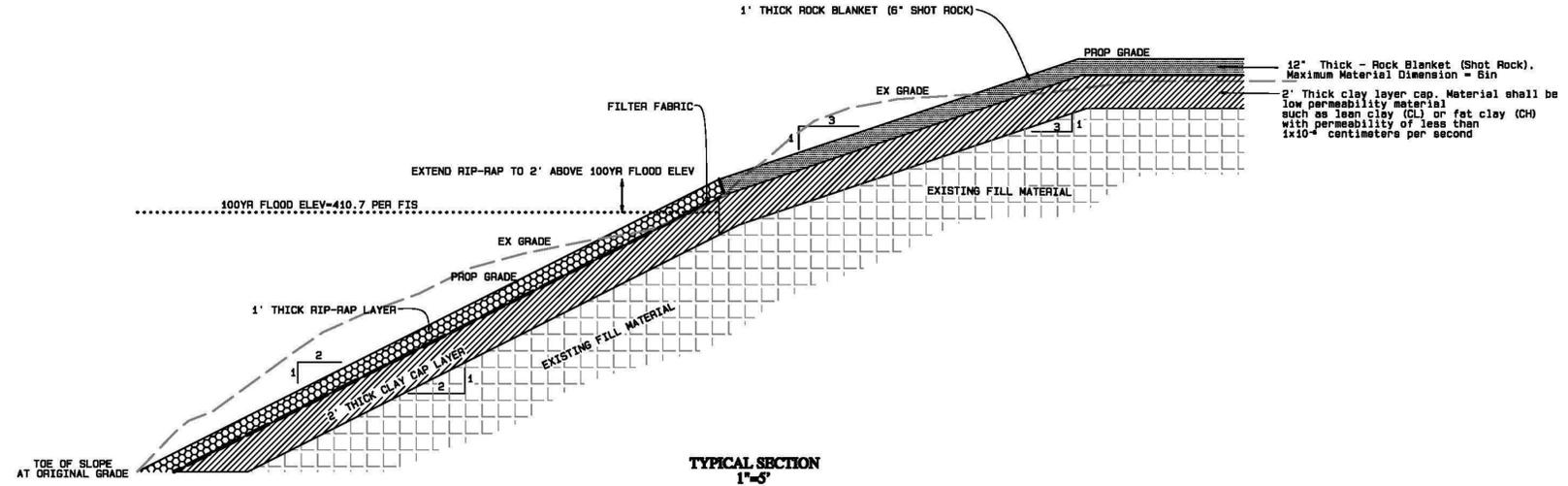
EARTHWORK QUANTITIES ESTIMATE Date 05/28/2015
The following estimate is to FINISH GRADE
Cut: 15,476 CY
Fill: 32,401 CY
This quantity is an estimate only. Contractors shall perform their own estimates for bidding and construction purposes. Goverso Land Services accepts no responsibility for estimates and bids based on these numbers. This estimate is to finish grade and does not account for over-site, remediation, utility installation, foundations or other subsurface construction activities. This estimate did not take into account any shrink or swell from excavation and/or compaction operations.

The Intermediate Grading Plan is designed to allow movement of the existing fill on the site before placement of the cap material, and stabilizing material. The Intermediate Grading Plan calls for the following quantities.
Cut: 17,021 CY
Fill: 17,070 CY

2,633 CY of Rip-Rap will be needed for stabilizing the berm cap to an elevation of 412.70
35,845 CY of fill material will be required for the clay cap on the site.
16,788 CY of Rock Blanket will be required to cover the clay cap on the site.
12,928 CY of clean fill material will be needed for the site
7,900 SY of filter fabric will be needed.

FIELD STAKING DESCRIPTORS AND FLAGGING

STANDARD DESCRIPTORS	REBON COLOR
TOP=Top of Pavement Elevation	Yellow
TBC=Top Back of Curb Elevation	
FG=Finish Grade (on non-paved areas)	
RF=Right of Way Dimension(TOP - Rock Pt w/Top of Pavement Elevation)	
MH=Manhole Manhole at Rowline Elevation	Green/Pink
LAL=Manhole Lat= Lateral at Rowline Elevation	Green/White
CI=Curb Inlet= Curb Inlet at Rowline Elevation	Grey/Orange
FE=Flared End Section of Rowline Ber.	
FACES=Face stakes for curb inlets	
10' offset from Centerline of structure with top of Curb elevation at 10' offset point	
W=Waterline=Waterline connections or structures with elevation at 4' below final grade	Blue
5' offset (at 5') = House corners of 5' offset with top of Foundation elevation.	Red
CL=Centerline of street at station	Yellow
4' offset R or L = 4' offset Top Back of Curb	Yellow
4' offset Right or Left (residential streets)	Yellow
G=Grade of Toe of Slope	White
T=Grade of Top of Slope	White



- AMBULANCE**
Joseph-Plattin Ambulance District
619 Collins Drive
P.O. Box 124
Festus, MO 63028
(636) 937-2224
- CABLE TELEVISION**
Charter Communications
ATTN: Sara Bishop, Tech Clerk I
Mapping and Design Dept.
941 Charter Commons
Town & Country, MO 63017
636-387-6633
- ELECTRIC**
Ameron U.E.
6450 Hwy. MM
House Springs, MO 63051
(636) 671-6151
- GAS**
Missouri Natural Gas Company
Residential Marketing Representative
410 West Main
Festus, MO 63028
(636) 931-9383
- FIRE**
Crystal City Fire Department
130 Mississippi Ave.
Crystal City, MO, 63019
636-937-1982
- JEFFERSON COUNTY 911**
Travis Williams
5475 Buckeye Valley Road
House Springs, MO 63051
(636) 797-9797 x 302
- POST OFFICES**
Crystal City
324 Bailey
Crystal City, MO 63019
636-937-5430
1-800-275-8777
- SCHOOLS**
Crystal City R-7
1100 Mississippi Avenue
Crystal City, MO 63019
(636) 937-4411
- SEWERS**
Festus Crystal City Sewage
335 County Rd
Crystal City, MO 63019
(636) 937-7444
- TELEPHONE**
AT & T
Tom Womack or Don (festus area)
(636) 931-7506
Glenn Hogenmiller (at Manchester & 270 office)
(314) 957-3780
122 N. 2nd Street
Festus, MO 63028
- WATER**
Crystal City Water Department
130 Mississippi Ave.
Crystal City, MO, 63019
(636) 933-9021

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Site Remediation Plan

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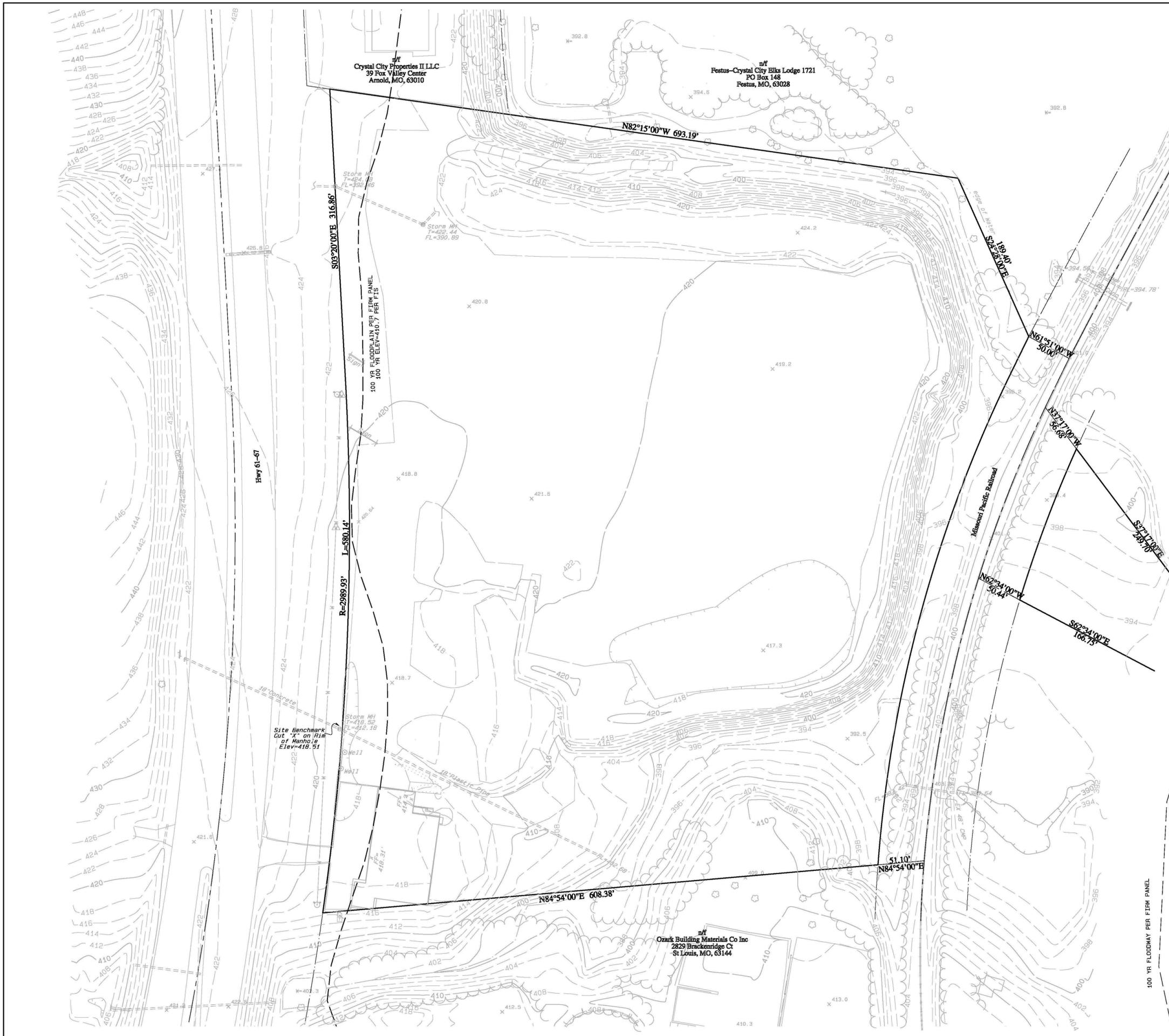
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Phone: (636) 464-9380 FAX: (636) 464-9406
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DRAWN BY	G. NOVAK	ENGINEERS SEAL	
CHECKED BY	D. BJORNSTAD	NAME	DOUGLAS S BJORNSTAD PE
DATE		DISCIPLINE	ENGINEER
		LTC#	PE-2002024006
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		JOB NO.	98058-E
		SHEET NO.	1 OF 11

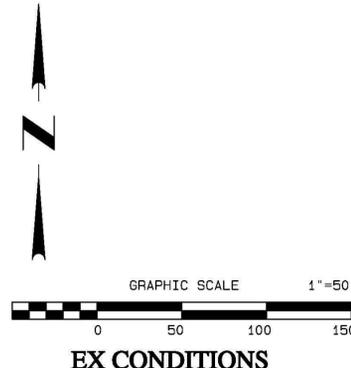
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Crystal City, Mo 63019
Darriel Coleman

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Goverso Land Services, Inc. 242D
5929 Old State Road
Imperial, MO 63052
636-464-9380

SURVEYOR - Daniel L. Goverso LS-1778
ENGINEER - Jerome J. Goverso E-13969
ENGINEER - Douglas Bjornstad PE-2002024006



- Legend of Symbols**
- Benchmark
 - ⊕ Fire Hydrant
 - ⊕ Water Valve
 - ⊕ Water Meter
 - ⊕ Water Manhole
 - ⊕ Gas Valve
 - ⊕ Gas Meter
 - ⊕ Propane Tank
 - ⊕ Electric Pedestal
 - ⊕ Electric Meter
 - ⊕ Light Pole
 - ⊕ Utility Pole
 - ⊕ Transformer Pole
 - ⊕ Cable TV Pedestal
 - ⊕ Grated Inlet
 - ⊕ Storm Manhole
 - ⊕ Sanitary Manhole
 - ◇ Downspout
 - ▲ Flared End Pipe
 - ⊕ Telephone Pedestal/Marker
 - ⊕ Sign
 - Bollard
 - Cleanout



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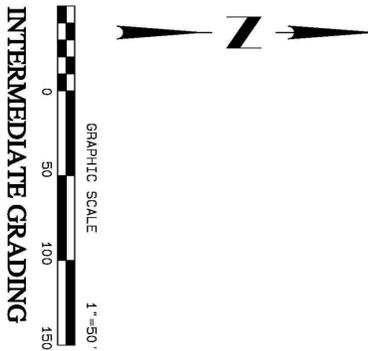
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DATE	3/13/13
ENGINEERS SEAL	
NAME	DOUGLAS S. BIORNSTAD PE
DISCIPLINE	ENGINEER
LTC#	PE-2002024006
JOB NO.	98058-E
SHEET NO.	2 OF 11

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- Legend of Symbols**
- ⊕ Benchmark
 - ⊕ Fire Hydrant
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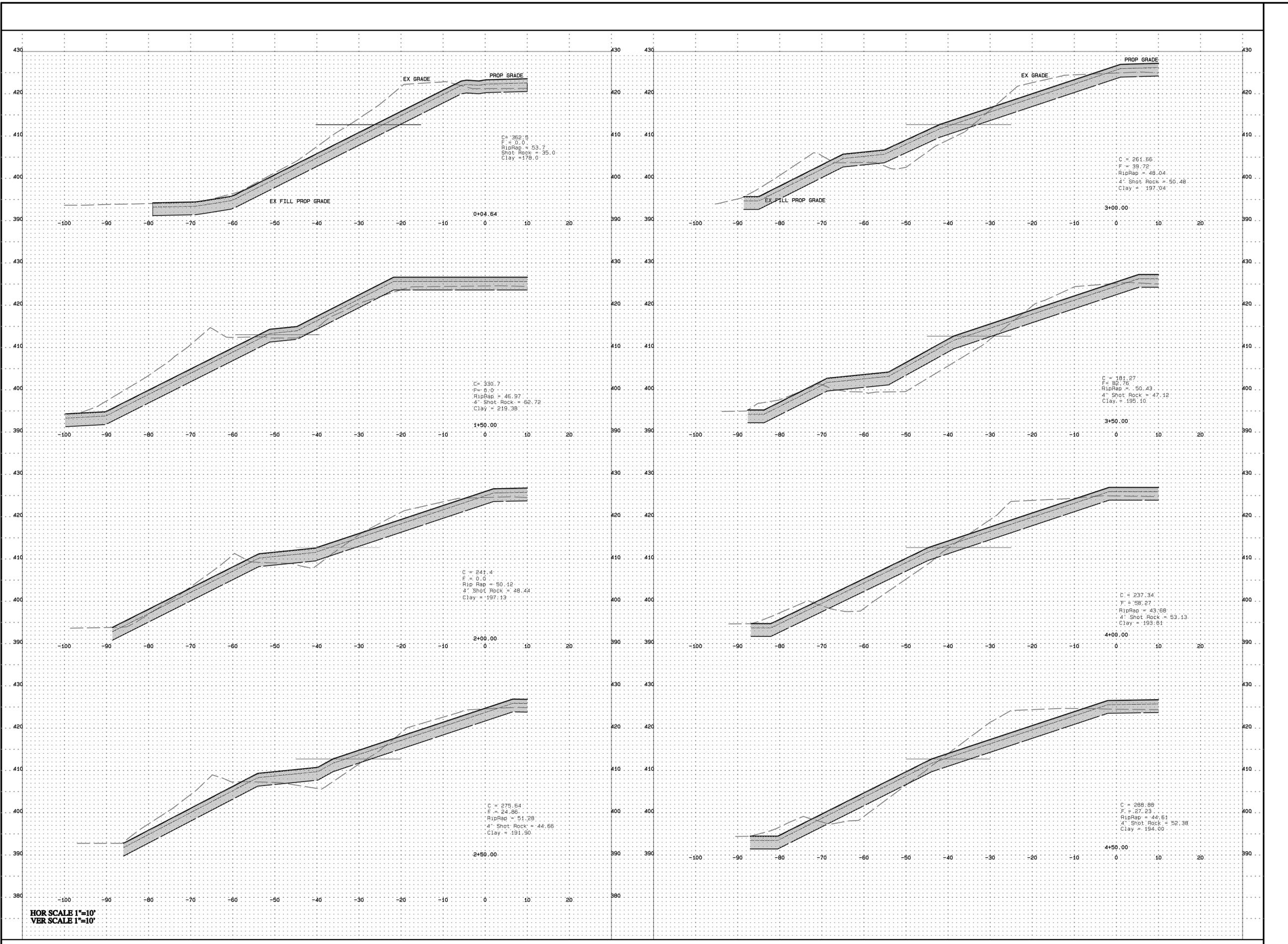
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 VER SCALE 1"=10'

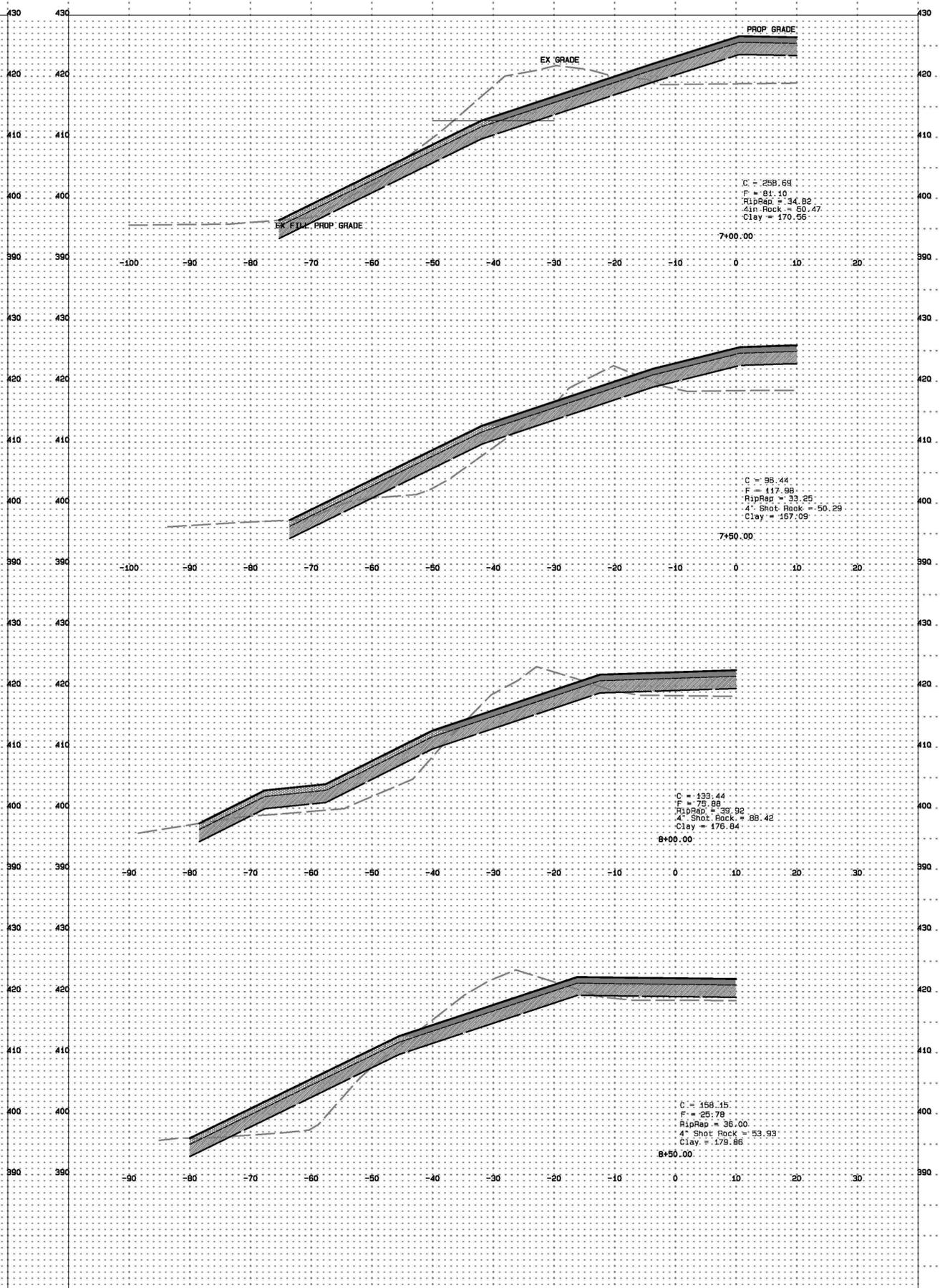
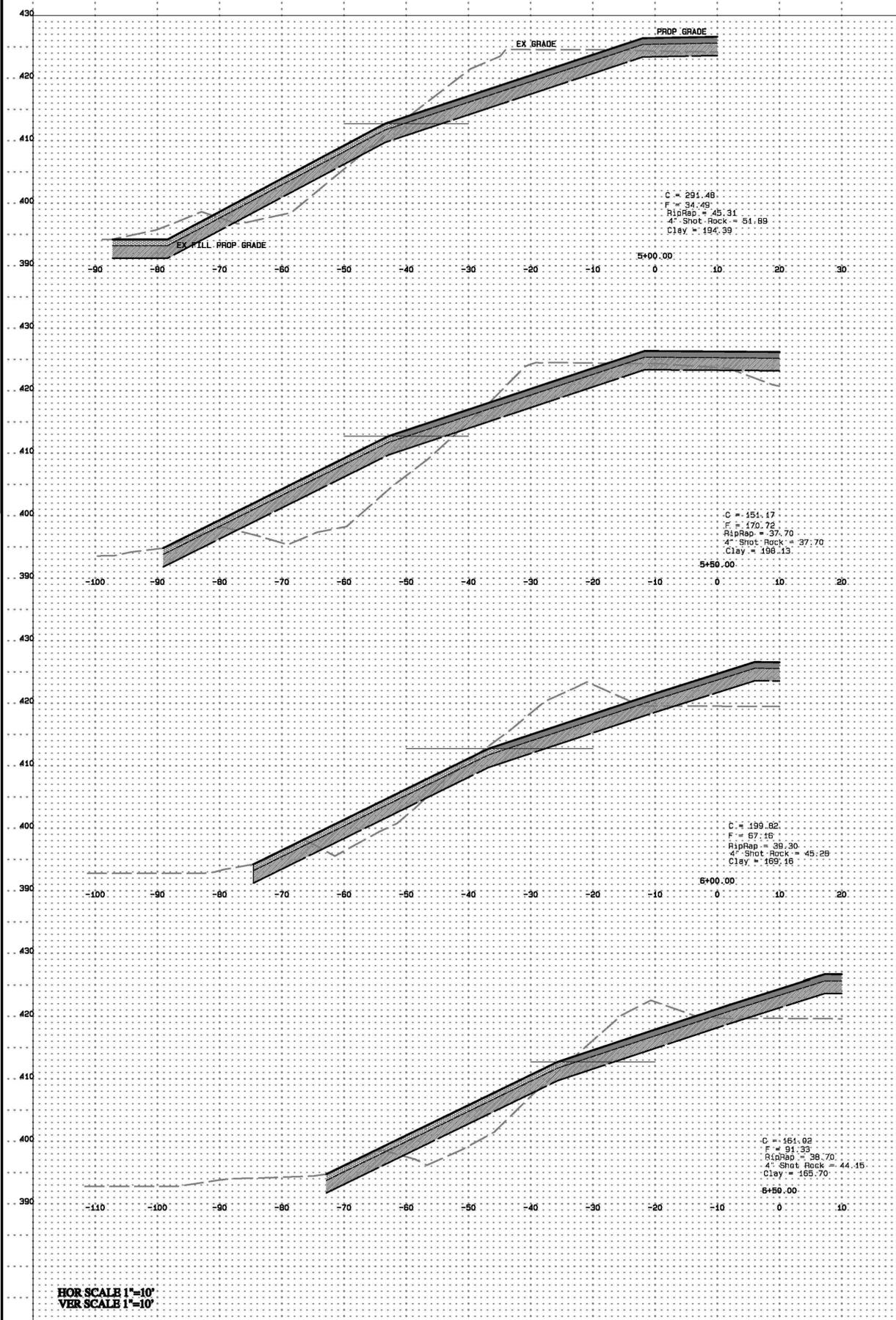
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CHECKED BY	D. BJORNSTAD
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NAME	DOUGLAS S. BJORNSTAD P.E.
DISCIPLINE	ENGINEER
LIC#	PE-2002024006

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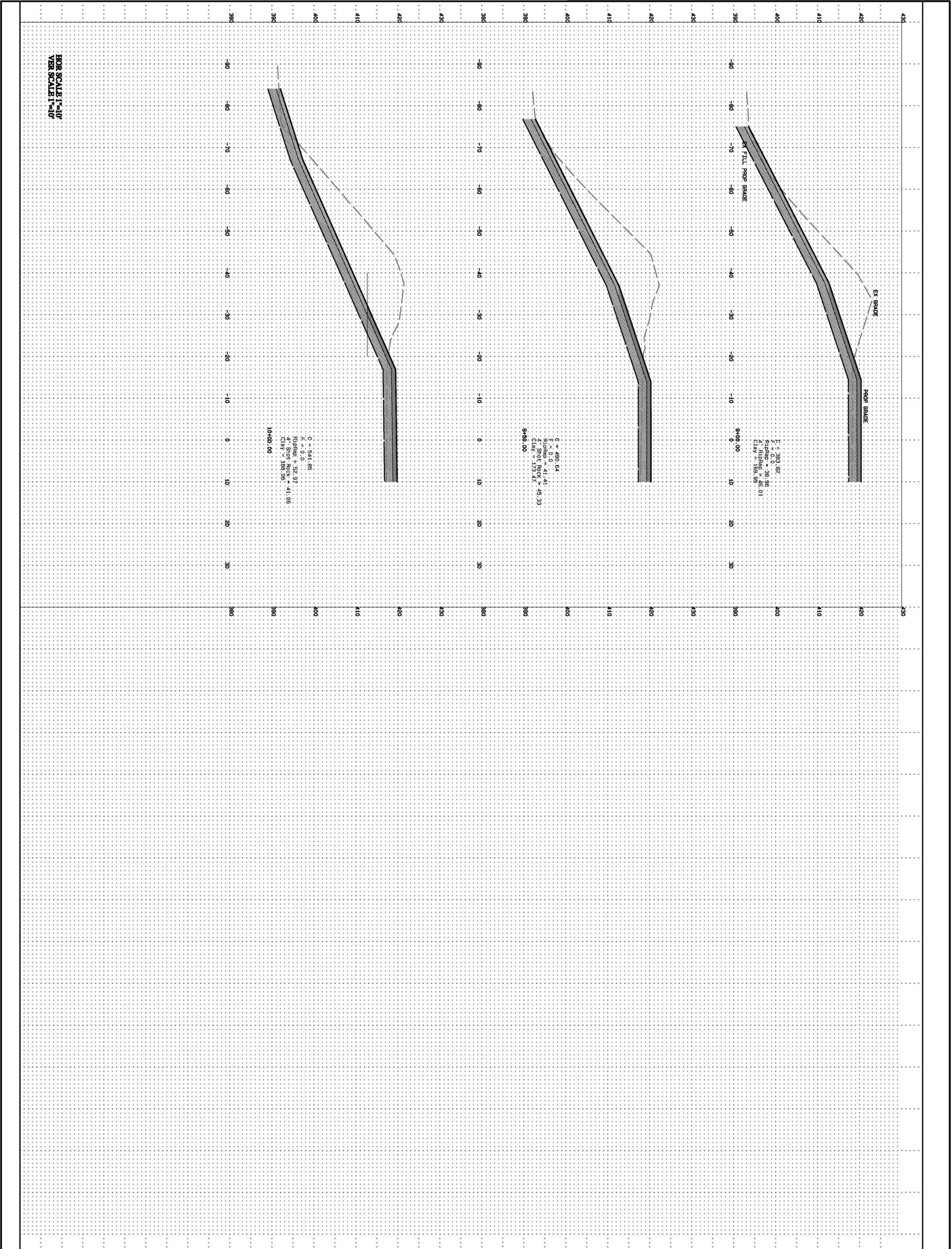
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DISCIPLINE: ENGINEER			
LIC#: PE-2002024006			
JOB NO. 98058-E			
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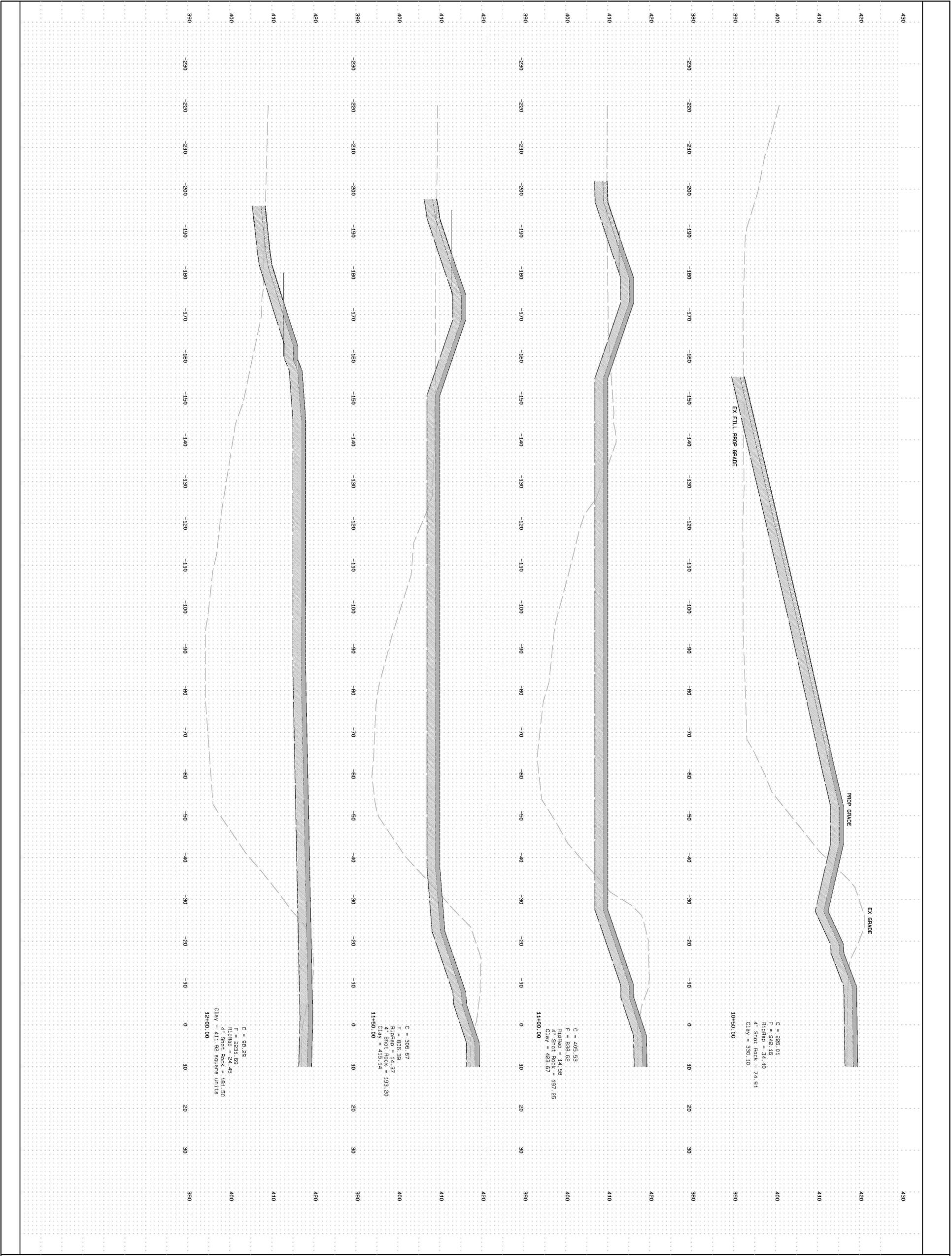
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LIC# : PE-0002024006
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ENGINEER'S SEAL

NAME: DOUGLAS S. BJORNSTAD P.E.
DISCIPLINE: ENGINEER
LIC# FE-200224006

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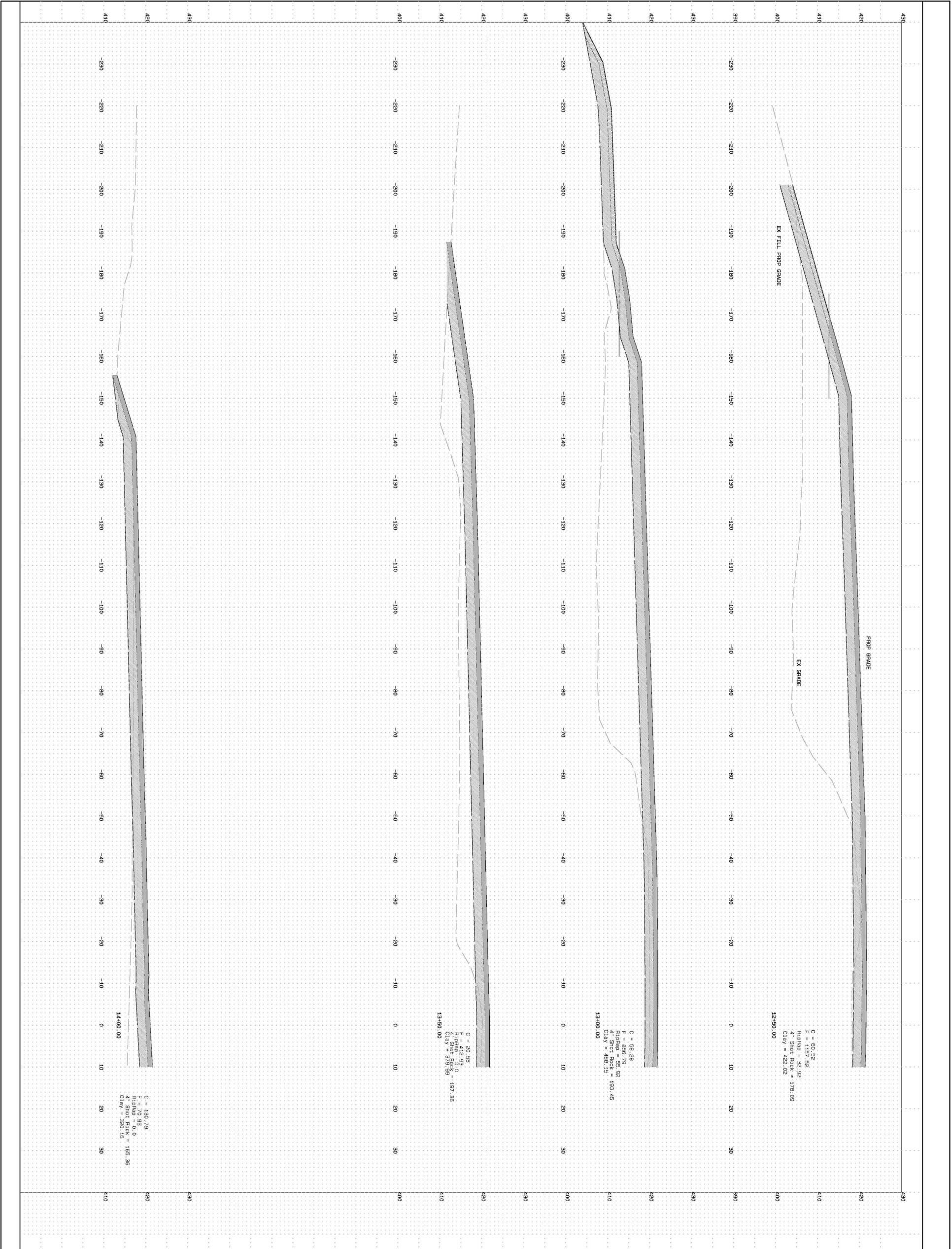
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Category: EROSION CONTROL

SEEDING REQUIREMENTS

Dates For Seeding

Permanent Seeding	Dates For Seeding											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tall Fescue												
Smooth Brome												
Fescue & Brome												
Fescue, Rye & Bluegrass	A	A	O	O	O	P	P	O	O	P	P	A

Temporary Seeding	Dates For Seeding											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rye or Sudan	A	A	O	O	O	O	O	O	O	O	A	A
Oats	A	A	O	O	O	O	O	O	O	O	O	O

O - Optimum seeding dates A - Acceptable seeding dates
P - Permitted seeding dates with reseeding 2 months later - Initially use 50% of seed and 75% of fertilizer. Reseed with additional 75% seed and remaining fertilizer.

Minimum Fertilizer and Seeding Rates

Permanent Seeding *	Lb./acre	lb./1000 sq.ft.
Tall Fescue	300	7
Smooth Brome	200	4.6
Mixture #1	250	5.7
Mixture #2	210	4.8

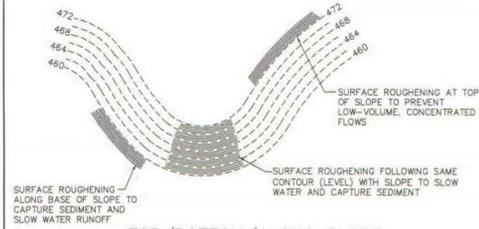
Mixture #1 - Tall Fescue @ 150 lbs./ac. and Brome @ 100 lbs./ac.
Mixture #2 - Tall Fescue @ 100 lbs./ac., Perennial Rye Grass @ 100 lbs./ac. and Kentucky Bluegrass @ 10 lbs./ac.
* Seeding rate for slopes in excess of 20% (5:1) shall be 10 lb./1000 sq. ft.

Temporary Seeding	Lb./acre	lb./1000 sq.ft.
Rye or Sudan	150	3.5
Oats	120	2.8

Fertilizer	Permanent Seeding (lb./acre)	Temporary Seeding (lb./acre)
Nitrogen	45	30
Phosphate	65	30
Potassium	65	30
Lime - ENM	600	600

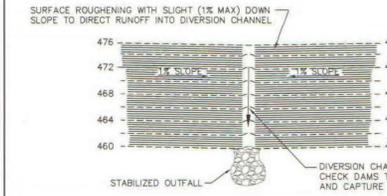
ENM - effective neutralizing material per State evaluation of quarried rock

SEEDING EC-8

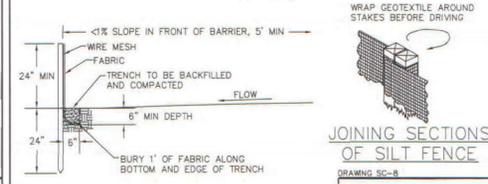
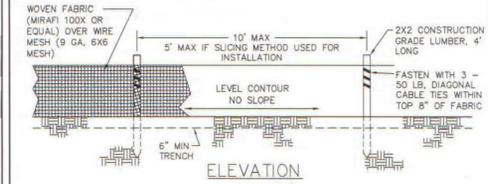
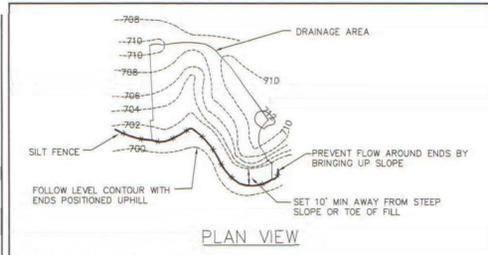
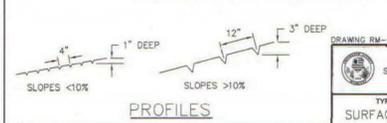


TOP/BOTTOM/ALONG SLOPE SURFACE ROUGHENING TYPES

*TYPES CAN BE USED INDIVIDUALLY OR IN COMBINATIONS TO INCREASE EFFECTIVENESS.

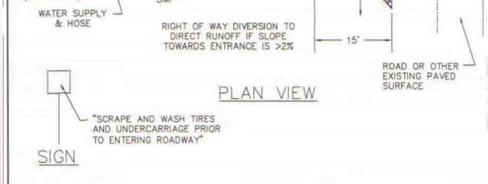
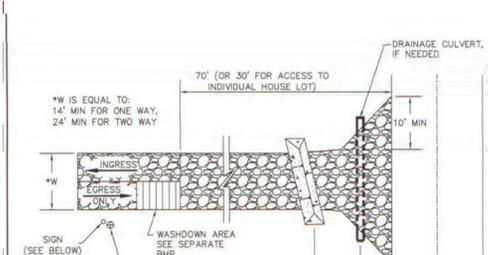


DOWN SLOPE SURFACE ROUGHENING WITH DIVERSION CHANNEL



NOTE: IF FABRIC IS INSTALLED BY EQUIPMENT DESIGNED TO SLICE INTO THE GROUND, THE TRENCH IS NOT NEEDED

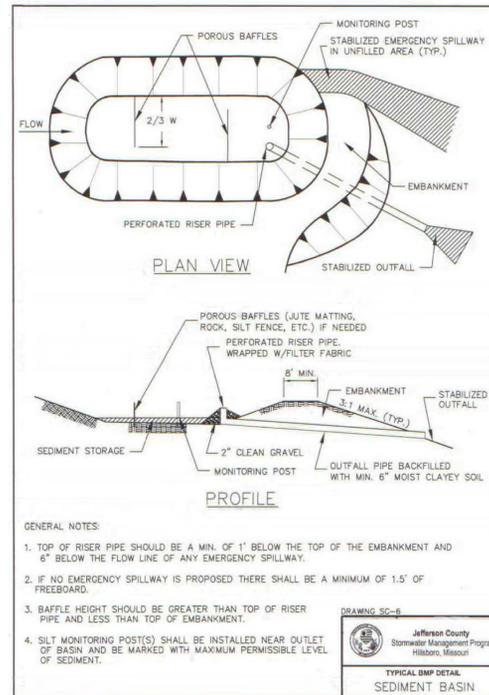
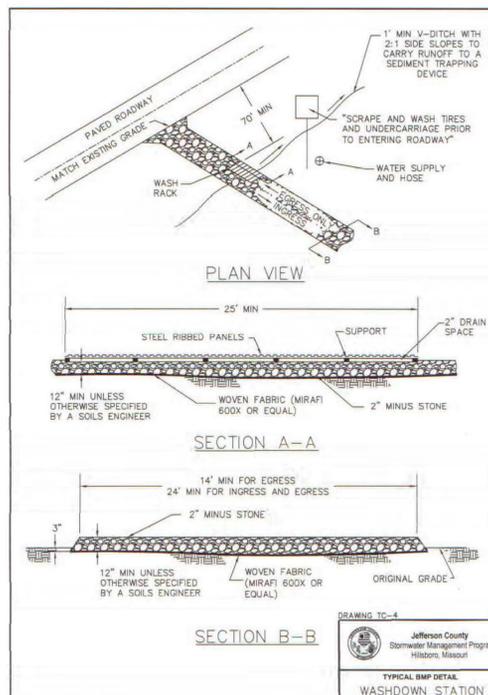
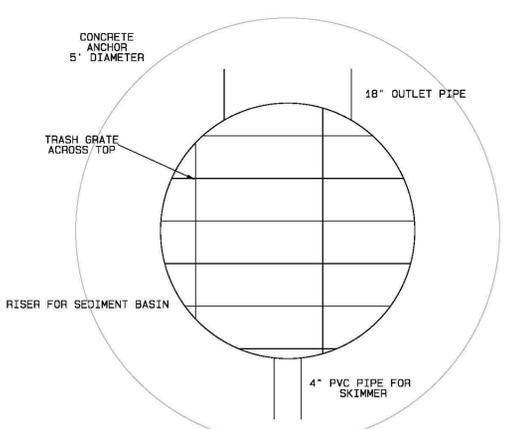
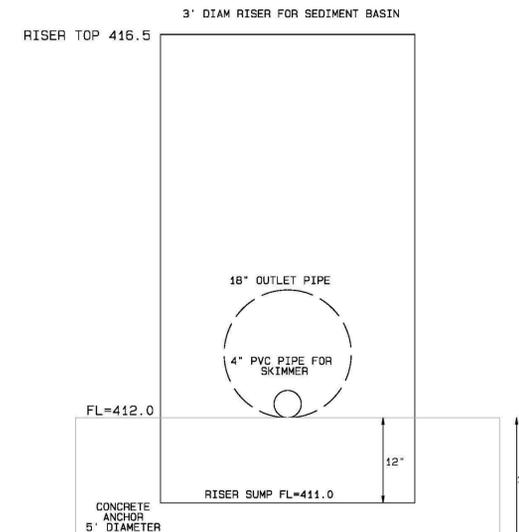
Jefferson County Stormwater Management Program
Hillsboro, Missouri



NOTE: IF FABRIC IS INSTALLED BY EQUIPMENT DESIGNED TO SLICE INTO THE GROUND, THE TRENCH IS NOT NEEDED

Jefferson County Stormwater Management Program
Hillsboro, Missouri

OFS-A2 DETAIL



4" Faircloth Skimmer® Surface Drain Cut Sheet

J. W. Faircloth & Son, Inc.
www.FairclothSkimmer.com

- Coupling can be removed and hose attached to outlet using the threaded 3" nipple. Typical methods used: on a metal structure a steel stubout welded on the side at the bottom with a 3" threaded coupling or reducers; on a concrete structure with a hole or orifice at the bottom, use a steel plate with a hole cut in it and coupling welded to it that will fit over the hole in the concrete and bolted to the structure with sealant. It is possible to grout a 4" PVC pipe in a hole in the concrete to connect the skimmer but this is less secure than other methods.
- Dimensions are approximate, not intended as plans for construction.
- Barrel (solid, not foam core pipe) should be 1.4 times the depth of water with a minimum length of 8' so the inlet can be pulled to the side for maintenance. If more than 10' long weight may have to be added to inlet to counter the increased buoyancy.
- Inlet tapers down from 4" maximum inlet to a 3" barrel and hose. Barrel is smaller to reduce buoyancy and tendency to lift inlet but is sufficient for flow through inlet because of slope. The inlet orifice can be reduced using the plug and cutter provided to control the outflow rate.
- Inlet is 8" pipe between the straps with slots cut in the inlet and aluminum screen door (smaller than shown in illustration) for access to the 4" inlet and orifice inside.
- Capacity 20,109 cubic feet per day maximum with 4" inlet and 4" head. Inlet can be reduced by installing a smaller orifice using the plug and cutter provided to adjust flow rate for the particular basin volume and drawdown time required.
- Shipped assembled. User glues inlet extension and barrel, installs vent, cuts orifice in plug and attaches to outlet pipe or structure. Includes flexible hose, rope, orifice cutter, etc.

