KENVIRONS

SPURLOCK STATION LANDFILL
AREA C, PHASE 4 CELL CONSTRUCTION

DESIGN CRITERIA COMPLIANCE DEMONSTRATION

EAST KENTUCKY
POWER COOPERATIVE

EAST KENTUCKY POWER COOPERATIVE

COAL COMBUSTION RESIDUAL RULE COMPLIANCE

REV. 0 (7/12/2018)

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Civil & Environmental Engineering and Laboratory Services • Visit us at www.Kenvirons.com

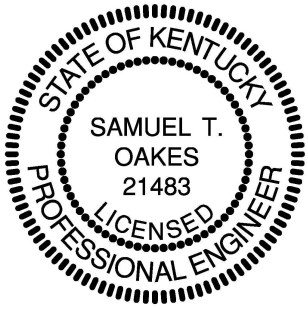
CERTIFICATION

EAST KENTUCKY POWER COOPERATIVE, INC.
SPURLOCK STATION LANDFILL
AREA C, PHASE 4 CELL CONSTRUCTION
DESIGN CRITERIA COMPLIANCE DEMONSTRATION

CERTIFICATION

I hereby certify, as a Professional Engineer in the Commonwealth of Kentucky, that East Kentucky Power Cooperative's Spurlock Station Landfill, Area C, Phase 4 Cell Construction has been designed to meet the requirements of the following provisions of the CCR Rule: 40 CFR § 257.70.

I further certify that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by East Kentucky Power Cooperative or others without specific verification or adaptation by the Engineer.



S. Tim Oakes, P.E. [21,483] – Kenvirons, Inc.

Date: 7/12/18

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1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual Rule (CCR Rule) to regulate the disposal of coal combustion residual (CCR) materials generated at coal-fired units. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], under Subtitle D.

East Kentucky Power Cooperative (EKPC) is subject to the CCR Rule and as such will demonstrate compliance with design criteria per 40 CFR §257.70. This document serves as EKPC's design criteria certification for Area C, Phase 4 Cell Construction at Spurlock Station Landfill. Phase 4 cell construction is defined as a lateral expansion of the existing CCR landfill per 40 CFR §257.53. Phase 4 Cell Construction Plans can be found in Attachment 1.

A compliance summary of the CCR Rule design criteria requirements addressed in this document are provided in Table 1-1 below.

TABLE 1-1 DESIGN CRITERIA SUMMARY

DESIGN CRITERIA			
Unit: Spurlock Station Landfill Lateral Expansion (Area C, Phase 4 Cell Construction)			
DESCRIPTION	**CCR RULE COMPLIANCE**		
	YES	**NO**	**REPORT REFERENCE**
Composite Liner[1]	☒	☐	See Sections 2.1 through 2.5
Leachate Collection & Removal System	☒	☐	See Section 2.6 (2.6.1 – 2.6.3)

[1] Certification applicable to Composite Liner of 40 CFR §257.70(b).

2.0 DESIGN CRITERIA

40 CFR §257.70(a)(1) states that new CCR landfills "must be designed, constructed, operated, and maintained with either a composite liner that meets the requirements of paragraph (b) of this section or an alternative composite liner that meets the requirements in paragraph (c) of this section, and a leachate collection and removal system that meets the requirements of paragraph (d) of this section."

2.1 Composite Liner

40 CFR §257.70(b) states "A composite liner must consist of two components; the upper component consisting of, at a minimum, a 30-mil geomembrane liner (GM), and the lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec). GM

components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. The GM or upper liner component must be installed in direct and uniform contact with the compacted soil or lower liner component."

Phase 4 Lateral Expansion incorporates components specified by 40 CFR §257.70(b) which are an upper component consisting of a textured 60-mil HDPE geomembrane and a lower component consisting of two feet of compacted soil with a hydraulic conductivity of no more than $1x10^{-7}$ cm/sec.

2.2 Chemical Properties, Strength and Thickness of Materials

40 CFR §257.70 (b)(1) states that the composite liner must be: "Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;"

The list below describes how the composite liner system design meets the requirements of 40 CFR §257.70 (b)(1) referenced above.

1. The 60-mil HDPE geomembrane materials are chemically compatible with CCR waste per manufacturer historic laboratory analysis.
2. A deformation and post-earthquake analysis performed by Stantec in June 2018 determined a maximum permanent deformation to be approximately 0.04 inches for the critical liner interface, well below the allowable range of 6 to 12 inches.
3. As discussed in Section 2.1, if isolated saturated zones (seeps) are encountered within the vadose zone during construction of the liner system, an underdrain will be installed to capture and convey groundwater seeps outside the landfill to control external hydrogeologic forces.
4. The subgrade (base) will be constructed following a CQA Plan to promote a stable support for the composite liner materials and resist static head forces.
5. All geosynthetic liner materials will be installed per manufacturer and CQA Plan guidelines to minimize installation stresses including stresses applied by construction equipment.
6. The initial lifts of CCR, next to the liner system, will be placed during filling operations at specified thicknesses and with equipment that will apply no more than 5 psi on the geomembrane component of the liner system.
7. The climatic conditions at the facility are relatively humid with abundant rainfall. The normal monthly mean temperature ranges from 30° F in January to 76° F in July. Average daily relative humidity ranges from 45% to 95% with the average annual precipitation around 47.3 inches. The CQA Plan and industry standards

(