4inchCut TM 11-07 November 14, 2007

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800-869-9600

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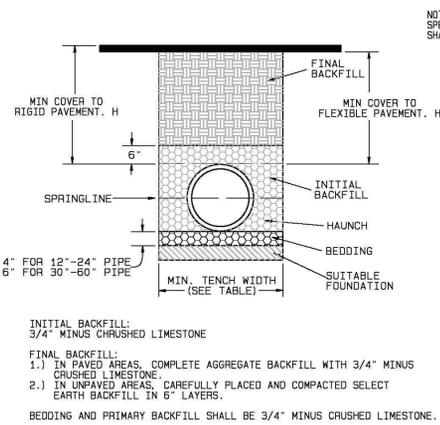
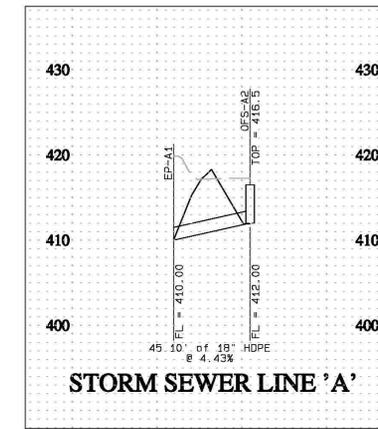
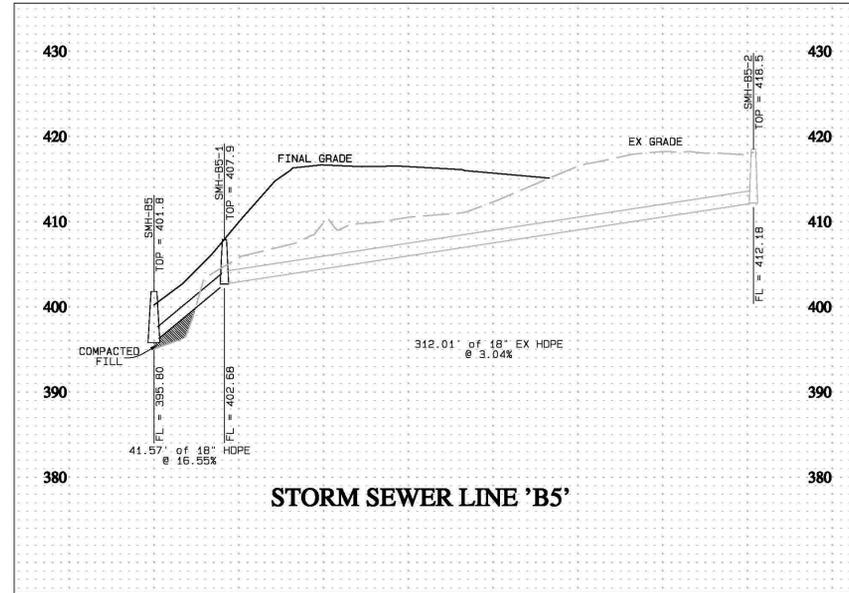
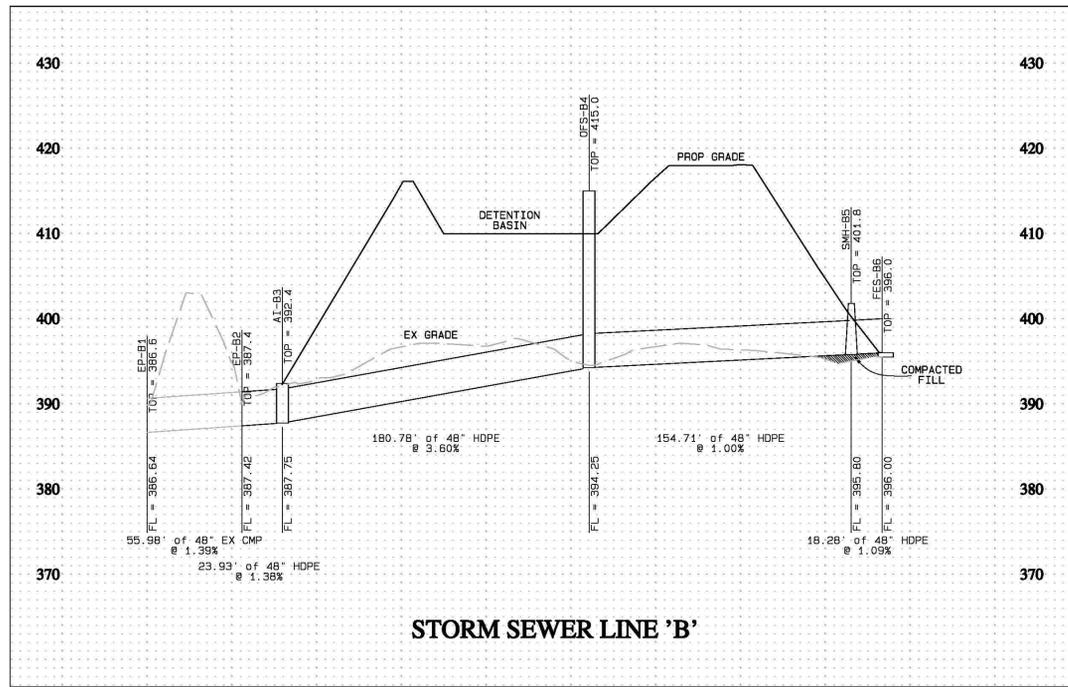
GOVERO LAND SERVICES
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Surveying Corporation License #028242

REVISION	12/31/14	REVISION	06/03/15
FIELD WORK BY	J.H./T.J./D.B.	CHECKED BY	D. BJORNSTAD
DRAWN BY	G. NOVAK	DATE	3/13/13
ENGINEERS SEAL			
NAME: DOUGLAS S. BJORNSTAD P.E.			
DISCIPLINE: ENGINEER			
LIC#: PE-2002024006			
JOB NO. 98058-E			
SHEET NO. 10 OF 11			

SWPPP DETAILS

US EPA ARCHIVE DOCUMENT

6/27/2016 10:47:38 AM



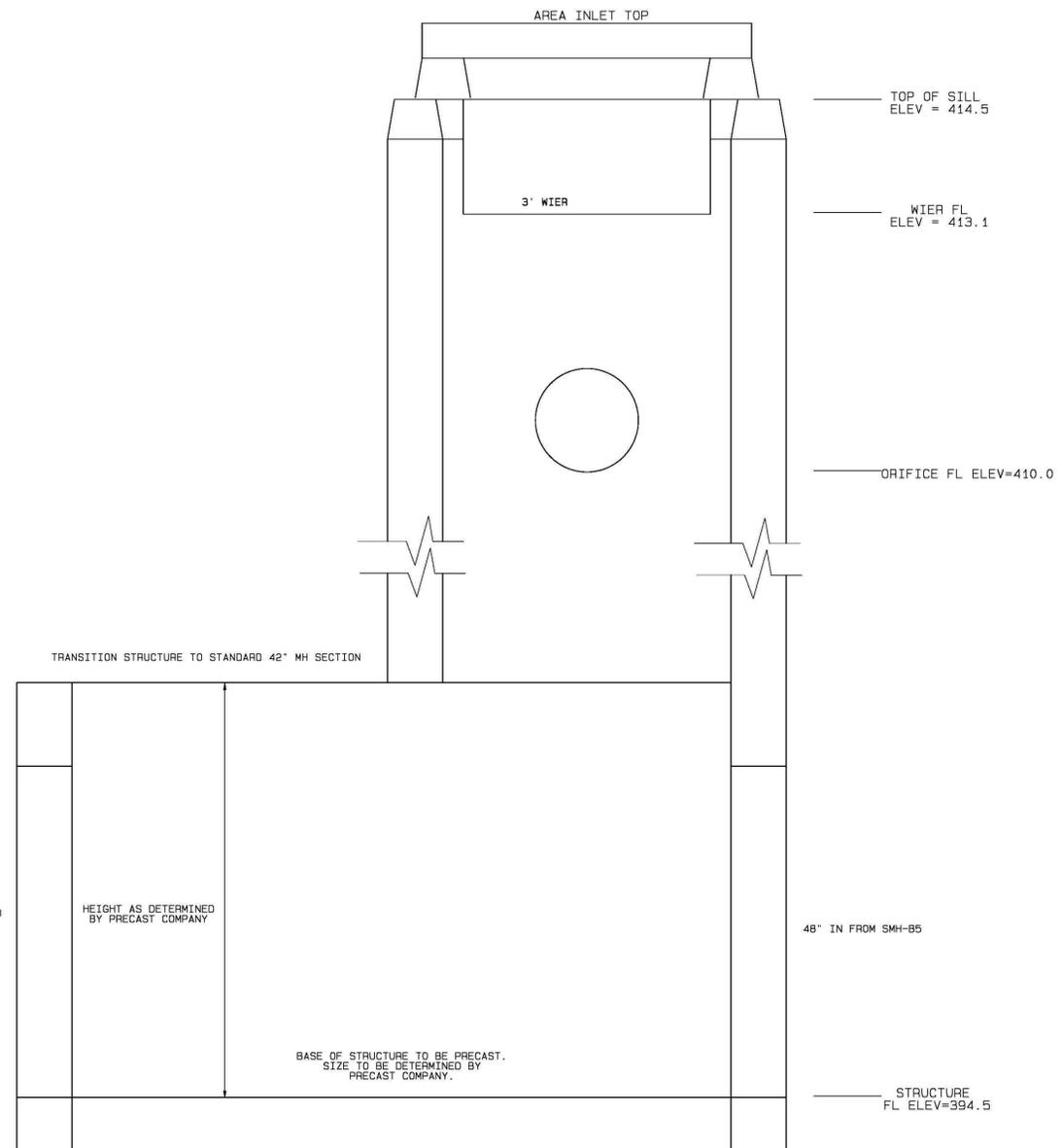
NOTE: WHERE APPLICABLE AND NOT OTHERWISE STATED IN THE SPECIFICATIONS, THE MINIMUM TRENCH WIDTHS SHOWN BELOW SHALL BE THE PAY WIDTH FOR TRENCHING IN ROCK

PIPE DIAM.	MIN TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	36"
24"	42"
30"	49"
36"	56"
42"	63"
48"	70"
54"	77"
60"	84"

MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS

PIPE DIAM.	H-25
12"-48"	12"
54"-60"	24"

TYPICAL TRENCH DETAIL



DISCLAIMER
THE PLANS WHICH THE REGISTERED PROFESSIONAL ENGINEER HAS PREPARED OR HAD PREPARED, ARE LIMITED TO ONLY THE SPECIFIC ITEMS OF GRADING, SEWERS, WATER SUPPLY, AND SANITATION. THE ENGINEER HAS NOT CONDUCTED A VISUAL INSPECTION OF THE PROJECT AND HAS NOT BEEN ADVISED OF ANY CHANGES TO THE PROJECT. THE ENGINEER'S SERVICES ARE LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AND DO NOT INCLUDE ANY LIABILITY FOR DELAYS, OMISSIONS, INADEQUACIES, OR INCOMPLETE INFORMATION. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AND DOES NOT INCLUDE ANY LIABILITY FOR DELAYS, OMISSIONS, INADEQUACIES, OR INCOMPLETE INFORMATION. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AND DOES NOT INCLUDE ANY LIABILITY FOR DELAYS, OMISSIONS, INADEQUACIES, OR INCOMPLETE INFORMATION.

Site Remediation Plan
ROTARY DRILLING
1150 Truman Blvd
Crystal City, Mo 63019

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REVISION	12/31/14
FIELD WORK BY	J.H./T.R./D.B.
REVISION	
DRAWN BY	G. NOVAK
REVISION	
CHECKED BY	D. BJORNSTAD
DATE	3/13/13
REVISION	
NAME	DOUGLAS S BJORNSTAD PE
DISCIPLINE	ENGINEER
LTC#	PE-2002024006
JOB NO.	98058-E
SHEET NO.	11 OF 11

Appendix B

AOC AND PERMITS

UNITED STATES
ENVIRONMENTAL PROTECTION
AGENCY-REGION 7

UNITED STATES ENVIRONMENTAL PROTECTION
REGION 7
11201 RENNER BOULEVARD
LENEXA, KANSAS 66219

2014 MAY 28 PM 3:04

IN THE MATTER OF:)
)
ROTARY DRILLING SUPPLY, INC.)
)
)
Respondent)
)
Proceedings under Section 7003 of the Resource)
Conservation and Recovery Act as amended,)
42 U.S.C. Section 6973)

Docket No. RCRA-07-2012-0028
ADMINISTRATIVE ORDER
ON CONSENT

I. INTRODUCTION

1. This Administrative Order on Consent (AOC) is entered into voluntarily by the United States Environmental Protection Agency (EPA) and Respondent Rotary Drilling Supply, Inc. ("Rotary," or "Respondent"). This AOC provides for the installation of short term and long term measures to stabilize the Site and manage stormwater runoff, including but not limited to, the installation of sediment and erosion controls and capping of the approximately 140,000 tons of coal combustion residue (CCR) in approximately ten acres of wetlands and approximately 500 linear feet of stream by Respondent at property located at 1150 Truman Boulevard, Crystal City, Missouri 63028. In entering into this AOC, the mutual objectives of EPA and Respondent are to identify, investigate, remedy, and/or prevent the potential endangerment to human health and/or the environment, and to insure that the Work ordered by EPA be designed and implemented to protect human health and/or the environment. Respondent shall finance and perform the Work in accordance with this AOC, plans, standards, specifications and schedules set forth in this AOC or developed by Respondent and approved by EPA pursuant to this AOC.
2. The EPA has determined that by the handling, transportation and disposal of various waste materials, including CCR, Respondent has contributed or are contributing to the past or present handling, storage, treatment, transportation or disposal of solid waste that may present an imminent and substantial endangerment to health or the environment.
3. The EPA has notified the State of Missouri of this action pursuant to Section 7003(a) of RCRA, 42 U.S.C. § 6973(a).
4. Respondent's participation in this AOC shall not constitute or be construed as an admission of liability. Respondent neither admits nor denies any factual allegations and legal conclusions set forth in this AOC.
5. The EPA and Respondent acknowledge that this AOC has been negotiated by the parties in good faith and that this AOC is fair, reasonable, and in the public interest.

ATTACHMENT A

Statement of Work For Surface Water Monitoring and Cap Maintenance Rotary Drilling Supply, Inc. Crystal City, Missouri

The purpose of this Statement of Work (SOW) is to define the requirements, standards and guidelines that shall be incorporated into the terms of the Work Plan required by Paragraph 50 of EPA's Administrative Order on Consent, Docket Number RCRA-07-2012-0028 and followed by the Respondents to accomplish the following tasks:

1. Prepare and implement a Surface Water Monitoring Plan
2. Prepare and implement a Cap Maintenance Plan

Task I: Prepare and implement a Surface Water Monitoring Plan to monitor for releases to the surface waters near the Site. The purpose of the plan is to monitor for coal combustion residual (CCR) constituents in surface waters near the site.

At a minimum, the Surface Water Monitoring Plan shall satisfy the following criteria:

- A. Provide a map showing the location of surface water bodies near the Site that could potentially be impacted by seeps and runoff from the Site.
- B. Quality Assurance Project Plan (QAPP). To ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented, the Respondents shall prepare a QAPP to document all monitoring procedures, sampling, field measurements and sample analysis performed during the investigation and monitoring of the Site. The Respondents shall use quality assurance, quality control, and chain-of-custody procedures approved by the EPA. The QAPP should be prepared in accordance with the EPA *Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003, March 2001, and following EPA *Guidance for Preparing Quality Assurance Project Plans*, EPA QA/G-5, EPA/240/R-02/009, December 2002. The minimum elements of the quality assurance program for data collection activities are in Chapter One of EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. The QAPP shall include a description and qualifications of all personnel performing or directing Site monitoring and sampling, including contractor personnel. Standard operating procedures (SOPs) shall be included as an attachment to the plan(s) if SOPs are cited in the text.
- D. Sampling and Analysis Plan (SAP). The SAP shall outline the field investigation activities which will be conducted to determine the nature and extent of surface water

contamination associated with the Site. The SAP shall be prepared in accordance with EPA *Guidance on Choosing a Sampling Design for Environmental Data Collection*, EPA QA/G-5S, EPA/240/R-02/005, December 2002. At a minimum, the SAP shall include the following:

1. A description of the Site, and its status;
2. Clearly stated objectives for the specific sampling event, including the ultimate goal and/or use of the sampling data and the techniques which will ensure that the samples will provide the required data;
3. A description of the sampling approach/rationale for defining the nature and extent of contamination; and
4. A description of sampling procedures which shall include: sampling locations, sample collection procedure, field quality assurance samples, analyses to be conducted including analytical method numbers, sample containers, sample preservation and shipment, and chain-of-custody procedures.

Task II: Prepare and implement a Cap Maintenance Plan (CMP). Respondents shall prepare and submit a CMP for the Site that includes but is not limited to cap repair and maintenance; details of site inspections including schedule; and annual surface water sampling and analysis.

In accomplishing the above tasks, the Respondents shall comply with the provisions of the Administrative Order on Consent (AOC), Docket Number RCRA-07-2012-0028, this SOW, and any applicable EPA guidance.

In addition, the CMP shall describe all normal operation and maintenance procedures including:

- (1) A description of tasks for inspection and maintenance of the cap; and
- (2) A schedule showing the frequency of each O & M task including, but not limited to annual surface sampling, cap inspections, and cap mowing.

The CMP shall state that all surface samples will be collected in accordance with the EPA-approved SAP and QAPP for the Site.

The CMP shall describe any solid wastes which may be generated by the operation of the remedy and describe how they will be managed.

The CMP shall describe, as applicable, contingency procedures necessary to ensure operation in a manner protective of human health and the environment.

II. JURISDICTION

6. This AOC is issued under the authority vested in the Administrator of EPA by Section 7003 of RCRA, which authority has been delegated to the Regional Administrators of EPA by Delegations 8-22-A and 8-22-C (April 20, 1994), and redelegated to the Region 7 Director of the Air and Waste Management Division by EPA Delegation Nos. R7-8-022-A and R7-8-022-B dated March 20, 1985.
7. Respondent agrees to undertake and complete all actions required by the terms and conditions of this AOC. In any action by EPA or the United States to enforce the terms of this AOC, Respondent consents to and agrees not to contest the authority or jurisdiction of the EPA Region 7 Director of the Air and Waste Management Division to issue or enforce this AOC, and agrees not to contest the validity of this AOC or its terms or conditions.

III. PARTIES BOUND

8. This AOC shall apply to and be binding upon EPA, and on Respondent and Respondent's officers, directors, employees, agents, successors, assigns, heirs, trustees, receivers, and upon all persons, including but not limited to contractors and consultants, acting on behalf of Respondent, as well as upon subsequent purchasers of the Site. Respondent is responsible for carrying out all actions required of them by this AOC. Any change in the ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter Respondent's responsibilities under this AOC.
9. Respondent shall provide a copy of this AOC to any subsequent owners or successors before a controlling interest in ownership rights, stock, assets, or the Site is transferred. Respondent shall be responsible for and liable for completing all of the activities required pursuant to this AOC, regardless of whether there has been a transfer of ownership or control of the Site or whether said activities are to be performed by employees, agents, contractors, subcontractors, laboratories, or consultants of Respondent. Respondent shall provide a copy of this AOC within seven days of the Effective Date of this AOC, or the date that such services are retained, to all contractors, subcontractors, laboratories, and consultants that are retained to conduct or monitor any portion of the Work performed pursuant to this AOC. Respondent shall condition all contracts or agreements with contractors, subcontractors, laboratories, and/or consultants in connection with this AOC, on compliance with the terms of this AOC. Respondent shall ensure that its contractors, subcontractors, laboratories, and consultants comply with this AOC.
10. Not later than 60 days prior to any voluntary transfer by Respondent of any interest in the Site or the operation of the facility, Respondent shall notify EPA of the proposed transfer. In the case of a voluntary transfer through a bankruptcy, Respondent shall notify EPA within 24 hours of the decision to transfer property. Respondent shall notify EPA of any involuntary transfers immediately upon Respondent's initial receipt of notice of any involuntary transfer. Not later than three days after any transfer, Respondent shall submit copies of the transfer documents to EPA.

IV. DEFINITIONS

11. Unless otherwise expressly provided herein, terms used in this AOC that are defined in the RCRA statute shall have the meaning assigned to them in that statute. Whenever the terms listed below are used in this AOC, the following definitions apply:

"AOC" shall mean this Administrative Order on Consent, any amendments thereto, and any documents incorporated by reference into this AOC.

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, *et seq.*

"CCR" shall mean fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste, generated from the combustion of coal, as described in 40 C.F.R. § 261.(b)(4).

"Corps" shall mean the U.S. Army Corps of Engineers.

"Data Quality Objectives" shall mean those qualitative and quantitative statements derived from the outputs of a scientific and legally defensible data collection planning process.

"Day" shall mean a calendar day unless expressly stated otherwise.

"Effective Date" shall be the date on which EPA signs this AOC following the public comment period which is held pursuant to Section XXVIII (Public Comment on this AOC).

"RCRA" shall mean the Resource Conservation and Recovery Act (also known as the Solid Waste Disposal Act), as amended, 42 U.S.C. § 6901, *et seq.*

"Site" shall mean the Rotary Drilling Supply, Inc., property, 1150 Truman Boulevard, Crystal City, Missouri 63028.

"Work" shall mean all the activities and requirements specified in this AOC including, but not limited to those set forth in Section VIII (Work To Be Performed) of this AOC and any approved Work Plan incorporated into this AOC.

V. FINDINGS OF FACT

12. Respondent Rotary Drilling Supply, Inc., is the owner of property near Section 7, Township 40 North, Range 6 East, Jefferson County, Missouri and has a mailing address of 1150 Truman Boulevard, Crystal City, Missouri 63028 (hereinafter, the "Site").
13. Between October 2004 and September 2009, Respondent Rotary contracted with Kleinschmidt Trucking, Inc. to dispose of approximately 140,000 tons of CCR at the Site, including a portion

of an unnamed tributary to Platin Creek, adjacent wetlands to the tributary and a southeast portion of Willers Lake.

14. Prior to 2004, Respondent disposed of various other wastes at the Site, including construction debris and concrete.
15. On January 12, 2010, the Corps visited the Site and documented the disposal of various wastes, including CCR, at the Site.
16. On March 1, 2010, the Corps issued a Notice of Violation to Rotary Drilling Supply, Inc., after determining that the disposal of CCR and other various wastes at the Site impacted a tributary to Platin Creek and adjacent wetlands, as well as a portion of Willers Lake.
17. On April 15, 2010, Corps and EPA personnel visited the Site and confirmed the disposal of CCR and other various wastes at the Site.
18. Documented releases of CCR into the environment have resulted in extensive and persistent harm to the environment.
19. Arsenic is a metalloid. Many common arsenic compounds can dissolve in water. Plants absorb arsenic fairly easily and it accumulates in plant-eating freshwater organisms. High concentrations of arsenic in fish enhance alteration of genetic materials and results in arsenic poisoning and death in birds eating fish. Common effects to species include death, inhibition of growth, photosynthesis and reproduction, and behavioral effects.
20. Copper is a metal that does not break down in the environment. Soil with excess copper yields few growing plants. The high copper level inhibits root elongation and branching, reducing the ability for plants to explore the soil for water and nutrients. The decomposition of organic matter slows down in soils with high copper levels because it negatively influences the activities of microorganisms and earthworms. Copper poisoning in mammals can cause a reduction in growth and food intake, development of anemia, and liver, kidney, brain, and muscle degeneration, often resulting in death.
21. Nickel is a metal with alloy forming properties when combined with other metals. A large part of nickel released into the environment is absorbed into sediment or soil particles. A high concentration of nickel in sandy soil inhibits plant growth and high concentrations in surface water can diminish the growth rates of algae. The presence of nickel may cause growth decline in microorganisms. In animals, an exceeded tolerable maximum amount of nickel is dangerous and can cause various kinds of cancers.
22. Chromium is a transition metal. Chromium is deposited into the soil and water. In organisms, chromium is toxic and can alter genetic materials and cause cancer. Chromium can be detrimental to plant growth and development. In animals, chromium can cause respiratory problems, a low ability to fight disease, birth defects, infertility, and tumor formation.
23. Barium is a metallic alkaline earth metal. Barium compounds can last a long time in the environment. Fish and aquatic organisms can accumulate barium. Animals that drink in barium over long periods can have kidney damage, decreases in body weight, and death.

24. Beryllium is a brittle metal whose compounds are very toxic. Emissions of beryllium typically settle into the soil. Beryllium may cause cancer and changes to DNA in animals.
25. Boron is a non metallic element. Plants absorb boron. The male reproductive organs of animals are affected by large amounts and long periods of boron absorption. Offspring may suffer from birth defects or delayed development when animals are exposed to boron during pregnancy. Boron also causes nose irritation in animals that breathe in the element.
26. Cobalt may enter surface water through run-off and settles on land through wind-blown dust. Cobalt cannot be destroyed once it has entered the environment, but may react with other particles or absorb into soil. Cobalt accumulates in plants and the bodies of animals. Eating plants where high concentrations of cobalt exist can cause negative health effects in animals. An inhalation of cobalt can cause lung cancer and inflammation in the respiratory tract of animals. Over-exposure to cobalt is associated with decreased reproductive output in ruminants, and can cause damage to testicular tissue and fertility in males. On aquatic life, cobalt has high chronic toxicity.
27. Iron is a mineral that persists in the environment. Iron toxicity can cause DNA and membrane change in vertebrates. In aquatic animals, iron effects survival, reproduction, and behavior.
28. Selenium is a nonmetal. Insoluble forms of selenium will remain in soil, but soluble forms are very mobile and may enter surface water from soils. Selenium may accumulate up the food chain when animals digest plants that have absorbed large amounts of selenium. Animal studies have shown that very high amounts of selenium can be absorbed in animals and can affect sperm production, female reproductive cycle and cause birth defects.
29. Vanadium is a ductile and malleable transition metal. Vanadium is abundant in soils and is taken up by plants. In animals, vanadium suppresses certain enzymes causing neurological effects. Vanadium can also cause breathing disorders, paralyses, and negative effects on the liver and kidneys in animals. Testing has shown that vanadium can harm the reproductive system of males and accumulates in female placenta. Also, some DNA alteration in animals can occur from vanadium exposure.
30. Antimony is a semimetallic chemical element that primarily pollutes soils, but can travel through groundwater great distances towards surface waters. Tests have shown that eye irritation, hair loss, lung damage, and heart problems are caused in animals breathing in small amounts of antimony - particularly dogs may experience heart problems when exposed to low levels of antimony. Animals that breathe in high levels of antimony have shown to have experienced lung, heart, and kidney damage. Death is caused by animals breathing in very high levels of antimony. Studies have also revealed that extended exposure to antimony may cause fertility problems in animals.
31. Zinc is a brittle and crystalline metal that is fairly reactive. Zinc builds up in fish and other organisms. The metal can move into groundwater, lakes, streams, and rivers-where it does not dissolve and can be accumulated in fish bodies. Once in the bodies of these fish, antimony is able to bio magnify up the food chain. Additionally, zinc may increase the acidity of waters. In soil, large quantities of zinc can lead to an absorption in animals that is damaging to their health, and plants often uptake levels of zinc that their systems cannot handle. Soils with high levels of zinc do not have a high rate of plant survival. Moreover, zinc can disrupt the activity in soils, leading

to negative impacts on microorganisms and earthworms, which causes a slowdown in the breakdown of organic material.

32. Thallium is a soft and malleable metal that is absorbed by plants and enters the food chain. One effect of thallium is an inhibition of nitrification by soil bacteria. Intake of thallium in plants, through roots in thallium rich soil, causes color changes in leaves and growth declines. Thallium may affect the gastrointestinal tract in seed-eating animals and cause a loss of dorsal feathers in ducks, loss of salivation from the nose and mouth in cattle, and a reduced growth in hens, sheep, and steers. Thallium also builds up in fish and shellfish.
33. Cadmium is a ductile and very malleable metal. Cadmium does not break down in the environment, but binds strongly to soil particles and is taken up by fish, plants, and animals. Animals dependent upon plants that uptake cadmium have potential dangers such as high blood-pressure, liver disease, and nerve or brain damage. In earthworms and other soil organisms, cadmium poisoning can lead to death at low concentrations because such organisms are extremely susceptible. Thus, the whole soil ecosystem is affected as the soil processes of microorganisms are threatened by cadmium influence.
34. On February 14 and 15, 2011, EPA-authorized representatives conducted sampling of the unnamed tributary to Plattin Creek and the CCR piles at the Site. Sample results indicate that elevated levels of CCR constituents have migrated, and continue to migrate, from the CCR piles into the unnamed tributary to Plattin Creek and adjacent wetlands.
35. The Corps has identified the impacted wetlands at the Site as "Palustrine Emerging Wetland" and "Palustrine Forested Wetland." Approximately 10 acres of wetland have been disturbed at the Site as a result of waste disposal activities. The Corps also identified the impacted tributary at the Site as Riverine (Cowardin Class) with intermittent stream flow and estimated that approximately 500 linear feet of stream were impacted by the disposed wastes.
36. Willer's Lake, also known as Elks Lodge Lake, is owned by the Festus-Crystal City chapter of the Elks Lodge. The lake is primarily used for fishing and contains channel catfish, flathead catfish, and yellow bass.
37. According to the Missouri Department of Conservation, species common to wetlands and stream habitats in the Mississippi bottoms, the area where the Site is located, include:
 - Plants: box elder, silver maple, cottonwood, Johnson grass, fescue, and musk thistle
 - Birds: indigo buntings, redwings, grackles, and song sparrows
 - Mammals: raccoon, opossum, and deer.
38. A stream study of Plattin Creek conducted by the Missouri Department of Conservation determined that the following fish species are in relative abundance in Plattin Creek: bluntnose minnow, Ozark minnow, striped shiner, bleeding shiner, stoneroller, longear sunfish, rock bass, and rainbow darter.
39. On March 27, 2012, EPA developed an ecological-risk screening that made the following observations concerning the direct impacts from placement of CCR at or near the Site based on the above-referenced sampling:
 - The "direct physical impact to the wetland environment results in a total loss of ecological habitat."

- Wetlands functions have been altered to the extent that "the site may be irreplaceable" unless the CCR is removed from the Site.
- Potential for natural revegetation is "extremely limited" due to the placement of CCR.
- Extremely high levels of boron make it "highly unlikely that revegetation of the wetland is ... achievable due to boron toxicity ... and that irreversible environmental damage has occurred."
- Sample results of the CCR piles at the Site showed metals exceeding EPA-promulgated Ecological Soil Screening Levels (Eco-SSLs) for plants, soil invertebrates, birds and mammals, as described in the following table:

Table 1: Sample results from CCR piles at Rotary Drilling Supply, Inc., Site (parts per million)

CCR Constituent	Eco-SSL for Plants	Eco-SSL for Soil Invertebrates	Eco-SSL for Birds	Eco-SSL for Mammals	No. of Locations (out of 9) exceeding ECO-SSL	Range of Exceedances
Antimony	5.0	78	N/A	0.27	9	5.2-8.3
Arsenic	18	60	43	46	4	18.2-56.2
Barium	500	330	N/A	2000	8	2200-4350
Boron	0.5	N/A	N/A	N/A	8	269 - 590
Cadmium	32	140	0.77	0.36	9	0.43-0.89
Chromium	1.0	0.4	26	34	8	22.1-59.1
Cobalt	13.0	N/A	120	230	7	13.5-19.3
Copper	70	80	28	49	8	75.4-142
Lead	120	1700	11	56	7	19.4-58.9
Nickel	38	280	210	130	4	41.9-50.7
Selenium	0.52	4.1	1.2	0.63	9	3.0-6.0
Thallium	1.0	N/A	N/A	N/A	9	2.2-3.4
Vanadium	N/A	2.0	7.8	280	8	108-167
Zinc	160	120	46	79	7	52.8-80.7

40. The above-referenced ecological-risk screening made the following observations concerning off-site aquatic impacts caused by the leaching of metals from the CCR piles on the Site to the unnamed tributary to Platin Creek and to Willer's Lake:
- The leaching of metals "may lead to chronic impairment of the aquatic system over time."
 - The CCR "appears to be gradually contributing to metal contamination in Willer's [Lake] and the drainage to Platin Creek ... potentially toxic to aquatic life."
 - Sediment concentrations in the unnamed tributary and Willer's Lake were compared to background sediment locations and to EPA-adopted Threshold Effect Concentrations (TECs) (MacDonald, Ingersoll and Berger, "Development and Evaluation of consensus-based sediment quality guidelines for freshwater ecosystems," 2000). Samples indicated exceedances as described in Table 2.

- Off-site impacts to aquatic life were evaluated by reviewing surface water concentrations compared to EPA-promulgated National Ambient Water Quality Criteria. Samples indicated exceedances as described in Table 3.

Table 2: Sample results from surface waters in and around Rotary Drilling Supply, Inc., Site

Sediment concentration screened against background. Concentrations exceed background, and are similar to or less than ash concentration.	Barium, Beryllium, Boron, Cobalt, Iron, Selenium, Vanadium
Sediment concentration screened against TEC, exceeds TEC, and is similar to fly ash concentration.	Arsenic, Copper, Nickel
Sediment concentration screened against TEC, does not exceed TEC, and is similar to fly ash concentration.	Chromium

Table 3: Sample results from surface waters exceeding Chronic Water Quality Criteria (ppm)

CCR Constituent	Chronic Water Quality Criteria Screening Level	No. of Locations (out of 7) exceeding Water Quality Criteria	Range of Exceedances
Barium	3.9	7	95 -309
Boron	43.7 (average background)	7	119-4040
Chromium	10.0	1	15.0
Cobalt	3.0	1	3.4
Copper	11	1	23.8
Lead	2.5	1	31.1
Manganese	80	5	222-641
Selenium	5.0	1	25.7
Vanadium	19	1	51.0

41. On April 18, 2012, MDNR issued a Notice of Violation to Respondent for violations of the coal combustion byproducts general beneficial use solid waste disposal area permit exemptions. The NOV assert MDNR's determination that the "placement of fly ash in a wetland is not a permit exempt beneficial reuse and constitutes the illegal dumping of solid wastes without a permit."
42. Due to the presence of the presence of CCR that Respondent handled and disposed of, and the continued migration of contaminants into surface waters and adjacent wetlands, conditions at the Site present an imminent and substantial endangerment to human health and/or the environment due to the complete loss of wetlands and stream functions in the area where wastes were disposed; as well as the continued migration of waste constituents into surface waters.
43. This potential endangerment stems from the past handling, transportation and disposal of solid waste.
44. Respondent is a person who has contributed to such handling, transportation and disposal.
45. This AOC is necessary to protect public health and/or the environment.

VI. CONCLUSIONS OF LAW AND DETERMINATIONS

46. Based on the Findings of Fact set forth above, and an administrative record supporting this AOC, EPA has determined that:
- a. Respondent is a "person" as defined in Section 1004(15) of RCRA, 42 U.S.C. §6903(15).
 - b. Respondent is responsible for the handling, storage, treatment, transportation or disposal of solid waste, as described in Section 7003(a) of RCRA, 42 U.S.C. §6973(a).
 - c. The CCR at the Site is discarded material that was not disposed of for beneficial use as determined by the State of Missouri and, thus, a "solid waste" as defined in Section 1004(27) of RCRA, 42 U.S.C. § 6903(27).
 - d. The past "handling," "transportation," "storage," "treatment," and/or "disposal" of CCR at the Site may present an imminent and substantial endangerment to human health and/or the environment within the meaning of Section 7003(a) of RCRA, 42 U.S.C. §6973(a).
 - e. Respondent has contributed to the handling, storage, treatment, transportation, or disposal by contracting for, and executing, the transportation and disposal of CCR at the Site. The actions required by this AOC are necessary to protect human health and/or the environment.

VII. ORDER ON CONSENT

47. Based upon the administrative record for the Site and the Findings of Fact (Section V) and Conclusions of Law and Determinations (Section VI) set forth above, and in consideration of the promises set forth herein, the following is hereby agreed to and ordered. Respondent shall comply with all provisions of this AOC, including, but not limited to, all appendices to this AOC and all documents incorporated by reference into this AOC.
48. Respondent shall finance and perform the Work in accordance with this AOC, plans, standards, specifications and schedules set forth in this AOC or developed by Respondent and approved by EPA pursuant to this AOC.

VIII. WORK TO BE PERFORMED

49. Short-Term Work Plan: As soon as practicable, but no later than 15 days after the effective date of this Order, Respondent shall install and maintain appropriate soil erosion and sediment controls to prevent the further migration of CCR-related contaminants off-Site. As soon as Respondent determines the appropriate controls to be installed at the Site, Respondent shall provide EPA a Short-Term Work Plan describing the controls to be implemented at the Site to prevent further migration of fill material. The Short-Term Work Plan is subject to EPA approval as outlined in Section IX.
50. Long-Term Work Plan: Respondent shall submit a Work Plan describing the abatement of impacts due to disposal of CCR at the Site and mitigation for the impacted wetlands. The Work Plan shall be submitted to EPA's Project Manager for approval no later than 30 days after the effective date of this AOC. The Work Plan shall include a schedule of the Work to be performed, including, but not limited to, the following:

- a. The unnamed tributary to Plattin Creek will be either be re-routed or piped to eliminate any contact with CCR.
- b. The waste materials and CCR will be capped in such a way that eliminates stormwater contact and further migration of CCR constituents into surface waters, including the unnamed tributary to Plattin Creek and Willers Lake. Further, the Work Plan will contain a plan to maintain the cap in perpetuity to ensure its long-term stability and ability to prevent CCR constituent migration. The maintenance plan shall comply with the attached Statement of Work (Attachment A).
- c. Controls that prevent contamination with floodwaters and prevent further destabilization and/or erosion due to flooding.
- d. Respondent will comply with the environmental covenant (Attachment B) pursuant to the Missouri Uniform Environmental Covenants Act that prohibits excavation or disturbance of the cap without EPA approval, prevents exposure to the underlying CCR, and requires maintenance of the cap to prevent off-Site migration of CCR constituents.
- e. Respondent will mitigate for lost wetlands functions.

Following EPA's approval or modification of the Work Plan pursuant to Section IX, Respondent shall implement the Work Plan in accordance with the schedule and provisions approved by EPA. Once approved by EPA, the Work Plan shall be incorporated into the terms of this AOC.

51. Project Coordinator. On or before the Effective Date of this AOC, Respondent shall designate its Project Coordinator. Respondent shall notify EPA in writing within five days of the Effective Date of this AOC of the name, address, phone number, electronic mail address and qualifications of its Project Coordinator. The EPA Project Coordinator will be Nicole Moran, 11201 Renner Boulevard, Lenexa, Kansas 66219, (913) 551-7641, moran.nicole@epa.gov, EPA may also designate an Alternate Project Coordinator. Each Project Coordinator shall be responsible for overseeing the implementation of this AOC. EPA and Respondent have the right to change their respective Project Coordinators. The other party must be notified in writing at least 10 days prior to the change.
52. The EPA will approve/disapprove of Respondent's Project Coordinator (original or replacement) based upon the person's qualifications and ability to effectively perform this role. The qualifications of the persons undertaking the Work for Respondent shall be subject to EPA's review, for verification that such persons meet minimum technical background and experience requirements of the EPA. All persons under the direction and supervision of Respondent's Project Coordinator must possess all necessary professional licenses required by federal and state law.
53. The EPA Project Coordinator shall be EPA's designated representative for the Site. Unless otherwise provided in this AOC, all reports, correspondence, notices, or other submittals relating to or required under this AOC shall be in writing and shall be sent to the EPA Project Coordinator at the address specified in Paragraph 51, unless notice is given in writing to Respondent of a change in address. Reports, correspondence, notices or other submittals shall be delivered by U.S. Postal Service, private courier service or electronic mail. All correspondence shall include a reference to the case caption EPA Docket No. RCRA-07-2012-0028.
54. Respondent shall undertake and complete all of the Work to the satisfaction of EPA, pursuant to RCRA § 7003, 42 U.S.C. § 6973. All of the Work performed under this AOC shall be under the

direction and supervision of Respondent's Project Coordinator and shall be in accordance with the terms of this AOC. Within five days of the Effective Date of this AOC, Respondent shall notify EPA in writing of the names, titles and qualifications of the personnel, including agents, contractors, subcontractors, consultants and laboratories, to be used in carrying out the Work.

55. Respondent's obligation to perform the Work will begin on the Effective Date of this AOC.
56. The Work undertaken pursuant to this AOC shall be conducted in compliance with all applicable EPA guidance, policies and procedures, and with this AOC, and is subject to EPA approval.
57. Completion Report. Once the Work identified in Paragraphs 49 and 50 has been completed, Respondent shall submit photographic evidence, copies of relevant documents, sampling evidence indicating that waste and CCR constituent runoff has been eliminated, and a signed statement indicating that the Work is complete.
58. Monitoring Reports. Respondent shall submit annual reports to EPA beginning after the first anniversary of the completion of the Work required by the Work Plan. These reports shall include photos of the Property, a description of the status of the Property, any corrective actions, if any, that will be taken to correct deficiencies to maintain the cap and other surface water controls, surface water sampling evidence indicating that CCR constituent runoff has been eliminated, and all other criteria identified in the Work Plan. All surface water monitoring shall comply with the terms of the attached Statement of Work (Attachment A). These annual reports shall be submitted to EPA by December 1st of each year. Respondent shall submit annual reports to EPA for a minimum period of five years. If the sampling evidence contained in the annual reports shows that CCR constituent runoff has been eliminated, then Respondent may request, in writing to EPA, that it be allowed to discontinue submitting annual reports. EPA, in its sole discretion, may allow Respondent to discontinue submitting annual reports. Alternatively, EPA may, in its discretion, require additional reporting. If sampling indicates continued migration of CCR constituents into surrounding surface water, Respondent shall submit a Work Plan to EPA within 30 days of receipt of sample results describing how Respondent will eliminate migration of CCR constituents. The Work Plan shall be subject to EPA approval as outlined in Section IX. Respondent shall also submit annual reports as described in this paragraph for an additional period as directed by EPA.
59. Health and Safety Plan. Respondent shall develop a Health and Safety Plan and it shall be implemented during the Work performed under this AOC. The Health and Safety Plan shall comply with applicable Occupational Safety and Health Administration (OSHA) regulations.
60. Future Development of Site. Once the site has been capped pursuant to Respondent's approved Work Plan, there shall be no excavations or penetrations of the cap without the prior written approval of EPA. Based on the potential hazards associated with excavations, EPA may require additional surface water sampling and reporting to determine if CCR constituents are migrating from the Property, or may deny a request to conduct an excavation, or may require other protective actions before allowing excavations to occur.

IX. EPA APPROVAL OF DELIVERABLES

61. Deliverables required by this AOC shall be submitted to EPA for approval or modification pursuant to this section. All deliverables must be received at EPA by the due date specified in this AOC or by schedules developed pursuant to this AOC.
62. After review of any deliverable that is required pursuant to this AOC, EPA will: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Respondent modify the submission; or (e) any combination of the above. However, EPA will not modify a submission without first providing Respondent at least one notice of deficiency and an opportunity to cure within 10 days, except where EPA determines that to do so would cause serious disruption to the Work or where EPA has disapproved previous submission(s) due to material defects and EPA determines that the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.
63. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Paragraph 61, Respondent shall proceed to take any action required by the deliverable, as approved or modified by EPA subject only to Respondent's right to invoke the Dispute Resolution procedures set forth in Section XVII (Dispute Resolution) with respect to the modifications or conditions made by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph 61 and EPA determines the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XVIII (Penalties).
64. Resubmission of Deliverable. Upon receipt of a notice of disapproval, in whole or in part, pursuant to Paragraph 61, Respondent shall, within 10 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the deliverable for approval. Any stipulated penalties applicable to the submission, as provided in Section XVIII (Penalties), shall accrue during the 10-day opportunity to cure period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 65 and 66.
65. Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 61, Respondent shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Respondent of any liability for stipulated penalties for the deficient portion of the deliverable under Section XVIII (Penalties).
66. In the event that a resubmitted deliverable, or portion thereof, is disapproved by EPA, EPA may again require Respondent to correct the deficiencies, in accordance with the preceding Paragraphs. The EPA also retains the right to modify or develop the plan, report or other item. Respondent shall implement any action as required in a deliverable which has been modified or developed by EPA, subject only to Respondent's right to invoke the procedures set forth in Section XVII (Dispute Resolution).
67. If upon resubmission, a deliverable is disapproved or modified by EPA due to a material defect, Respondent shall be deemed to have failed to submit such deliverable timely and adequately unless Respondent invokes the dispute resolution procedures set forth in Section XVII (Dispute

Resolution) and EPA's action to disapprove or modify a deliverable is overturned pursuant to that Section. The provisions of Section XVII (Dispute Resolution) and Section XVIII (Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XVIII (Penalties).

68. All deliverables required to be submitted to EPA under this AOC, shall, upon approval or modification by EPA, be incorporated into and be enforceable under this AOC. In the event EPA approves or modifies a portion of a deliverable required to be submitted to EPA under this AOC, the approved or modified portion shall be enforceable under this AOC.

X. MODIFICATION OF THE WORK PLAN

69. If at any time during the implementation of the Work, Respondent identifies a need for a compliance date modification or revision of the Work Plan, Respondent shall submit a memorandum documenting the need for the modification or revision to the EPA Project Coordinator. The EPA in its discretion will determine if the modification or revision is warranted and may provide written approval or disapproval. Any approved modified compliance date or Work Plan modification is incorporated by reference into this AOC.
70. Emergency Response. In the event of any action or occurrence during the performance of the Work that constitutes an emergency situation or may present an immediate threat to human health and the environment. Respondent shall immediately take all appropriate action to minimize such emergency or threat, and shall immediately notify the EPA's Project Coordinator. Respondent shall take such immediate and appropriate actions in consultation with EPA's Project Coordinator. Respondent shall then submit to EPA written notification of such emergency or threat at the Site within three (3) calendar days of such discovery. Respondent shall thereafter submit to EPA for approval, within 20 days, a plan to mitigate this threat. EPA will approve or modify this plan, and Respondent shall implement this plan as approved or modified by EPA. In the case of an extreme emergency, Respondent may act as it deems appropriate, at its own risk, to protect human health or the environment.

XI. QUALITY ASSURANCE

71. As part of the Work Plan, Respondent shall include a Quality Assurance Project Plan (QAPP), for EPA review and approval. The QAPP shall address quality assurance, quality control, and chain of custody procedures for all sampling, monitoring, and analytical activities. Respondent shall follow "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/003, March 2001 (Reissued May 2006)), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/240/R-02/009, December 2002), and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/b-01/002, March 2001) as well as other applicable documents identified by EPA.
72. As part of the Work Plan, Respondent shall include Data Quality Objectives for any data collection activity to ensure that data of known and appropriate quality is obtained and that the data is sufficient to support their intended use as required by this AOC.

73. Respondent shall ensure that laboratories used by Respondent for analysis perform such analysis according to the latest approved edition of "Test Methods for Evaluating Solid Waste (SW-846)" or other methods approved by EPA. If methods other than EPA methods are to be used, Respondent shall specify all such protocols in the applicable Work Plan. EPA may reject any data that does not meet the requirements of the approved Work Plan and EPA analytical methods and may require resampling and additional analysis.
74. Respondent shall ensure that all the laboratories it uses for analyses participate in a quality assurance/quality control (QA/QC) program equivalent to the program that EPA follows. Respondent shall, upon EPA's request, make arrangements for EPA to conduct a performance and QA/QC audit of the laboratories chosen by Respondent, whether before, during, or after sample analyses. Upon EPA's request, Respondent shall have its laboratories perform analyses of samples provided by EPA to demonstrate laboratory QA/QC and performance. If the audit reveals deficiencies in a laboratory's performance or QA/QC, Respondent shall submit a plan to address the deficiencies and EPA may require resampling and additional analysis.
75. The EPA reserves the right to require a change in laboratories for reasons which may include, but shall not be limited to, QA/QC, performance, conflict of interest, or confidential agency audit information. In the event EPA requires a laboratory change, Respondent shall propose two alternative laboratories within 30 calendar days. Once EPA approves of the laboratory change, Respondent shall ensure that laboratory service shall be made available within 15 calendar days.

XII. ADMINISTRATIVE DOCUMENTATION

76. The EPA retains the responsibility for the issuance of any decision documents related to the Site.
77. The EPA will provide Respondent with copies of all decision documents for the Site.
78. Submission of Documentation. The EPA will determine the contents of the administrative record file for selection of the remedial action. Respondent shall submit to EPA documents developed during the course of performing the work upon which selection of the response action may be based. EPA will maintain an administrative record file. The administrative record supporting this AOC and the Work to be performed shall be available for public review at the EPA Region 7 office, 11201 Renner Boulevard, Lenexa, Kansas, 66219 during regular business hours.

XIII. DOCUMENT CERTIFICATION

79. Any report or other document submitted by Respondent pursuant to this AOC which makes recommendations as to whether or not further actions are necessary, or makes any representation concerning Respondent's compliance or noncompliance with any requirement of this AOC shall be certified by a responsible corporate officer of Respondent. A responsible corporate officer means: a president, secretary, treasurer, or vice-president in charge of a principal business function, or any other person who performs similar policy or decision-making functions.
80. The certification required by Paragraph 78 above, shall be in the following form:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel

properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:
Name:
Title:
Date:

XIV. SAMPLING, ACCESS AND DATA AVAILABILITY

81. All results of sampling, testing, modeling or other data generated (including raw data if requested) by Respondent, or on Respondent's behalf, during implementation of this AOC shall be validated by Respondent and submitted to EPA within 30 days of Respondent's receipt of the data. Respondent shall tabulate data chronologically by media. EPA will make available to Respondent data generated by EPA for the purposes of oversight of the Work unless it is exempt from disclosure by any federal or state law or regulation.
82. Respondent shall orally notify EPA at least 20 days prior to conducting field sampling. At EPA's request, Respondent shall allow split or duplicate samples to be taken by EPA or EPA's representative.
83. Site Access. Pursuant to RCRA § 3007(a), 42 U.S.C. § 6927(a), Respondent shall provide access to the Site at reasonable times to EPA, EPA's contractors and oversight officials. Respondent shall also provide access at reasonable times to EPA, EPA's contractors and oversight officials to all records and documentation in its possession or control, including those records and documents in the possession or control of Respondent's contractors and employees, related to the conditions at the Site and the actions conducted pursuant to this AOC. Respondent shall use best efforts to gain access to areas owned by or in the possession of someone other than Respondent, as necessary to implement this AOC, as described in Paragraph 84. Such access shall be provided to EPA, its contractors and oversight officials. These individuals shall be permitted to move freely about the Site and appropriate off-Site areas in order to conduct actions that EPA determines to be necessary. The EPA, its contractors and oversight officials shall notify Respondent of its presence on the Site by presenting their credentials. All parties with access to the Site under this paragraph shall comply with all approved health and safety plans and regulations.
84. Pursuant to this Section, any denial of access at reasonable times to any portion of the Site property where a request for access was made for the purposes of enforcing the requirements of RCRA or this AOC shall be construed as a violation of the terms of this AOC subject to the penalty provisions outlined in Section XVIII (Penalties) of this AOC.
85. Access Agreements. Where action under this AOC is to be performed in areas owned by, or in possession of, someone other than Rotary, Rotary shall use best efforts to obtain all necessary access agreements within 45 days of approval of any Work Plan for which access is necessary or as otherwise specified, in writing, by the EPA Project Coordinator. Any such access

agreement shall provide for access by EPA and its representatives to move freely in order to conduct actions that EPA determines to be necessary. The access agreement shall specify that Respondent is not EPA's representatives with respect to any liabilities associated with activities to be performed. Respondent shall provide EPA's Project Coordinator with copies of any access agreements. Respondent shall immediately notify EPA if after using Respondent's best efforts it is unable to obtain such agreements within the time required. Best efforts as used in this paragraph shall include, at a minimum, a certified letter from Respondent to the present owner of such property requesting access agreements to permit Respondent, EPA, and EPA's authorized representatives to enter such property, and the offer of payment of reasonable sums of money in consideration of granting access. Respondent shall, within 10 days of its receipt of a denial of access, submit in writing, a description of its efforts to obtain access. EPA may, at its discretion, assist Respondent in obtaining access. In the event EPA obtains access, Respondent shall undertake the Work on such property and Respondent shall reimburse EPA for all costs and attorney fees incurred by the United States in obtaining such access.

86. Confidential Business Information. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this AOC under 40 C.F.R. § 2.203 in the manner described at 40 C.F.R. § 2.203(b) and substantiated with the information described at 40 C.F.R. § 2.204(e)(4). Information EPA determines is confidential will be given the protection specified in 40 C.F.R. Part 2. If no such claim or substantiation accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the state without further notice to Respondent. Respondent agrees not to assert confidentiality claims with respect to any data related to Site conditions, sampling, monitoring or the Work performed pursuant to this AOC.
87. Privileged Documents. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Respondent asserts such a privilege in lieu of providing documents, Respondent shall provide EPA with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the author's name and title; (4) the name and title of each addressee and recipient; (5) a description of the contents; and (6) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this AOC shall be withheld on the grounds that they are privileged.
88. All data, information, and records created or maintained relating to any Solid or Hazardous Waste found at the Site shall be made available to EPA upon request unless Respondent asserts a claim that such documents are legally privileged from disclosure. Respondent shall have the burden of demonstrating to EPA by clear and convincing evidence that such privilege exists.
89. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.
90. Nothing in this AOC shall be construed to limit EPA's right of access, entry, inspection, and information gathering pursuant to applicable law, including but not limited to RCRA and CERCLA.

XV. COMPLIANCE WITH OTHER LAWS

91. Respondent shall perform all actions required pursuant to this AOC in accordance with all applicable local, state, and federal laws and regulations. Respondent shall obtain or cause its representatives to obtain all permits and approvals necessary under such laws and regulations in a timely manner so as not to delay the Work required by this AOC.

XVI. RECORD RETENTION

92. Respondent shall preserve all documents and information, including raw data, relating to the Work performed under this AOC, or relating to any solid waste or hazardous waste found at the Site, for 10 years following completion of the Work required by this AOC.
93. Respondent shall acquire and retain copies of all documents that relate to the Site that are in the possession of its employees, agents, accountants, contractors or attorneys.
94. Respondent shall make available to EPA all employees and persons, including contractors, who engage in activities under this AOC and ensure its cooperation with EPA with respect to this AOC.
95. After the 10 year retention period and 90 days before any document or information is destroyed, Respondent shall notify EPA that such documents and information are available to EPA for inspection, and upon request, shall provide the originals or copies (at no extra cost) of such documents and information to EPA. Notification shall be in writing and shall reference the effective date, caption, and docket number of this AOC and shall be addressed to the Chief of Waste Enforcement and Materials Management Branch, EPA Region 7, 11201 Renner Boulevard, Lenexa, Kansas 66219. In addition, Respondent shall provide documents and information retained under this Section at any time before expiration of the 10 year retention period at the written request of EPA.
96. All documents pertaining to this AOC shall be stored by Respondent in a centralized location at the Site, or an alternative location mutually approved by Respondent and EPA, to promote easy access by EPA or its representatives.

XVII. DISPUTE RESOLUTION

97. Respondent shall raise any disputes concerning the Work required under this AOC to EPA (excluding any decision document(s) issued by EPA), in writing, within 15 days after receiving written notice from EPA regarding any aspect of the Work required under this AOC that Respondent disputes. The EPA and Respondent shall expeditiously and informally attempt to resolve any disagreements. The EPA and Respondent Project Coordinators shall first confer in an effort to resolve the dispute. If the Project Coordinators are unable to informally resolve the dispute within three days of the first conference, Respondent shall notify EPA, within five days, in writing of its objections. Written objections shall identify Respondent's objections, state the basis for those objections, and provide all data, analyses and information relied upon by Respondent. The EPA and Respondent then have an additional 14 days from EPA's receipt of the objections to reach agreement. If an agreement is not reached within the 14 days, Respondent may request in writing, within five days, a

determination resolving the dispute by EPA's Director of the Air and Waste Management Division. The request should provide all information that Respondent believes is relevant to the dispute. If such request is submitted within five days, the Division Director shall issue a determination in writing. EPA's final decision shall be incorporated into and become an enforceable part of this AOC and shall no longer be subject to dispute pursuant to this AOC. Respondent shall proceed in accordance with the Division Director's decision regarding the matter in dispute, regardless of whether Respondent agrees with the decision. If Respondent does not agree to perform or does not actually perform the Work in accordance with EPA's decision, EPA reserves the right in its sole discretion to conduct the Work itself, seek reimbursement from Respondent, seek enforcement of this AOC, seek stipulated penalties, and/or any other appropriate relief. Any disputes arising under this AOC are not subject to judicial review until such time as EPA seeks to enforce this AOC.

98. If EPA and Respondent reach agreement on the dispute at any stage, the agreement shall be set forth in writing and shall, upon signature of both parties, be incorporated into and become an enforceable part of this AOC.
99. The existence of a dispute and EPA's consideration of matters placed in dispute shall not excuse, toll, or suspend any compliance obligation or deadline required pursuant to this AOC during the pendency of the dispute resolution process except as agreed by EPA in writing. The invocation of dispute resolution does not stay the accrual of stipulated penalties under this AOC.

XVIII. PENALTIES

100. Stipulated Penalties. Any time Respondent fails to comply with any requirement of this AOC, Respondent shall be liable for stipulated penalties in the amounts set forth in this section unless a Force Majeure event has occurred as defined in Section XIX (Force Majeure) and EPA has approved the extension of a deadline as required by Section XIX (Force Majeure). Compliance with this AOC by Respondent shall include completion of an activity or any matter under this AOC in accordance with this AOC, and within the specified time schedules approved under this AOC.

<u>Period of Noncompliance</u>	<u>Penalty per Violation per Day</u>
1st to 5 th Day	\$250.00
5th to 30th Day	\$1,000.00
31st to 60th Day	\$2,500.00
more than 60 Days	\$5,000.00

101. Penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of correction of the violation or completion of the activity. Payment shall be due within 30 days of receipt of a demand letter from EPA. Nothing herein shall prevent the simultaneous accrual of separate stipulated penalties for separate violations of this AOC, even where those violations concern the same event (e.g., submission of a Work Plan that is late and is of unacceptable quality).
102. If payment is not made within 30 days of the date of Respondent's receipt from EPA of a written demand for payment of the penalties or of the date of agreement or decision resolving

the dispute, interest shall begin to accrue on any unpaid stipulated penalty balance beginning on the first day after Respondent's receipt of EPA's demand letter, or the date of the agreement or decision resolving the dispute, and will accrue until such penalties and interest have been paid in full. Interest shall accrue at the Current Value of Funds Rate established by the Secretary of the Treasury. An additional penalty of six percent (6 %) per annum on any unpaid principal shall be assessed for any stipulated penalty payment which is overdue for ninety (90) days or more. The applicable rate of interest shall be the rate in effect at the time the interest accrues pursuant to 31 U.S.C. § 3717.

103. Respondent shall make payments by money order, certified check, company check, electronic funds transfer, or cashier's check payable to the Treasurer of the United States within 30 days of Respondent's receipt of EPA's request, and shall be submitted to the following address:

U.S. Environmental Protection Agency
Fines and Penalties
Cincinnati Finance Center
P.O. Box 979077
St. Louis, Missouri 63197-9000.

104. Docket No. RCRA-07-2012-0028 should be clearly typed on the check to ensure proper credit. Respondent shall send simultaneous notices of such payments, including copies of the money order, certified check, company check, electronic funds transfer, or cashier's check to the following:

Chief of Waste Enforcement and Materials Management Branch
U.S. EPA, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219.

105. Respondent may dispute an EPA determination that it failed to comply with this AOC by invoking the dispute resolution procedures under Section XVII (Dispute Resolution) unless the matter has already been in or is the subject of dispute resolution. Penalties shall accrue but need not be paid during the dispute resolution period. If Respondent does not prevail upon resolution, all penalties shall be due to EPA within 30 days of resolution of the dispute. If Respondent prevails upon resolution, no penalties shall be paid. In the event that Respondent prevails in part, penalties shall be due on those matters in which Respondent did not prevail.
106. Neither the invocation of dispute resolution nor the payment of penalties shall alter in any way Respondent's obligation to comply with the terms and conditions of this AOC. The stipulated penalties set forth in this Section do not preclude EPA from pursuing any other remedies or sanctions which may be available to EPA by reason of Respondent's failure to comply with any of the terms and conditions of this AOC.
107. No payments under this Section shall be deducted for federal tax purposes.
108. Notwithstanding any other provision of this section, EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this AOC.

109. Civil Penalties. Violation of this AOC may subject Respondent to civil penalties of at least seven thousand five hundred dollars (\$7,500.00) per violation per day. The assessment of penalties are provided for in Section 7003(b) of RCRA, 42 U.S.C. § 6973(b), as adjusted pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended by the Debt Collection Improvement Act of 1996, 28 U.S.C. § 2461 note. Should Respondent violate this AOC or any portion hereof, EPA may carry out the required actions unilaterally, pursuant to any applicable authorities, and/or may seek judicial enforcement of this AOC.

XIX. FORCE MAJEURE

110. Respondent agrees to perform all requirements under this AOC within the time limits established under this AOC, unless the performance is delayed by a force majeure. For purposes of this AOC, a force majeure is defined as any event arising from causes beyond the control of Respondent, or any entity controlled by Respondent or Respondent's contractors, which delays or prevents performance of any obligation under this AOC despite Respondent's best efforts to fulfill the obligation. The requirement that the Respondent exercises "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event: (1) as it is occurring, and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. Force majeure does not include financial inability to complete the Work, increased cost of performance, changes in Respondent's business or economic circumstances, or inability to attain media cleanup standards.
111. If any event occurs or has occurred that may delay the performance of any obligation under this AOC, whether or not caused by a force majeure event, Respondent shall orally notify EPA within 48 hours of when Respondent knew or should have known that the event might cause a delay. Such notice shall: (1) identify the event causing the delay, or anticipated to cause delay, and the anticipated duration of the delay; (2) provide Respondent's rationale for attributing such delay to a force majeure event; (3) state the measures taken or to be taken to prevent or minimize the delay; (4) estimate the timetable for implementation of those measures; and (5) state whether, in the opinion of Respondent, such event may cause or contribute to an endangerment to public health or the environment. Respondent shall undertake best efforts to avoid and minimize the delay. Failure to comply with the notice provision of this paragraph and to undertake best efforts to avoid and minimize the delay shall waive any claim of force majeure by Respondent. Respondent shall be deemed to have notice of any circumstances of which its contractors had or should have had notice.
112. If EPA determines that a delay in performance or anticipated delay in fulfilling a requirement of this AOC is or was attributable to a force majeure, then the time period for performance of that requirement will be extended as deemed necessary by EPA. If EPA determines that the delay or anticipated delay has been or will be caused by a force majeure, then EPA will notify Respondent, in writing, of the length of the extension, if any, for performance of such obligations affected by the force majeure. Any such extensions shall not alter Respondent's obligation to perform or complete other tasks required by this AOC which are not directly affected by the force majeure.

113. If EPA disagrees with Respondent's assertion of a force majeure, then Respondent may elect to invoke the dispute resolution provision, and shall follow the procedures set forth in Section XVII (Dispute Resolution). In any such proceeding, Respondent shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that Respondent's best efforts were exercised to avoid and mitigate the effects of the delay, and that Respondent complied with the requirements of this section. If Respondent satisfies this burden, then EPA will extend the time for performance as EPA determines is necessary.

XX. RESERVATION OF RIGHTS

114. Notwithstanding any other provisions of this AOC, the United States retains all of its authority to take, direct, or order any and all actions necessary to protect public health or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste or constituents of such wastes, on, at, or from the Site, including but not limited to the right to bring enforcement actions under RCRA, CERCLA, and any other applicable statutes or regulations.
115. The EPA reserves all of its statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Respondent's failure to comply with any of the requirements of this AOC, including without limitation the assessment of penalties under Section 7003 of RCRA, 42 U.S.C. § 6973.
116. This AOC shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, claims, and/or authorities, civil or criminal, which EPA has under RCRA, CERCLA, or any other statutory, regulatory, or common law authority of the United States.
117. This AOC is not intended to be nor shall it be construed to be a permit. Respondent acknowledges and agrees that EPA's approval of the Work and/or Work Plan does not constitute a warranty or representation that the Work and/or Work Plans will achieve the required cleanup or performance standards. Compliance by Respondent with the terms of this AOC shall not relieve Respondent of its obligations to comply with RCRA or any other applicable local, state, or federal laws and regulations.
118. Respondent agrees not to contest any action or decision by EPA pursuant to this Order, including without limitation, decisions of the Regional Administrator, the Waste Enforcement and Materials Management Branch Chief, the Director of the Air and Waste Management Division, or any authorized representative of EPA prior to EPA's initiation of a judicial action to enforce this Order, including an action for penalties or an action to compel Respondent's compliance with the terms and conditions of this Order.

XXI. OTHER CLAIMS

119. By issuance of this AOC, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent. The United States or EPA will not be deemed a party to any contract, agreement or other

arrangement entered into by Respondent or its officers, directors, employees, agents, successors, assigns, heirs, trustees, receivers, contractors, or consultants in carrying out actions pursuant to this AOC.

120. Respondent waives all claims against the United States relating to or arising out of conduct of this AOC, including, but not limited to, contribution and counterclaims.
121. Respondent shall bear its own litigation costs and attorney fees.
122. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive or other appropriate relief relating to the Site, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been raised in the present matter.

XXII. INSURANCE

123. Prior to commencing the on-Site Work under this AOC, Respondent shall secure, and shall maintain in force for the duration of this AOC and for two years after the completion of all activities required by this AOC, comprehensive general liability insurance and automobile insurance with limits of \$2 million dollars, combined single limit, naming EPA as an additional insured. Prior to commencement of the Work under this AOC, and annually thereafter on the anniversary of the Effective Date of this AOC, Respondent shall provide EPA with certificates of such insurance and a copy of each insurance policy. If Respondent demonstrates by evidence satisfactory to EPA that its contractors and subcontractors maintain insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondent need provide only that portion of the insurance described above which is not maintained by the contractors and subcontractors.
124. For the duration of this AOC, Respondent shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of employer's liability insurance and worker's compensation insurance for all persons performing the Work on behalf of Respondent, in furtherance of this AOC.
125. At least seven days prior to commencing the Work under this AOC, Respondent shall certify to EPA that its contractors and subcontractors have obtained the required insurance.

XXIII. COST ESTIMATES AND FINANCIAL ASSURANCE

126. Cost Estimates. Within 30 days after the Effective Date of this AOC, Respondent shall submit to EPA a detailed written initial estimate, in current dollars, of the cost of hiring a third party to perform the Work described in Section VIII (Work to be Performed). A third party is a party who: (i) is neither a parent nor a subsidiary of Respondent, and (ii) does not share a common parent or subsidiary with Respondent. The initial cost estimate must account for the total costs of the work activities described in Section VIII (Work to be Performed) for the entire period of this AOC, including any necessary long term costs, such as operation and maintenance costs, monitoring costs, and institutional controls. The cost estimate must not incorporate any salvage value that may be realized from the sale of wastes, facility structures or equipment, land or other assets associated with the Site. Concurrent with the submission of any Work Plan(s) for additional work required under Section XXVI (Additional Work), Respondent shall submit revised detailed written estimate(s), in current dollars, of the cost of hiring a third party to perform the Work.
127. Respondent must annually adjust the cost estimate(s) for inflation within 30 days after the close of Respondent's fiscal years until the Work required by this AOC is completed. In addition, Respondent must adjust the cost estimate if EPA determines that any additional work is required, pursuant to Section XXVI (Additional Work), or if any other conditions increase the cost of the Work to be performed under this Consent Order.
128. Respondent shall submit each cost estimate to EPA for review, pursuant to Section IX (EPA Approval of Deliverables).
129. Assurances of Financial Responsibility for Completing the Work. In order to secure the completion of the Work in accordance with this AOC, Respondent shall establish financial assurance in the form of a trust fund administered by a trustee who has the authority to act as a trustee under federal or state law and whose trust operations are regulated and examined by a U.S. federal or state agency and that is acceptable in all respects to the EPA. The trust agreement shall provide that the trustee shall make payments from the fund only for the costs of performing the Work required under this AOC, and only after EPA has advised the trustee that the Work has been performed in accordance with the requirements of the approved Work Plans. The trust agreement shall further provide that the trustee shall not refund to the grantor any amounts from the fund unless and until EPA has advised the trustee that the Work under this AOC has been successfully completed.
130. Respondent shall submit a draft trust agreement to EPA for review pursuant to Section IX (EPA Approval of Deliverables) within 30 days after the Effective Date of this AOC, concurrently with Respondent's submission of the initial cost estimate required by Paragraph 125. The trust agreement shall be in form and substance satisfactory to EPA, determined in EPA's sole discretion.
131. Within 30 days after EPA's approval of both the initial cost estimate and the draft trust agreement, whichever date is later, Respondent shall establish a trust fund in an amount at least equal to the initial cost estimate approved by EPA.

132. Respondent shall submit an original copy of the trust agreement to Chris Muehlberger, Assistant Regional Counsel, US EPA Region 7, 11201 Renner Boulevard, Lenexa, Kansas 66219.
133. Whenever the annually adjusted estimate for the cost of completing the remaining Work exceeds the amount of financial assurance already provided pursuant to this Section, Respondent shall, within 30 days thereafter, increase the amount of the trust fund to cover such cost increase. In addition, in the event that EPA determines at any time that the financial assurances provided pursuant to this AOC are inadequate (including, without limitation, the trust agreement or the trustee), Respondent shall, within 30 days after receipt of notice of EPA's determination, correct the inadequacy. Furthermore, if at any time EPA notifies Respondent that the anticipated cost of completing the Work has increased, then, within 30 days after receipt of such notification, Respondent shall increase the amount of the trust fund to cover such cost increase.
134. Respondent's inability to post financial assurance for completion of the Work shall in no way excuse performance of any other requirements of this AOC, including, without limitation, Respondent's obligation to complete the Work in strict accordance with the terms of this AOC.
135. Reduction of Amount of Financial Assurance. If Respondent believes that the estimated cost to complete the remaining Work has diminished below the amount covered by the existing financial assurance provided under this AOC, Respondent may, on any anniversary date of the Effective Date of this AOC, or at any other time agreed to by EPA and Respondent, submit a written proposal to EPA to reduce the amount of the financial assurance provided under this Section to the estimated cost of the remaining Work to be performed. The written proposal shall specify, at a minimum, the cost of the remaining Work to be performed and the basis upon which such cost was calculated. The decision whether to approve a proposal to reduce the amount of financial assurance shall be within EPA's sole discretion and EPA shall notify Respondent of its decision regarding such a proposal in writing. Respondent may reduce the amount of the financial assurance only after receiving EPA's written decision and only in accordance with and to the extent permitted by such written decision. In the event of a dispute, Respondent may reduce the amount of the financial assurance required by this Section only in accordance with a final administrative decision resolving such dispute under Section XVII (Dispute Resolution) of this AOC.
136. Release of Financial Assurance. Respondent may submit a written request to the Director, Air and Waste Management Division, EPA Region 7, that EPA release Respondent from the requirement to maintain financial assurance under this Section at such time as EPA has provided written notice, pursuant to Section XXVII (Termination and Satisfaction) that Respondent has demonstrated that all the terms of this Order have been addressed to the satisfaction of EPA. The Director, Air and Waste Management Division, shall notify both Respondent and the Trustee in writing that Respondent is released from all financial assurance obligations under this AOC.

XXIV. INDEMNIFICATION

137. Respondent agrees to indemnify, save and hold harmless the United States, its officials, agents, contractors, employees, and representatives from any and all claims or causes of action: (a) arising from, or on account of, acts or omissions of Respondent, Respondent's directors, officers, employees, agents, successors, assigns, heirs, trustees, receivers, contractors, or consultants in carrying out actions pursuant to this AOC; and (b) for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Respondent and any persons for performance of the Work on or relating to the Site, including claims on account of construction delays. In addition, Respondent agrees to pay the United States all costs incurred by the United States, including litigation costs arising from or on account of claims made against the United States based on any of the acts or omissions referred to in the preceding sentence.

XXV. MODIFICATION OF THIS AOC

138. Except for Modification of the Work Plan as provided in Section X, this AOC may only be modified by the mutual agreement of EPA and Respondent. Any agreed modifications shall: be in writing; be signed by both parties; have as their effective date the date on which they are signed by EPA; and be incorporated into this AOC.
139. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligation to obtain such formal approval as may be required by this AOC, and to comply with all requirements of this AOC unless it is formally modified. Any deliverables, plans, technical memoranda, reports, specifications, schedules and attachments required by this AOC are, upon approval by EPA, incorporated into and enforceable under this AOC.

XXVI. ADDITIONAL WORK

140. The EPA may determine or Respondent may propose that certain tasks are necessary in addition to or in lieu of the tasks included in any EPA-approved Work Plan when such additional work is necessary to meet the objectives set forth in Section I (Introduction). The EPA may determine that Respondent shall perform any additional work and EPA will specify, in writing, the basis for its determination that any additional work is necessary. Within five days after the receipt of such determination, Respondent shall have the opportunity to meet or confer with EPA to discuss any additional work. Respondent shall submit for EPA approval a Work Plan for any additional work. Such Work Plan shall be submitted within 10 days of Respondent's receipt of EPA's determination that any additional work is necessary, or according to an alternative schedule established by EPA. Upon approval of a Work Plan for any additional work, Respondent shall implement the Work Plan for any additional work in accordance with the schedule and provisions contained therein. The Work Plan for any additional work shall be incorporated by reference into this AOC.

XXVII. TERMINATION AND SATISFACTION

141. The provisions of this AOC shall be deemed terminated and satisfied by Respondent upon written notice from EPA that Respondent has demonstrated that all of the terms of this AOC, including any additional work as may be performed pursuant to Section XXVI (Additional Work) and any stipulated penalties demanded by EPA under Section XVIII (Penalties), have been addressed to the satisfaction of EPA. Termination of this AOC shall not terminate Respondent's obligation to comply with: Sections XIV (Sampling, Access and Data Availability); XVI (Record Retention); XX (Reservation of Rights); and XXIV (Indemnification) of this AOC, and to maintain institutional and engineering controls.

XXVIII. PUBLIC COMMENT ON THIS AOC

142. The EPA shall provide public notice, opportunity for a public meeting and a reasonable opportunity for public comment on the proposed settlement. After consideration of any comments submitted during a public comment period of not less than 30 days (which EPA may extend), EPA may withhold consent or seek to amend all or part of this AOC if EPA determines that comments received disclose facts or considerations which indicate that this AOC is inappropriate, improper, or inadequate.

XXIX. SEVERABILITY

143. If a court issues an order that invalidates any provision of this AOC or finds that Respondent has sufficient cause not to comply with one or more provisions of this AOC, Respondent shall remain bound to comply with all provisions of this AOC not invalidated or determined to be subject to a sufficient cause defense by the court's order.

XXX. WAIVER

144. Respondent waives any and all claims for relief and otherwise available rights or remedies to judicial or administrative review which Respondent may have with respect to any issue of fact or law set forth in this Order on Consent, including, but not limited to, any right of judicial review of the RCRA § 7003 Compliance Order on Consent under the Administrative Procedure Act, 5 U.S.C. §§ 701-708.

XXXI. EFFECTIVE DATE

145. This AOC shall be effective when EPA signs this AOC after the public comment period as specified in Section XXVIII (Public Comment on This AOC) above. Within two business days of signing this AOC, EPA will provide Respondent with a copy of the signature page of this AOC signed by the Director of the Air and Waste Management Division. The undersigned representative of Respondent certifies that it is fully authorized to enter into the terms and conditions of this AOC and to bind the party it represents to this document. Respondent agrees not to contest the validity or terms of this AOC, or the procedures underlying or relating to it in any action brought by the United States, including EPA, to enforce its terms or seek penalties for its violation. Respondent retains its right to assert claims against any third parties with respect to this Site.

Agreed this 23 day of 05, 2014

By: Darrell D. Coleman
Signature

Print Name: DARRELL D. COLEMAN

Title: PRESIDENT

Company Address: P.O. Box 202

FRASER, IN. 47828

It is so ORDERED and Agreed this 27 day of MAY, 2014. By:

Becky Weber

Becky Weber

Director

Air and Waste Management Division

Date: 5/27/14

EFFECTIVE DATE: 5.27.14

ATTACHMENT A

Statement of Work For Surface Water Monitoring and Cap Maintenance Rotary Drilling Supply, Inc. Crystal City, Missouri

The purpose of this Statement of Work (SOW) is to define the requirements, standards and guidelines that shall be incorporated into the terms of the Work Plan required by Paragraph 50 of EPA's Administrative Order on Consent, Docket Number RCRA-07-2012-0028 and followed by the Respondents to accomplish the following tasks:

1. Prepare and implement a Surface Water Monitoring Plan
2. Prepare and implement a Cap Maintenance Plan

Task I: Prepare and implement a Surface Water Monitoring Plan to monitor for releases to the surface waters near the Site. The purpose of the plan is to monitor for coal combustion residual (CCR) constituents in surface waters near the site.

At a minimum, the Surface Water Monitoring Plan shall satisfy the following criteria:

- A. Provide a map showing the location of surface water bodies near the Site that could potentially be impacted by seeps and runoff from the Site.
- B. Quality Assurance Project Plan (QAPP). To ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented, the Respondents shall prepare a QAPP to document all monitoring procedures, sampling, field measurements and sample analysis performed during the investigation and monitoring of the Site. The Respondents shall use quality assurance, quality control, and chain-of-custody procedures approved by the EPA. The QAPP should be prepared in accordance with the EPA *Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003, March 2001, and following EPA *Guidance for Preparing Quality Assurance Project Plans*, EPA QA/G-5, EPA/240/R-02/009, December 2002. The minimum elements of the quality assurance program for data collection activities are in Chapter One of EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. The QAPP shall include a description and qualifications of all personnel performing or directing Site monitoring and sampling, including contractor personnel. Standard operating procedures (SOPs) shall be included as an attachment to the plan(s) if SOPs are cited in the text.
- D. Sampling and Analysis Plan (SAP). The SAP shall outline the field investigation activities which will be conducted to determine the nature and extent of surface water

contamination associated with the Site. The SAP shall be prepared in accordance with EPA *Guidance on Choosing a Sampling Design for Environmental Data Collection*, EPA QA/G-5S, EPA/240/R-02/005, December 2002. At a minimum, the SAP shall include the following:

1. A description of the Site, and its status;
2. Clearly stated objectives for the specific sampling event, including the ultimate goal and/or use of the sampling data and the techniques which will ensure that the samples will provide the required data;
3. A description of the sampling approach/rationale for defining the nature and extent of contamination; and
4. A description of sampling procedures which shall include: sampling locations, sample collection procedure, field quality assurance samples, analyses to be conducted including analytical method numbers, sample containers, sample preservation and shipment, and chain-of-custody procedures.

Task II: Prepare and implement a Cap Maintenance Plan (CMP). Respondents shall prepare and submit a CMP for the Site that includes but is not limited to cap repair and maintenance; details of site inspections including schedule; and annual surface water sampling and analysis.

In accomplishing the above tasks, the Respondents shall comply with the provisions of the Administrative Order on Consent (AOC), Docket Number RCRA-07-2012-0028, this SOW, and any applicable EPA guidance.

In addition, the CMP shall describe all normal operation and maintenance procedures including:

- (1) A description of tasks for inspection and maintenance of the cap; and
- (2) A schedule showing the frequency of each O & M task including, but not limited to annual surface sampling, cap inspections, and cap mowing.

The CMP shall state that all surface samples will be collected in accordance with the EPA-approved SAP and QAPP for the Site.

The CMP shall describe any solid wastes which may be generated by the operation of the remedy and describe how they will be managed.

The CMP shall describe, as applicable, contingency procedures necessary to ensure operation in a manner protective of human health and the environment.

(ABOVE SPACE RESERVED FOR RECORDER'S USE)

Document Title: ENVIRONMENTAL COVENANT
Document Date: _____, 2014
Grantor: Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028
Grantee: Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028
Legal Description: see Attachment A, General Warranty Deed

ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into by and between Rotary Drilling Supply, Inc. (“Rotary Drilling”), as Grantor and “Holder,” and the United States Environmental Protection Agency (“EPA”) as “Department,” as provided for in the Missouri Environmental Covenants Act (“MoECA”), Sections 260.1000 through 260.1039, RSMo.

RECITALS

WHEREAS, Rotary Drilling is the owner in fee simple of certain real property commonly known and numbered as Rotary Drilling Supply, Inc., 1150 Truman Boulevard, P.O. Box 302, Crystal City, Missouri 63208 and legally described in the attached General Warranty Deed (Attachment A, hereinafter, the “Property”);

WHEREAS, Owner desires to grant to itself as a Holder this Environmental Covenant for the purpose of subjecting the Property to certain activity and use limitations as provided in MoECA;

WHEREAS, EPA enters into this Environmental Covenant as a “Department” pursuant to MoECA, with all the attendant rights of a “Department” under MoECA, which include, but are not limited to, the right to enforce this Covenant;

WHEREAS, in addition to being the Owner and Grantor, Rotary Drilling enters into this Environmental Covenant as a “Holder” pursuant to MoECA, with all the attendant rights of a “Holder” under MoECA, which include, but are not limited to, acquiring an interest in the Property, and a right to enforce this Environmental Covenant;

WHEREAS, between October 2004 and September 2009, Rotary Drilling contracted with various entities to dispose of approximately 140,000 tons of coal combustion residue (CCR) on the Property, including a portion of an unnamed tributary to Plattin Creek, adjacent wetlands to the tributary, and a southeast portion of Willers Lake;

WHEREAS, on February 14 and 15, 2011, EPA sampled the unnamed tributary to Plattin Creek and the CCR piles located on the Property. Sample results indicated that elevated levels of CCR constituents had migrated, and continue to migrate, from the CCR piles into the unnamed tributary to Plattin Creek and adjacent wetlands;

WHEREAS, on March 27, 2012, EPA conducted an ecological-risk screening of the Property assessing the direct impacts caused by the CCR. In this screening, EPA concluded that the ongoing migration of CCR constituents presented an “imminent and substantial endangerment” to the environment, within the meaning of Section 7003(a) of the Resource Conservation and Recovery Act, 42 U.S.C. § 6973(a);

WHEREAS, on March 29, 2013, Rotary Drilling entered into an Administrative Order on Consent (AOC) with EPA (EPA-Docket No. RCRA-07-2012-0028), pursuant to

which Rotary Drilling agreed, among other things, to submit to EPA for approval a Long-Term Work Plan (the "Work Plan"), which addressed capping the CCR to eliminate stormwater contact and prevent further migration of CCR constituents into surface waters, including the unnamed tributary to Plattin Creek and Willers Lake. Rotary Drilling also agreed to re-route or pipe the unnamed tributary to Plattin Creek on the Property to eliminate any further contact with CCR. Finally, Rotary Drilling agreed to maintain the cap and to provide to EPA periodic monitoring reports evaluating whether the cap and other injunctive relief remain adequate to prevent off-site migration of CCR constituents; and

WHEREAS, Owner desires to grant to itself as Holder, this Environmental Covenant for the purpose of subjecting the Property to certain activity and use limitations as provided in MoECA; and grants to EPA certain rights and powers as herein provided and as provided to a "Department" in MoECA.

NOW THEREFORE, the parties hereto agree as to follows:

1. Definitions. Whenever the terms listed below are used in this Environmental Covenant the following definitions shall apply:
 - a) "Residential land use" refers to property whose use is unrestricted as determined by EPA and that is either being used for residential use, or is zoned for residential use, or access to the Property is not restricted and children under 18 years of age are on the Property more than 250 days per year.
 - b) "Non-residential land use" refers to property not included in "residential land use" which is publicly accessible with public access limited to non-routine visits, and where visitors are not supervised while on the property, commonly referred to as "commercial use," and to property that is not publicly accessible, and where visitors are supervised while on the property, commonly referred to as "industrial use."
 - c) "Owner" means as of any particular date, any then current owner of any interest in the Property or any portion thereof, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees.
 - d) "Transferee" means any future owner of any interest in the Property or any portion thereof, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees.
2. Activity and Use Limitations. As part of the environmental response project implemented at the Property, Owner, for itself and its successors in title, agrees to prohibit any uses of the Property which would be inconsistent or interfere with the work conducted pursuant to the Work Plan, and also agrees to subject the Property to, and comply with, the follow activity and use limitations:

Owner and Transferees shall comply with the following:

- a) The Property shall not be used, or allowed to be used, for residential land uses. The Property shall be used only for non-residential land uses as long as the CCR cap is required by Department to be maintained on the Property. If any person desires in the future to use the Property for residential land use, Department must approve such use, in writing, in advance. Department may require further analysis and response actions prior to such use;
- b) There shall be no excavations or penetrations of the cap without the prior written approval of Department. Based on the potential hazards associated with excavations, Department may require that Owner or Transferee conduct additional surface water sampling and reporting to determine if CCR constituents are migrating from the Property, or may deny a request to conduct an excavation, or may require other protective actions before allowing excavation to occur;
- c) For all excavations, worker safety precautions shall be implemented prior to such work; and
- d) Owner or Transferee will maintain in good condition and repair the engineered cap in perpetuity to ensure its long-term stability and ability to prevent CCR constituent migration. The cap shall be maintained in accordance with EPA's Administrative Order on Consent, Docket Number RCRA-07-2012-0028.

3. Compliance Reporting. If Owner/Transferee becomes aware of any noncompliance with the activity and use limitations described in paragraph 2 above, such person or entity shall notify all other Parties to this Environmental Covenant in writing as soon as possible, but no later than ten (10) days thereafter.

4. Running with the Land. The declarations as set forth herein shall be binding upon Rotary Drilling and its successors, assigns, and Transferees in interest, including Owners, and shall run with the land, as provided in Section 260.1012, RSMo, subject to amendment or termination as set forth herein.

5. Enforcement. Compliance with this Environmental Covenant may be enforced as provided in Section 260.1030, RSMo. The Missouri Department of Natural Resources (MDNR) (and any successor agency), is expressly granted the power to enforce this Covenant. Failure to timely enforce compliance with this Environmental Covenant or the activity and use limitations contained herein by any party shall not bar subsequent enforcement by such party and shall not be deemed a waiver of the party's right to take action to enforce any non-compliance. Nothing in this Environmental

Covenant shall restrict any person from exercising any authority under any other applicable law.

6. Notice upon Conveyance. Each instrument hereafter conveying any interest in the Property, or any portion of the Property, shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and provide the recording reference for this Environmental Covenant. The notice shall be substantially in the following form:

THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT, DATED _____, 2014, RECORDED IN THE OFFICE OF THE RECORDER OF DEEDS, JEFFERSON COUNTY, MISSOURI, ON _____, 2014, AS DOCUMENT ____, BOOK ____, PAGE ____.

Owner shall notify Holder, Department, and MDNR within ten (10) days following each conveyance of the Property, or any portion thereof. The notice shall include the name, address, and telephone number of the Transferee, and a copy of the deed or other documentation evidencing the conveyance.

7. Notification Requirement. Grantor/Owner shall notify Holder and Departments of any proposed changes in the use of the Property, of any applications for building permits for work affecting the Property, and of any proposals for site work affecting the contamination on the Property.

8. Right of Access. Grantor hereby grants to Holder, Department, and MDNR, and their respective agents, contractors, and employees, the right of access at all reasonable times to the Property for implementation, monitoring or enforcing this Environmental Covenant. Nothing herein shall be deemed to limit or otherwise affect Holder or Department's right of access and entry under federal or state law.

10. Representations and Warranties. Grantor hereby represents and warrants to Holder and Department that:

- a) Grantor is the sole owner of the Property and holds fee simple title;
- b) Grantor has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided, and to carry out all obligations required of Grantor hereunder;
- c) Grantor has identified all other parties who hold any interest in the Property, exercise of which could extinguish this Environmental Covenant, and notified such parties of Grantor's intent to enter into this Environmental Covenant; and

- d) this Environmental Covenant will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which Grantor is a party or by which Grantor may be bound or affected.

11. Amendment or Termination. This Covenant may be amended or terminated by consent of Holder, Department, and the current Owner/Transferee of record at the time of such amendment or termination, pursuant to section 260.1027 RSMo. Any other Party to this Covenant hereby waives the right to consent to any amendment to, or termination of, this Covenant. Following signature by all requisite persons or entities on any amendment or termination of this Covenant, Owner/Transferee shall record and distribute such documents as described below.

Temporary deviations from the obligations or restrictions specified in this Covenant may be approved by Department in lieu of a permanent amendment to this Covenant. Owner/Transferee may submit a written request to Department to temporarily deviate from specified requirements described herein for a specific purpose and timeframe. Any such request shall be transmitted to Holder and Department as described below. The request shall reference this paragraph of this Covenant, fully explain the basis for the proposed temporary deviation, and demonstrate that protection of human health and the environment will be maintained. Department will evaluate the request and convey approval or denial in writing. Owner/Transferee may not deviate from the requirements of this Covenant unless and until such approval has been obtained.

12. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

13. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Missouri.

14. Recordation. Within thirty (30) days after the date of the final required signature upon this Environmental Covenant, Grantor shall record this Environmental Covenant with the Recorder's office, or other appropriate land records office, of the County where the Property is located.

15. Effective Date. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded with the Recorder's office, or other appropriate land records office, of the County where the Property is located.

16. Distribution of Environmental Covenant. Within thirty (30) days following the recording of this Environmental Covenant, or any amendment or termination of this Environmental Covenant, Grantor/Owner shall, in accordance with Section 260.1018, RSMo, distribute a file- and date-stamped copy of the recorded Environmental Covenant to: (a) each signatory hereto; (b) each person holding a

recorded interest in the Property; (c) each person in possession of the Property; (d) MDNR; and (d) each municipality or other unit of local government in which the Property is located.

17. Notice. Any document or other item required by this Environmental Covenant to be given to another party hereto shall be delivered as follows, unless such individual or their successors provide proper written notice of another individual designated to receive such communication:

If to Grantor:

Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028

If to Grantee/Holder:

Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028

If to MDNR:

Chris Nagel, Director, Solid Waste Management Program
Missouri Department of Natural Resources
P.O. Box 176
1730 East Elm Street
Jefferson City, Missouri 65101

If to EPA:

Director, Air and Waste Management Division
United States Environmental Protection Agency
11201 Renner Boulevard
Lenexa, Kansas 66219

FOR GRANTOR/OWNER of ROTARY DRILLING SUPPLY, INC.

By: _____

Date: _____

Name: Darriel F. Coleman

Title: President

STATE OF _____)

_____)

COUNTY OF _____)

On this ___ day of _____, 20___, before me a Notary Public in and for said state, personally appeared _____ (*Name*), _____ (*Title*) of _____ (*Corporate Name*), known to me to be the person who executed the within Covenant on behalf of said corporation and acknowledged to me that he/she executed the same for the purposes therein stated.

Notary Public

FOR GRANTEE/HOLDER of ROTARY DRILLING SUPPLY, INC.

By: _____

Date: _____

Name: Darriel F. Coleman

Title: President

STATE OF _____)

_____)

COUNTY OF _____)

On this ___ day of _____, 20___, before me a Notary Public in and for said state, personally appeared _____ (*Name*), _____ (*Title*) of _____ (*Corporate Name*), known to me to be the person who executed the within Covenant on behalf of said corporation and acknowledged to me that he/she executed the same for the purposes therein stated.

Notary Public



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

January 15, 2015

Regulatory Branch
File Number: MVS-2009-774

Mr. Darriel Coleman
Rotary Drilling Supply
P.O. Box 302
Festus, Missouri 63028

Dear Mr. Coleman:

We have reviewed your submittal, dated December 19, 2014, updated on January 6, 2015 and submitted on your behalf by SCI Engineering, Inc. The submittal includes a permit application to complete a work plan required by the USEPA for an Administrative Order on Consent (AOC) dated 28 May 2014. The AOC is a voluntary agreement to resolve a Section 404 Clean Water Act violation and to complete proceedings under Section 7003 of the Resource Conservation and Recovery Act (RCRA), regarding the project known as *Rotary Drilling Supply*. The AOC requires the construction of short term and long term measures to stabilize the Site and manage stormwater runoff, including but not limited to, the installation of sediment and erosion controls and capping of approximately 140,000 tons of coal combustion residue (CCR) on the property located at 1150 Truman Boulevard, Crystal City, Missouri 63028. Although some of the short term corrections have begun, there are additional long term protections that must be completed. These actions include the piping of approximately 1,015 linear feet (0.25-acres) of an unnamed tributary to Plattin Creek. The piping is required by the AOC to prevent the transport of CCR to Plattin Creek and was previously mitigated through an agreement with the USEPA, Rotary Drilling, Ameren, and CEMEX Materials LLC. The mitigation included the purchase of 15 credits from the Missouri Botanical Garden's Shaw Reserve Wetland Mitigation Bank. The credit purchase was intended to account for the wetland impacts and stream impacts associated with the original violation referred to the USEPA on June 30, 2010 and the AOC.

The piping of the tributary shall be undertaken to minimize future impacts to waters of the U.S. from development and the contaminated fill material located adjacent to the tributary. The unnamed tributary to Plattin Creek is degraded and previously impacted by construction activities and unauthorized fill activities. The project is located on and adjacent to 1150 South Truman Boulevard, Crystal City, Missouri 63028 (Latitude N 38.229892 Longitude -90.38714).

Based upon a review of the U.S. Geological Survey 7.5-minute topographical maps, soil survey, the National Wetland Inventory, aerial photography, and the submittal, we have determined that the wetlands and unnamed tributary to Plattin Creek would be considered jurisdictional waters of the United States. Therefore, the placement of fill material in these waters requires a permit from this office. Plattin Creek flows into the Mississippi River.

The Corps of Engineers has determined that this activity will have no effect on endangered species, and is authorized under Section 404 of the Clean Water Act by an existing Department of the Army nationwide permit for *Completed Enforcement Actions*, as described in the February 21, 2012, Federal Register, Reissuance of Nationwide Permits; Notice (77 FR 10279), Appendix A (B) (32). **This verification is valid until March 18, 2017**, unless the district engineer modifies, suspends, or revokes the nationwide permit authorization in accordance with 33 CFR 330.5(d). If you commence, or are under contract to commence, this activity before the nationwide permit expires, you will have 12 months after the date the nationwide permit expires or is modified, suspended, or revoked, to complete the activity under the present terms and conditions of this nationwide permit. Enclosed is a copy of the nationwide permit and conditions and management practices with which you must comply. **The district engineer has further conditioned this permit to include the following special conditions:**

- a. The permittee shall notify the Corps should any change in size, location or methods to accomplish the work occur. Changes could potentially require additional authorizations from the Corps as well as other Federal, state or local agencies.*
- b. The final approved work plan for the project site shall be submitted to this office prior to construction.*

In accordance with General Condition number 30 of the Nationwide Permit, a compliance certification (Attachment A of this package) must be completed within 30 days of project completion or the permit issuance may be revoked and considered null and void.

The Missouri Department of Natural Resources Water Protection Program (MDNR/WPP) has denied general Section 401 Water Quality Certification for Nationwide Permit 32. Therefore, Individual Water Quality Certification may be required by the Missouri Department of Natural Resources. If you have any questions regarding the water quality certification conditions, you may call Ms. Stacia Bax, MDNR/WPP, at 573-526-4586.

This determination is applicable only to the permit program administered by the Corps of Engineers. It does not eliminate the need to obtain other federal, state or local approvals before beginning work. This permit verification does not convey property rights, nor authorize any injury to property or invasion of other rights.

You are reminded that the permit is based on submitted plans. Variations from these plans shall constitute a violation of Federal law and may result in the revocation of the permit. If this nationwide permit is modified, reissued, or revoked during this period, the provisions described at 33 CFR 330.6(b) will apply.

On August 27, 2007, an Approved Jurisdictional Determination (AJD) was completed for the adjacent property that included the unnamed tributary to Platin Creek and is in accordance with Corps regulations at 33 CFR Part 331. A Preliminary Jurisdictional Determination (PJD) was also completed prior to case referral to the USEPA. The PJD is dated February 12, 2010.

If you have any questions please contact me at (314) 331-8579. Please refer to file number **MVS-2009-774**. I am forwarding a copy of this letter, without enclosures, to Ms. Stacia Bax, MDNR-WPP; Ms. Judith Deel, MDNR-SHPO; Mr. Bryan Simmons, USFWS; Ms. Delia Garcia, USEPA; Ms. Audrey Beres, MDC; and Mr. Scott Harding, SCI Engineering, Inc. The St. Louis District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to go to our Customer Service Survey found on our web site at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

Robert S. Gramke
Missouri Section
Regulatory Branch

Enclosures:

Nationwide Permit Summary

ATTACHMENT A

COMPLETED WORK CERTIFICATION

Date of Issuance: January 15, 2015

File Number: MVS-2009-774

Name of Permittee: Darriel Coleman

Name of Project: Rotary Drilling Supply

Project Location: 1150 South Truman Blvd, Crystal City, Missouri 63028

River Basin/County/State: Plattin/Jefferson/Missouri

Project Manager: R. Gramke

Upon completion of this activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

**U.S. Army Corps of Engineers
Attn: Regulatory Branch (OD-F)
1222 Spruce Street
St. Louis, Missouri 63103-2833**

(Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification or revocation.)

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

www.dnr.mo.gov

MAR 16 2015

Mr. Darriel Coleman
Rotary Drilling Supply
P.O. Box 302
Festus, MO 63028

RE: 2009-774/CES002472, Nationwide Permit 32 in Jefferson County

Dear Mr. Coleman:

The Missouri Department of Natural Resources' Water Protection Program (DNR) has reviewed your request for Clean Water Act Section 401 Water Quality Certification (WQC) to accompany the U.S. Army Corps of Engineers' (USACE) Nationwide Permit 32 for "Completed Enforcement Actions."

The proposed project includes the installation of sediment and erosion controls and capping approximately 140,000 tons of coal combustion residue as part of a work plan required by the U.S. Environmental Protection Agency (USEPA) for an Administrative Order on Consent dated May 28, 2014. Although some of the short-term corrections have begun, there are additional long-term protections that must be completed. These actions include the piping of approximately 1,015 linear feet of an unnamed tributary to Platin Creek.

The piping is required by the agreement between the USEPA, Rotary Drilling, Ameren and CEMEX Materials LLC. The mitigation included the purchase of 15 credits from the Missouri Botanical Garden's Shaw Reserve Wetland Mitigation Bank. The credit purchase was intended to account for the wetland impacts and stream impacts associated with the original violation referred to the USEPA on June 30, 2010, and the Administrative Order on Consent.

The project is located in an unnamed tributary to Platin Creek at Latitude 38.229892, Longitude -90.38714 in Jefferson County, Missouri.

The proposed project does not meet the state of Missouri's General Condition 9 for pre-certification; therefore, an individual WQC is being issued. Condition 9 states when the 300 linear feet threshold for stream impacts is waived, an individual WQC shall be required.

This WQC is being issued under Section 401 of Public Law 95-217, The Clean Water Act of 1977 and subsequent revisions. This office certifies that the ongoing activities will not cause the general or numeric criteria to be exceeded nor impair beneficial uses established in Water Quality Standards, 10 CSR 20-7.031, provided the following conditions are met:

1. Best Management Practices shall be used during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project shall not involve more than normal stormwater or incidental loading of sediment caused by construction disturbances.
2. Acquisition of a WQC shall not be construed or interpreted to imply the requirements for other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System Permits. Permits or any other requirements shall remain in effect. Land disturbance activities disturbing one or more acres of total area for the entire project require a stormwater permit. Instructions on how to apply for and receive the on-line land disturbance permit are located at www.dnr.mo.gov/env/wpp/epermit/help.htm. Questions regarding permit requirements may be directed to DNR's St. Louis Regional Office at (314) 416-2960.
3. Care shall be taken to keep machinery out of the water way as much as possible. Fuel, oil and other petroleum products, equipment, construction materials and any solid waste shall not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions shall be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.
4. Petroleum products spilled into any water or on the banks where the material may enter waters of the state shall be immediately cleaned up and disposed of properly. Any such spills of petroleum shall be reported as soon as possible, but no later than 24 hours after discovery to DNR's Environmental Emergency Response number at (573) 634-2436.
5. Conduct project activity at low flows and water levels to limit the amount of sediment disturbance caused by the heavy equipment. Limit the duration and extent that any heavy equipment is required to be in-stream.
6. The riparian area, banks, etc., shall be restored to a stable condition to protect water quality as soon as possible. Seeding, mulching and needed fertilization should be within three days of final contouring. On-site inspections of these areas should be conducted as necessary to ensure successful re-vegetation and stabilization, and to ensure that erosion and deposition of soil in waters of the state is not occurring from these projects.
7. Should it be found that the remediation activities do not fully address water quality concerns and additional measures would be needed to comply with 10 CSR 20-7.031, this WQC may be reviewed and additional conditions placed in it to protect the state's water quality standards.

Mr. Darriel Coleman
Page Three

8. Representatives from DNR shall be allowed on the project property to inspect the authorized activity at any time deemed necessary by DNR to ensure compliance with the above conditions.
9. The WQC is based on the plans as submitted. Should any plan modifications occur, please contact DNR to determine whether the WQC remains valid or may be amended or revoked.

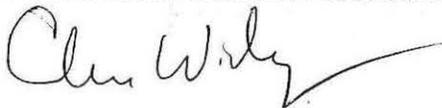
Pursuant to Chapter 644.054.4, RSMo, commonly referred to as the Missouri Clean Water Law, and fee regulations under 10 CSR 20-6.011(2)(1), this WQC shall be valid only upon payment of a fee of \$150.00. The enclosed invoice contains the necessary information on how to submit your fee. Payment must be received within ten business days of receipt of this WQC. Upon receipt of the fee, the applicable office of the USACE will be informed that the WQC is now in effect and final.

You may appeal to have the matter heard by the Administrative Hearing Commission (AHC). To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

This WQC is part of the USACE's permit. Water Quality Standards must be met during any operations authorized. If you have any questions, please contact Mr. Christopher Miller by phone at (573) 526-3337, by e-mail at christopher.miller@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176. Thank you for working with DNR to protect our environment.

Sincerely,

WATER PROTECTION PROGRAM



Chris Wieberg
Operating Permits Section Chief

CW:cmp

Enclosure

- c: Mr. Robert Gramke, U.S. Army Corps of Engineers, St. Louis District
Ms. Sandy Schoen, St. Louis Regional Office
✓ Mr. Jeffrey Stone, SCI Engineering, Inc.
Ms. Sarah Wright-Aholt, St. Louis Regional Office



Jeremiah W. (Jay) Nixon, Governor

Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

dnr.mo.gov

ROTARY DRILLING SUPPLY IN
MORA06126, Jefferson County
ROTARY DRILLING SUPPLY IN
PO BOX 302
FESTUS, MO 63028

Enclosed please find your Missouri State Operating Permit which authorizes land disturbance activities for MORA06126. This permit has been issued as requested and is based upon application information entered in the Missouri Department of Natural Resources' (Department) ePermitting program. This permit contains several requirements and should be thoroughly read and understood. Please reference General Operating Permit number MORA06126 for future correspondences with the Department with regards to this land disturbance activity.

Acquisition of the permit does not imply that the requirements or ordinances of other local, state or federal permits are replaced or superseded. This permit does not authorize land disturbance activity in jurisdictional waters of the United States as defined by the Army Corps of Engineers (Corps), unless the permittee has obtained the required Clean Water Act Section 404 Permit. Not all land disturbance projects will require a 404 permit; however, if a 404 permit is required, land disturbance activities are not to be conducted in the jurisdictional area of the project until the 404 permit has been obtained. Information for the Missouri Corps offices can be found in the general operating permit's Fact Sheet.

Please contact the applicable Regional Office if you would like to schedule an Environmental Assistance Visit (EAV). Regional Office contact information is contained with the documents issued with the operating permit. During the visit, Department staff will review the requirements of the permit and answer questions pertaining to Land Disturbance activities.

Sincerely,

Water Protection Program

A handwritten signature in cursive script that reads "John Madras".

John Madras
Director

JM

ROTARY DRILLING SUPPLY IN
MORA06126

ePermitting Certification and Signature Document

Missouri State Operating General Permit number MORA06126 was issued on 02/05/2015 based on information entered into the Missouri Department of Natural Resources' electronic Permitting (ePermitting) system. Missouri Regulation 10 CSR 20-6.010(2)(B) requires that all applications for construction and operating permits be signed. Please print, review, sign, and mail this document to the Missouri Department of Natural Resources (Department) within 30 days of the Issue Date (02/05/2015).

If the Department does not receive this document with signature within 30 days, this general operating permit may be considered not valid and subsequently revoked.

ROTARY DRILLING SUPPLY IN, Jefferson County
1150 SOUTH TRUMAN
CRYSTAL CITY, MO 63019
Total Permitted Area: 14.27 Acres
Total Number of Permitted Features: 1

The below Certifications were electronically certified in the ePermitting system by:

Name: Gabriel Novak
Title: Engineering Manager
Date: 01/30/2015

Based upon the selection you made on the 'New Permit' screen; it was indicated that a single polygon was drawn indicating the entire disturbance area.

Is any part of the area that is being disturbed in a jurisdictional water of the United States? If yes, you must also receive a Clean Water Act, Section 404 Permit for this site from the United States Army Corp of Engineers.

Yes

I understand there may be an established Local Authority Erosion Control Plan in the city or the unincorporated area of the county where land disturbance activities covered under this general permit will occur. (Note - you may want to contact your local authority to determine if there are any requirements).

Agreed

A Storm Water Pollution Prevention Plan (SWPPP) must be developed for this site. This plan must be developed in accordance with requirements and guidelines specified within the general permit for storm water discharges from land disturbance activities. The application, as completed in ePermitting is considered incomplete if the SWPPP has not been developed.

Agreed

I certify that I am familiar with the information contained in the application, that to the best of my knowledge and belief such information is true, complete and accurate, and being granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders and decisions, and terms of this permit, subject to any legitimate appeal available to an applicant under the Missouri Clean Water Commission.

Agreed

Signature

Date

The above must be signed by the Owner, Continuing Authority, or Main Facility Contact. Please send this document with original signature to the Water Protection Program, PO Box 176, Jefferson City, MO 65102. If you do not agree with the above Certifications, please contact the Department by phone at (573) 751-1300.

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

General Operating Permit

In compliance with the Missouri Clean Water Law, (chapter 644 R.S. Mo as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.: MORA06126
Owner: ROTARY DRILLING SUPPLY IN
Address: PO BOX 302
FESTUS, MO 63028
Continuing Authority: ROTARY DRILLING SUPPLY IN
PO BOX 302
FESTUS, MO 63028
Facility Name: ROTARY DRILLING SUPPLY IN
Facility Address: 1150 SOUTH TRUMAN
CRYSTAL CITY, MO 63019
Legal Description: Land Grant 01906, Jefferson County
UTM Coordinates: 728328.638 / 4231923.824
Receiving Stream: Tributary to Platin Cr. (U)
First Classified Stream - ID#: Platin Cr. (P) 1728.00
USGS# and Sub Watershed#: 07140101 - 0806

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

FACILITY DESCRIPTION All Outfalls SIC # 1629

All Outfalls - Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading and other activities that result in the destruction of the root zone and/or land disturbance activity that is reasonably certain to cause pollution to waters of the state).

This permit authorizes only wastewater, including storm water, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System, it does not apply to other regulated areas. This permit may be appealed in accordance with RSMo Section 644.051.6 and 621.250, 10 CSR 20-6.020, and 10 CSR 20-1.020.

02/05/2015

Issue date

Sara Parker Pauley, Director
Department of Natural Resources

02/07/2017

Expiration date

John Madras
Director, Water Protection Program

A. APPLICABILITY

1. This general permit authorizes the discharge of stormwater and certain non-stormwater discharges from land disturbance sites that disturb one or more acres or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project. This general permit also authorizes the discharge of stormwater and certain non-stormwater discharges from smaller projects where the Missouri Department of Natural Resources (Department) has exercised its discretion to require a permit [10 CSR 20-6.200 (1)(B)].

A Missouri State Operating Permit that specifically identifies the project must be issued before any site vegetation is removed or the site disturbed.

Any site owner/operator subject to these requirements for stormwater discharges and who disturbs land prior to permit issuance from the Department is in violation of both State and Federal Laws.

The legal owner of the property or the holder of an easement on the property, and operator on which the site is located are responsible for compliance with this permit.

2. This permit authorizes non-stormwater discharges from the following activities provided that these discharges are addressed in the permittee's specific Stormwater Pollution Prevention Plan (SWPPP) required by this general permit:
 - a. De-watering activities if there are no contaminants other than sediment present in the discharge, and the discharge is treated as specified in Requirements, Section C.3.m. of this permit;
 - b. Flushing water hydrants and potable water lines;
 - c. Water only (i.e., without detergents or additives) rinsing of streets and buildings; and
 - d. Site watering to establish vegetation.
3. This general permit does not authorize the placement of fill materials in flood plains, the obstruction of stream flow, directing stormwaters across private property not owned or operated by the permittee, or changing the channel of a defined drainage course. This general permit addresses only the quality of the stormwater runoff and the minimization of off-site migration of sediments and other water contaminants.
4. This general permit does not authorize any discharge to waters of the state of sewage or pollutants including but not limited to:
 - a. Any hazardous material, oil, lubricant, solid waste or other non-naturally occurring substance from the site, including fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
 - b. Soaps or solvents used in vehicle and equipment washing;
 - c. Hazardous substances or petroleum products from an on-site spill or handling and disposal practices,
 - d. Wash and/or rinse waters from concrete mixing equipment including ready mix concrete trucks, unless managed by an appropriate control. Any such pollutants must be adequately treated and addressed in the SWPPP, and cannot be discharged to waters of the state;
 - e. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 - f. Wastewater generated from air pollution control equipment or the containment of scrubber water in lined ponds;
 - g. Domestic wastewaters, including gray waters; or
 - h. Industrial stormwater runoff.

A. APPLICABILITY (continued)

5. The Department reserves the right to revoke or deny coverage under this general permit to applicants for stormwater discharges from land disturbance activities at sites that have contaminated soils that will be disturbed by the land disturbance activity or where such materials are brought to the site to use as fill or borrow. A site-specific permit may be required to cover such activities.
6. Discharges shall not cause violations of the Water Quality Standards 10 CSR 20-7.0.031(3). If at any time the Department determines that the quality of waters of the state may be better protected by requiring the owner/operator of the permitted site to apply for a site-specific permit, the Department may require any person to obtain a site-specific operating permit [10 CSR 20-6.010(13)(C)].

The Department may require the permittee to apply for and obtain a site-specific or different general permit if:

- a. The permittee is not in compliance with the conditions of this general permit;
- b. The discharge no longer qualifies for this general permit due to changed site conditions and/or regulations; or
- c. Information becomes available that indicates water quality standards have been or may be violated.

The permittee will be notified in writing of the requirement to apply for a site-specific permit or a different general permit. When a site-specific permit or different general permit is issued to the authorized permittee, the applicability of this general permit to the permittee is automatically terminated upon the effective date of the site specific or different general permit.

7. Any owner/operator authorized by a general permit may request to be excluded from the coverage of the general permit and apply for a site-specific permit [10 CSR 20-6.010(13)(D)].
8. This permit does not authorize land disturbance activity in jurisdictional waters of the United States as defined by the Army Corps of Engineers, unless the permittee has obtained the required 404/401 permit. Land disturbance activities may not begin in the affected portions of the site until the required 404/401 permits have been obtained.
9. This permit does not supersede compliance with the Historic Preservation Act or the Endangered Species Act.
10. This permit does not supersede any requirement for obtaining project approval under an established local authority.
11. This permit is not transferable to other owners or operators.

B. EXEMPTIONS FROM PERMIT REQUIREMENTS

1. Facilities that discharge all stormwater runoff directly to a combined sewer system are exempt from stormwater permit requirements.
2. Land disturbance activity as described in [10 CSR 20-6.200(1)(B)] and [10 CSR 20-6.010(1)(B)] where water quality standards are not exceeded.
3. Linear, strip, or ribbon construction (as described in [10 CSR 20-6.200(1)(B)8]) where water quality standards are not exceeded.
4. Sites that disturb less than one acre of total land area as described in [10 CSR20-6.200 (1)(B)7], that are not part of a common plan or sale and that do not cause any violations of water quality standards, and are not otherwise designated by the Department as requiring a permit.
5. Agricultural stormwater discharges and irrigation return flows as described in [10CSR 20-6.200 (1)(B)6].

C. REQUIREMENTS

These requirements do not supersede nor remove any requirement to comply with county or other local ordinances [10 CSR20-6.010(14)(D)]:

1. This permit is to ensure the design, the installation and the maintenance of effective erosion controls and sediment controls to minimize the discharge of pollutants. At minimum, such controls must be designed, installed and maintained to:
 - a. Control stormwater volume and velocity within the site to minimize soil erosion;
 - b. Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
 - c. Minimize the amount of soil exposed during construction activity;
 - d. Minimize the disturbance of steep slopes;
 - e. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle size expected to be present on the site.;
 - f. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible; and
 - g. Minimize soil compaction and, unless infeasible, preserve topsoil.
2. The primary requirement of this permit is the development and implementation of a SWPPP which incorporates site specific practices to best minimize the soil exposure, soil erosion, and the discharge of pollutants. The permittee shall fully implement the provisions of the SWPPP required under this part as a condition of this general permit throughout the term of the land disturbance project. **The SWPPP must be developed prior to issuance of the permit and must be specific to the land disturbance activities at the site.** A permit must be issued before any disturbance of root zone of the existing vegetation or other land disturbance activities may begin. A copy of the SWPPP must be available on-site when land disturbance operations are in progress, or other operational activities that may affect the maintenance or integrity of the Best Management Practices (BMP) structures and made available made available as specified under Section F. Records of this permit.

C. REQUIREMENTS (continued)

The SWPPP must:

- a. List and describe all outfalls;
- b. Incorporate required practices identified below;
- c. Incorporate erosion control practices specific to site conditions;
- d. Provide for maintenance and adherence to the plan;
- e. Discuss whether or not a 404/401 Permit is required for the project; and
- f. Name the person responsible for inspection, operation and maintenance of BMPs.

The purpose of the SWPPP is to ensure; the design, implementation, management and maintenance of BMPs in order to prevent sediment and other pollutants in stormwater discharges associated with the land disturbance activities; compliance with the Missouri Water Quality Standards; and compliance with the terms and conditions of this general permit.

The permittee shall select, install, use, operate and maintain appropriate BMPs for the permitted site. The following manuals are acceptable resources for the selection of appropriate BMPs. *Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*, (Document number EPA 833-R-06-004) published by the United States Environmental Protection Agency (USEPA) in May 2007. This manual as well as other information, including examples of construction SWPPPs, is available at the USEPA internet site at <http://cfpub1.epa.gov/npdes/stormwater/swppp.cfm>; and

The latest version of *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri*, published by the Missouri Department of Natural Resources. This manual is available on the Department's internet site at: <http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm>.

The permittee is not limited to the use of these guidance manuals. Other guidance publications may be used to select appropriate BMPs. However, all BMPs should be described and justified in the SWPPP.

3. SWPPP Requirements: The following information and practices shall be provided for in the SWPPP:
 - a. Nature of the Construction Activity: The SWPPP briefly must describe the nature of the construction activity, including:
 - 1) The function of the project (e.g., low density residential, shopping mall, highway, etc.);
 - 2) The intended sequence and timing of activities that disturb the soils at the site;
 - 3) Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities including off-site borrow and fill areas; and
 - 4) A general map (e.g., United States Geological Survey quadrangle map, a portion of a city or county map, or other map) with enough detail to identify the location of the construction site and waters of the United States within one mile of the site.

C. REQUIREMENTS (continued)

- b. Site Map: The SWPPP must contain a legible site map showing the site boundaries and outfalls and identifying:
- 1) Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;
 - 2) Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
 - 3) Location of major structural and non-structural BMPs identified in the SWPPP;
 - 4) Locations where stabilization practices are expected to occur;
 - 5) Locations of off-site material, waste, borrow or equipment storage areas;
 - 6) Locations of all waters of the United States (including wetlands);
 - 7) Locations where stormwater discharges to a surface water; and
 - 8) Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.
- c. Site Description: In order to identify the site, the SWPPP shall include facility and outfall information. The SWPPP shall have sufficient information to be of practical use to contractors and site construction workers to guide the installation and maintenance of BMPs.
- d. Effluent Limits: The permittee must select control measurements (e.g., BMPs, controls, practices, etc.) to meet effluent limits found in Section E.1. of this permit. All control measures must be properly selected, installed and maintained in accordance with any relevant manufacturer specifications and good engineering practices. The permittee must implement the control measures from commencement of the construction activity until final stabilization is complete unless the exception noted in Section C.3.i. of this permit applies.
- e. Selection of Temporary and Permanent Non-Structural BMPs: The permittee shall select appropriate non-structural BMPs for use at the site and list them in the SWPPP. The SWPPP shall require existing vegetation to be preserved where practical. For surface waters located on or immediately adjacent to the site, the permittee must provide at minimum a 25-foot buffer of undisturbed natural vegetation between the disturbed portions of the site and the surface water unless infeasible or where there is a more stringent local requirement. The time period for disturbed areas to be without vegetative cover is to be minimized to the maximum extent practicable.

Examples of non-structural BMPs which the permittee should consider specifying in the SWPPP include preservation of trees and mature vegetation, protection of existing vegetation for use as buffer strips, mulching, sodding, temporary seeding, final seeding, geotextiles, stabilization of disturbed areas, preserving existing stream channels as overflow areas when channel straightening or shortening is allowed, soil stabilizing emulsions and tackifiers, mulch tackifiers, stabilized site entrances/exits and other appropriate BMPs.

- f. Selection of Temporary and Permanent Structural BMPs: The permittee shall select appropriate structural BMPs for use at the site and list them in the SWPPP. Examples of structural BMPs that the permittee should consider specifying in the SWPPP include diverting flows from undisturbed areas away from disturbed areas, silt (filter fabric and/or straw bale) fences, earthen diversion dikes, drainage swales, sediment traps, rock check dams, subsurface drains (to gather or transport water for surface discharge elsewhere), pipe slope drains (to carry concentrated flow down a slope face), level spreaders (to distribute concentrated flow into sheet flow), storm drain inlet protection and outlet protection, reinforced soil retaining systems, gabions, temporary or permanent sediment basins and other appropriate BMPs.

C. REQUIREMENTS (continued)

- g. Description of BMPs: The SWPPP shall include a description of both structural and non-structural BMPs that will be used at the site.

The SWPPP shall provide the following general information for each BMP which will be used one or more times at the site:

- 1) Physical description of the BMP;
- 2) Site and physical conditions that must be met for effective use of the BMP;
- 3) BMP installation/construction procedures, including typical drawings; and
- 4) Operation and maintenance procedures for the BMP.

The SWPPP shall provide the following information for each specific instance where a BMP is to be installed:

- 1) Whether the BMP is temporary or permanent;
- 2) Where, in relation to other site features, the BMP is to be located;
- 3) When the BMP will be installed in relation to each phase of the land disturbance procedures to complete the project; and
- 4) Site conditions that must be met before removal of the BMP if the BMP is not a permanent BMP.

- h. Disturbed Areas: Slopes for disturbed areas must be defined in the SWPPP. A site map or maps defining the sloped areas for all phases of the project must be included in the SWPPP. Stabilization must be initiated immediately and completed within seven (7) calendar days where soil disturbing activities have temporarily ceased on any portion of the site and will not resume for a period exceeding fourteen (14) calendar days the permittee shall construct BMPs to establish interim stabilization. Interim stabilization shall consist of well established and maintained BMPs that are reasonably certain to protect waters of the state from sediment pollution over an extended period of time. This may require adding more BMPs to an area than is normally used during daily operations. These BMPs may include a combination of sediment basins, check dams, sediment fences and mulch. The types of BMPs used must be suited to the area disturbed, taking into account the number of acres exposed and the steepness of the slopes. If the slope of the area is greater than 3:1 (three feet horizontal to one foot vertical) or if the slope is greater than 3% and greater than 150 feet in length, then the permittee shall establish interim stabilization within seven days of ceasing operations on that part of the site. Final stabilization of disturbed areas must be initiated immediately and completed within seven (7) calendar days whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site. Allowances to the seven (7) day completion period for temporary and final stabilization may be made due to weather and equipment malfunctions. The use of allowances shall be documented in the SWPPP.
- i. Installation: The permittee shall ensure the BMPs are properly installed at the locations and relative times specified in the SWPPP. Peripheral or border BMPs to control runoff from disturbed areas shall be installed or marked for preservation before general site clearing is started. Note that this requirement does not apply to earth disturbances related to initial site clearing and establishing entry, exit and access of the site, which may require that stormwater controls be installed immediately after the earth disturbance. Stormwater discharges from disturbed areas which leave the site shall pass through an appropriate impediment to sediment movement such as a sedimentation basin, sediment traps and silt fences prior to leaving the land disturbance site. A drainage course change shall be clearly marked on a site map and described in the SWPPP. The location of all BMPs must be indicated on a site map, included in the SWPPP.

C. REQUIREMENTS (continued)

- j. Sedimentation Basins: The SWPPP shall include a sedimentation basin for each drainage area with ten or more acres disturbed at one time. The sedimentation basin shall be sized to contain a volume of at least 3,600 cubic feet per each disturbed acre draining thereto. Accumulated sediment shall be removed from the basin when basin is 50% full. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface unless infeasible. Discharges from the basin shall not cause scouring of the banks or bottom of the receiving stream. The SWPPP shall require the basin be maintained until final stabilization of the disturbed area served by the basin.

Where use of a sediment basin is impractical, the SWPPP shall evaluate and specify other similarly effective BMPs to be employed to control erosion and sediment delivery. These similarly effective BMPs shall be selected from appropriate BMP guidance documents authorized by this permit. The BMPs must provide equivalent water quality protection to achieve compliance with this permit. The SWPPP shall require both temporary and permanent sedimentation basins to have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

- k. Pollution Prevention Measures: The SWPPP shall include BMPs for pollution prevention measures. At minimum such measures must be designed, installed, implemented and maintained to:
- 1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
 - 2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
 - 3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures. Included but not limited to the installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers.
- l. Roadways: Where applicable, upon installation of or connection to roadways, all efforts should be made to prevent the deposition of earth and sediment onto roadways through the use of proper BMPs. Stormwater inlets susceptible to receiving sediment from the permitted land disturbance site shall have curb inlet protection. Where stormwater will flow off the end of where a roadway terminates, a sediment catching BMP such as gravel berm or silt fence shall be provided. Roadways and curb inlets shall be cleaned weekly or following a rainfall that generates a run-off. Where practicable, construction entrance BMP controls shall be used to prevent sediment trackout.
- m. Dewatering: Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls. The SWPPP shall include a description of any anticipated dewatering methods including the anticipated volume of water to be discharged and the anticipated maximum flow discharged from these dewatering activities expressed in gallons per minute. Maximum flow may be stated in the SWPPP as an estimate based on the type and capacity of equipment being used for dewatering. The SWPPP shall call for specific BMPs designed to treat water pumped from trenches and excavations and in no case shall this water be pumped off-site without being treated by the specified BMPs. When discharging from basins and impoundments utilize outlet structures that withdraw water from the surface, unless infeasible.

C. REQUIREMENTS (continued)

4. Good housekeeping practices shall be maintained at all times to keep waste from entering waters of the state. Solid and hazardous waste management include providing trash containers and regular site clean up for proper disposal of solid waste such as scrap building material, product/material shipping waste, food containers and cups, and providing containers and proper disposal of waste paints, solvents and cleaning compounds. The provision of portable toilets for proper disposal of sanitary sewage and the storage of construction materials should be kept away from drainage courses and low areas.
5. All fueling facilities present shall at all times adhere to applicable federal and state regulations concerning underground storage, above ground storage and dispensers.
6. Hazardous wastes that are transported, stored, or used for maintenance, cleaning, or repair shall be managed according to the provisions of the Missouri Hazardous Waste Laws and Regulations.
7. All paint, solvents, petroleum products, petroleum waste products and storage containers such as drums, cans, or cartons shall be stored according to BMPs. The materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers. All containers shall be inspected for leaks or spillage during the once per week inspection of BMPs.
8. Amending/Updating the SWPPP: The permittee shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. The permittee shall amend the SWPPP at a minimum whenever the:
 - a. Design, operation, or maintenance of BMPs is changed;
 - b. Design of the construction project is changed that could significantly affect the quality of the stormwater discharges;
 - c. Permittee's inspections indicate deficiencies in the SWPPP or any BMP;
 - d. Department notifies the permittee in writing of deficiencies in the SWPPP;
 - e. SWPPP is determined to be ineffective in minimizing or controlling erosion and sedimentation (e.g., there is visual evidence of excessive site erosion or excessive sediment deposits in streams or lakes);
 - f. Settleable Solids from a stormwater outfall exceed 2.5 ml/L; and
 - g. Department determines violations of water quality standards may occur or have occurred.
9. An individual shall be designated by the permittee as responsible for environmental matters. The individual responsible for environmental matters shall have a thorough and demonstrable knowledge of the site's SWPPP and sediment and erosion control practices in general. The individual responsible for environmental matters or a designated inspector knowledgeable in erosion, sediment and stormwater control principles shall inspect all structures that function to prevent pollution of waters of the state. These inspections shall be conducted in accordance with C.10 of these requirements.

C. REQUIREMENTS (continued)

10. **Site Inspections Reports:** The permittee (or a representative of the permittee) shall conduct regularly scheduled inspections at least once per seven calendar days. These inspections shall be conducted by a qualified person, one who is responsible for environmental matters at the site, or a person trained by and directly supervised by the person responsible for environmental matters at the site. For disturbed areas that have not been finally stabilized, all installed BMPs and other pollution control measures shall be inspected for proper installation, operation and maintenance. All stormwater outfalls shall be inspected for evidence of erosion or sediment deposition. When practicable the receiving stream shall also be inspected for 50 feet downstream of the outfall. Any structural or maintenance problems shall be noted in an inspection report and corrected within seven calendar days of the inspection. If a rainfall causes stormwater runoff to occur on-site, the BMPs must be inspected within a reasonable time period after the rainfall event has ceased. These inspections must occur within 48 hours after the rain event has ceased during a normal work day and within 72 hours if the rain event ceases during a non-work day such as a weekend or holiday.

The SWPPP must explain how the person responsible for erosion control will be notified when stormwater runoff occurs. If weather conditions prevent correction of BMPs within 7 calendar days, the reasons for the delay must be documented (including pictures) and there must be a narrative explaining why the work cannot be accomplished within the 7 day time period. The documentation must be filed with the regular inspection reports. The permittee shall correct the problem as soon as weather conditions allow. Areas on-site that have been finally stabilized must be inspected at least once per month.

A log of each inspection and copy of the inspection report shall be kept on-site. The inspection report shall be signed by the permittee or by the person performing the inspection if duly authorized to do so. The inspection report is to include the following minimum information:

- a. Inspector's name;
 - b. Date of inspection;
 - c. Observations relative to the effectiveness of the BMPs;
 - d. Actions taken or necessary to correct the observed problem; and
 - e. Listing of areas where land disturbance operations have permanently or temporarily stopped.
11. **Proper Operation and Maintenance:** The permittee shall at all times maintain all pollution control measures and systems in good order to achieve compliance with the terms of this general permit.
12. **Notification to All Contractors:** The permittee shall be responsible for notifying each contractor or entity (including utility crews and city employees or their agents) who will perform work at the site of the existence of the SWPPP and what action or precautions shall be taken while on-site to minimize the potential for erosion and the potential for damaging any BMP. The permittee is responsible for any damage a subcontractor may do to established BMPs and any subsequent water quality violation resulting from the damage.
13. **Public Notification:** The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. The public notification sign must be visible from the public road that provides access to the site's main entrance. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

D. OTHER DISCHARGES

1. Hazardous Substance and Oil Spill Reporting: Refer to Section B, #14 of Part I of the Standard Conditions that accompany this permit.
2. Removed substances: Refer to Section B, #6 of Part I of the Standard Conditions that accompany this permit.
3. Change in discharge: In the event soil contamination or hazardous substances are discovered at the site during land disturbance activities, the permittee shall notify the Department's regional office by telephone as soon as practicable but no later than 24 hours after discovery. The permittee must also notify the Department's regional office in writing no later than 14 calendar days after discovery.

E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

1. The effluent limitation for Settleable Solids from a stormwater outfall discharging shall not exceed 2.5 ml/L per Standard Method 2540 F, except immediately following the local 2-year, 24-hour storm event. The Settleable Solids limit is not enforceable during or greater than the local 2-year, 24-hour storm event.
2. The Department may require sampling and reporting as a result of illegal discharges, compliance issues, complaint investigations, or other such evidence of contamination from activities at the site. If such an action is needed, the Department will specify in writing any sampling requirements, including such information as location, extent and parameters.

F. RECORDS

1. The permittee shall retain copies of this general permit, the SWPPP and all amendments for the site named in the State Operating Permit, results of any monitoring and analysis and all site inspection records required by this general permit. The records shall be accessible during normal business hours. The records shall be retained for a period of at least three years from the date of the Letter of Termination.
2. The permittee shall provide a copy of the SWPPP to the Department, USEPA, or any local agency or government representative if they request a copy in the performance of their official duties.
3. The permittee shall provide a copy of the SWPPP to those who are responsible for installation, operation, or maintenance of any BMP. The permittee, their representative, and/or the contractor(s) responsible for installation, operation and maintenance of the BMPs shall have a current copy of the SWPPP with them when on the project site.

G. LAND PURCHASE AND CHANGE OF OWNERSHIP

1. Federal and Missouri stormwater regulations [10 CSR 20-6.200] require a stormwater permit and erosion control measures for all land disturbances of one or more acres. These regulations also require a permit for less than one acre lots if the lot is part of a common plan of development or sale where that plan is at least one acre in size. If the permittee sells less than one acre of the permitted site to an entity for, commercial, industrial, or residential use, (unless sold to an individual for the purpose of building his/her own private residence and in accordance with G.3 of this section) this land remains a part of the common sale and regulated by this permit. Therefore, the permittee is still responsible for erosion control on the sold property until termination of the permit.
2. If the permittee sells one or more acres of the permitted site to an entity, the new owner of the property must obtain a land disturbance permit for the purchased property. The original permittee must amend the SWPPP to show that the property (one acre or more) has been sold and therefore no longer under the original permit jurisdiction.
3. If the permittee has stabilized the less than one acre lot which is part of a larger common plan of development and the lot is sold to an individual for purposes of building his/her own private residence, the permittee is no longer responsible for erosion control on the lot.
4. Property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity.
5. If the entire tract is sold to a single entity, then this permit shall be terminated when the new owner obtains a new land disturbance permit for the site.

H. TERMINATION

This permit may be terminated when the project is stabilized. The project is considered to be stabilized when perennial vegetation, pavement, buildings, or structures using permanent materials cover all areas that have been disturbed. With respect to areas that have been vegetated, vegetation cover shall be at least 70% plant density over 100% of the site. In order to terminate the permit, the permittee shall notify the Department.

The Cover Page (Certificate Page) of the Master General Permit for Land Disturbance specifies the "effective date" and the "expiration date" of the Master General Permit. The "issued date" along with the "expiration date" will appear on the State Operating Permit issued to the applicant. This permit does not continue administratively beyond the expiration date.

If the project or development completion date will be after the expiration date of this general permit, then the permittee must reapply to the Department for a new permit. The applicant must file a request to the Department for a new permit 180 days prior to the expiration of this permit.

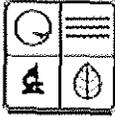
If the permittee has not terminated the permit and the permit expires, and the permittee has not applied for a new permit the permittee will be considered "operating without a permit" if the site does not meet the requirements for termination.

I. MODIFICATION, REVOCATION, AND REOPENING

1. The U.S. Environmental Protection Agency (EPA) has proposed stormwater requirements that may direct the State to reopen this permit. The EPA is proposing to change its construction general permit (CGP) with more prescriptive requirements and design standards for buffers to prevent stormwater runoff, increased monitoring requirements and more frequent inspections. While the EPA permit is only effective in areas where EPA has permitting authority these requirements are likely to act as a template, setting a baseline for the EPA approval of state plans for permitting sites.
2. If at any time the Department determines that the quality of waters of the state may be better protected by reopening this permit, or revoking this permit and requiring the owner/operator of the permitted site to apply for a site-specific permit, the Department may revoke a general permit and require any person to obtain such an operating permit as authorized by 10 CSR 20-6.010(13) and 10 CSR 20-6.200(1)(B).
3. If this permit is reopened, modified or revoked pursuant to this Section, the permittee retains all rights under Chapter 536 and 644 Revised Statutes of Missouri upon the Department's reissuance of the permit as well as all other forms of administrative, judicial, and equitable relief available under law.

J. DUTY TO COMPLY

The permittee must comply with all conditions of this general permit. Any noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.



STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

Revised

October 1, 1980

PART I - GENERAL CONDITIONS

SECTION A - MONITORING AND REPORTING

1. **Representative Sampling**
 - a. Samples and measurements taken as required herein shall be representative of the nature and volume, respectively, of the monitored discharge. All samples shall be taken at the outfall(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.
 - b. Monitoring results shall be recorded and reported on forms provided by the Department, postmarked no later than the 28th day of the month following the completed reporting period. Signed copies of these, and all other reports required herein, shall be submitted to the respective Department Regional Office, the Regional Office address is indicated in the cover letter transmitting the permit.
2. **Schedule of Compliance**

No later than fourteen (14) calendar days following each date identified in the "Schedule of Compliance", the permittee shall submit to the respective Department Regional Office as required therein, either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements, or if there are no more scheduled requirements, when such noncompliance will be corrected. The Regional Office address is indicated in the cover letter transmitting the permit.
3. **Definitions**

Definitions as set forth in the Missouri Clean Water Law and Missouri Clean Water Commission Definition Regulation 10 CSR 20-2.010 shall apply to terms used herein.
4. **Test Procedures**

Test procedures for the analysis of pollutant shall be in accordance with the Missouri Clean Water Commission Effluent Regulation 10 CSR 20-7015.
5. **Recording of Results**
 - a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:
 - (i) the date, exact place, and time of sampling or measurements;
 - (ii) the individual(s) who performed the sampling or measurements;
 - (iii) the date(s) analyses were performed;
 - (iv) the individual(s) who performed the analyses;
 - (v) the analytical techniques or methods used; and
 - (vi) the results of such analyses.
 - b. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six (6) months per violation, or both.
 - c. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.
6. **Additional Monitoring by Permittee**

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monitoring Report Form. Such increased frequency shall also be indicated.

7. **Records Retention**

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recording for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

SECTION B - MANAGEMENT REQUIREMENTS

1. **Change In Discharge**

- a. All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant not authorized by this permit or any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.
- b. Any facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants shall be reported by submission of a new NPDES application at least sixty (60) days before each such change, or, if they will not violate the effluent limitations specified in the permit, by notice to the Department at least thirty (30) days before such changes.

2. **Noncompliance Notification**

- a. If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Department with the following information, in writing within five (5) days of becoming aware of such conditions:
 - (i) a description of the discharge and cause of noncompliance, and
 - (ii) the period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.
- b. Twenty-four hour reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally with 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided with five (5) days of the time the permittee becomes aware of the circumstances. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

3. **Facilities Operation**

Permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions. Operators or supervisors of operations at publicly owned or publicly regulated wastewater treatment facilities shall be certified in accordance with 10 CSR 209.020(2) and any other applicable law or regulation. Operators of other wastewater treatment facilities, water contaminant source or point sources, shall, upon request by the Department, demonstrate that wastewater treatment equipment and facilities are effectively operated and maintained by competent personnel.

4. **Adverse Impact**

The permittee shall take all necessary steps to minimize any adverse impact to waters of the state resulting from noncompliance with any effluent limitations specified in this permit or set forth in the Missouri Clean Water Law and Regulations (hereinafter the Law and Regulations), including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. **Bypassing**
- a. Any bypass or shut down of a wastewater treatment facility and tributary sewer system or any part of such a facility and sewer system that results in a violation of permit limits or conditions is prohibited except:
- where unavoidable to prevent loss of life, personal injury, or severe property damages; and
 - where unavoidable excessive storm drainage or runoff would catastrophically damage any facilities or processes necessary for compliance with the effluent limitations and conditions of this permit;
 - where maintenance is necessary to ensure efficient operation and alternative measures have been taken to maintain effluent quality during the period of maintenance.
- b. The permittee shall notify the Department in writing of all bypasses or shut down that result in a violation of permit limits or conditions. This section does not excuse any person from liability, unless such relief is otherwise provided by the statute.
6. **Removed Substances**
Solids, sludges, filter backwash, or any other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutants from entering waters of the state unless permitted by the Law, and a permanent record of the date and time, volume and methods of removal and disposal of such substances shall be maintained by the permittee.
7. **Power Failures**
In order to maintain compliance with the effluent limitations and other provisions of this permit, the permittee shall either:
- in accordance with the "Schedule of Compliance", provide an alternative power source sufficient to operate the wastewater control facilities; or
 - if such alternative power source is not in existence, and no date for its implementation appears in the Compliance Schedule, halt or otherwise control production and all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.
8. **Right of Entry**
For the purpose of inspecting, monitoring, or sampling the point source, water contaminant source, or wastewater treatment facility for compliance with the Clean Water Law and these regulations, authorized representatives of the Department, shall be allowed by the permittee, upon presentation of credentials and at reasonable times:
- to enter upon permittee's premises in which a point source, water contaminant source, or wastewater treatment facility is located or in which any records are required to be kept under terms and conditions of the permit;
 - to have access to, or copy, any records required to be kept under terms and conditions of the permit;
 - to inspect any monitoring equipment or method required in the permit;
 - to inspect any collection, treatment, or discharge facility covered under the permit; and
 - to sample any wastewater at any point in the collection system or treatment process.
9. **Permit's Transferable**
- Subject to Section (3) of 10 CSR 20-6.010 an operating permit may be transferred upon submission to the Department of an application to transfer signed by a new owner. Until such time as the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
 - The Department, within thirty (30) days of receipt of the application shall notify the new permittee of its intent to revoke and reissue or transfer the permit.
10. **Availability of Reports**
Except for data determined to be confidential under Section 308 of the Act, and the Law and Missouri Clean Water Commission Regulation for Public Participation, Hearings and Notice to Governmental Agencies 10 CSR 20-6.020, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. As required by statute, effluent data shall not be considered confidential. Knowingly making any false statement on any such report shall be subject to the imposition of criminal penalties as provided in Section 204.076 of the Law.
11. **Permit Modification**
- a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
- violation of any terms or conditions of this permit or the Law;
 - having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
 - a change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge, or
 - any reason set forth in the Law and Regulations.
- b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
12. **Permit Modification - Less Stringent Requirements**
If any permit provisions are based on legal requirements which are lessened or removed, and should no other basis exist for such permit provisions, the permit shall be modified after notice and opportunity for a hearing.
13. **Civil and Criminal Liability**
Except as authorized by statute and provided in permit conditions on "Bypassing" (Standard Condition 13-5) and "Power Failures" (Standard Condition 13-7) nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.
14. **Oil and Hazardous Substance Liability**
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act, and the Law and Regulations. Oil and hazardous materials discharges must be reported in compliance with the requirements of the Federal Clean Water Act.
15. **State Laws**
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state statute or regulations.
16. **Property Rights**
The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of or violation of federal, state or local laws or regulations.
17. **Duty to Reapply**
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit 180 days prior to expiration of this permit.
18. **Toxic Pollutants**
If a toxic effluent standard, prohibition, or schedule of compliance is established under Section 307(a) of the Federal Clean Water Act for a toxic pollutant in the discharge of permittee's facility and such standard is more stringent than the limitations in the permit, then the more stringent standard, prohibition, or schedule shall be incorporated into the permit as one of its conditions, upon notice to the permittee.
19. **Signatory Requirement**
All reports, or information submitted to the Director shall be signed (see 40 CFR-122.6).
20. **Rights Not Affected**
Nothing in this permit shall affect the permittee's right to appeal or seek a variance from applicable laws or regulations as allowed by law.
21. **Severability**
The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

State of Missouri
Missouri Department of Natural Resources

FACT SHEET

MORA00000 LAND DISTURBANCE GENERAL PERMIT
2012 Reissue

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Major , Minor , Industrial Facility ; Variance ; Master General Permit ; General Permit Covered Facility ; and/or permit with widespread public interest .

PART I. NPDES Stormwater General Permit

The vast majority of discharges associated with construction activity are covered under NPDES general permits. General permits cover a group of similar dischargers under one permit. General permits simplify the process for dischargers to obtain authorization to discharge, provide permit requirements for any discharger that applies for coverage, and reduce the administrative workload for NPDES permitting authorities.

This General Permit is for regulating stormwater discharge at land disturbance construction sites in Missouri. This program requires the owner or operator of a construction site disturbing land of one acre or greater, or less than one acre but part of a larger common plan of development, to obtain this permit prior to conducting any land disturbance activity.

PART II. The Need for Stormwater Regulations at Construction Sites

Stormwater runoff is a major source of urban water pollution endangering humans by polluting the water resources used for drinking, household purposes, recreation and fishing. Stormwater discharges often contain pollutants in amounts that could reduce water quality. The primary pollutants of concern from construction activities are silt and sediment, but other pollutants such as oils and grease, vehicle fluids, and debris are present as well.

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion. Debris can clog waterways and potentially reach the ocean where it can kill marine wildlife and impact habitat.

Construction activities increase pollutant loads in runoff. The volume and rate of runoff are typically increased, providing a larger capacity to transport pollutants to rivers and lakes. In addition, the removal of vegetation leaves bare soil which is much more vulnerable to erosion, resulting in sediment moving into receiving waters.

Additional stormwater information and requirements including application for a land disturbance permit can be found at <http://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm>.

PART III. Key Components of this Permit

The key components of this permit are effluent limitations that require the permittee to minimize discharge of pollutants in stormwater by using control measures that reflect best engineering practices based on federal and state government best professional judgment. Dischargers must minimize their discharge of pollutants in stormwater using appropriate erosion and sediment controls and control measures for other pollutants such as litter, construction debris, and construction chemicals that could be exposed to stormwater and other wastewater. This general permit requires dischargers to develop a stormwater pollution prevention plan (SWPPP) to document the steps they will take to comply with the terms, conditions and effluent limitations of the permit. Note that the SWPPP is not an effluent limitation, nor does it include effluent limitations. Information including examples of a SWPPP can be found at the following <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm#model>. These examples should be used for educational or training purposes only. Construction site SWPPPs must be developed following the requirements of Missouri's land disturbance permit and describe the specific conditions of the site and plans for development.

PART IV. Additional Information for the Purpose of Permit Clarity

Applicability

- “**Industrial stormwater run-off**” are activities that take place at industrial facilities, such as material handling and storage, that are often exposed to the weather. As runoff from rain or snowmelt comes into contact with these activities, it can pick up pollutants and transport them to a nearby storm sewer system or directly to a river, lake, or coastal water. To minimize the impact of stormwater discharges from industrial facilities, the NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activity that require authorization under an NPDES industrial stormwater permit for stormwater discharges. More information on industrial permit requirements can be found at <http://dnr.mo.gov/env/wpp/stormwater/sw-industrial-permits.htm>.
- A “**larger common plan of development or sale**” is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan. For example, if a developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller plots were included on the original site plan. Other than the less than one acre property sold to the individual for construction of their personal residence, property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity. The larger common plan of development or sale also applies to other types of land development such as industrial parks or well fields. A permit is required if one or more acres of land will be disturbed, regardless of the size of any of the individually-owned or developed sites.
- Documentation of Permit Eligibility Related to **Endangered Species**: The SWPPP must include documentation supporting a determination of permit eligibility with regard to Endangered Species.

For more information please visit the following links:

For information on understand what critical habitat is, please go to the following link, www.fs.fed.us/r9/wildlife/tes/docs/esa_references/critical_habitat.pdf.

For information on listed species by State & County, please go to the following link, <http://cfpub.epa.gov/npdes/stormwater/esa.cfm>.

The Missouri Department of Conservation's internet site for the Natural Heritage Review may be very helpful and can be found at the following link, <http://mdcgis.mdc.mo.gov/heritage/newheritage/heritage.htm>. Also helpful are the local offices of the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), these centers often maintain lists of federally listed endangered or threatened species on their internet sites.

If there are listed species in the county or township, check to see if critical habitat has been designated and if that area overlaps or is near the project area. Critical habitat designations and associated requirements may also be found at 50 CFR Parts 17 and 226. For additional information, use the mapview tool at <http://criticalhabitat.fws.gov/crithab/> to find data specific to your state and county.

- A Clean Water Act **Section 404 Department of the Army Permit** and the Department's Clean Water Act Section 401 Water Quality Certification (certification) are needed when placing material or fill into jurisdictional waters of the United States. Any impacts to jurisdictional streams or wetlands would require an application to be sent to the appropriate US Army Corps of Engineers District Regulatory Branch. A map of the district offices and contact information can be located online at: <http://www.dnr.mo.gov/env/wpp/401/corps-map3.gif>. Not all land disturbance projects will require a 404 permit; however, if a 404 permit is required, land disturbance activities are not to be conducted in the jurisdictional area of the project until the 404 permit has been obtained. A discussion on the need for a 404/401 permit as a requirement of this permit and is to be included in the SWPPP.

Exemptions from Permit Requirements

- The USEPA defines **linear projects** to include the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area. Missouri regulation 10 CSR 20-6.200 (1)(B) 8 exempts linear project construction from stormwater permit regulations which meet one of the following: A. Grading of existing dirt or gravel roads which does not increase the runoff coefficient and the addition of an impermeable surface over an existing dirt or gravel road; B. Cleaning or routine maintenance of roadside ditches, sewers, waterlines, pipelines, utility lines or similar facilities; C. Trenches two (2) feet in width or less; or D. Emergency repair or replacement of existing facilities as long as best management practices are employed during the emergency repair.

Permit Requirements

- The permittee is required to conduct inspections of the site. The person(s) inspecting the site may be a staff person or a hired third party to conduct such inspections. The permittee is responsible for ensuring that the person who conducts inspections is a “qualified person or personnel.” A “**qualified person**” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected to control the quality of stormwater discharges from the construction activity.
- A sample **inspection report** has been developed as a helpful tool to aid in completing site inspections. This sample inspection report was created consistent with USEPA’s Developing Your Stormwater Pollution Prevention Plan and can be found at http://www.epa.gov/npdes/pubs/sw_swppp_inspection_form.doc. Both the guide and the sample inspection report (formatted in Microsoft Word) can be found at <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm>.
- For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) **sediment basin** that provides storage for a calculated volume of runoff from the drainage area from a 2-year, 24-hour storm, or equivalent control measures, must be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, must be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from offsite areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the operator may consider factors such as site soils, slope, available area on-site, etc. In any event, the operator must consider public safety, especially as it relates to children, as a design factor for the sediment basin, and alternative sediment controls must be used where site limitations would preclude a safe design.
- **Public Notification:** A public notification sign has been added to the permit. If a different sign is to be used it should be one of the same size sign and lettering and containing the same information as that of the one supplied with the permit. The required information includes a statement for those with questions or concerns, the permit number and the Department’s toll free phone number. The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

Other Discharges

- Machinery should be kept out of the waterway as much as possible. Fuel, oil and other petroleum products, equipment and any solid waste should not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions are to be taken to avoid the release of wastes or fuel as a result of this operation. Petroleum products spilled should be immediately cleaned up and disposed of properly. Any such **spills of petroleum or other chemicals** are to be reported as soon as possible to the Department's 24-hour Environmental Emergency Response number at (573) 634-2436.

Sampling Requirements and Other Effluent Limitations

- 40 CFR 450.21 Subpart B - Construction and Development (C&D) Effluent Guidelines are **non-numeric effluent limits** and are structured to require construction operators to first prevent the discharge of sediment and other pollutants through the use of effective planning and erosion control measures; and second, to control discharges that do occur through the use of effective sediment control measures. Permittees are also required to implement a range of pollution prevention measures to limit or prevent discharges of pollutants including those from dry weather discharges. The C&D rule's non-numeric effluent limits are available at the following internet site: <http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol29/xml/CFR-2010-title40-vol29-sec450-21.xml>. The associated fact sheet can be found at: http://www.epa.gov/npdespub/pubs/cgp_proposedfs.pdf.
- The USEPA has proposed numeric **effluent limitation guidelines** (ELGs) to control the discharge of pollutants from construction sites of a certain size. The Department may modify this permit upon finalization of the USEPA effluent limitation guidelines. The proposed Effluent limitation guidelines can be view at the following website <http://water.epa.gov/scitech/wastetech/guide/construction/>.

Land Purchase and Change of Ownership

- A person having **operational control over only a portion of a larger project** (e.g., one of four homebuilders in a subdivision), is responsible for compliance with all applicable effluent limits, terms, and conditions of the permit as it relates to the activities on that portion of the construction site, including protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP. This person must ensure either directly or through coordination with other permittees, that these activities do not render another party's pollutant discharge controls ineffective. This person must either implement their own portion of a common SWPPP or develop and implement their own SWPPP. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required to, develop separate SWPPPs that cover only their portion of the project provided referenced is made to other operators at the site. In instances where there is more than one SWPPP for a site, cooperation between the permittees is encouraged to ensure stormwater discharge control measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).
- The Department does not allow the transfer of a land disturbance permit from one owner to another; however, to facilitate the change in the ownership status of a property the Department developed the "Application for Change of Ownership" form. This form will allow the new owner to receive a new permit and number. The form may also be used to terminate the original permit if all the property included in the original permit is no longer the responsibility of the original owner. The "Application for Change of Ownership" (form MO780-2051) can be found online at <http://www.dnr.mo.gov/forms/#StormWater>.

Termination

- To begin the process of terminating this permit, the permittee should submit Form H – "Request for Termination" (MO780-1409) to the Department. The form can be found at the following web location: <http://www.dnr.mo.gov/forms/#StormWater>.

PART V. Addendums to Fact Sheet

Addendum #1

Individual Lot Certification

This form is not a requirement of the permit, but may be used by the permittee when selling individual lots that are part of the property that has been authorized by a Missouri Water Pollution Control General Permit under the NPDES for stormwater discharged associated with construction activity. This is a certification between the purchaser and the seller to cooperatively implement the SWPPP and the conditions of the NPDES permit and does not constitute a transfer of the permit. The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certification forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources.

Addendum #2

Response to Comments

The public comment period for this permit expired on October 30, 2011. Addendum #2 contains the Missouri Department of Natural Resources' response to comments received during the public comment period.

ADDENDUM #1
INDIVIDUAL LOT CERTIFICATION

For Storm Water Discharges Associated with Construction Activity Authorized by a Missouri Water Pollution Control General Permit under the National Pollutant Discharge Elimination System

TO BE COMPLETED BY THE NEW LOT OWNER

I certify, under penalty of law, that I have received a copy of the general NPDES permit referenced below, which authorized the original lot owner or developer to discharge storm water runoff from construction activities, and the Storm Water Pollution Prevention Plan (SWPPP) prepared by the original lot owner or developer. I have reviewed the terms and conditions of the general permit and the SWPPP. I accept responsibility for erosion and sediment control during construction of the home or building for each of the lot(s) listed below. In the event the Missouri Department of Natural Resources notifies the undersigned of water quality violations due to conditions at any lot listed below and I am unable or unwilling to take action within 30 days to further reduce erosion or control sediment, then I agree to allow the original lot owner or developer to have reasonable access to the site to implement erosion and sediment control measures. I understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Facility Name: _____
(as listed on permit)

Permit Number: MOR _____

Lot Number(s): _____

New Owner's Signature: _____

Name (typed or printed): _____

Phone Number: _____

Complete Only if New Owner is a Corporation and not an Individual:

Company Name: _____

Company Address: _____

Company Phone #: _____

TO BE COMPLETED BY THE PERMIT HOLDER

As permittee for the overall tract wherein the above listed lot(s) are located, I certify that I have provided the above named lot purchaser with a copy of the general NPDES permit and the Storm Water Pollution Prevention Plan (SWPPP) for the project, and I have informed the lot purchaser of their responsibility to minimize erosion and control sedimentation. I understand this certification does not constitute a transfer of the permit and understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Signature: _____

Name (typed or printed): _____

Phone Number: _____

The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certifications forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources upon request.

ADDENDUM #2

MORA00000 Land Disturbance Permit Response to Public Notice Comments

(The Missouri Department of Natural Resources' public notice comment period for this permit expired on October 30, 2011.)

GENERAL COMMENT RESPONSES

LAND DISTURBANCE PERMIT MOR100

The Department received certain comments specifically related to the MOR100 permit (the area-wide permit for state, federal, local government, etc.). These comments may be considered in the development of that permit. The MOR100 permit expires March 2012. There has been no change to the permit as a result of these comments.

FEDERAL REGULATION 40 CFR 450.21

As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CRF 450.21. These are non-numeric effluent limitations reflecting the best practicable technology currently available (BPT). Some limitations come with the words "unless infeasible." The Department received several questions on who determines what is or isn't feasible. The owner or operator is to make the determination for a specific project site if a requirement is infeasible and document in the SWPP as to why it is infeasible. There has been no change to the permit as a result of this comment.

EPERMITTING and FEES

The Department received a few comments regarding electronic permitting (epermitting) and permit fees. These comments have been relayed to the respective workgroups. The first phase of epermitting is expected to be completed mid-year 2012 and will include the issuance of new land disturbance permits. At this time, all renewals will be processed without epermitting. More information regarding electronic permitting will be placed on the Department's webpage in the very near future. There has been no change to the permit as a result of these comments.

TYPOS/RENUMBERING/DEFINITIONS

The Department received comments regarding typos, renumbering and similar items in the proposed permit. These entries have been corrected in the final permit.

The Department received comments suggesting definition and clarification to several areas of the proposed permit. All suggestions were considered and many have been added to the permit Fact Sheet.

SPECIFIC COMMENT RESPONSES

SECTION A. APPLICABILITY

OWNER/OPERATOR

Section A.1. - The Department received comments regarding the owner/operator statement asking for clarification of primary responsibility for compliance with the permit and to expand the responsibility to include the holder of an easement on the property as an alternative to the property owner. If there are enforcement actions the Department has the authority to involve all parties as necessary and to the extent possible. The Department has revised the applicability language to include easement in lieu of property owners where appropriate.

The Department received a comment requesting there be a differentiating permit between land development and vertical house construction. With exception to lots that are part of a larger common plan of development or sale, this permit is required for land disturbances for any reason based on the size (the acreage) of the disturbance. There has been no change to the permit as a result of this comment.

The Department received comments requesting the inclusion of other areas (borrow pits) which are outside the permitted area as well as an allowance for a specific activity (portable concrete and asphalt plants) to be listed in the permit. The Department believes that the permitted areas should be sufficiently stated in the application and the SWPPP to include all areas where land disturbance activities are planned to take place. There has been no change to the permit as a result of these comments.

DISCHARGES

Section A.2. - The Department received a comment asking to identify non-stormwater discharges. For the purposes of this rule, non-stormwater discharges are identified in this section of the permit. There has been no change to the permit as a result of this comment.

Section A.2. - The Department received comments requesting we add “flushing fire hydrants and potable water lines” back to the list of authorized non-stormwater discharges. Current regulation (10CSR 20.6.010 (1) (B)7) exempts these discharges from all general permitting. However, the Department has added these items back to the permit.

Section A.4. - The Department has clarified, in the permit Fact Sheet, what is meant by “industrial stormwater runoff”.

OTHER FEDERAL REGULATION

Section A.8. - A Clean Water Act Section 404 Department of the Army Permit and the Department's Clean Water Act Section 401 Water Quality Certification (certification) are needed when placing material or fill into jurisdictional waters of the United States. Any impacts to jurisdictional streams or wetlands would require an application to be sent to the appropriate US Army Corps of Engineers District Regulatory Branch. Contact information can be found at <http://www.dnr.mo.gov/env/wpp/401/corps-map3.gif>. Not all land disturbance projects will require a 404 permit; however, if a 404 permit is required then land disturbance activities are not to be conducted in the jurisdictional area of the project until the 404 permit has been obtained. Language in the permit has been reworded and additional information added to the permit Fact Sheet to help better clarify this concern.

Section A.9. - Compliance with the Historic Preservation Act and the Endangered Species Act is not a requirement to obtain a land disturbance permit. However, NPDES permittees must be in compliance with these federal regulations. The Department has added a statement to the permit Fact Sheet, that this permit does not supersede compliance with other federal requirements.

Section A.10. – The Department added language to the permit that the permit does not superseded any local authority requirement to obtain approval for a land disturbance project.

SECTION B. EXEMPTIONS FROM PERMIT REQUIREMENTS

Section B.2. – The Department received a comment requesting that we list the general permit exemptions outlined in the cited regulations. Missouri State Regulations 10CSR 20-6.200 (1) (B) and 10 CSR 20.6.010 (1) (B) outline exemptions from NPDES stormwater permits and all NPDES general permits, respectively. There has been no change to the permit as a result of this comment.

Section B.3. – The Department received comments requesting we include the words “maintenance operations” in this sentence. The permit language has been updated with this inclusion. A discussion on linear, strip, and ribbon construction and maintenance exemptions can be found in the permit Fact Sheet.

Section B.5. – The Department received a comment recommending the inclusion of CAFOs in the Agriculture Exemption. The Department removed the second sentence from the draft permit so that this section continues to read as it did in the previous permit.

SECTION C. REQUIREMENTS

Section C.1. a-g. – This section of the permit outlines verbatim the federal requirements of 40 CFR 450.21 effluent limitations reflecting the best practicable technology currently available (BPT). These are non-numeric effluent limits which the NPDES permitting authority must include in the permit. The Department received several comments regarding this section of the permit; it was recommended that we remove this section of the permit, it was recommended that we delete some of the wording, and there were comments which questioned the practicality of some items. When the Department does not have design guidelines for federal requirements, it is left to the discretion of the stormwater professional as to the proper design protocol. There were no changes to the permit as a result of these comments.

Section C.2.e. – The Department received comments regarding the need to comply with 404/401 permitting versus the requirement to comply in order to obtain a stormwater permit and identifying this in the SWPPP. The Department has added language to the permit Fact Sheet which describes the SWPPP requirement regarding 404/401 permitting is only to verify that the need for a 404/401 permit was addressed. For additional discussion on the 404/401 requirement, please refer to the Department’s response to Section A.8. of this document.

SELECTION OF TEMPORARY AND PERMANENT NON-STRUCTURAL BMPS

Section C.3.e. – The Department received several comments regarding this section of the permit. The requirement of a buffer is part of federal regulation 40 CFR 450.21. This is the federal requirement which covers the non-numeric effluent limits which the permitting authority must include in the permit.

The regulation states, “The permittee is to provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible..” The permit requires a 25-foot buffer at minimum. The Department has added language to the permit which will allow for a more stringent local government buffer requirement.

For additional related discussion please refer to the earlier section of this document titled “General Comment Responses”

DISTURBED AREAS

Section C.3.h. - The Department received several comments regarding this section of the permit. Stabilization is addressed in federal regulation 40 CFR 450.21. This is the federal requirement which covers the non-numeric effluent limits which the permitting authority must include in the permit. The regulation states - “Stabilization of disturbed areas must, at minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site

and will not resume for a period exceeding 14 calendar days. Stabilization must be completed within a period of time determined by the permitting authority.” The Department has included the exact federal language into the permit and has designated a period of 7 days to complete stabilization activities. Temporary (interim) stabilization clarification: Stabilization is to begin as soon as the operator knows an area will need interim stabilization. The Department has also included, in the permit, allowances for weather and equipment malfunctions. For additional related discussion please refer to the earlier section of this document titled “General Comment Responses”

BMP INSTALLATION

Section C.3.i. – The Department received one comment regarding the installation of BMPs and another comment recommending the words “not to exceed 24 hours” be added after the word “immediately”. The permit will continue to allow for certain BMP installations to occur after initial site clearing to establish entry, exit and access and to require that stormwater controls be installed immediately after the earth disturbance. There were no changes to the permit as a result of this comment.

SEDIMENT BASINS

Section C.3.j. – The Department received two comments regarding the removal of sediments from sediment basins. The Department additionally received suggested wording when the use of sediment basin is impracticable. The Department has made changes to the permit to address these comments. The Department also received a comment regarding the feasibility of the use of outlet structures that withdraw water from the surface. Withdrawing water from the surface is a requirement of federal regulation 40 CFR 450.21. This is the federal requirement which covers the non-numeric effluent limits which the permitting authority must include in the permit. For additional related discussion please refer to the earlier section of this document titled “General Comment Responses”.

ROADWAYS

Section C.3.m. – The Department received several similar comments on this section of the permit and has responded with rewording the second sentence of this paragraph. The new sentence reads, “Stormwater inlets susceptible to receiving sediment from the permitted land disturbance site shall have curb inlet protection.” In addition, the Department has reworded the last sentence of this paragraph. The new sentence reads; “Where practicable, construction entrance BMP controls shall be used to prevent sediment track-out”.

Section C.6. - This section has to do with the individual designated by the permittee as responsible for environmental matters. This section has been moved so that it precedes Section C.9. Site Inspection Reports.

AMENDING AND UPDATING THE SWPPP

Section C.8.e. - The proposed permit states, "SWPPP is determined to be ineffective in preventing or controlling erosion and sedimentation (e.g., there is visual evidence of excessive site erosion or excessive sediment deposits in streams or lakes). The Department received two comments recommending a change to this sentence. The Department has replaced the word "preventing" with the word "minimizing" in the final permit.

Section C.8.g. - The Department changed this line to read "Exceedances of effluent limitations for new source performance standards for construction activities in accordance with 40 CFR Part 450.21." This is the federal requirement which covers the non-numeric effluent limits which the permitting authority must include in the permit. For additional related discussion please refer to the earlier section of this document titled "General Comment Responses".

INSPECTION REPORTS

Section C.9. - The Department received several comments regarding site inspection reports. The Department has made changes to this section of the permit to address most of the comments received. The Department added the words "When practicable" to the middle sentence of the first paragraph so that it reads, "When practicable the receiving stream shall also be inspected for 50 feet downstream of the outfall." The Department has made changes to the last sentence of the first paragraph so that it now reads, "If rainfall causes stormwater runoff to occur on-site, the BMPs must be inspected within a reasonable time period after the rainfall event has ceased. Inspections must occur within 48 hours during normal work days, plus an additional 24 hours for each non-workday for weekends and holidays."

PUBLIC NOTIFICATION

Section C.12. - The Public Notification sign is included with the issued permit. The Department has added language to the permit Fact Sheet to describe what is acceptable should a different sign be posted. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP.

SECTION E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

Section E.2. - The Department received several comments regarding the proposed effluent limitations. Commenters have requested that the settleable solid limit remain at 2.5 ml/L just as it was in the previous standard land disturbance permit. The permit has been revised to a settleable solid (SS) limit of 2.5 ml/L per Standard Methods 2540 F and includes a local 2-year 24-hour storm event. Runoff and peak discharge information can be found online at ftp://ftp-fc.sc.egov.usda.gov/MO/eng/EFH/EFH_MO_Sup_Chap_02-1.pdf.

SECTION G. LAND PURCHASE AND CHANGE OF OWNERSHIP

The Department received four comments related to this section of the permit. In addition to recommendations received from commenters, the Department has also looked at how other states address this area of their permit. To better clarify the Department's intent with regard to property belonging to "a larger common plan of development or sale" a new statement has been added to the permit. This statement as well as language in the permit Fact Sheet clarifies that any property which was once permitted as "a larger common plan of development or sale" will require and an application for a new permit for any future land disturbance on that property.

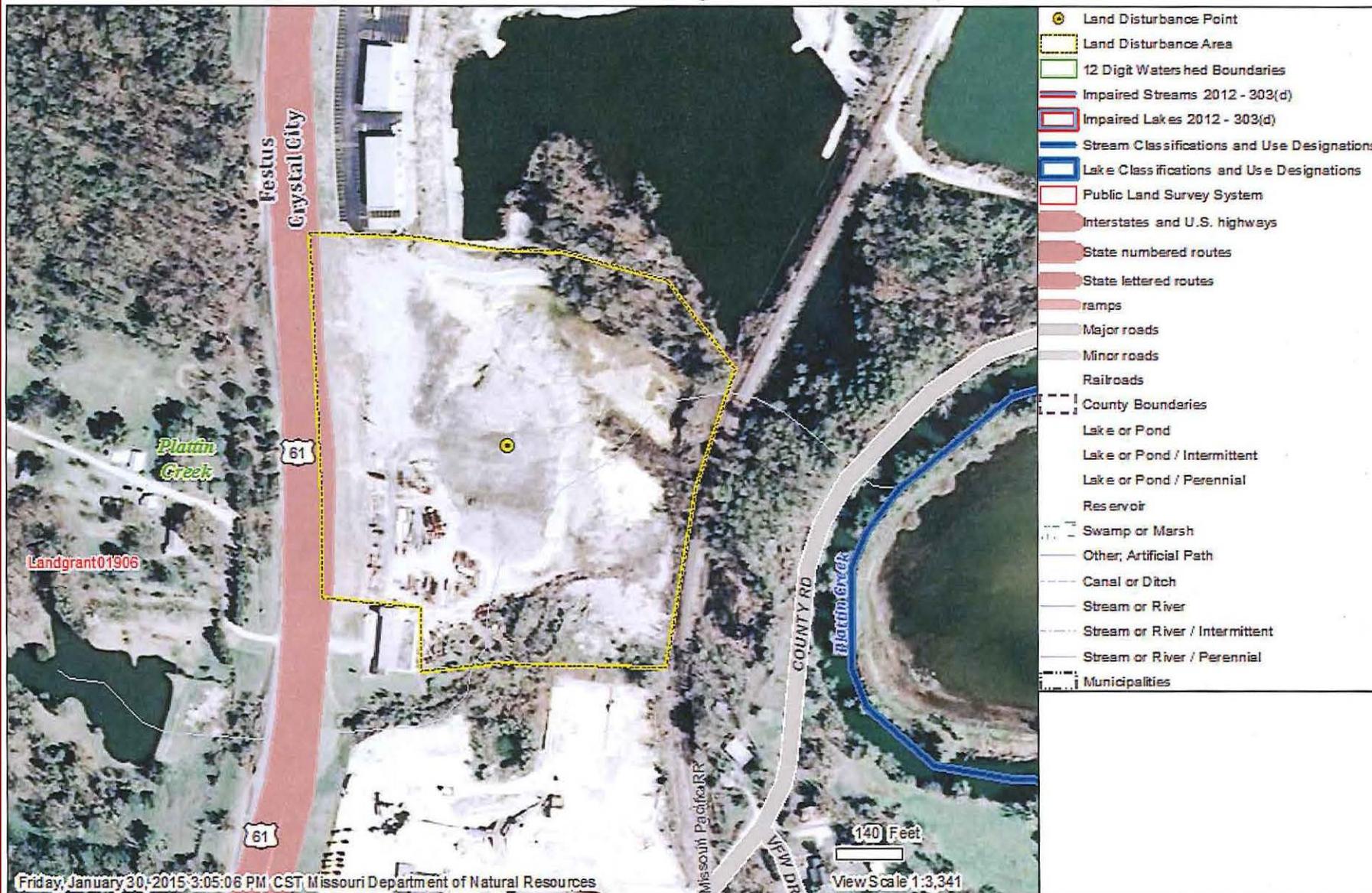
The Department received a request that there be a differentiating permit between land development and vertical house construction. The Department would need more discussion and justification to fully explore and respond to this request. There has been no change to the permit as a result of this comment.

SECTION H. TERMINATION

The Department received a few comments regarding permit transfer and permit coverage continuance. The Department does not allow the transfer of a land disturbance permit from one owner to another; however, to facilitate the change in the ownership status of a property the Department developed the "Change of Ownership" form. This is an application that will allow the new owner to receive a new permit and number. The form may also be used to terminate the original permit if all the property included in the original permit is no longer the responsibility of the original owner. The "Change of Ownership" application form can be found online at <http://dnr.mo.gov/forms/index.html#WaterPollution>. This web location has been added to the permit Fact Sheet.

The Department received a comment regarding the administrative continuance of an issued permit. This permit does not continue administratively. The permit is not valid after the expiration date. A new permit would need to be issued for the site where work has not been completed and the property has not been stabilized in accordance with the termination requirements. Language has been added to the permit in order to better clarify this issue.

MoDNR Geographic Information System Editor



- Land Disturbance Point
- Land Disturbance Area
- 12 Digit Watershed Boundaries
- Impaired Streams 2012 - 303(d)
- Impaired Lakes 2012 - 303(d)
- Stream Classifications and Use Designations
- Lake Classifications and Use Designations
- Public Land Survey System
- Interstates and U.S. highways
- State numbered routes
- State lettered routes
- ramps
- Major roads
- Minor roads
- Railroads
- County Boundaries
- Lake or Pond
- Lake or Pond / Intermittent
- Lake or Pond / Perennial
- Reservoir
- Swamp or Marsh
- Other; Artificial Path
- Canal or Ditch
- Stream or River
- Stream or River / Intermittent
- Stream or River / Perennial
- Municipalities

Friday, January 30, 2015 3:05:06 PM CST, Missouri Department of Natural Resources

140 Feet
View Scale 1:3,341



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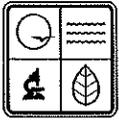


Missouri
Department of
Natural Resources

STORMWATER DISCHARGES
FROM THIS LAND DISTURBANCE
SITE ARE AUTHORIZED BY THE
MISSOURI STATE OPERATING
PERMIT NUMBER:

ANYONE WITH QUESTIONS OR
CONCERNS ABOUT
STORMWATER DISCHARGES
FROM THIS SITE, PLEASE
CONTACT THE MISSOURI
DEPARTMENT OF NATURAL
RESOURCES AT

1-800-361-4827



MISSOURI DEPARTMENT OF NATURAL RESOURCES

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Kansas City Area

- **Kansas City Regional Office**
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Lee's Summit, MO 64086-4710
816-251-0700
FAX: 816-622-7044
- **Northwest Missouri Satellite Office**
Northwest Missouri State University
Environmental Services Building,
800 University Dr.
Maryville, MO 64468-6015
660-562-1876 or 660-562-1877
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- **Truman Lake Satellite Office**
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Neosho, MO 64850
417-455-5180 or 417-455-5158
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Northeast Area

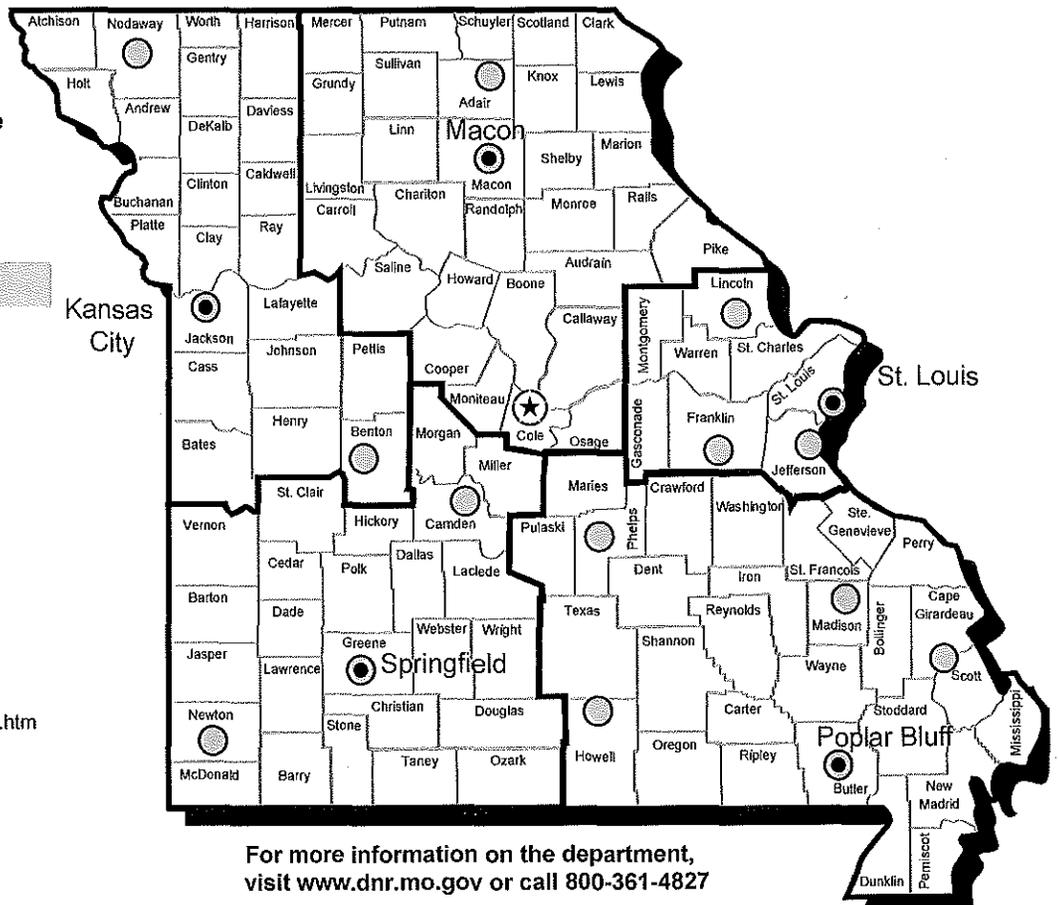
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660-385-8000
FAX: 660-385-8090
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- **Franklin County Satellite Office**
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Sullivan, MO 63080
573-860-4308
FAX: 573-468-5051
- **Jefferson County Satellite Office**
Eastern District Parks Office
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Festus, MO 63028
636-931-5200
FAX: 636-931-5204
- **Lincoln County Satellite Office**
Cuivre River State Park
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Troy, MO 63379
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FAX: 636-528-8362

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FAX: 573-840-9754
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573-783-2385
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- **Rolla Satellite Office**
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FAX: 573-368-3912



For more information on the department,
visit www.dnr.mo.gov or call 800-361-4827

Appendix C

Geotechnical Report



SCI ENGINEERING, INC.

47 St. Andrews Drive
Union, Missouri 63084
636-584-7991 Fax 636-584-7966
www.sciengineering.com

Geotechnical Report

**ROTARY DRILLING SUPPLY SITE, INC.
CRYSTAL CITY, MISSOURI**

**November 2014
Revised June 2015**

**ROTARY DRILLING SUPPLY SITE, INC.
Owner**

**GOODWIN BROTHERS CONSTRUCTION CO.
General Contractor**

**GOVERO LAND SERVICES, INC.
Civil Engineer/Surveyor**

SCI No. 2014-5129.10



US EPA ARCHIVE DOCUMENT



SCI ENGINEERING, INC.

CONSULTANTS IN DEVELOPMENT,
DESIGN AND CONSTRUCTION
GEOTECHNICAL
ENVIRONMENTAL
NATURAL RESOURCES
CULTURAL RESOURCES
CONSTRUCTION SERVICES

June 12, 2015

Mr. Darriel F. Coleman
Rotary Drilling Supply, Inc.
1150 Truman Boulevard
P.O. Box 302
Crystal City, Missouri 63028

RE: Geotechnical Report (Revised)
Rotary Drilling Supply Site, Inc.
Crystal, Missouri
SCI No. 2014-5129.10

Dear Mr. Coleman:

Attached is our *Geotechnical Report*, dated November 2014, revised June 2015. It should be read in its entirety, and our recommendations applied to the design and construction of the project. Selected excerpts from the report are highlighted below:

- Acceptable materials for the proposed clay cap include low permeability materials, such as lean clay (CL) or fat clay (CH), with a permeability of less than or equal to 1×10^{-6} centimeters per second. The clay cap should be at least 24 inches thick and should be placed and compacted as described in the report. However, if CH soils are used within the clay cap, potential issues with volume change may influence shallow foundations, as further discussed in the report.
- We confirmed the presence of fill materials, including the Coal (CCR) material across the site at depths ranging from approximately 3 to 28.5 feet (El. 417 to 392). Based on present knowledge of the site, the engineering properties and performance of the existing fill cannot be predicted with certainty. Foundation recommendations requiring differing amounts of risk are provided in this report.
- Auger refusal was encountered in borings B-2 and B-6 at depths of 15 feet and 10 feet respectively. Based on observations at the time of drilling, including rock outcroppings adjacent to the site, it is believed that auger refusal occurred on bedrock.
- Groundwater was encountered near the bottom of the existing fill soils at depths of 22.5 feet to 29 feet during drilling. It is not anticipated that groundwater will have an effect on the proposed grading activities.
- Global stability analyses were performed on the proposed slope configurations. At each of the cross sections analyzed, the minimum factors of safety were achieved, as discussed in the report.

We appreciate the opportunity to be of service, and look forward to working with you during the construction phase of the project. SCI should participate in a meeting prior to clearing/grading of the site. Such meetings are valuable in reviewing and clarifying project requirements and responsibilities.

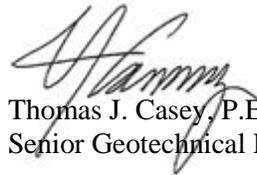
If you have any questions or comments, please call.

Respectfully,

SCI ENGINEERING, INC.



Hobson H. Fizette, P.E.
Staff Engineer



Thomas J. Casey, P.E.
Senior Geotechnical Engineer

HHF/TJC/tlw

Enclosure
Geotechnical Report

C: Mr. Adam Breeze; Breeze Law Firm
Mr. Larry Goodwin; Goodwin Brothers Construction

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- Figure 2 - Aerial Photograph
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- Appendix A - Boring Log Legend and Nomenclature, Boring Logs, Laboratory Test Results
- Appendix B - Slope Stability Analyses

Geotechnical Report

ROTARY DRILLING SUPPLY SITE CRYSTAL CITY, MISSOURI

1.0 INTRODUCTION

At the request of Mr. Darriel Coleman of Rotary Drilling Supply Site, Inc., SCI Engineering, Inc. (SCI) conducted a geotechnical exploration on the existing site. The purpose of our exploration was to characterize and evaluate the subsurface conditions, evaluate the proposed slopes for stability, and provide limited recommendations related to the potential site development. Our services were provided in general accordance with our proposal dated August 21, 2014, as authorized by Mr. Coleman on September 10, 2014.

2.0 SITE AND PROJECT DESCRIPTION

We understand the site is located at 1150 South Truman Boulevard in Crystal City, Missouri, as shown on the *Vicinity and Topographic Map*, Figure 1. A portion of the site was previously filled with Coal Combustion Residue (CCR) and other fill materials beginning on the western end of the site dating back to at least 1996, as shown on the *Aerial Photograph*, Figure 2. Available documentation estimates the amount of fill to be at least 140,000 tons.

The United States Environmental Protection Agency (EPA) has previously investigated the site, which resulted in an *Administrative Order of Consent* (AOC) being issued to the owner. Due to the nature of the fill material, the EPA has required that the site and slopes be covered with a protective clay cap. We understand that as part of an overall containment plan, or what is referred to as the *Long Term Work Plan*, the site will be graded to form stable slopes and the site capped to reduce surface water infiltration, erosion and runoff concerns.

As part of the planned improvements, a permanent detention basin will be constructed near the southeast corner of the site in an existing low area. Additionally, to collect sediments from stormwater runoff during construction activities, an additional sedimentation basin will be constructed on the southeast corner of the area to receive the clay cap, and will ultimately be removed upon completion of the grading and cap installation activities. While we understand that future development is a possibility, plans detailing future development on the site were not available at the time of this report.

SCI is currently completing a *Site Health and Safety Plan*, a *Short Term Work Plan*, a *Long Term Work Plan*, and a *Wetland/Waterbody Reconnaissance* in conjunction with a *Section 404 permit* submitted to the United States Army Corps of Engineers (USACE) for the subject site. Those plans and reports are to be submitted under a separate cover(s). We are not reviewed, nor are we aware of, any other previous studies by SCI or others, that would affect the preparation of this report.

3.0 SUBSURFACE CONDITIONS

A total of eight borings, designated as B-1 through B-8, were drilled at the approximate locations shown on the *Site Plan*, Figure 3. Detailed information regarding the nature and thickness of the soils and rock encountered, and the results of the field sampling and laboratory testing are shown on the Boring Logs in Appendix A.

The boring locations were staked in the field by SCI personnel measuring from existing site features. Approximate ground surface elevations at the boring locations were interpolated from an *Existing Conditions* plan prepared by Govero Land Services, Inc (Govero), dated March 13, 2013. If more precise locations and elevations are required, we recommend you retain the project surveyor to survey the boring locations.

In each of the eight borings, existing fill was encountered to depths of 27 to 28.5 feet (El. 392 to 395). Based on available imagery at the time of this report, the fill appears to have been placed from the western end to the eastern end of the site, as detailed on the *Aerial Photograph*. In general, the fill consisted of flyash (CCR) and silt (ML) containing varying amounts of crushed rock, sand, and cinders. Additionally, a large stockpile of soil has been placed on the site for future site grading activities. To determine the moisture density and volume change characteristics of the stockpiled material, Modified proctor tests and Atterberg limits tests were performed, and are included in Appendix A.

The consistency of the fill soils was variable and ranged from soft to very stiff in consistency with SPT N-values ranging from 1 to 65 blows per foot (bpf), averaging 10 bpf. Additionally, the moisture content within the fill soils was high, and ranged from 8 to 89 percent, with an average of 47 percent. To further characterize the characteristics of the fill soils, unit weight measurements and triaxial unconsolidated-undrained tests were performed on selected Shelby Tube samples, as detailed in Table 3.1 below.

Table 3.1 – Fill Soil Laboratory Test Results

Boring No.	Depth (ft)	Unit Weight (pcf)	Unconfined Compressive Strength (UU, ksf)
B-1	8-10	70	5.1
B-4	13-15	58	8.0
B-8	18-20	54	2.9

Beneath the fill soils, the natural soils encountered consisted of interbedded layers of lean clay (CL), sandy clay (CL), clayey sand (SC), and sand (SP). To characterize the volume change characteristics of the soils, Atterberg limits testing was performed on selected samples. The Atterberg limits testing resulted in liquid limits of 32 to 43 with corresponding plasticity indices of 12 to 23. These results indicate that the soils are low plastic in nature. The consistency of the natural cohesive soils was soft with SPT N-values of 1 to 4 bpf, while the consistency of the natural granular soils ranged from loose to medium dense with N-values of 3 to 11 bpf, averaging 6 bpf. Moisture contents within the natural cohesive soils ranged from 23 to 29 percent, and averaged 27 percent. To further characterize the characteristics of the natural soils, unit weight measurements and triaxial unconsolidated-undrained tests were performed on selected Shelby Tube samples, as detailed in Table 3.2 below.

Table 3.2 – Natural Soil Laboratory Test Results

Boring No.	Depth (ft)	Unit Weight (pcf)	Unconfined Compressive Strength (UU, ksf)
B-1	28-30	106	4.4
B-1	35-36.5	107	N/C
B-1	35.5-36.5	98	1.6
B-4	33-34	100	--
B-4	34-35	99	1.6
B-8	38-40	99	1.6

Auger refusal was encountered in borings B-2 and B-6 at depths of 15 feet and 10 feet respectively. Based on observations at the time of drilling, including rock outcroppings adjacent to the site, it is believed that auger refusal occurred on bedrock. Auger refusal is a designation applied to any material that cannot be further penetrated by the power auger without extraordinary effort, and is indicative of a very hard or very dense material, usually boulders or bedrock.

Groundwater levels observed at the time of drilling are summarized in Table 3.3. It should be noted that the groundwater level is subject to seasonal and climatic variations, the water level in the adjacent Willers Lake, and other factors; and may be present at different depths in the future. In addition, without extended periods of observation, measurement of the true groundwater levels may not be possible.

Table 3.3 – Summary of Approximate Groundwater Levels

Boring No.	Depth To Groundwater During Drilling (ft)	Groundwater Elevation During Drilling (ft)	Delayed Groundwater Depth (ft) ^A	Delayed Groundwater Elevation (ft) ^A
B-1	29.0	393.0	30.0	392.0
B-4	24.5	397.5	23.5	396.5
B-5	22.5	399.5	N/A	N/A
B-8	24.5	395.5	27.0	393.0

^ADelayed groundwater readings were taken 24 hours after drilling was completed.

4.0 DESIGN RECOMMENDATIONS

4.1 Slope Stability Analyses

As part of the planned site remediation, global stability analyses were performed at three of the proposed cross sections, designated as A-A', B-B', and C-C', as detailed on the *Site Plan*. Based on the plans provided by Govero, the proposed slopes are configured at 2 horizontal to 1 vertical (2H:1V), 3H:1V, and compound 2H:1V and 3H:1V inclinations.

Slope stability analyses were conducted using limit equilibrium slope stability methods and the commercially available software program Slope/W (part of the GeoStudio 2012 software package developed by Geo-Slope International). A Morgenstern-Price analysis was used to search for a circular failure to calculate the factor of safety for the slope.

The slopes were evaluated using short-term, long-term and seismic loading conditions. For the static, long-term slope stability analyses, effective stress values were used in a simplified soil profile developed for the slopes. For the short-term analyses, total stress values were used. To model the seismic loading, a seismic coefficient of 0.11g was applied, in general accordance with the procedures outlined in the Federal Highway Administration (FHWA) publication FHWA-HI-99-012. Additionally consideration was applied to future developments by incorporating surcharge loads of 250 psf and 2,000 psf to represent loading from parking lots and building foundations, respectively. The building foundations were modeled

30 feet back from the top edge of the slope. The soil parameters and the slope geometry used for the stability analyses can be found on the attached slope stability outputs.

Based on cursory observations at the time of our site visit, the existing slope configurations appear to be stable. To further calibrate the model for the proposed conditions, the existing conditions were modeled at each of the three cross sections, and the the soil parameters were refined to result in a factor of safety near 1.0. Once the existing conditions were modeled, the proposed geometry at the cross sections was modeled from the plans provided to SCI on July 31, 2014 by Govero. **If future development plans include adding more fill than currently indicated, or if different slope configurations are proposed, SCI should be retained to review our recommendations, and perform additional analyses if required.** Based on the proposed slope configurations, and the estimated future loading on the site, the minimum factors of safety were met. The FS for each cross section are shown on the output plots in Appendix B, and are summarized in Table 4.1 below.

Table 4.1 – Summary of Slope Stability Factors of Safety

Location	Short Term (End of Construction)		Long Term		Seismic	
	Required Minimum Factor of Safety	Estimated Factor of Safety	Required Minimum Factor of Safety	Estimated Factor of Safety	Required Minimum Factor of Safety	Estimated Factor of Safety
Cross Section A-A' (Existing)	N/A	1.6	N/A	1.2	N/A	N/A
Cross Section A-A' (Proposed)	1.5	1.8	1.5	1.7	1.0	1.2
Cross Section B-B' (Existing)	N/A	1.6	N/A	1.2	N/A	N/A
Cross Section B-B' (Proposed)	1.5	1.5	1.5	1.5	1.0	1.2
Cross Section C-C' (Existing)	N/A	1.4	N/A	0.9	N/A	N/A
Cross Section C-C' (Proposed)	1.5	1.9	1.5	1.5	1.0	1.2

4.2 Existing Fill

Based on information available at the time of this report, including conversations with the owner, the Administrative Order of Consent (AOC), and available aerial imagery, fill has been placed on the site dating back to at least 1996, as shown on the *Aerial Photograph*, Figure 2. The fill material generally consists of Coal Combustion Residue (CCR). Presently, there are no records to document that the existing fill was placed and compacted in a controlled manner. Based on present knowledge of the site,

the engineering properties and performance of the existing fill cannot be predicted with certainty. As a result, there is some risk of settlement or other performance problems if future developments are placed on the existing fill, as further discussed in Section 4.7.

Due to the nature of the fill material, the EPA has required that the site and slopes be covered with a clay cap. Activities that disturb the in-place fill materials and proposed clay cap should be performed in accordance with both the AOC and the *Long Term Work Plan*. Recommendations for the clay cap are provided in subsequent sections. If the existing fill materials are impacted during grading operations, they should be handled in accordance with the *Long Term Work Plan*.

4.3 Protective Cap

To meet the requirements set forth in the AOC, a protective cap is required to eliminate further migration of the CCR material into adjacent surface waters. Additionally, controls to prevent contamination with flood waters and further destabilization and/or erosion due to flooding are required to be implemented. The protective cap shall consist of two parts: a relatively impermeable clay portion capped with an armored layer. Current design plans indicate that the relatively impermeable clay layer will cover both the top of the site and the slopes. For the armored layer, shotrock will be installed across the top of the site, while filter fabric and riprap will be installed on the slopes beginning at elevation 412.7 and extending down to the toe of the slope.

The clay portion of the cap shall be a minimum of 24 inches in thickness and consist of low permeability materials, such as lean clay (CL) or fat clay (CH), with a permeability of less than or equal to 1×10^{-6} centimeters per second. The clay cap should be placed and compacted as described in subsequent sections. However, if CH soils are used within the clay cap, potential issues with volume change may influence shallow foundations, as further discussed in subsequent sections. The shotrock and riprap layers shall be a minimum of 12 inches in thickness and the shotrock shall have a maximum dimension of 6 inches.

4.4 Fill Materials and Compaction

Once the initial site grading has been performed, the clay portion of the site cap should be placed in maximum 8-inch thick loose lifts and mechanically compacted to at least 90 percent of its modified Proctor dry density (ASTM D 1557). The clay cap material should meet the criteria previously discussed in Section 4.3. Once the clay cap has been installed, the shotrock barrier layer should be placed in such a manner as to avoid disturbance of the underlying clay cap. Compaction testing of the shotrock material

may not be practical using conventional methods (nuclear density gauge or drive tubes). Therefore, continuous observation by an on-site geotechnical engineer is recommended. The shotrock should be placed horizontal lifts not exceeding 12-inches in thickness, and compacted with at least a D8 dozer (or equivalent), a heavy vibratory roller, or other equipment acceptable to the geotechnical engineer on site. As a guide, we would anticipate that a minimum of 4 traced passes of a D8 dozer, five passes of a 10-ton vibratory roller, or equivalent would be required to achieve proper compaction. Poorly compacted areas can usually be detected by observing the fill subgrade during the passing of a loaded scraper or compactor over the fill area, and should be recompactd with additional passes or removed and replaced with more suitable material.

Any additional fill to be placed on the site above the protective cap should also be placed in maximum 8-inch thick loose lifts and compacted to at least 90 percent of its modified Proctor dry density. Aggregate base course, if used, should be compacted to at least 95 percent modified Proctor. We recommend that any fill be placed in future building areas have a liquid limit of 45 or less and a plasticity index less than 25. If higher plasticity soils are placed within 3 feet of the floor slab subgrade, or 2 feet of the bottom of the footings, then remediation will be required. Acceptable non-organic fill soils for the site include materials designated as CL, ML, CL-ML, and GW by ASTM D 2487.

Slopes to receive fill which are steeper than 5H:1V should be benched prior to the placement of fill. Benching will provide level surfaces for compaction and reduce the potential for development of inclined planes of weakness between the existing soils and the compacted fill. The benches should be spaced such that the height of the cut at the up-slope end of the bench is less than 5 feet.

Prior to compaction, the soil may require moisture adjustment. During warm weather, moisture reduction can generally be accomplished by disking or otherwise aerating the soil. During dry weather, some addition of moisture may be required to facilitate compaction. This should also be done in a controlled manner using a tank truck with a spray bar. The moistened soil should be thoroughly blended with a disk or pulverizer to produce a uniform moisture content. If construction is performed during the winter season, fill materials should be carefully observed to see that no frozen soil is placed as fill or remains in the base materials upon which fill is placed.

In addition to the minimum density requirements listed above, the soil must be stable, i.e., not “pumping” or rutting excessively under construction traffic, prior to placing additional fill or constructing foundations, floor slabs, or pavements. Field density tests should be performed on each lift of fill to document that proper compaction is achieved.

4.5 Site Grading and Drainage

Site grading should be provided to prevent water from collecting in low areas of the site. For future developments, site drainage should be provided to reduce surface water infiltration around the perimeter of the buildings and beneath the floor slabs. Additionally, all grades should be sloped away from the buildings. Roof and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill of the buildings.

Large trees and shrubs should be planted away from exterior footings as they may cause drying and shrinkage of the foundation soils and, with the passage of time, potentially detrimental settlement of the building floor slabs and foundations. A minimum distance of 20 feet or the mature tree’s dripline, whichever is greater, is suggested.

4.6 Temporary Sedimentation Basin

To collect sediments from stormwater runoff during construction activities, a sedimentation basin will be constructed on the southeast corner of the area to receive the clay cap, and will ultimately be removed upon completion of the grading and cap installation activities. **The bottom of the sedimentation basin should not penetrate through the protective clay cap into the underlying CCR materials.** Upon completion of the grading activities, any collected sediment and soft soils should be removed and replaced with materials meeting the criteria established in Section 4.4.

4.7 Stormwater Detention Basin

A stormwater detention basin is planned near the southeast corner of the site in the vicinity of an existing tributary. As discussed in the *Long Term Work Plan*, the existing tributary in this location will be enclosed within a 48-inch diameter high density polyethylene pipe (HDPE), with several associated manholes and collector boxes. To achieve the proposed design grades in this area, fills on the order of approximately 6 to 22 feet above the HDPE pipe will be required. This detention basin was added after our field work had been performed. As such, soil borings were not advanced in this area.

Special consideration should be given to the design of these structures with respect to future settlement due to the installation of the detention basin. These considerations include removal of any soft soils beneath the bearing elevation of the manholes, collector boxes, and HDPE pipe, and replacement with crushed rock, such as 2-inch clean crushed limestone. The 2-inch clean crushed limestone should be capped with a 6-inch layer of 1-inch minus crushed limestone. Based on the soft nature of the natural soils encountered in other portions of the site, an undercut depth of 2 to 4 feet may be required. SCI should be retained to verify the depth and extents of the removal and replacement during construction as conditions may require additional undercutting. The replacement material should be placed and compacted as previously discussed in Section 4.4.

The upstream and downstream slopes of the stormwater detention basin embankments should be no steeper than 3 horizontal to 1 vertical (3H:1V). We recommend that the crest be at least 8 feet wide to provide access for maintenance. The entire embankment should consist of cohesive soils with a plasticity index (PI) of at least 20. Rocky or organic soils or high silt-content soils are not suitable for the construction of stormwater detention basin embankments because of their potential for erosion and piping.

Rock bedding should not be used for the outlet piping of the stormwater detention basin. Instead, the outlet pipe should be placed on a cohesive soil subgrade, shaped to fit the pipe barrel, and the trench backfilled with properly compacted cohesive soil. Alternately, the trench can be backfilled to the springline of the pipe with lean concrete or flowable fill. Concrete anti-seepage collars should also be used to reduce seepage around the pipe.

4.8 Erosion Control and Land Disturbance Monitoring Program

Appropriate erosion and sediment control measures, such as proper contouring during site grading activities, the installation of siltation fences, and/or inlet protection, should be used during construction to keep eroded materials from being carried onto adjacent properties or waterbodies. Depending on the length of time the subgrade is exposed and the amount of siltation that occurs, it may be necessary to periodically remove materials collected by the sediment control systems. Timely sodding and/or seeding of sloped surfaces will help reduce this potential problem.

SCI recommends following the procedures detailed in the Stormwater Pollution Prevention Plan (SWPPP). Any site disturbing more than one acre of ground must obtain a Land Disturbance Permit from the Missouri Department of Natural Resources (MDNR). As part of the permit compliance procedures,

weekly and rain-event site observations must be performed to document the changing site conditions and maintenance of control measures.

4.9 Future Development Considerations

Due to the variable consistency of the on-site fill soils, and the requirement for a protective clay cap on the site, special considerations for future developments on the site should be taken into account. Presently, there are no records to document that the existing fill was placed and compacted in a controlled manner. Based on present knowledge of the site, the engineering properties and performance of the existing fill cannot be predicted with certainty. As a result, there is some risk of settlement or other performance problems if future developments are placed on the existing fill.

Depending on loading conditions, the type of structure and its tolerance to settlement, future structures may implement several foundation options. The foundation option with the highest amount of risk for future settlement would be conventional shallow foundations. Preliminary allowable bearing pressures on the order of 1,500 pounds per square foot (psf) could be used for planning purposes. Another foundation option to consider would be a structural mat, however; further evaluation would be needed to further determine the suitability of this option. For structures that are particularly sensitive to settlement, deep foundations that extend through the fill soils and bear in the natural soils or extend to bedrock may be required. However, any disturbance of the clay cap and underlying CCR fill materials is required to be coordinated through the EPA in accordance with the AOC. It is recommended that additional geotechnical explorations and/or analyses should be performed for any future developments once plans are available.

Additionally, structure placement with respect to the top of the slope should be taken into consideration. Structures should be set back a minimum of 30 feet back from the crest of the slope. If structures are proposed within 30 feet of the crest of the slope, the slopes should be re-evaluated for stability.

5.0 CONSTRUCTION MONITORING PROGRAM

The following list summarizes SCI's recommendations for a construction monitoring program during the proposed grading activities for the clay cap. These services are recommended to provide quality assurance in assessing design assumptions and to document earth-related construction procedures for compliance with plans, specifications, and good engineering practice. SCI should be retained to:

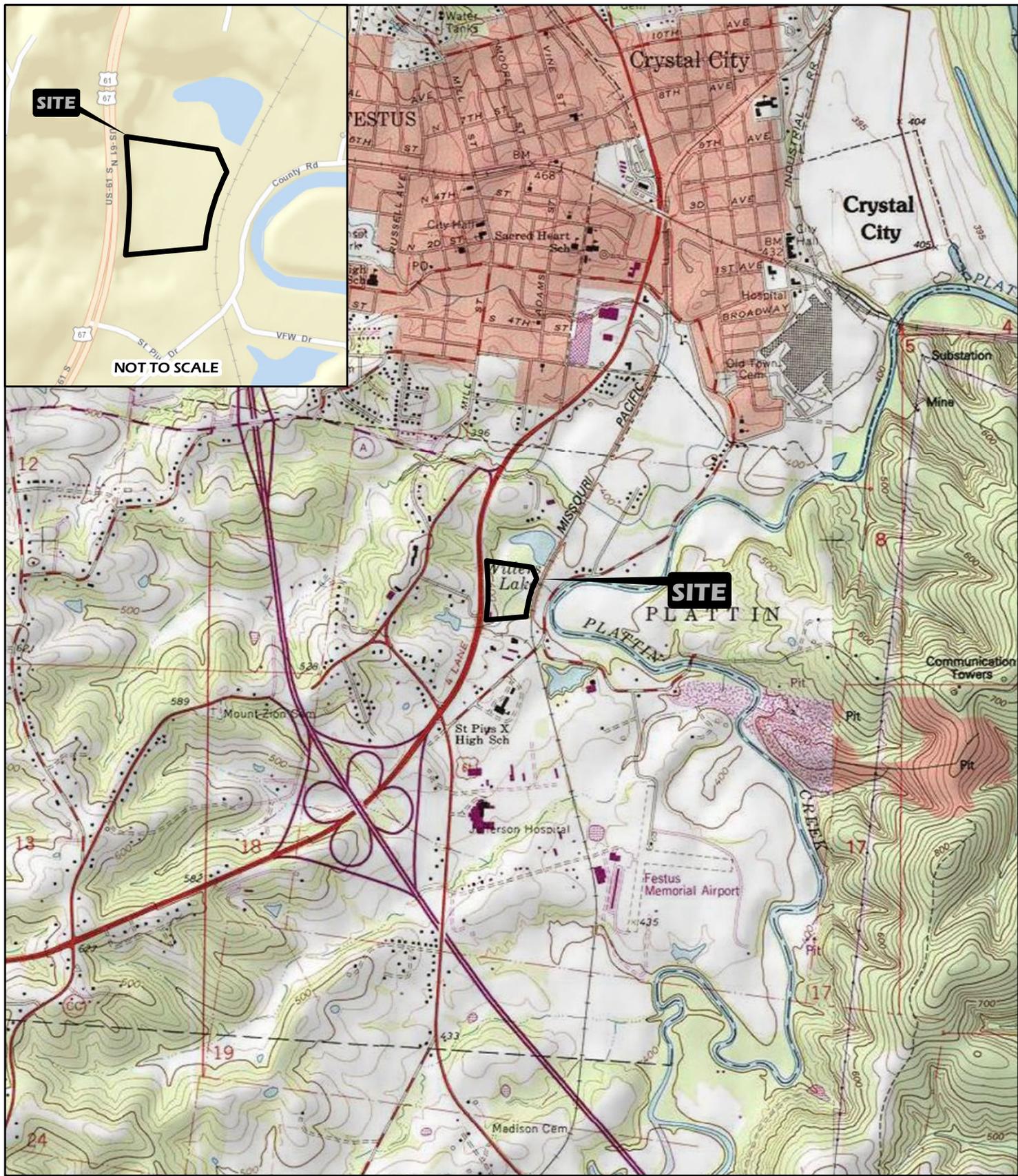
- Participate in a formal preconstruction meeting with the Owner's Representative, Civil Engineer, and Contractor, prior to construction at the site.
- Observe site preparation activities prior to construction, including stripping and proofrolling.
- Conduct and document weekly and rain-event observations at the site, maintain and update on-site paperwork, and provide submittals required by the SWPPP and Land Disturbance Permit.
- Assess the suitability of potential fill materials, including both on-site and off-site sources.
- Monitor placement and compaction of structural fill and backfill.

6.0 LIMITATIONS

The recommendations provided herein are for the exclusive use of our client. It is imperative that SCI be contacted by any third-party interests to evaluate the applicability of this report relative to use by anyone other than our client. Our recommendations are specific only to the project described, and are not meant to supercede more stringent requirements of local ordinances. They are based on subsurface information obtained at eight specific widely-spaced, boring locations within the project area; our understanding of the project as presented in Section 2.0, "Site and Project Description"; and geotechnical engineering practice consistent with the standard of care. No other warranty is expressed or implied. SCI should be contacted if conditions encountered are not consistent with those described.

We should also be provided with a set of final development plans, once they are available, to review whether our recommendations have been understood and applied correctly, and to assess the need for additional exploration or analysis. Failure to provide these documents to SCI may nullify some or all of the recommendations provided herein. In addition, any changes in the planned project or changed site conditions may require revised or additional recommendations on our part.

The final part of our geotechnical service should consist of direct observation during construction, to observe that conditions actually encountered are consistent with those described in this report, and to assess the appropriateness of the analyses and recommendations contained herein. SCI cannot assume responsibility or liability for the adequacy of its recommendations without being retained to observe construction.



PROJECT NAME
 ROTARY DRILLING SUPPLY SITE, INC.
 CRYSTAL CITY, MISSOURI

VICINITY AND TOPOGRAPHIC MAP

DRAWN BY	RCV	DATE	JOB NUMBER
CHECKED BY	HHF	06/2015	2014-5129.10

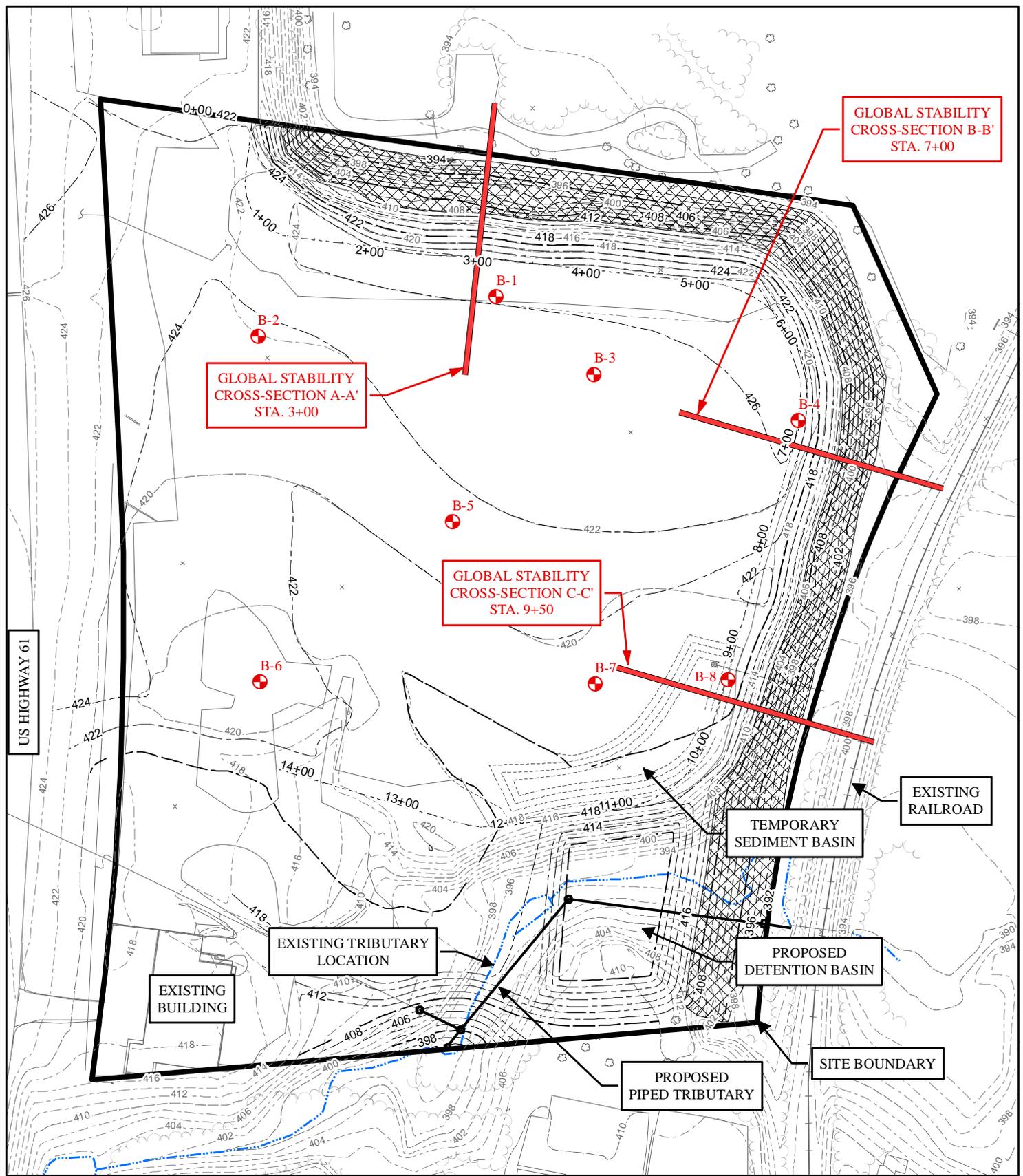
GENERAL NOTES/LEGEND
 USGS TOPOGRAPHIC MAP
 FESTUS, MISSOURI QUADRANGLE
 DATED 1964, PHOTO REVISED 1984
 SELMA, ILLINOIS - MISSOURI QUADRANGLE
 DATED 1993
 10' CONTOURS

N
 W E
 S

SCALE 1" = 2000'
FIGURE 1



	PROJECT NAME ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI			GENERAL NOTES/LEGEND COLORED LINES REPRESENT APPROXIMATE FILL LANDFORM EXTENT BY YEAR (BASED ON HISTORICAL AERIAL IMAGERY). AERIAL PHOTOGRAPH OBTAINED FROM BING MAPS VIA ARCGIS ONLINE.	 SCALE 1" = 120' FIGURE 2	
	AERIAL PHOTOGRAPH					
	DRAWN BY	RCV	DATE			JOB NUMBER
	CHECKED BY	HHF	06/2015			2014-5129.10



PROJECT NAME			
ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI			
SITE PLAN			
DRAWN BY	RCV	DATE	JOB NUMBER
CHECKED BY	HHF	06/2015	2014-5129.10

GENERAL NOTES/LEGEND

- INDICATES APPROXIMATE SOIL BORING LOCATIONS.
- INDICATES PROPOSED RIPRAP AREA.

UNDATED PLAN PROVIDED ELECTRONICALLY ON 1/08/2015 BY GOVERO LAND SERVICES. DIMENSIONS AND LOCATIONS ARE APPROXIMATE; ACTUAL MAY VARY. DRAWING SHALL NOT BE USED OUTSIDE THE CONTEXT OF THE REPORT FOR WHICH IT WAS GENERATED.

SCALE 1" = 120'

FIGURE 3

Appendix A



BORING LOG LEGEND AND NOMENCLATURE

Depth is in feet below ground surface. **Elevation** is in feet mean sea level, site datum, or as otherwise noted.

Sample Type

- SS** Split-spoon sample, disturbed, obtained by driving a 2-inch-O.D. split-spoon sampler (ASTM D 1586).
- NX** Diamond core bit, nominal 2-inch-diameter rock sample (ASTM D 2113).
- ST** Thin-walled (Shelby) tube sample, relatively undisturbed, obtained by pushing a 3-inch-diameter, tube (ASTM D 1587).
- CS** Continuous sample tube system, relatively undisturbed, obtained by split-barrel sampler in conjunction with auger advancement.
- SV** Shear vane, field test to determine strength of cohesive soil by pushing or driving a 2-inch-diameter vane, and then shearing by torquing soil in existing and remolded states (ASTM D 2573).
- BS** Bag sample, disturbed, obtained from cuttings.

Recovery is expressed as a ratio of the length recovered to the total length pushed, driven, cored.

Blows Numbers indicate blows per 6 inches of split-spoon sampler penetration when driven with a 140-pound hammer falling freely 30 inches. The number of total blows obtained for the second and third 6-inch increments is the N value (Standard Penetration Test or SPT) in blows per foot (ASTM D 1586). Practical refusal is considered to be 50 or more blows without achieving 6 inches of penetration, and is expressed as a ratio of 50 to actual penetration, e.g., 50/2 (50 blows for 2 inches).

For analysis, the N value is used when obtained by a cathead and rope system. When obtained by an automatic hammer, the N value may be increased by a factor of 1.3.

Vane Shear Strength is expressed as the peak strength (existing state) / the residual strength (remolded state).

Description indicates soil constituents and other classification characteristics (ASTM D 2488) and the Unified Soil Classification (ASTM D 2487). Secondary soil constituents (expressed as a percentage) are described as follows:

Trace	<5
Few	5-15
With	>15-30

Stratigraphic Breaks may be observed or interpreted, and are indicated by a dashed line. Transition between described materials may be gradual.

Laboratory Test Results

- Natural moisture content (ASTM D 2216) in percent.
- Dry density in pounds per cubic foot (pcf).
- Hand penetrometer value of apparently intact cohesive sample in kips per square foot (ksf).
- Unconfined compressive strength (ASTM D 2166) in kips per square foot (ksf).
- Liquid and Plastic Limits (ASTM D 4318) in percent.

RQD (Rock Quality Designation) is the ratio between the total length of core segments 4 inches or more in length and the total length of core drilled. RQD (expressed as a percentage) indicates insitu rock quality as follows:

Excellent	90 to 100
Good	75 to 90
Fair	50 to 75
Poor	25 to 50
Very Poor	0 to 25

US EPA ARCHIVE DOCUMENT



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-1
LOCATION Crystal City, Missouri **SHEET** 1 of 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 422± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
3	1	SS	10/18	3 3 5	FILL: Brown and gray, flyash, trace sand			67		-				420
6	2	SS	15/18	1 1 1	Becomes gray, with fine to medium sand		44		4.5				417	
9	3	SS	18/18	5 14 14	Becomes brown and gray, with fine to medium sand, trace gravel		36		>9.0				414	
12	4	ST	13/20				1	45	70	-	5.1		411	
15	5	SS	13/18	1 1 1	Becomes brown, with fine sand		47		-				408	
18	6	SS	18/18	3 3 3	With cinders		28		4.0				405	

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WATER LEVEL: NONE OBSERVED WHILE DRILLING 29.0 ft WHILE DRILLING 30.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 1) UU Test Performed
--	---



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-1
LOCATION Crystal City, Missouri **SHEET** 2 **of** 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 422± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
21					FILL: Brown and gray, flyash, trace sand (Continued)										399
24	7	SS	18/18	1 1 2	Trace clay			45		5.0					396
27					LEAN CLAY (CL): Brown and gray, trace sand										
30	8	ST	18/24				3	23	106	--	4.4	43	23		393
33															390
36	9	SS	18/18	WOH WOH WOH	Becomes brown			29		0.5					387
36	10	ST	24/24		CLAYEY SAND (SC): Brown, lean, sand is fine		4	24	107	--					
39					SANDY CLAY (CL): Brown, sand is fine		5	27	98	--	1.6				
39	11	SS	18/18	0 1 1	LEAN CLAY (CL): Brown			26		0.5					384

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WATER LEVEL: NONE OBSERVED WHILE DRILLING 29.0 ft WHILE DRILLING 30.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 3) UU Test Performed 4) Unit Weight Test Performed 5) UU Test Performed
--	--



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-1
LOCATION Crystal City, Missouri **SHEET** 3 **of** 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 422± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
42					LEAN CLAY (CL): Brown (Continued)										381
45	12	SS	18/18	6 8 3	SAND (SP): Brown, fine to coarse, trace silt			20		N/C					378
45					Boring terminated at 45 feet.										375
48															372
51															369
54															366
57															363

US EPA ARCHIVE DOCUMENT

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING _____ 29.0 ft WHILE DRILLING _____ 30.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS:
--	-------------------------



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-2
LOCATION Crystal City, Missouri **SHEET** 1 of 1
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
1	1	SS	7/18	5 6	FILL: Gray, flyash, with crushed rock, trace sand			13	-					417
3	2	SS	8/18	11 32 33	Becomes grayish-brown, flyash, with silt, trace clay and crushed rock		15	-						414
6	3	SS	11/18	6 10 7	With crushed rock		9	-						411
9	4	SS	5/18	6 5 8			8	-						408
12	5	SS	0/1	50/1"					N/A					405
15					Auger Refusal at 15 feet								402	
18														

US EPA ARCHIVE DOCUMENT

WATER LEVEL: <input type="checkbox"/> NONE OBSERVED WHILE DRILLING <input type="checkbox"/> ft WHILE DRILLING <input type="checkbox"/> ft HRS AFTER DRILLING <input type="checkbox"/> ft DAYS AFTER DRILLING	REMARKS:
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BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-3
LOCATION Crystal City, Missouri **SHEET** 1 of 1
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
3	1	SS	18/18	3 2	FILL: Gray, flyash, trace silt and crushed rock			60		2.0					417
6	2	SS	18/18	1 2	Becomes grayish-brown, with fine sand			57		2.5					414
9	3	SS	14/18	2 11 6				43		4.5					
9	4	SS	16/18	1 0 2	Trace gravel			85		3.0					411
12					Boring terminated at 10 feet.										408
15															405
18															402

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WATER LEVEL: <input type="checkbox"/> NONE OBSERVED WHILE DRILLING <input type="checkbox"/> ft WHILE DRILLING <input type="checkbox"/> ft _____ HRS AFTER DRILLING <input type="checkbox"/> ft _____ DAYS AFTER DRILLING	REMARKS:
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BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-4
LOCATION Crystal City, Missouri **SHEET** 1 of 2
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 422± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
1	1	SS	14/18	2 3	FILL: Gray, flyash, trace sand			89		7.0				420
3	2	SS	18/18	1 1	Trace gravel		64		4.0				417	
6	3	SS	13/18	2 0 1	With sand and gravel		59		4.0				414	
9	4	SS	18/18	5 4 3			44		--				411	
12	5	ST	10/24				1	44	58	8.0			408	
15	6	SS	12/18	1 1 0	Becomes grayish-brown			61		-			405	

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WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING _____ 24.5 ft WHILE DRILLING _____ 23.5 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 1) Unit Weight Test Performed
--	--



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-4
LOCATION Crystal City, Missouri **SHEET** 2 **of** 2
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 422± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
21					FILL: Gray, flyash, trace sand (Continued)	[Cross-hatch pattern]									399
24	7	SS	18/18	1 2 2	With gravel	[Cross-hatch pattern]		58		<0.5					396
27															
30	8	SS	18/18	1 1	LEAN CLAY (CL): Brown, trace sand	[Diagonal lines pattern]		25		0.5					393
33	9	ST	24/24		SANDY CLAY (CL): Brown, sand is fine	[Diagonal lines pattern]	2	27	100	-					390
36					LEAN CLAY (CL): Brown, trace sand	[Diagonal lines pattern]	3	27	99	-	1.6	34	13		387
39	10	SS	18/18	2 2 3	SAND (SP): Brown, fine to medium, trace silt	[Dotted pattern]		21		N/C					384

Boring terminated at 40 feet.

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING _____ ft WHILE DRILLING _____ ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 2) Unit Weight Test Performed 3) UU Test Performed
--	--

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BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-5
LOCATION Crystal City, Missouri **SHEET** 1 of 2
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
1	1	SS	18/18	6	FILL: Gray with brown, flyash, trace sand									417
				9										
3	2	SS	18/18	1	With fine to medium sand, trace cinders									414
				1										
6	3	SS	13/18	1										411
				1										
9	4	SS	18/18	3										408
				5										
12	5	SS	15/18	1	Becomes grayish-brown, with crushed rock and fine sand, trace silt									405
				1										
15	6	SS	18/18	1										402
				1										
18				1										
				2										

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WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING 22.5 ft WHILE DRILLING _____ ft _____ HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS:
--	-------------------------



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-5
LOCATION Crystal City, Missouri **SHEET** 2 **of** 2
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
21					FILL: Gray with brown, flyash, trace sand (Continued)										399
24	7	SS	18/18	1 2 1	SAND (SP): Brown, fine, with silt			57		N/C					396
27					Boring terminated at 25 feet.										393
30															390
33															387
36															384
39															381

US EPA ARCHIVE DOCUMENT

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING 22.5 ft WHILE DRILLING _____ ft _____ HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS:
--	-------------------------



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-6
LOCATION Crystal City, Missouri **SHEET** 1 of 1
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
3	1	SS	13/18	1 1	FILL: Gray, flyash, with sand, trace crushed rock			54	3.0				417	
				12										
6	2	SS	10/18	19 11	FILL: Grayish-brown, silt, with sand and crushed rock			8	-				414	
				8										
9	3	SS	8/18	5 10	Auger Refusal at 10 feet			9	-				411	
				9										
12														408
15														405
18														402

US EPA ARCHIVE DOCUMENT

WATER LEVEL: <input type="checkbox"/> NONE OBSERVED WHILE DRILLING <input type="checkbox"/> ft WHILE DRILLING <input type="checkbox"/> ft _____ HRS AFTER DRILLING <input type="checkbox"/> ft _____ DAYS AFTER DRILLING	REMARKS:
---	-------------------------



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-7
LOCATION Crystal City, Missouri **SHEET** 1 of 1
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/CFA **ELEVATION** 420± **DATE DRILLED** 09/26/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
3	1	SS	13/18	4 3	FILL: Gray and brown, flyash, trace sand and gravel			43	8.5				417	
	2	SS	14/18	2 1 2										45
6	3	SS	18/18	7 16 9	With fine sand, trace silt			41	1.06				414	
9	4	SS	7/18	3 3 2	With cinders			30	1.0				411	
12					Boring terminated at 10 feet.								408	
15													405	
18													402	

US EPA ARCHIVE DOCUMENT

WATER LEVEL: <input type="checkbox"/> NONE OBSERVED WHILE DRILLING <input type="checkbox"/> _____ ft WHILE DRILLING <input type="checkbox"/> _____ ft _____ HRS AFTER DRILLING <input type="checkbox"/> _____ ft _____ DAYS AFTER DRILLING	REMARKS:
---	-------------------------



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-8
LOCATION Crystal City, Missouri **SHEET** 1 of 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 420± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX	
1	1	SS	12/18	2 2	FILL: Gray, flyash, trace sand and crushed rock			51	3.5				417	
3				2										
6	2	SS	13/18	1 1	Becomes brown and gray			47	2.0				414	
9	3	SS	18/18	2 9	With fine to medium sand, trace crushed rock			38	5.0				411	
12				2										
15	4	SS	18/18	2 3				80	3.5				408	
18	5	SS	18/18	1 1				54	1.0				405	
21	6	ST	22/24		With crushed rock and fine sand		1	80	54	-	2.9		402	

US EPA ARCHIVE DOCUMENT

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING 24.5 ft WHILE DRILLING 27.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 1) UU Test Performed
--	---



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-8
LOCATION Crystal City, Missouri **SHEET** 2 **of** 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 420± **DATE DRILLED** 09/25/14

DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
21					FILL: Gray, flyash, trace sand and crushed rock (Continued)	[Cross-hatched pattern]									399
24	7	SS	18/18	1 1	With coarse sand, trace crushed rock			51		1.5					396
27															393
30	8	SS	18/18	2 1 3	LEAN CLAY (CL): Gray, trace sand	[Diagonal hatching]									390
33															387
36	9	SS	18/18	0 1 2	Becomes brown and gray			28		1.0		33	13		384
39	10	ST	24/24		SANDY CLAY (CL): Brown and gray, sand is fine to medium	[Diagonal hatching]	2	27	99	-	1.6	32	12	381	

US EPA ARCHIVE DOCUMENT

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING 24.5 ft WHILE DRILLING 27.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS: 2) UU Test Performed
--	---



BORING LOG

PROJECT Rotary Drilling Supply Site **BORING NUMBER** B-8
LOCATION Crystal City, Missouri **SHEET** 3 **of** 3
DRILLER Midwest Drilling, Inc. **HAMMER** Automatic **PROJECT NO.** 2014-5129.10
EQUIPMENT CME 75 w/HSA **ELEVATION** 420± **DATE DRILLED** 09/25/14

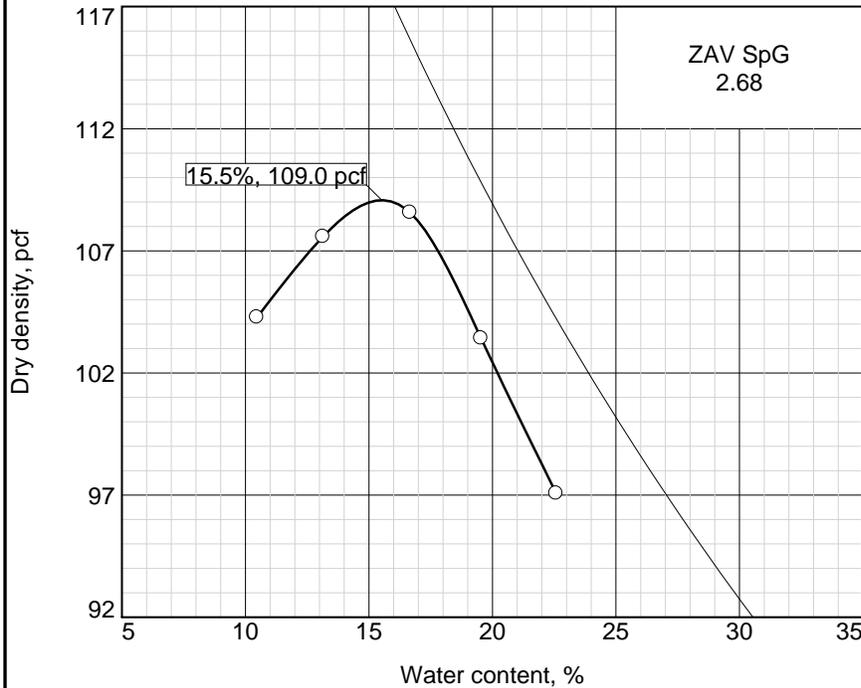
DEPTH (ft)	SAMPLE				DESCRIPTION (UNIFIED SOIL CLASSIFICATION)	GRAPHIC	SEE REMARK NO.	LABORATORY TEST RESULTS						ELEVATION (ft)	
	NUMBER	TYPE	RECOVERY (in/in)	BLOWS (per 6 in)				MOISTURE CONTENT (%)	DRY DENSITY (pcf)	HAND PENETROMETER (ksf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LIQUID LIMIT	PLASTICITY INDEX		
42					SANDY CLAY (CL): Brown and gray, sand is fine to medium (Continued)										378
45	11	SS	13/18	1 0 3	SAND (SP): Gray, fine to coarse, trace gravel			19		N/C					375
45					Boring terminated at 45 feet.										375
48															372
51															369
54															366
57															363

US EPA ARCHIVE DOCUMENT

WATER LEVEL: _____ NONE OBSERVED WHILE DRILLING _____ 24.5 ft WHILE DRILLING _____ 27.0 ft 24 HRS AFTER DRILLING _____ ft _____ DAYS AFTER DRILLING	REMARKS:
--	-------------------------

COMPACTION TEST REPORT

Curve No.
1



Test Specification:
ASTM D 1557-07 A (B-4CM-1) 2011

Preparation Method WET
Hammer Wt. 10 lb.
Hammer Drop 18 in.
Number of Layers five
Blows per Layer 25
Mold Size 0.03308 cu. ft.
Test Performed on Material
Passing #4 **Sieve**
NM 13.5 **LL** 34 **PI** 9
Sp.G. (ASTM D 854) _____
%>#4 _____ **%<No.200** _____
USCS ML **AASHTO** _____
Date Sampled 9-25-2014
Date Tested 11-10-2014
Tested By J. Booth

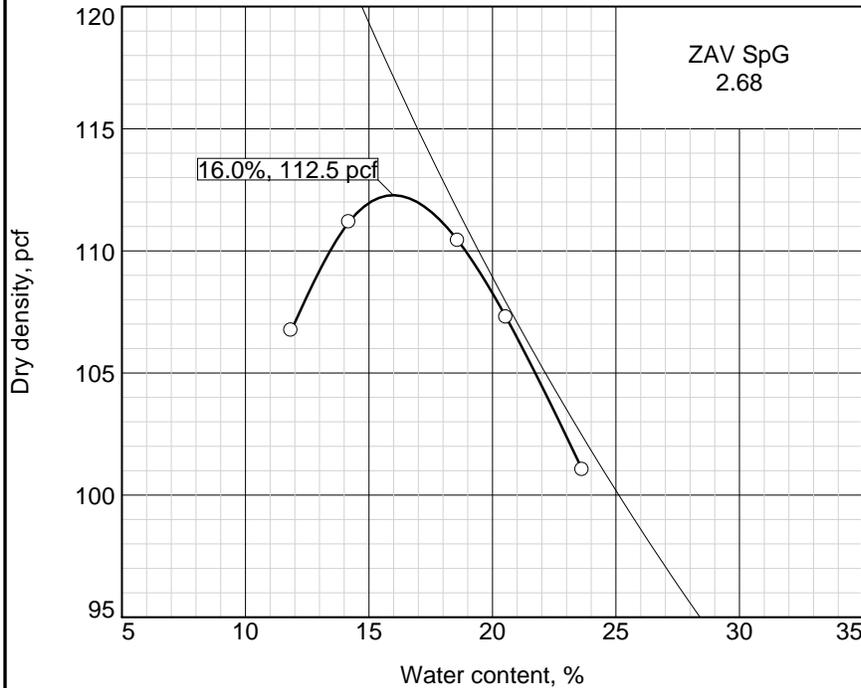
TESTING DATA

	1	2	3	4	5	6
WM + WS	3806.5	3880.5	3835.0	3765.5	3708.5	
WM	1980.0	1980.0	1980.0	1980.0	1980.0	
WW + T #1	334.5	309.5	311.0	317.0	320.0	
WD + T #1	301.5	272.5	268.5	268.0	294.5	
TARE #1	50.5	50.5	51.0	51.0	51.0	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	13.1	16.7	19.5	22.6	10.5	
DRY DENSITY	107.6	108.6	103.4	97.1	104.3	

TEST RESULTS	Material Description
Maximum dry density = 109.0 pcf Optimum moisture = 15.5 %	SILT (ML): Brown, trace organics
Project No. 20145129.10 Client: Rotary Drilling Supply, Inc Project: Rotary Drilling Supply Site Crystal City, Missouri Location: TP-1 Composite Depth: 1-2' Sample Number: 1	Remarks: The specific gravity is estimated. Sample collected from 3 locations on the top of the large stockpile.
SCI Engineering, Inc. O'Fallon, IL	Checked by: B. Gass 11/13/2014 Title: GIS Specialist Figure

COMPACTION TEST REPORT

Curve No.
2



Test Specification:
ASTM D 1557-07 A (B-4CM-1) 2011

Preparation Method WET
Hammer Wt. 10 lb.
Hammer Drop 18 in.
Number of Layers five
Blows per Layer 25
Mold Size 0.03308 cu. ft.
Test Performed on Material
Passing #4 **Sieve**
NM 17.5 **LL** 63 **PI** 41
Sp.G. (ASTM D 854) _____
%>#4 _____ **%<No.200** _____
USCS CH **AASHTO** _____
Date Sampled 11-17-2014
Date Tested 11-19-2014
Tested By J.Booth

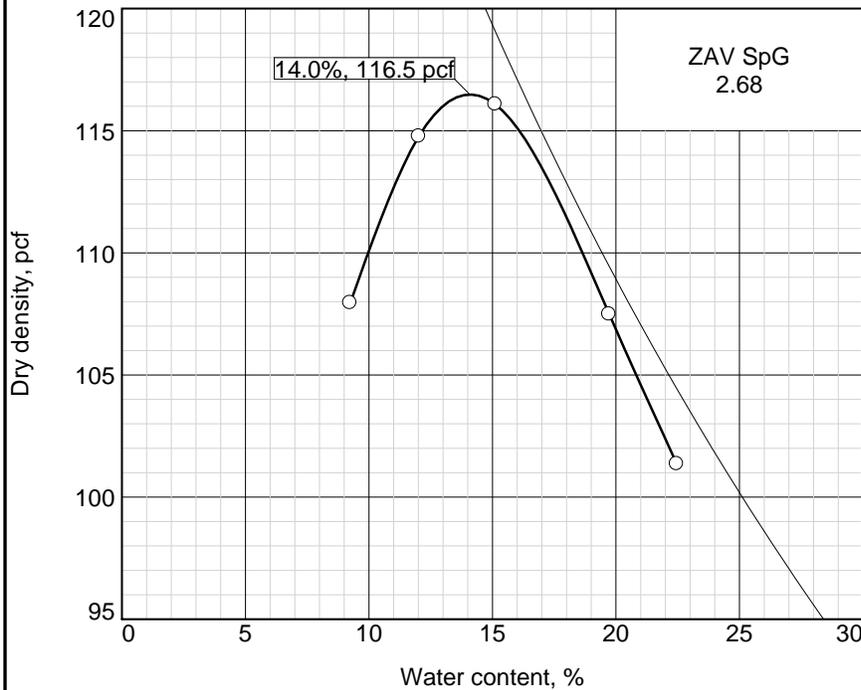
TESTING DATA

	1	2	3	4	5	6
WM + WS	3945.0	3920.5	3885.0	3854.5	3771.5	
WM	1980.0	1980.0	1980.0	1980.0	1980.0	
WW + T #1	306.0	311.5	312.0	312.5	310.5	
WD + T #1	266.0	267.0	279.5	262.5	283.0	
TARE #1	51.0	50.5	50.5	51.0	51.0	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	18.6	20.6	14.2	23.6	11.9	
DRY DENSITY	110.4	107.3	111.2	101.0	106.7	

TEST RESULTS	Material Description
Maximum dry density = 112.5 pcf Optimum moisture = 16.0 %	FAT CLAY (CH): Brown
Project No. 20145129.10 Client: Rotary Drilling Supply, Inc Project: Rotary Drilling Supply Site Crystal City, Missouri Loc.: BS-1,1A,&1B Composite Depth: 6'-8' Sample No.: 2	Remarks: The specific gravity is estimated. Sample collected near bottom of large stockpile
SCI Engineering, Inc. O'Fallon, IL	Checked by: H. Fizette Title: Staff Engineer Figure

COMPACTION TEST REPORT

Curve No.
3



Test Specification:
ASTM D 1557-07 A (B-4CM-1) 2011

Preparation Method WET
Hammer Wt. 10 lb.
Hammer Drop 18 in.
Number of Layers five
Blows per Layer 25
Mold Size 0.03308 cu. ft.
Test Performed on Material
Passing #4 **Sieve**
NM 21.6 **LL** 46 **PI** 27
Sp.G. (ASTM D 854) _____
%>#4 _____ **%<No.200** _____
USCS CL **AASHTO** _____
Date Sampled 11-12-2014
Date Tested 11-20-2014
Tested By J. Booth

TESTING DATA

	1	2	3	4	5	6
WM + WS	3985.0	3911.0	3909.0	3842.5	3749.5	
WM	1980.0	1980.0	1980.0	1980.0	1980.0	
WW + T #1	310.0	315.0	311.5	308.9	311.0	
WD + T #1	276.0	271.5	283.5	261.5	289.0	
TARE #1	51.0	51.0	50.5	50.5	51.0	
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	15.1	19.7	12.0	22.5	9.2	
DRY DENSITY	116.1	107.5	114.8	101.4	108.0	

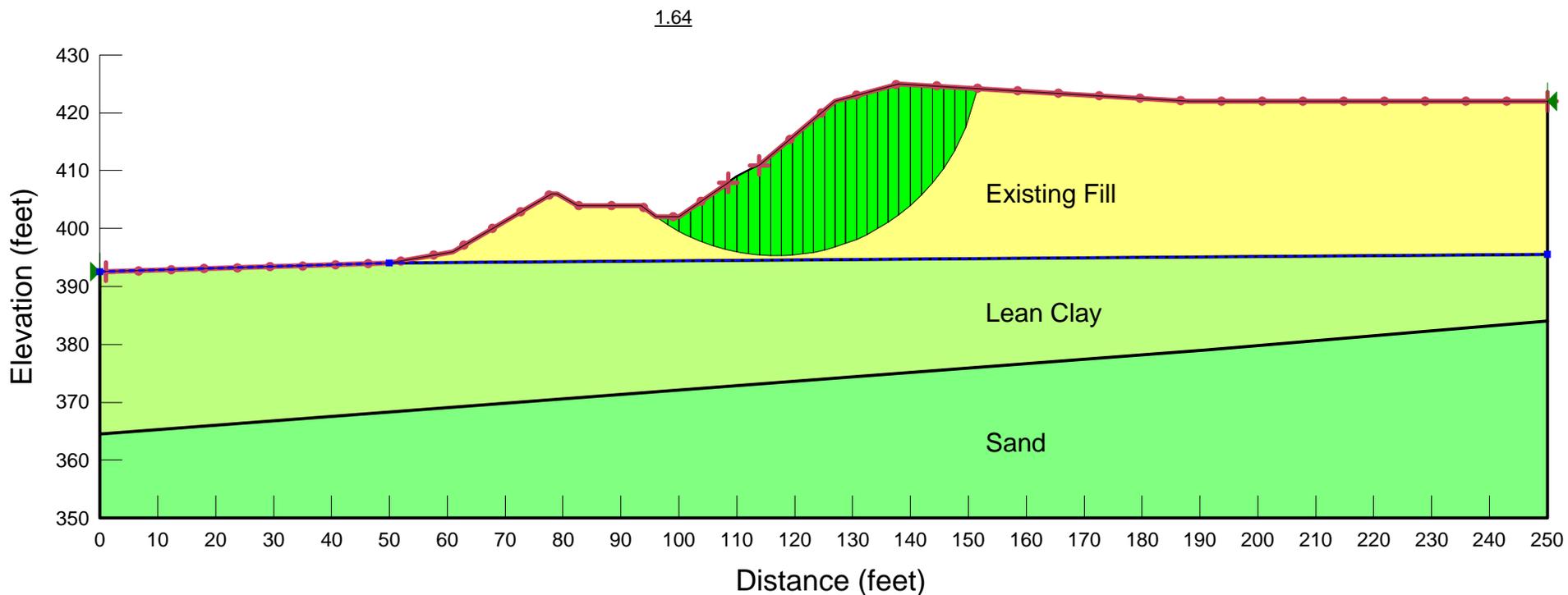
TEST RESULTS	Material Description
Maximum dry density = 116.5 pcf Optimum moisture = 14.0 %	LEAN CLAY (CL): Brown
Project No. 20145129.10 Client: Rotary Drilling Supply, Inc Project: Rotary Drilling Supply Site Crystal City, Missouri Location: BS-3 Depth: 1'-2' Sample Number: 3 SCI Engineering, Inc. O'Fallon, IL	Remarks: The specific gravity is estimated. Sample collected from newly placed stockpile Checked by: H. Fizette Title: Staff Engineer
	Figure

Appendix B

2014-5129.10: Rotary Drilling Supply Site

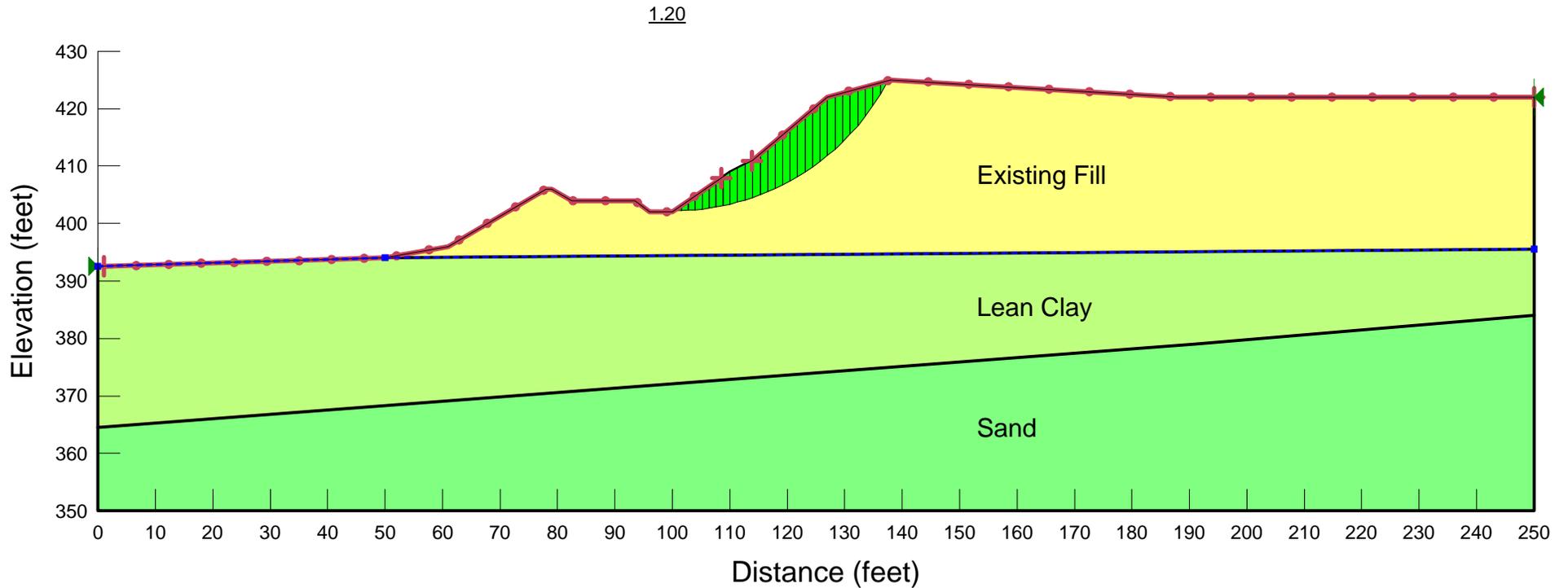
Cross Section A-A', Station 3+00

Existing: Short Term



Name: Existing Fill (Fly Ash) Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion': 600 psf
 Name: Lean Clay Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site
 Cross Section A-A', Station 3+00
 Existing: Long Term

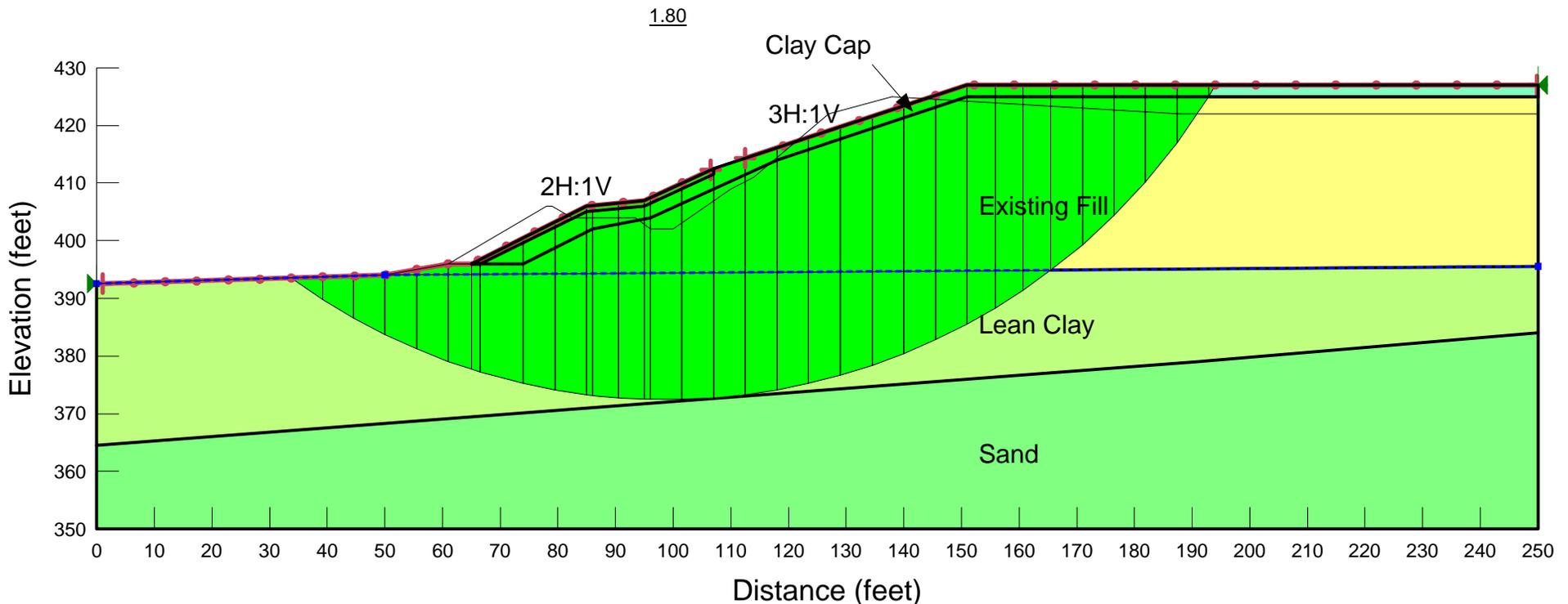


Name: Existing Fill (Fly Ash) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion': 125 psf Phi': 21 °
 Name: Lean Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 100 psf Phi': 26 °
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section A-A', Station 3+00

Proposed: Short Term

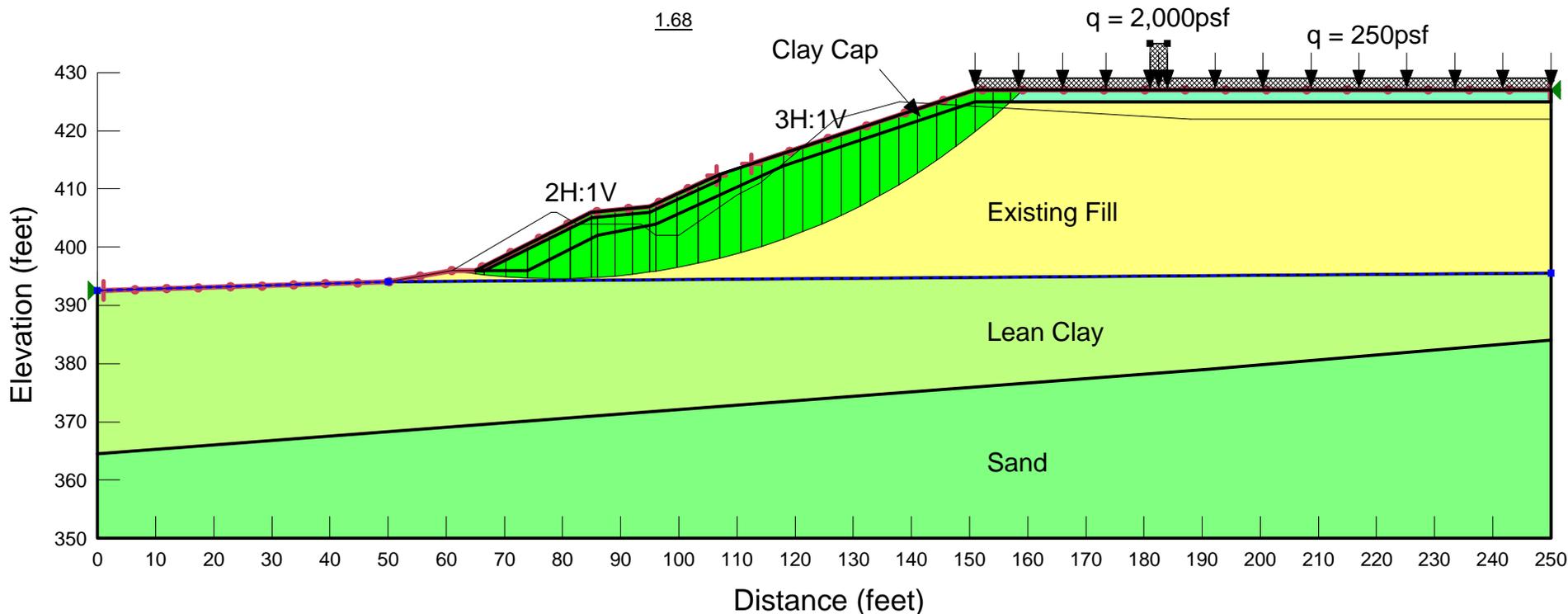


Name: Existing Fill (Fly Ash) Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion': 600 psf
 Name: Lean Clay Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °
 Name: New Fill (Clay Cap) Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Rip-Rap Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section A-A', Station 3+00

Proposed: Long Term

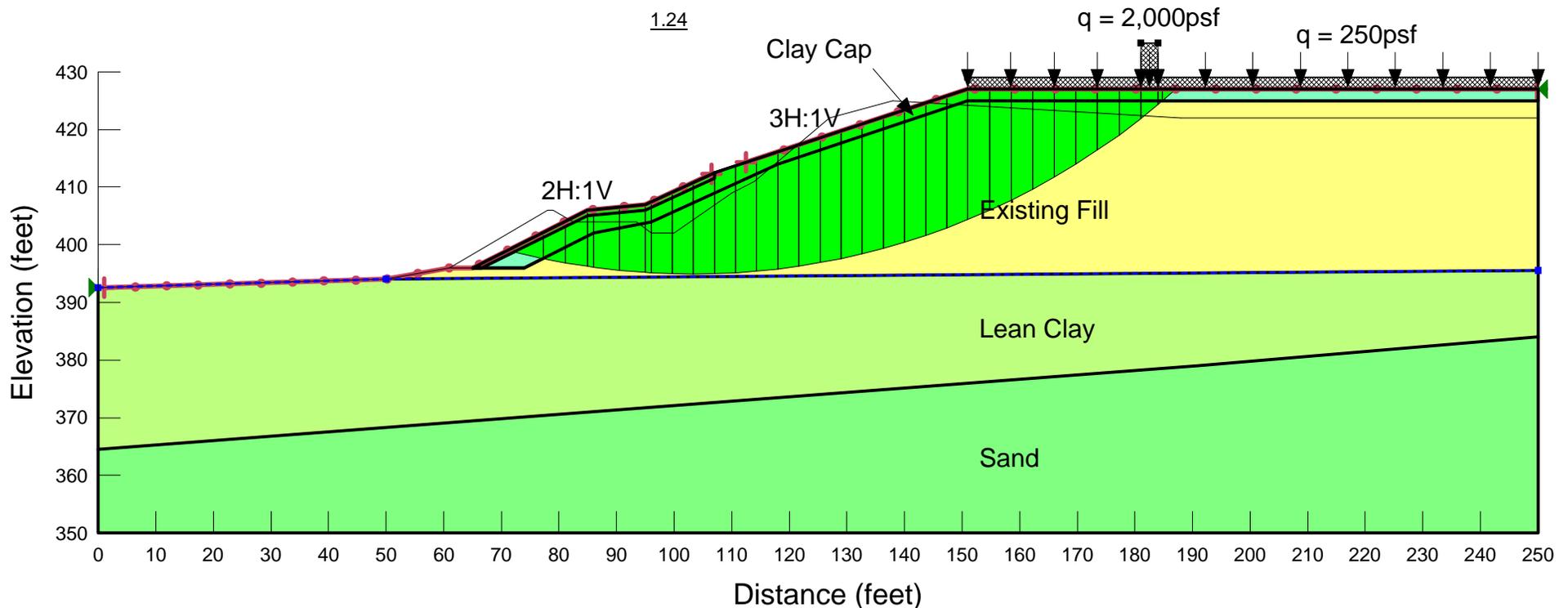


Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 125 psf	Phi': 21 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 100 psf	Phi': 26 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 250 psf	Phi': 20 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site

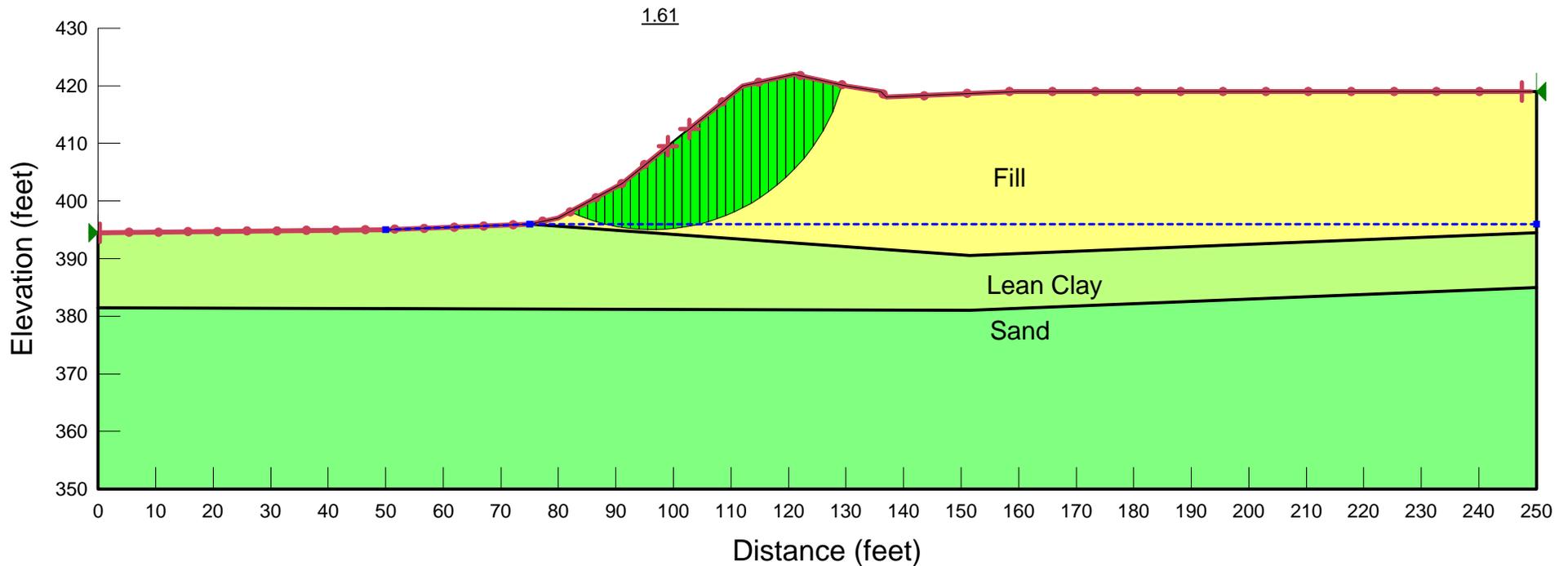
Cross Section A-A', Station 3+00

Proposed: Seismic
 Seismic Coefficient = 0.11g



Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 480 psf	Phi': 6 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 8 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 7 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site
 Cross Section B-B', Station 7+00
 Existing Conditions: Short Term

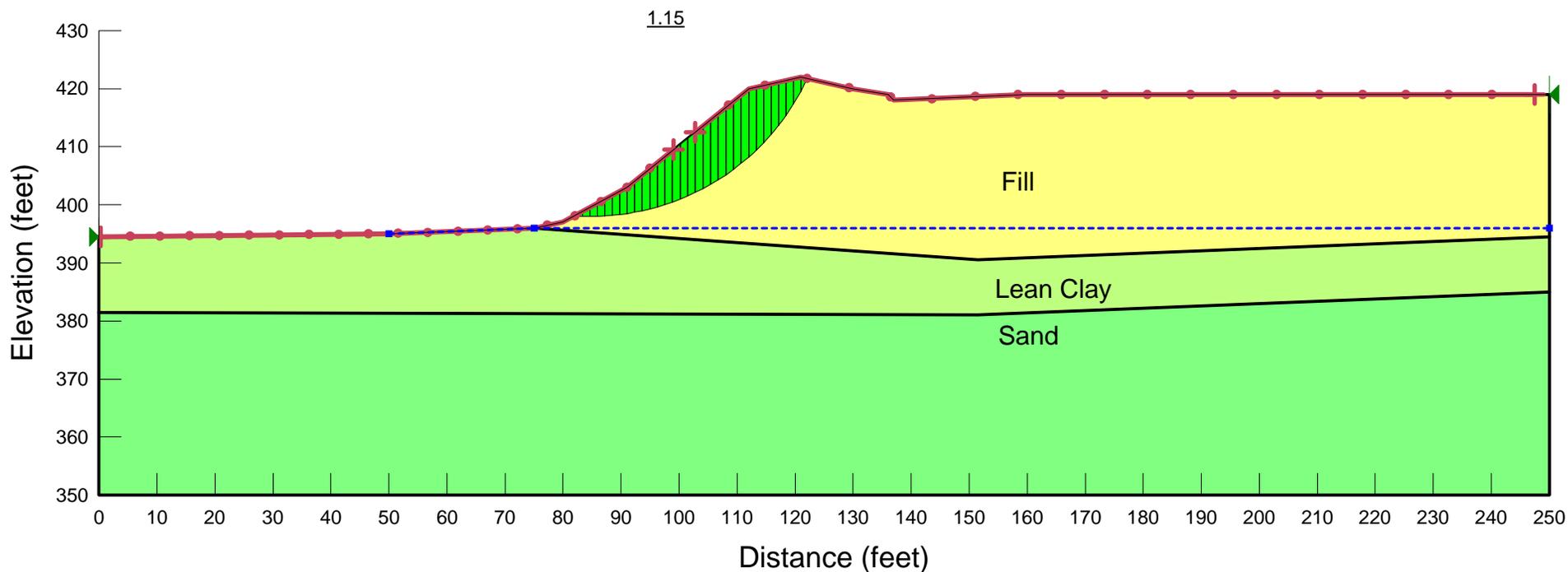


Name: Existing Fill (Fly Ash) Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion': 600 psf
 Name: Lean Clay Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section B-B', Station 7+00

Existing Conditions: Long Term

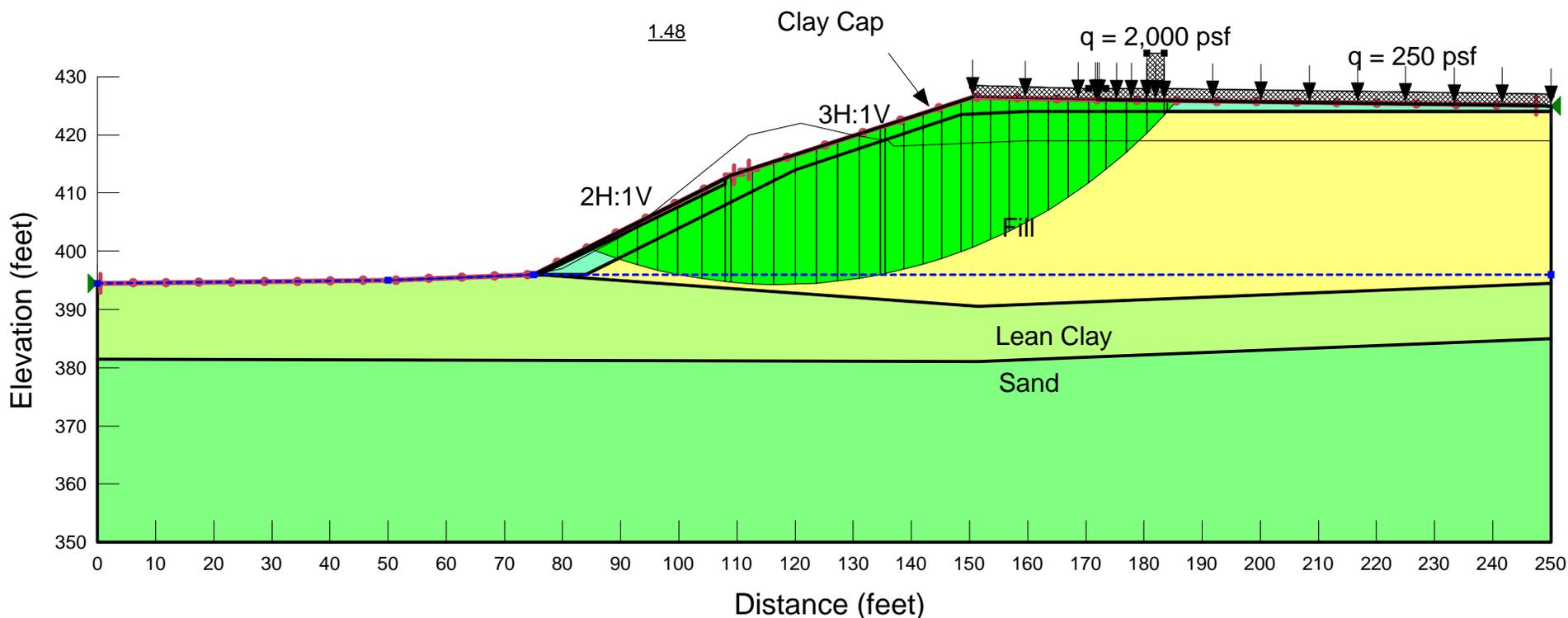


Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 125 psf	Phi': 21 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 100 psf	Phi': 26 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site

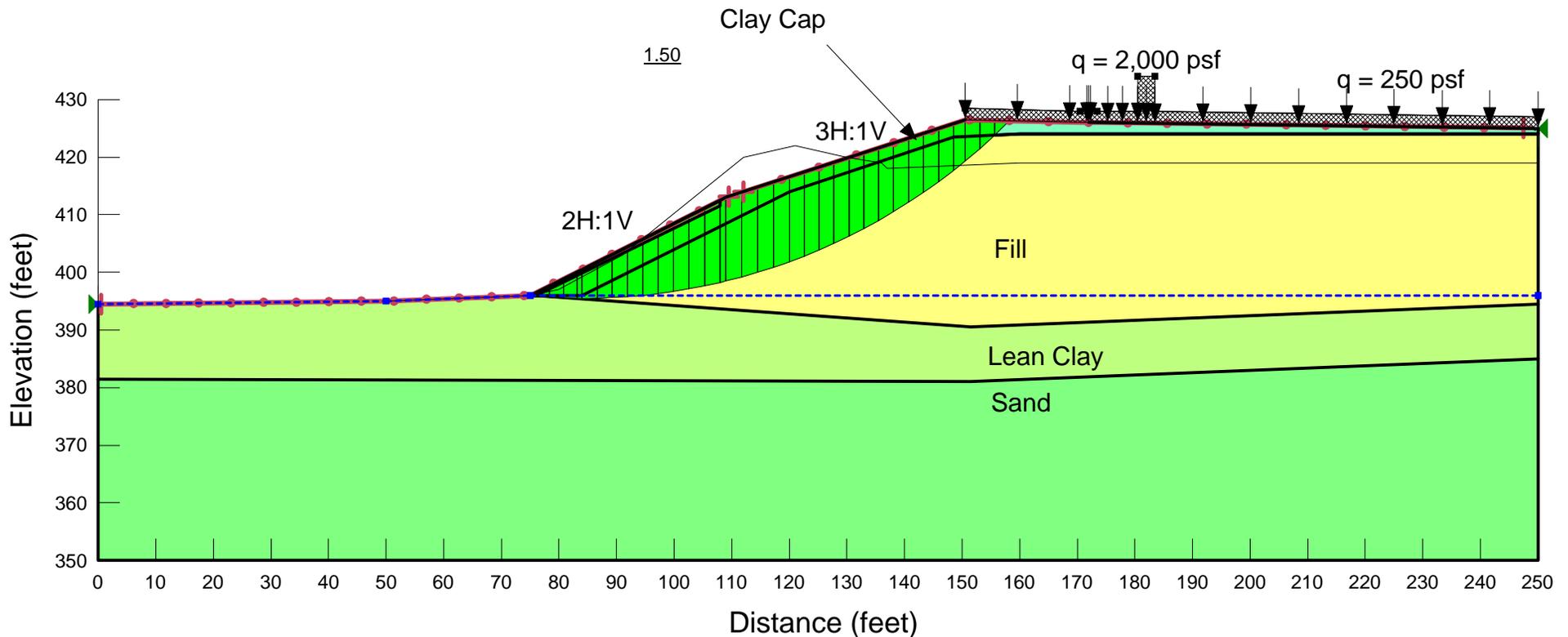
Cross Section B-B', Station 7+00

Proposed: Short Term



Name: Existing Fill (Fly Ash) Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion': 600 psf
 Name: Lean Clay Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °
 Name: New Fill (Clay Cap) Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Rip-Rap Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site
 Cross Section B-B', Station 7+00
 Proposed: Long Term

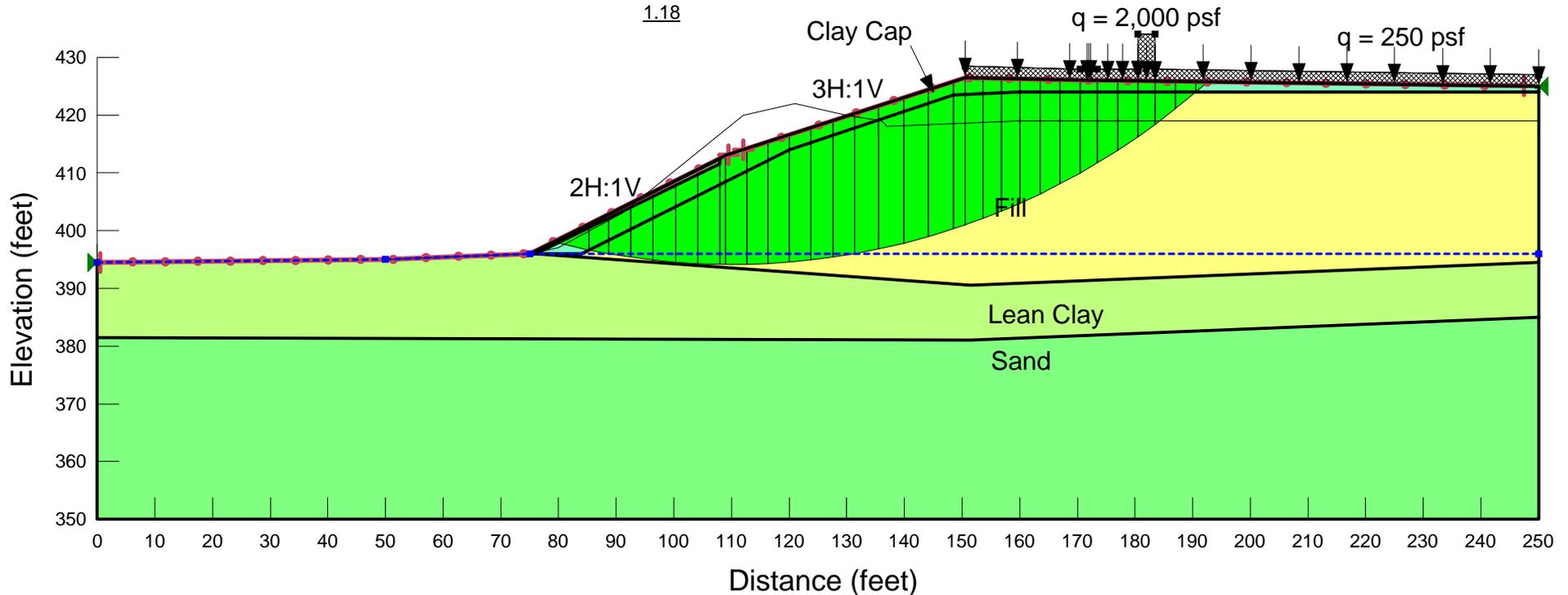


Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 125 psf	Phi': 21 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 100 psf	Phi': 26 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 250 psf	Phi': 20 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site

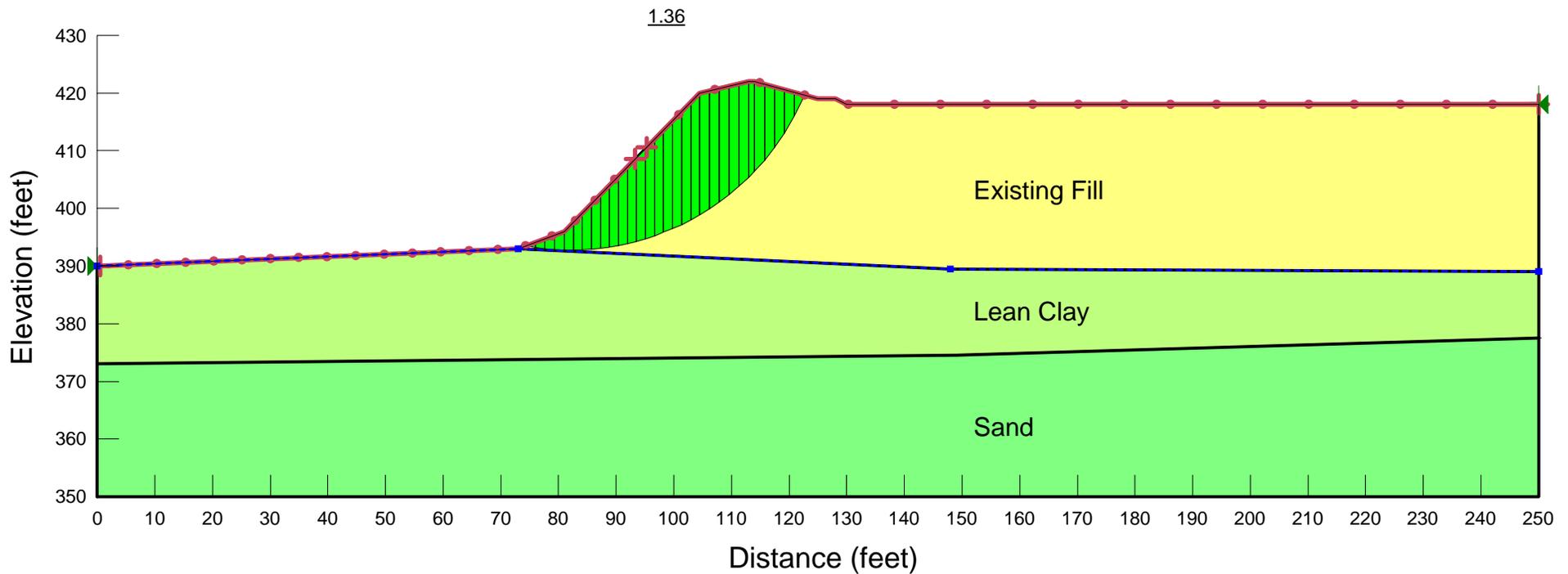
Cross Section B-B', Station 7+00

Proposed: Seismic
 Seismic Coefficient = 0.11g



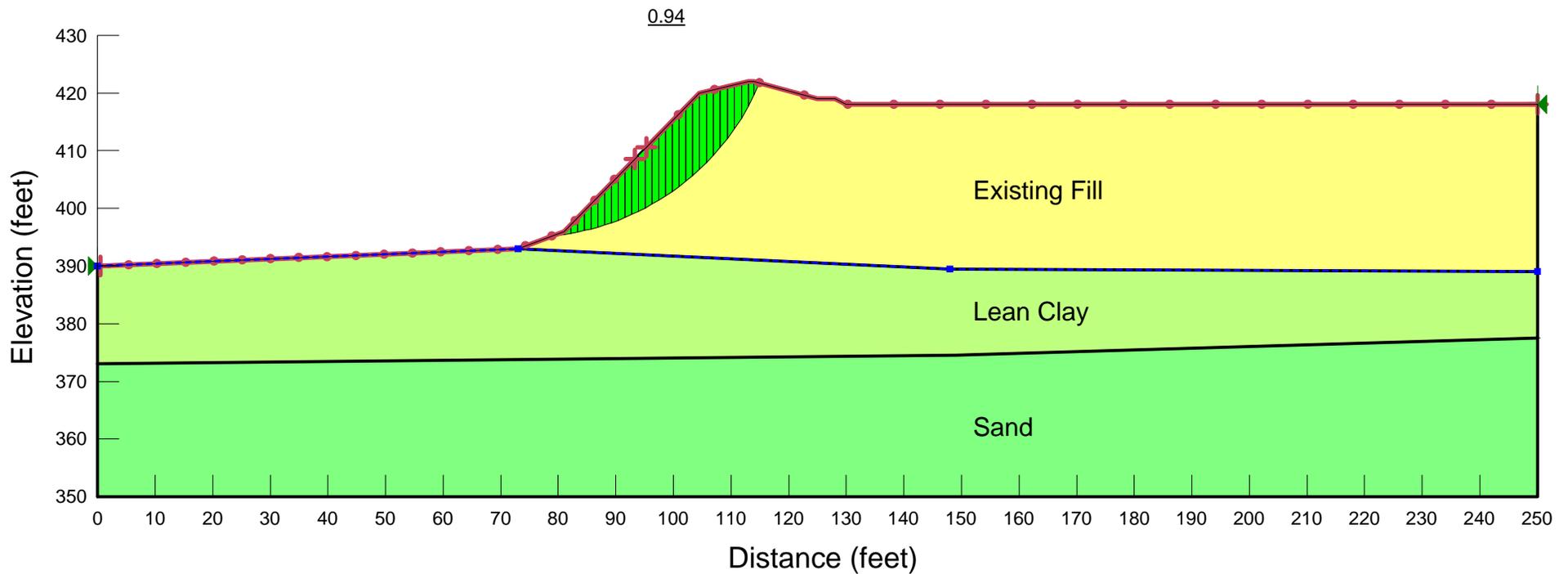
Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 480 psf	Phi': 6 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 8 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 7 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site
 Cross Section C-C', Station 9+50
 Existing: Short Term



Name: Existing Fill (Fly Ash) Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion': 600 psf
 Name: Lean Clay Model: Undrained (Phi=0) Unit Weight: 125 pcf Cohesion': 1,000 psf
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site
 Cross Section C-C', Station 9+50
 Existing: Long Term

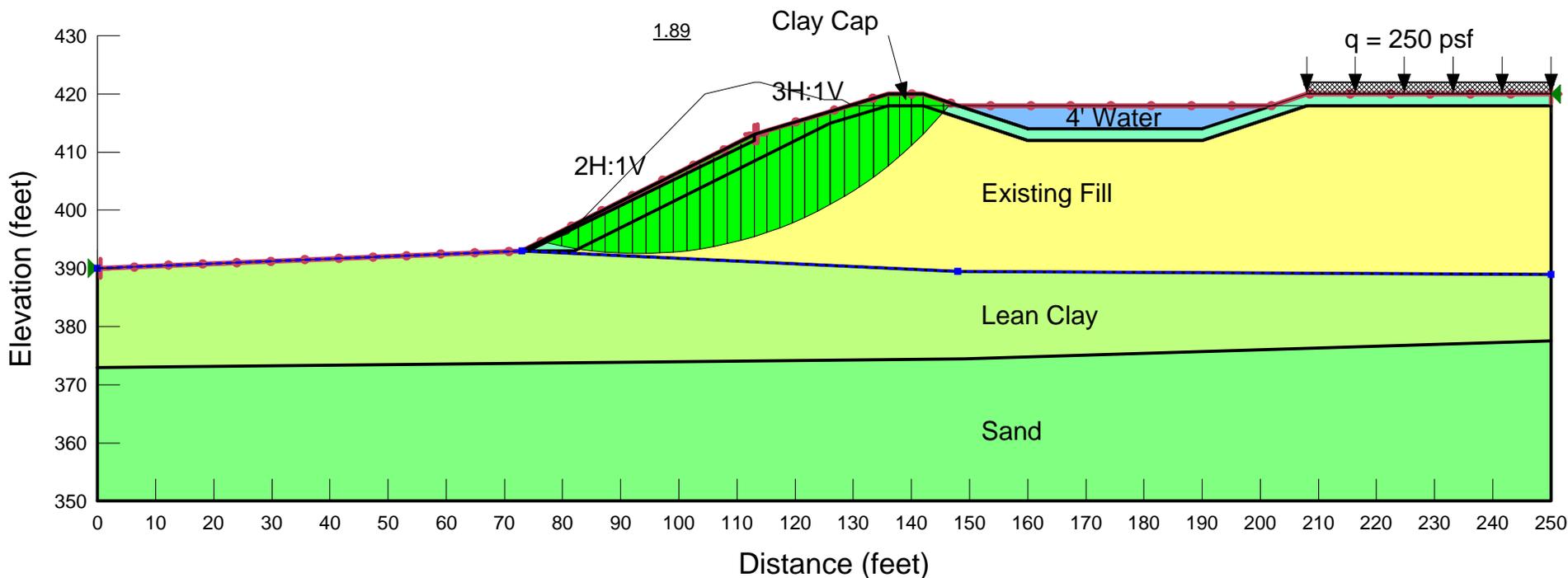


Name: Existing Fill (Fly Ash) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion': 125 psf Phi': 21 °
 Name: Lean Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 100 psf Phi': 26 °
 Name: Sand Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion': 0 psf Phi': 30 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section C-C', Station 9+50

Proposed: Short Term

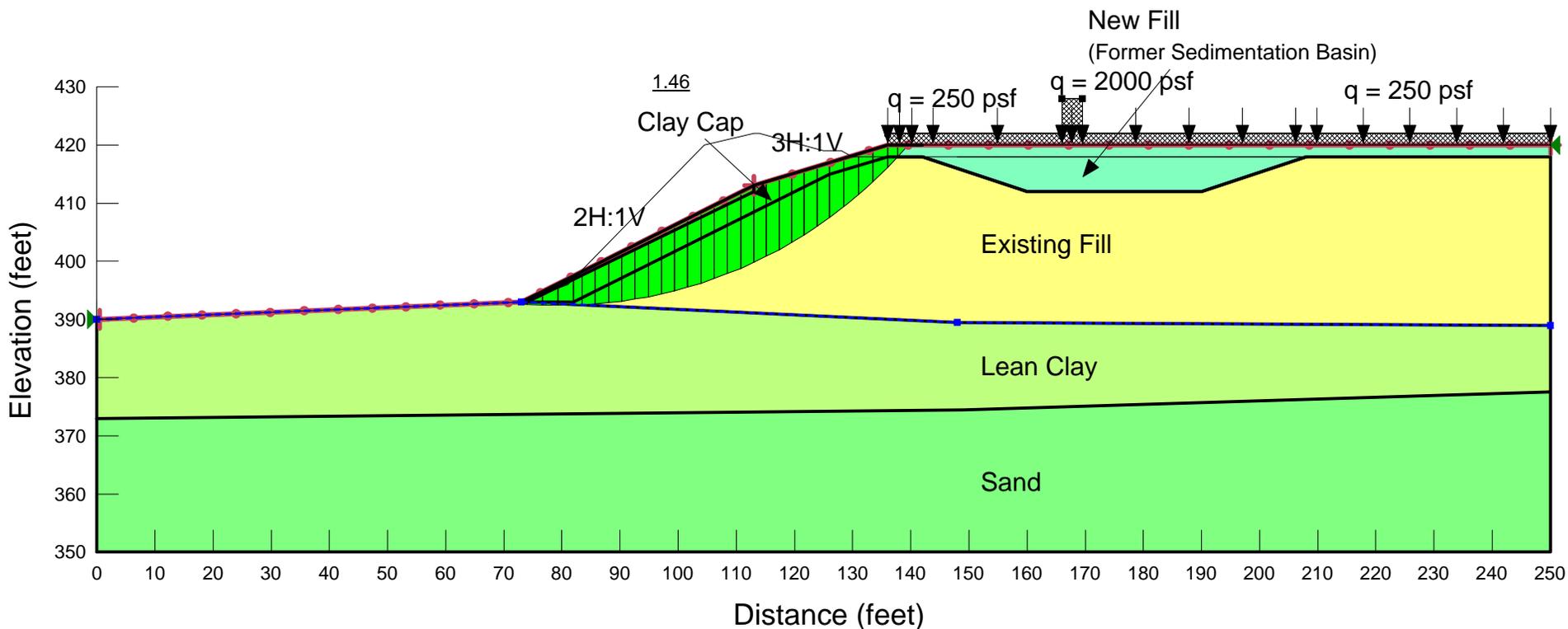


Name: Existing Fill (Fly Ash)	Model: Undrained (Phi=0)	Unit Weight: 100 pcf	Cohesion': 600 psf
Name: Lean Clay	Model: Undrained (Phi=0)	Unit Weight: 125 pcf	Cohesion': 1,000 psf
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf Phi': 30 °
Name: New Fill (Clay Cap)	Model: Undrained (Phi=0)	Unit Weight: 125 pcf	Cohesion': 1,000 psf
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf Phi': 38 °
Name: Water	Model: Mohr-Coulomb	Unit Weight: 62.4 pcf	Cohesion': 0 psf Phi': 0 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section C-C', Station 9+50

Proposed: Long Term

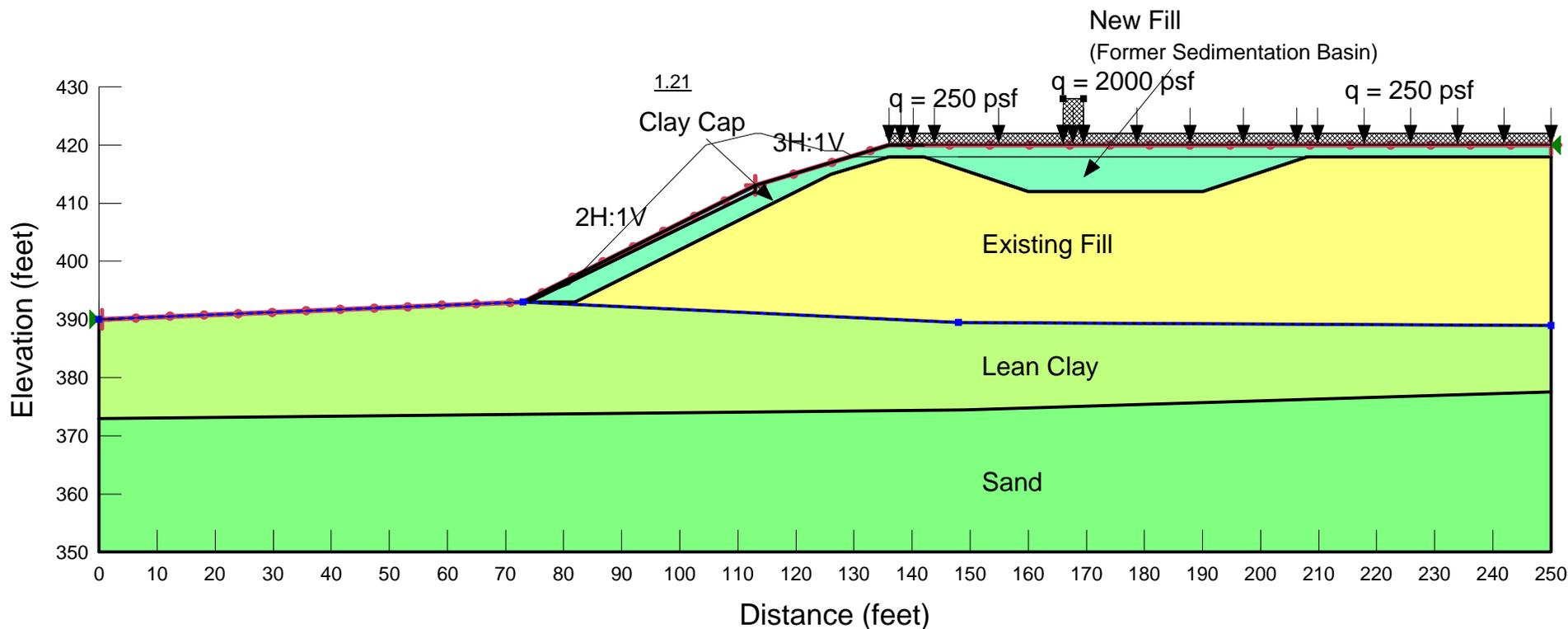


Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 125 psf	Phi': 21 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 100 psf	Phi': 26 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 250 psf	Phi': 20 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

2014-5129.10: Rotary Drilling Supply Site

Cross Section C-C', Station 9+50

Proposed: Seismic
 Seismic Coefficient = 0.11g



Name: Existing Fill (Fly Ash)	Model: Mohr-Coulomb	Unit Weight: 100 pcf	Cohesion': 480 psf	Phi': 6 °
Name: Lean Clay	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 8 °
Name: Sand	Model: Mohr-Coulomb	Unit Weight: 115 pcf	Cohesion': 0 psf	Phi': 30 °
Name: New Fill (Clay Cap)	Model: Mohr-Coulomb	Unit Weight: 125 pcf	Cohesion': 800 psf	Phi': 7 °
Name: Rip-Rap	Model: Mohr-Coulomb	Unit Weight: 135 pcf	Cohesion': 0 psf	Phi': 38 °

Appendix D

Surface Water Monitoring and Cap Maintenance Plan



SCI ENGINEERING, INC.

47 St. Andrews Drive
Union, Missouri 63084
636-584-7991 Fax 636-584-7966
www.sciengineering.com

Surface Water Monitoring and Cap Maintenance Plan

**ROTARY DRILLING SUPPLY SITE, INC.
CRYSTAL CITY, MISSOURI**

June 12, 2015

**ROTARY DRILLING SUPPLY, INC.
Owner**

**GOODWIN BROTHERS CONSTRUCTION CO.
General Contractor**

**GOVERO LAND SERVICES, INC.
Civil Engineer/Surveyor**

SCI No. 2014-5129.20

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1.0	PROJECT DESCRIPTION	1
1.1	Site Map	1
1.2	Quality Assurance Project Plan	1
1.3	Sampling and Analysis Plan	1
1.4	Cap Maintenance Plan	2

FIGURE

Figure 1 – Adjacent Waterbodies and Sampling Locations

APPENDICES

Appendix A – Quality Assurance Project Plan

Appendix B – Sampling and Analysis Plan

Appendix C – Cap Maintenance Plan

Surface Water Monitoring and Cap Maintenance Plan

ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI

1.0 PROJECT DESCRIPTION

The purpose of the Surface Water Monitoring and Cap Maintenance Plan is to outline the guidelines and standards of the LTWP as required by paragraph 50 and Attachment A of the Administrative Order on Consent (AOC). The Surface Water Monitoring Plan will include a Quality Assurance Project Plan (QAPP), included as Appendix A, and a Sampling and Analysis Plan (SAP), included as Appendix B, and the Cap Maintenance Plan (CMP), included as Appendix C that details the LTWP sampling procedures and data quality requirements. Samples will be analyzed for the same metals of concern laid out in the AOC. Implementation of the LTWP will be considered successful if sample results indicate levels below the Chronic Water Quality Criteria Screening levels as described in the AOC.

1.1 Site Map

A map showing the location of surface water bodies near the site that might be potentially impacted by seeps or runoff from the site is included as Figure 1.

1.2 Quality Assurance Project Plan

The QAPP will ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. A QAPP has been prepared in order to document all monitoring procedures, sampling, field measurements and sample analysis performed during investigation and monitoring of the site. Surface water samples will be analyzed for a minimum of five years following the installation of the clay cap. An analytical laboratory will test the samples for the metals of concern outlined and follow the procedures laid out in the QAPP and Sampling and Analysis Plan (SAP) attached as Appendix A and B.

1.3 Sampling and Analysis Plan

The Sampling and Analysis Plan (SAP) has been prepared based on the requirements laid out in Attachment A of the AOC. The purpose of the SAP is to outline the sampling approach, objectives, and procedures to determine the nature and extent of the contamination associated with the site. Previous EPA surface water sample results from this site indicated high levels of CCR have migrated into the unnamed tributary to Platin Creek and adjacent waterbodies. Surface water sampling and analysis will be done quarterly, semi-annually, and annually as described for a minimum of five years following

construction of the clay cap in order to monitor levels of CCR. Samples will be taken at 3 locations, two grab samples will be taken upstream and two downstream from the piped unnamed tributary. Additionally, a grab sample will be taken from the southeastern and southwestern corners of Willers Lake, closet to the project site. The data collected following the completion of the clay cap will be compared to the Chronic Water Quality Criteria Screening levels included in the AOC. These monitoring activities shall commence beginning after the first anniversary of completion of work required by this LTWP. Annual monitoring reports should be submitted to the EPA by December 1st of each year. The site specific SAP is included as Appendix B.

1.4 Cap Maintenance Plan

The Cap Maintenance Plan (CMP) has been designed to include necessary operation and maintenance procedures needed to maintain the effectiveness of the clay cap. The primary consideration of the CMP is to ensure the long-term integrity of the cap and to minimize any degradation that could be caused by weathering or future activities on site. The clay cap will consist of 24 inches of clay placed and compacted over the CCR material and then 12 inches of shot rock fully covering over the entire top. The side slopes of the CCR will also have 24 inches of clay cap and be covered with riprap to 2 feet above the 100-year flood plain elevation. The clay cap, side slopes, and piped tributary will be inspected semi-annually for the first 2 years and annually for the remaining 3 years after the completion of the LTWP.



PROJECT NAME			
ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI			
ADJACENT WATERBODIES & SAMPLING LOCATIONS			
DRAWN BY	RCV	DATE	JOB NUMBER
CHECKED BY	MKW	06/2015	2014-5129.20

GENERAL NOTES/LEGEND

⊕ INDICATES APPROXIMATE SAMPLE LOCATIONS

AERIAL PHOTOGRAPH OBTAINED FROM BING MAPS VIA ARCGIS ONLINE



SCALE 1" = 120'

FIGURE 1

Appendix A

Quality Assurance Project Plan
Crystal City, Missouri

Prepared for
Rotary Drilling Supply, Inc.

November 2014
Revised January 16, 2015
Revised February 11, 2015
Revised June 12, 2015

As required by
U.S. Environmental Protection Agency



SCI Engineering, Inc.

Owner : *Darriel F. Coleman* Date: 6/12/15
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Scott Harding, CPSS/SC
SCI Engineering, Inc., Vice President

**Quality Assurance Project Plan
Rotary Drilling Supply, Inc.**

November 21, 2014, Revised January 16, 2015, February 11, 2015, and June 12, 2015

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1.0 PROJECT MANAGEMENT

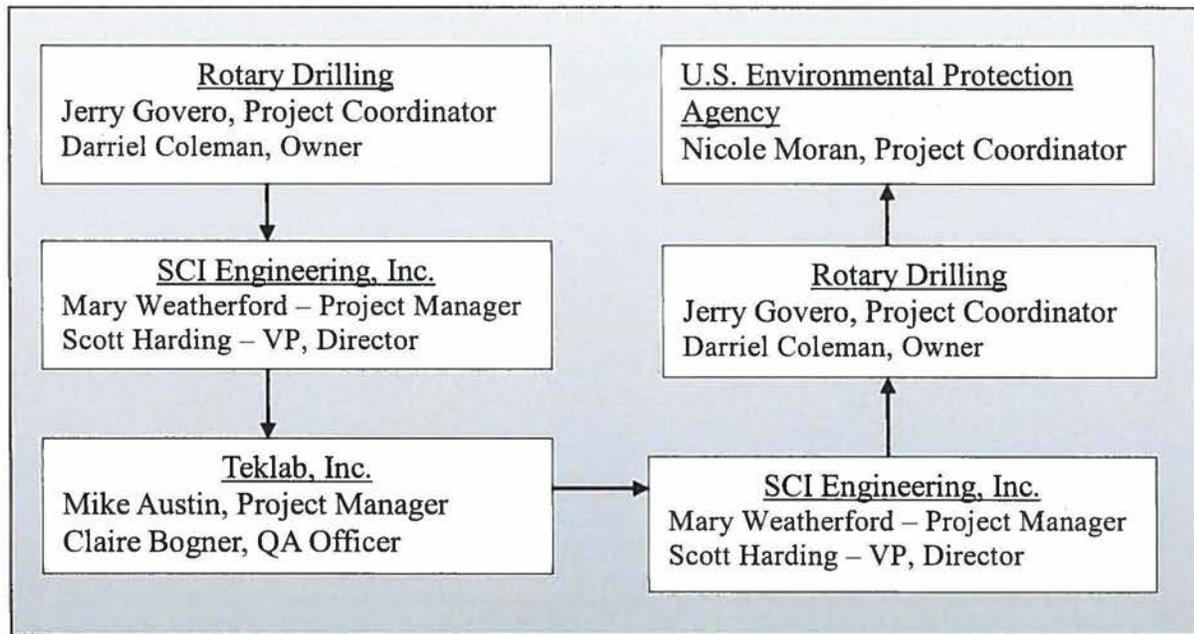
1.1 Distribution List

Each person listed in Table 1 will receive a copy of the final approved version of this Quality Assurance Project Plan (QAPP). A copy will also be made available to other persons participating in this project and to other interested parties.

Table 1 – QAPP Distribution

Name, Title and Organization	Contact	Role/Responsibility
Nicole Moran	Moran.nicole@epa.gov	U.S. EPA Project Coordinator
Jerry Govero Lachaize, LLC.	(314) 406-9272	Project Coordinator. Provide overall leadership for implementation of the project; provide vision and direction, resources and accountability. Implement QAPP, maintain and oversee QAPP.
Mary Weatherford SCI Engineering, Inc.	mweatherford@sciengineering.com	Assist in development of Long-Term Work Plan and QAPP
Mike Austin Teklab, Inc.	maustin@teklabinc.com	Project Manager for Teklab, Inc. (Analytical Laboratory)
Darriel Coleman	(636) 937-0310	Owner
Adam Breeze	Adam.breeze@breezelaw.com	Attorney

1.2 Project/Task Organization



1.3 Problem Definition/Background

The approximately 12-acre project site is located at 1150 South Truman Boulevard in Crystal City, Missouri. The property is currently the business location for Rotary Drilling Supply, Inc. which contains a large fill pad and one structure. A portion of the site was previously filled over the last 10+ years with coal combustion residue (CCR) and other fill material to create the grades present at the time of this report. As part of an overall containment plan or what is referred to as the Long-Term Work Plan (LTWP), the site will be graded to form stable slopes and capped to reduce infiltration, erosion and runoff. The lower portions of the slopes adjacent to the railroad tracks and tributary will be covered with a geotechnical fabric and riprap. Additionally, a portion of an unnamed tributary that is on site will be piped, as per the Administrative Order on Consent (AOC) and permitted by the U.S. Army Corps of Engineers, to reduce possible erosion of the embankment and exposure of the CCR.

1.4 Project/Task Description

The LTWP identifies how Rotary Drilling will contain the CCR constituents that are on site while still allowing for future development of the site. The LTWP will include descriptions for cap implementation, slope stabilization and maintenance, creek channel realignment or piping, and long-term surface water monitoring plan. The purpose of this QAPP is to provide guidelines for monitoring surface water runoff for the presence of CCR constituents. Water quality samples will be collected from selected monitoring locations near the site for a period of five years or at the direction of the U.S. Environmental Protection Agency (EPA).

1.4.1 On-site Tributary will be Piped

An unnamed tributary will be enclosed in a 48 inch High Density Polyethylene Pipe in order to minimize further contact with the CCR. Wetland mitigation for impacts to Willers Lake, the on-site wetland and the proposed impacts to the unnamed tributary on site has been completed with the mitigation purchase from the Shaw Nature Reserve Mitigation Bank. This mitigation purchase has been approved by the U.S. Army Corps of Engineers (USACE) to satisfy all mitigation requirements for the project.

1.4.2 Fill Material Capped

The fill material will be capped in such a way as to minimize further surface water contact to the CCR. A maintenance plan will ensure that the cap maintains long-term stability thereby helping to prevent the CCR constituent migration. Surface water sampling and analysis will continue for a minimum of five

years or at the direction of the EPA. If the sampling must continue for longer than 5 years, the LTWP and QAPP will be reassessed and submitted to the EPA for approval.

1.4.3 Erosion and Stabilization Controls

Controls will be in place to prevent contamination with floodwaters and prevent further destabilization and erosion due to flooding.

1.4.4 Environmental Covenant

Once executed, the site will operate under the Environmental Covenant included in the AOC as Attachment B. The Environmental Covenant prohibits excavation or disturbance of the cap without EPA approval. This ensures that the underlying CCR will not be exposed and also requires the regular maintenance of the cap to prevent off-site migration of CCR constituents.

Table 2 – Estimated Project Schedule

Activity	Anticipated Date of Initiation	Anticipated Date of Completion
Submit draft LTWP to USEPA	NOVEMBER 2014	NOVEMBER 2014
Receive comments from USEPA	DECEMBER 2014	DECEMBER 2014
Submit final LTWP to USEPA	FEBRUARY 2015	FEBRUARY 2015
Receive comments from USEPA	MAY 2015	MAY 2015
Submit revised LTWP to USEPA	JUNE 2015	NA
Receive Approved LTWP from USEPA	JULY 2015	NA
Implementation of LTWP	JULY/AUG 2015	DECEMBER 2015
Initial first quarterly sampling	JANUARY 2016	JANUARY 2016
Submit annual report	DECEMBER 2016	DECEMBER 2016

1.5 Special Training Requirements/Certification

All field staff as well as Teklab, Inc. (Teklab) laboratory staff, should have all required training and certifications needed to perform monitoring services. Certificates and other documentation are available upon request. For consistency, the field sampling leader will provide training as needed to personnel conducting field sample collection.

1.6 Documentation and Record

All versions of the QAPP will be retained in the Rotary Drilling office as well as at SCI Engineering and with Mr. Jerry Govero, Project Coordinator. The Project Coordinator will be responsible for

distributing new versions of the QAPP to project staff. Rotary Drilling will retain sampling reports, custody chains, field sampling sheets and copies of records, field notebooks and all raw data for following the completion of the work and the monitoring period outlined in the LTWP. Rotary Drilling will be responsible for all reporting and project management associated with this project.

Reports will be submitted to the EPA annually for the initial five year monitoring period. These reports will summarize the year's sampling event(s). At a minimum, the annual report will compare the data from the sampling event(s) and discuss the findings, such as significant fluctuations in laboratory results. Additionally, each of these reports will discuss changes in the QAPP and will include the applicable laboratory reports and field logs. At the completion of the five year monitoring period, a final report will be provided to the EPA which summarizes the findings of the project including a statement regarding the effectiveness of the corrective actions/Best Management Practices (BMPs).

2.0 SUMMARY OF MONITORING PLAN

2.1 Monitoring Overview

2.1.1 Monitoring and Field Sampling

Locations upstream and downstream from the site will be sampled for a minimum of 5 years or as instructed by the EPA. If the sampling must continue for longer than 5 years, the LTWP and QAPP will be reassessed and submitted to the EPA for approval. Sampling will occur on a quarterly basis for the first two years, a semi-annual basis for the following two years and then annually for the last year for a total of 5 years. The schedule and sampling locations may be used or modified based on specific climate conditions or other factors. However, the basic frequency and location should be followed as much as possible. All samples are anticipated to be grab samples. The goal of this monitoring is to capture surface water runoff samples and analyze for CCR constituents. Grab sampling events should take place during both base flow conditions and during stormwater runoff event. Sampling frequency may be adjusted to accommodate rainfall events and the project timeline.

2.2 Existing Data for Rotary Drilling

On February 14 and 15, 2011, EPA-authorized personnel conducted sampling of the unnamed tributary that flows to Platin Creek. Sample results indicated the presence of elevated levels of CCR constituents which have migrated and continue to migrate from the CCR piles onsite to Platin Creek

and adjacent waterbodies. The following Table 3 shows the sample results from surface waters exceeding Chronic Water Quality Criteria (ppm).

Table 3 - Metals of Concern

CCR Constituent	Chronic Water Quality Criteria Screening Level	No. of Locations (out of 7) exceeding Water Quality Criteria	Range of Exceedances
Barium	3.9	7	95-309
Boron	43.7 (average background)	7	119-4040
Chromium	10.0	1	15.0
Cobalt	3.0	1	3.4
Copper	11	1	23.8
Lead	2.5	1	31.1
Manganese	80	5	222-641
Selenium	5.0	1	25.7
Vanadium	19	1	51.0

3.0 DATA QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The tables in this section describe the data quality indicators (DQIs) and the methods used to address the DQIs.

Table 4 – Data Quality Indicators

DQI	Definition	Determination Methodologies
Precision	<p>The measurement among repeated measurements of the same property under identical or substantially similar conditions; calculated as either the range or as the standard deviation.</p> <p>May also be expressed as a percentage of the mean of the measurements, such as relative range or relative standard deviation (coefficient of variation).</p>	<p>Field sampling precision will be determined by using field duplicate samples.</p> <p>Laboratory precision will be determined by comparing the results of split samples, duplicate samples, and duplicate spike samples.</p>
Bias	<p>The systematic or persistent distortion of a measurement process that causes errors in one direction.</p>	<p>Laboratory bias will be determined as part of its internal QC. Bias effects that fall outside the laboratory’s acceptance limits will be flagged.</p>
Accuracy	<p>A measurement of the overall agreement of a measurement to a known value; includes a combination of random error (bias) components of both sampling and analytical operations.</p>	<p>Laboratory accuracy will be determined by analysis of standard reference samples, spiked samples and/or matrix-spiked samples, as well as by instrument and method blank samples.</p>

Table 4 – Data Quality Indicators (continued)

DQI	Definition	Determination Methodologies
Representativeness	A qualitative term that expresses “the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition”.	Samples will be collected in such a manner that will assure representativeness with respect to space, time, and flow. More specifically, samples will be collected from a well-mixed area of the stream, and sample collection will be distributed throughout the year and across the range of flow conditions.
Comparability	A qualitative term that expresses the measure of confidence that one data set can be compared to another and can be combined for the decision(s) to be made.	Consistent field and laboratory data will be used throughout the project, except where improvements are required for data quality.
Completeness	A measure of the amount of valid data needed to be obtained from a measurement system.	The goal will be to complete 90% or better of the total number of measurements expected according to the project sampling plan.
Sensitivity	The capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest.	The lowest reporting limits for the stream monitoring variables to be measured for this project are shown in Tables 5a-d.

4.0 MEASUREMENT/DATA ACQUISITION

4.1 Sampling Methods Requirements

Grab samples and field observations are to be done during both base flow conditions and during stormwater runoff events. A storm event will be defined as any event with more than 0.5 inches of predicted precipitation. In order to be valid for sampling, the storm should have a minimum antecedent dry period of at least 24 hours. Precipitation events selected for monitoring will ultimately depend on previously sampled events and the project timeline. The goal will be to sample a wide range of precipitation events (size, intensity) with sufficient antecedent dry period so that pollutants are not diluted at the surface. If the project is behind schedule, sampling events will likely be closer to the minimum size and antecedent dry period listed. Sampling results from upstream and downstream of each site can be plotted to determine the water quality.

The minimum volume needed to analyze for all water quality parameters is 1,000 milliliters. All samples will be collected using approved methods and sampling devices. Samples will be transferred from sample collection devices to pre-cleaned plastic or glass bottles as provided by Teklab (see Table 5). Table 6 outlines the frequency of QA sampling. The procedures and equipment that will be used for collecting these samples are described below.

4.1.1 Grab Sampling Procedures

Grab samples will be generally collected from the stream thalweg, where the water is well mixed. Three different methods may be used for grab sample collection. The method used for any particular sample depends on several factors, including stream flow, depth and accessibility. However, the overriding factor is safety of the sampling crew. In certain cases, and on certain sampling events, the sampling points may fall within the upstream/downstream adjacent lakes. In those cases, observations will be made of the sampling area to determine an appropriate location for sample collection where adequate and uniform mixing has occurred.

Regardless of collection method, the grab sample will be stored and transported in a clean, labeled container. A unique sample ID will be used and retained throughout the analytical process. Container size will depend on the number of water quality parameters to be analyzed. The container should be rinsed twice with sample water before the sample is collected. For each rinsing, the container should be partially filled, capped, and shaken; then the rinsate should be discarded. For samples requiring preservatives, a collection container should be used to collect the grab sample and transfer the sample to the preserved bottle. The collection container should be rinsed twice with sample water before the sample is collected and cleaned between each sampling location. The sample container is capped, stored in a cooler with ice packs, and transported to the laboratory. The three variations of grab sampling method are described below.

4.1.2 Wading and Hand Collection

When applicable, wading and hand collection may be necessary. If the stream is safe to wade, the sample collector wades to the center of the stream with a sample bottle. The sample collector faces upstream taking care not to disturb any stream bottom debris or sediment that may contaminate the sample. The sample bottle is inverted and dipped below the surface, then turned upright to collect the sample while holding the bottle about one foot below the water surface when possible. If there is not sufficient depth to collect the sample from one foot below the water surface, care should be taken not to disturb stream bottom sediment while sampling.

4.1.3 Reach Pole Collection

When applicable, reach pole collection may be necessary. When wading conditions are not safe in smaller streams, a grab sample may be collected using a reach pole. With the reach pole, the sample bottle is fitted into a wire cage attached to the end of a long, telescoping reach pole. The sample bottle is inverted and dipped below the surface, then turned upright to collect the sample while holding the bottle about one foot below the water surface.

An alternative method is to use a 1-L polyethylene bottle affixed to the end of the reach pole to collect sample water which is then transferred to the sample bottles on shore. With this method the sampler bottle is triple rinsed with site water before taking samples for laboratory analysis.

4.1.4 Bridge and Rope Collection

When applicable, bridge and rope collection may be necessary. For larger water bodies where the monitoring location is adjacent to a bridge, a grab sample may be collected using a Labline Polypro (or equivalent) sampler lowered from the bridge deck near the river thalweg. The Labline sampler is lowered to the river surface and plunged into the water to an approximate depth of one meter below the water surface. The sampler is then raised to the bridge deck, and the grab sample is poured into the sample container. In this variation, both the Labline sampler and the sample bottle are triple rinsed with site water before collection of the final sample, as described above.

4.1.5 Field Equipment Used for Grab Sampling

The following equipment is used for collecting grab samples.

- Chest or hip waders
- Clean, labeled sample container
- Telescoping reach pole
- Labline Polypro sampler with 50-ft nylon rope
- Cooler and ice

The exact equipment will vary slightly depending upon which of the three grab sampling methods are used.

4.1.6 Sample Bottle Cleaning

All containers will be cleaned and field ready prior to mobilization for field sampling.

4.2 Summary of Sampling Procedures

The following table summarizes the sampling procedures to be used for this project

Table 5 – Summary of Analytical Parameters Sampling Procedures

Parameter	Sample Matrix	Sampling Method	Sample Container	Sample Volume	Maximum Sample Holding Time
Metals of Concern	Water	Grab	1 liter amber glass jar	1000 mL	6 Months

4.2.1 Field Notes

Field notes will be used to document important information during sampling events and maintenance work. They will be entered into a bound field notebook with waterproof pages. Data collected by hand and written on field forms or in notebooks must be crossed out and initialed, not erased. The field notebook will be copied using a scanner in order to create digital copies. Information will include, but will not be limited to, date and time of sampling or maintenance work, measurements taken by portable field instruments, stream and weather conditions, and equipment performance issues.

4.2.2 Sample Handling and Custody Requirements

Sample containers will be labeled with site identification and date. They will be sealed tightly and packed in a cooler on ice at the sampling location. Field notebooks and chain of custody forms will be used to track all collection and handling of water quality samples. Water quality samples will be transferred in person to receiving personnel with relevant chain of custody forms. All samples will be transported to the lab within 24 hours of collection to provide sufficient time for the analysis of samples with short hold times.

4.2.3 Field Sampling Records

The field record will include the project name, sampler's name or initials, unique sample ID, sample volume, parameters for laboratory analysis, and date and time. Information on field conditions, such as the weather, deviations from written procedures, operating condition of the equipment, and other unusual occurrences should also be recorded for sampling events.

The Project Coordinator, who will be responsible for project records, will arrange to receive all laboratory data and field logs. Rotary shall keep all records and raw data for a minimum of 10 years from the date of submission of the final report.

4.3 Laboratory Sample Handling

Teklab will maintain current SOPs on all laboratory handling procedures.

4.4 Analytical Methods Requirements

Priority metals will be analyzed for total metals using the EPA Method 6010.

4.5 Quality Control Requirements

Quality control activities will be routinely performed in the field and laboratory, as well as in the office by means of data post-processing and analysis. Table 6 summarizes some of the quality control measures observed in the field and laboratory. If QC samples reveal a sampling or analytical problem, field and laboratory staff will attempt to identify the cause. Upon working out a plausible solution, personnel will take necessary steps to ensure that similar problems do not arise during future sampling.

Table 6 – Summary of Quality Control Analytical

Quality Control Procedure	Field Procedure (Yes/No)	Laboratory Procedure (Yes/No)	Frequency	Analysis
Duplicate (Retrofit sites)	Y	Y	One duplicate shall be collected for every 10 samples	Variable – Based on individual site analyses
Field blank	Y	Y	One blank sample per cooler per sampling event	Variable
Lab Duplicate	N	Y	Every sample batch	Variable
Reviews of Field Sheets and Chain of Custody Forms	Y	Y	5 times	N/A

4.5.1 Field Sampling Quality Control

The EPA may make arrangements to conduct quality assurance activities including reviews of field sheets and chain of custody forms. Field audits may include trips with field staff to study sites to observe and potentially replicate samples taken for independent confirmation of measurements and assess compliance with QAPP requirements. It is understood that EPA also reserves the right to conduct field audits of sampling activities.

4.5.2 Analytical Sampling Quality Control

One field QC grab sample duplicate for laboratory analysis will be collected at least for both downstream and upstream locations. The field duplicate for laboratory analysis will be collected to determine sampling and analytical precision.

Analytical laboratory data will be checked for completeness and adherence to QAPP specifications, including required frequency of QC samples, conformance to determined acceptance criteria for QC samples, and non-exceedance of maximum holding times. Results from field duplicates are compared and relative percent difference calculated. For relative percent difference (RPD), lower values are considered better (i.e. samples are similar). Field duplicates must be within 30 percent relative percent difference. Differences greater than this value generally mean that samples are not homogeneous. Pollutants that are not detected or are less than five times the detection limit in field duplicates will not be analyzed in this manner. In cases where these values are exceeded, the Teklab project manager, will assist in determining data validity and sampling and/or analytical protocol will be reevaluated as necessary.

4.5.3 *Inspection/Acceptance Requirements for Supplies and Consumables*

Supplies and consumables will be purchased only from reputable and reliable suppliers and inspected for usability upon receipt.

4.5.4 *Data Management*

The field sampling leader will be responsible for completing the field data sheets, entering data and field notes into a spreadsheet or database, and submitting to the EPA.

Laboratory data will be maintained according to the lab QAPP and minimally consist of chain-of-custody documents, analytical data and QA/QC data. Laboratory results will be entered into a computer database and lab data, data verification records, and original chain of custody documents will be submitted to Rotary Drilling. The laboratory reports will be provided to the EPA within 30 days after analysis is complete. The Project Coordinator will be responsible for data management including storage and quality assurance procedures. Quality assurance data sheet checks will include scanning for apparent entry errors, measurement errors, and omissions. Suspect data will be flagged and/or excluded from use. Data may be presented in table, graph, and chart format. Unusual data will be rechecked to verify their accuracy.

Data will be stored a minimum of 10 years after the end of the project. Hard copies will be stored and electronic files will be stored in an office computer at SCI Engineering, Inc.

5.0 ASSESSMENT/OVERSIGHT

5.1 Assessments and Response Action

The Project Coordinator will be responsible for oversight of all field activities, reviewing the data, and reporting findings. He will periodically assess whether the QAPP is being implemented as approved or needs to be amended in order to adjust to changing conditions. He has the authority to issue stop work orders if necessary. The potential for problems such as equipment failure and access complications will be minimized by pre-testing field equipment in the office prior to installation, and flexible field sampling schedules to accommodate the weather and study site access.

Prior to the start of fieldwork and data collection, the Project Manager will ensure project staff receive the necessary training, safety equipment, gear, and communication devices. Project personnel will be responsible for monitoring and maintaining field equipment to ensure data collection accuracy as required by manufacturer specifications.

Field sampling procedures, including but not limited to sampling methods, sample handling, and equipment use will be periodically evaluated. The Project Coordinator will be responsible for addressing any deficiencies related to the field procedures and will document corrective actions, as necessary. Teklab uses QA/QC software and laboratory personnel to track and monitor potential laboratory deficiencies. QA/QC qualifications and corrective actions will be documented and presented in the analytical report, as necessary.

6.0 DATA VALIDATION AND USABILITY

6.1 Data Review

Data will be proofread for typos and transcription errors. It will also be cross-checked against field notes and data sheets. QC data (e.g., duplicates, calibration data, etc.) will be reviewed. If data quality does not meet project specifications, the deficient data will be flagged or discarded and the cause of failure evaluated. The Project Coordinator will be responsible for this review or for delegating this review.

6.2 Validation and Verification Methods

Data validation is the process of ensuring data are adequate for their intended use. Data validity will be routinely assessed during the project, with the primary characteristics of importance being precision, accuracy, and completeness. Assessment of these characteristics will ensure that overall project data quality objectives are achieved. Measurements outside of accepted ranges for relative standard deviation or relative percent difference will be rejected and not included in project analysis.

Accuracy for samples measured at Teklab will be measured using laboratory blanks. Analytical samples not meeting laboratory accuracy requirements will not be reported, and samples will be rerun.

Verification of data from both field measurements and laboratory measurements of water quality parameters will be conducted. Field measurements will be checked for completeness in data sheets and maintenance logs and adherence to established testing procedures. Teklab will check laboratory data for completeness as described in the data quality objectives and assessed for instrument accuracy and precision. Instruments found to be measuring data outside the ranges of accuracy and precision described in the data quality objectives will be recalibrated as necessary.

Water samples not processed within the specified holding times will be subject to evaluation in order to determine if they meet project objectives. Proper storage of samples will be monitored by Teklab. Samples not stored properly will be flagged as suspect and discarded if deemed erroneous during data review; this will require additional samples in order to meet data quality objectives for completeness. Field duplicates will also be used to measure variability in the samples obtained in order to document the accuracy and precision of the sampling process.

Exploratory statistics (descriptive statistics) and/or graphing exercises may be used to help identify outlying data. Any data that does not fall within a reasonable range of error will be identified and corrected, or excluded from the final analysis.

For any other issues, project staff will follow the EPA *Guidance on Environmental Verification and Validation* (EPA QA/G-8) whereby the data are reviewed and accepted. Data may also be reviewed and qualified by EPA project staff. All data that does not meet validation and verification criteria will be discarded. The Project Coordinator will perform validation and verification reviews on each sampling report provided by Teklab.

6.3 Reconciliation with Data Quality Objectives

The goal of the study is to generate newly-collected data of sufficient quantity and quality to analyze surface water quality coming from the CCR fill site. By using a qualified professional laboratory with extensive experience in quality assurance for sampling and analytical tasks, the risk of data error is low. The QA procedures in this plan will provide further assurance of data quality.

6.4 Use of Data in Water Quality Analysis

Data collected from the upstream and downstream locations can be used as a basis to measure the response of water quality indicators to the corrective actions. Project reporting will also document where data quality indicators did not meet the performance criteria, including an indication of whether and how the data will be limited in its use for drawing conclusions. Statistical outliers should be evaluated in accordance with *ASTM E178 Standard Practice for Dealing with Outlying Observations*. Where applicable, standard error estimates will also be made and reported. For the statistical regressions, the standard error will be accounted for in the confidence levels that are used for each comparison of regression slopes.

7.0 REFERENCES

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Appendix B



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Sampling and Analysis Plan

**ROTARY DRILLING SUPPLY SITE, INC.
CRYSTAL CITY, MISSOURI**

**June 12, 2015
Revised July 8, 2015**

**ROTARY DRILLING SUPPLY, INC.
Owner**

**GOODWIN BROTHERS CONSTRUCTION CO.
General Contractor**

**GOVERO LAND SERVICES, INC.
Civil Engineer/Surveyor**

SCI No. 2014-5129.20

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Sampling and Analysis Plan

ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI

1.0 SITE INFORMATION AND BACKGROUND

The primary scope of work is to assist Rotary Drilling Supply Inc. (Rotary Drilling) to comply with the U. S. Environmental Protection Agency's (EPA) Administrative Order of Consent (AOC) by providing technical guidance on the development of an approved Long Term Work Plan (LTWP). This LTWP will identify how Rotary Drilling will comply with containing the coal combustion residuals (CCR) while still allowing for future development of the site.

The approximately 12-acre project site is located at 1150 South Truman Boulevard in Festus, Missouri. The property is currently the business location for Rotary Drilling which contains a large fill pad and one structure. A portion of the site was previously filled over the last 10+ years with CCR and other fill material to create the grades present at the time of this report.

EPA sample results indicated high levels of coal combustion residue (CCR) have, and will continue to migrate into the unnamed tributary to Platin Creek and adjacent waterbodies. The EPA determined that CCR has done irreparable harm to wetlands and adjacent surface waters. The Sampling and Analysis Plan (SAP) details how Rotary Drilling will sample surface water coming from likely CCR migration routes for contaminants.

2.0 PROJECT DESCRIPTION

As part of an overall containment plan, or what is referred to as the LTWP, the site will be graded to form stable slopes and the site capped to reduce infiltration, erosion and runoff concerns. The lower portions of the slopes adjacent to the railroad tracks and tributary will be covered with a geotechnical fabric and riprap. Additionally, a portion of an unnamed tributary that is on site will be piped as per the AOC from the EPA and permitted by the U.S. Army Corps of Engineers in order to minimize stormwater contamination from the CCR.

2.1 Sampling Objectives

Sampling of surrounding surface waters will be conducted to monitor levels of CCR and determine if CCR has ceased to migrate off site. Multiple samples will be taken at a minimum of 3 locations in order to provide a thorough understanding of CCR migration. Please refer to Figure 1 in the Surface Water

Monitoring and Cap Maintenance Plan for an overview of the sampling locations. Samples will be analyzed for the same metals of concern laid out in the AOC. Implementation of the LTWP will be considered successful if sample results indicate levels below the Chronic Water Quality Criteria Screening levels as described in the AOC.

2.2 Sampling Approach

Surface water sampling and analysis will be done quarterly, bi-annually, and annually for a minimum of 5 years following construction of the clay cap. Quarterly monitoring will be done for the first 3 years, bi-annual monitoring will be done for the following fourth year, and annual monitoring will be done for the fifth year. Samples will be analyzed for the following metals: Arsenic, Copper, Nickel, Chromium, Barium, Beryllium, Boron, Cobalt, Iron, Selenium, Vanadium, Antimony, Zinc, Thallium, and Cadmium. Sampling results will be compared to the results determined by the EPA and listed in Tables 2 and 3 of the AOC. If quarterly sampling results exceed allowable limits, further measures will be taken in order to contain migration of CCR and additional sampling locations may be suggested. All samples will be collected and preserved in accordance with procedures and requirements found in the Quality Assurance Project Plan (QAPP) attached as Appendix A in the Surface Water Monitoring and Cap Maintenance Plan.

2.3 Sampling Procedure

Surface water samples will be taken from a minimum of 3 sources (see Adjacent Waterbodies and Sampling Locations Figure) surrounding the project site as approved by the EPA. The first sampling location (S1) will be upstream of the piped portion of the unnamed tributary. The second location (S2) will be downstream of the piped portion of the unnamed tributary. The third sampling location (S3A, S3B) will be the southeast and southwest portion of Willers Lake. Two grab samples will be taken from each location and will follow the sampling procedures discussed in Chapter 4 of the QAPP. Should data results from the following Sampling Approach and Procedures indicate that elevated levels of contaminants are present in the unnamed tributary and Willers Lake after the implementation of the LTWP, sampling may extend to Plattin Creek to understand the extent of the migration. The integrity of the measures taken to prevent contamination spread, such as the piping of the tributary and the clay cap, will be reassessed and an adjusted LTWP may be developed. Samples will be analyzed for the contaminants of concern as discussed in the AOC. Samples will be analyzed using EPA method 6010. Samples will be taken in 1 liter amber jars then transferred to appropriate laboratory bottles and sent to a certified lab for analysis. The samples will be kept chilled between 0.1°C and 6.0°C at all times. Appropriate chain of custody procedures and forms will be used during transfer. As per the AOC, data

sampling results will be submitted to the EPA within 30 days of Respondent’s receipt of the data. Sampling design, sampling rationale, method techniques, analytical methods, and data validation and usability requirements to be followed for this sampling approach are discussed in the QAPP. For further descriptions of sampling procedure and quality assurance, please see Section 4 and 5 of the QAPP.

3.0 PROJECT TIMELINE

Progress for this project will be tracked from start to final implementation of the LTWP. This will help ensure that all sampling and analytical procedures are conducted correctly and in a cost effective manner. Steps will be scheduled in objective and realistic time frame. Please refer to Table 1 for the estimated project timeline.

Table 1 – Estimated Project Schedule

Activity	Anticipated Date of Initiation	Anticipated Date of Completion
Submit draft LTWP to USEPA	NOVEMBER 2014	NOVEMBER 2014
Receive comments from USEPA	DECEMBER 2014	DECEMBER 2014
Submit final LTWP to USEPA	FEBRUARY 2015	FEBRUARY 2015
Receive comments from USEPA	MAY 2015	MAY 2015
Submit revised LTWP to USEPA	JUNE 2015	NA
Receive Approved LTWP from USEPA	JULY 2015	NA
Implementation of LTWP	JULY/AUG 2015	DECEMBER 2015
Initial first quarterly sampling	JANUARY 2016	JANUARY 2016
Submit annual report	DECEMBER 2016	DECEMBER 2016

These monitoring activities shall commence beginning after the first anniversary of completion of work required by this LTWP. Annual monitoring reports should be submitted to the EPA by December 1st of each year. The goal of the study is to generate newly-collected data of sufficient quantity and quality to analyze surface water quality coming from the CCR fill site. If sampling indicates continued migration of CCR constituents, additional considerations for the length of monitoring and/or containment must be made and submitted to EPA within 30 days. Monitoring will occur for a minimum of 5 years following the implementation of the LTWP. If levels indicate that CCR constituent runoff has been eliminated, a request will be sent to EPA requesting to discontinue submitting annual reports.

4.0 REFERENCES:

U.S. Environmental Protection Agency, 1999. "Site-Specific Sampling and Analysis Plan Template," EPA QA/R-5: EPA Requirements for Quality Assurance Project Plans. Fort Meade, Maryland. 1999. http://www.epa.gov/reg3hwmd/bf-lr/granteereporting/sap_generic.pdf

Appendix C



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Cap Maintenance Plan

**ROTARY DRILLING SUPPLY SITE, INC.
CRYSTAL CITY, MISSOURI**

June 12, 2015

**ROTARY DRILLING SUPPLY, INC.
Owner**

**GOODWIN BROTHERS CONSTRUCTION CO.
General Contractor**

**GOVERO LAND SERVICES, INC.
Civil Engineer/Surveyor**

SCI No. 2014-5129.20

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Cap Maintenance Plan

ROTARY DRILLING SUPPLY SITE, INC. CRYSTAL CITY, MISSOURI

1.0 PROJECT DESCRIPTION

The Cap Maintenance Plan (CMP) has been designed to include necessary operation and maintenance procedures needed to maintain the effectiveness of the clay cap. The primary consideration in the CMP is to ensure the long-term integrity of the cap and to minimize any degradation that could be caused by weathering or future activities on site. The clay cap will consist of 24 inches of clay placed and compacted over the Coal Combustion Residue (CCR) material and then 12 inches of shot rock fully covering the clay cap. The side slopes of the CCR will also have 24 inches of clay cap and be covered with riprap to 2 feet above the 100-year flood plain elevation.

2.0 CAP MAINTENANCE

The site will be inspected concurrently with surface water monitoring for a minimum of 5 years. Inspections will occur as detailed below to ensure that the shot rock, clay cap, and rip rap are functioning as intended. The clay cap and side slopes will be visually inspected for any signs of erosion, instability, or migration of material. The cap will also be inspected for areas of subsidence, upheaval, exposed cap, ponding, seeps, deep rooted plants or evidence of human activities such as digging. The final detention basin will be inspected for evidence of erosion along the clay cap and accumulation of sediment. The piped tributary realignment will also be inspected as part of the CMP. The area will be visually inspected for settling, erosion, and vegetation growth. The surface water sampling and analysis will be done in accordance to the U.S. Environmental Protection Agency's (EPA) approved Sampling and Analysis Plan (SAP) and the Quality Assurance Project Plan (QAPP) outlined for the site. The results of the surface water sampling are intended to measure the effectiveness of the containment as well as identify the potential need for modification or repair if necessary. Further consideration to protect the long-term integrity of the cap, through the establishment of environmental covenants, is further described in Section 3.6 of Long Term Work Plan (LTWP).

Any solid waste generated through construction of the cap will be contained and trucked off site to a designated suitable disposal facility. Table 1 includes an operation and maintenance schedule for cap maintenance and inspection.

Table 1 - Operation and Maintenance Schedule

Task	Frequency
Surface water sampling and analysis	Quarterly for the first 2 years Semi-annually for the next 2 years Annually for the final year
Inspection of Clay Cap for evidence erosion due to weathering or deep rooted plants, exposed cap, subsidence, upheaval, ponding, or seeps.	Semi-annually for the first 2 years Annually for the next 3 years
Inspection of Shot Rock Layer for evidence of displaced rock	Semi-annually for the first 2 years Annually for the next 3 years
Inspection of Rip Rap Layer for evidence of displaced rock	Semi-annually for the first 2 years Annually for the next 3 years
Inspection of Side Slopes for evidence of erosion due to weathering or deep rooted plants, exposed cap, subsidence, upheaval, ponding, or seeps	Semi-annually for the first 2 years Annually for the next 3 years
Inspection of Piped Unnamed Tributary for evidence of erosion due to weathering or settlement, exposed cap, subsidence, upheaval, ponding, or seeps	Semi-annually for the first 2 years Annually for the next 3 years
Inspection of final Detention Basin for evidence of erosion along the clay cap and build of sedimentation	Semi-annually for the first 2 years Annually for the next 3 years

If a significant failure of the cap occurs as evidenced during our routine monitoring that necessitates a change of the LTWP, Rotary Drilling will submit a letter to the EPA project coordinator for review and approval. In the event that that a situation presents immediate threat to human health or the environment, the EPA’s project coordinator will be immediately contacted. As discussed in the AOC, Rotary Drilling will submit a letter in writing within at least 3 calendar days of the discovery. Rotary Drilling will then submit a plan within 20 days detailing how to mitigate the threat.

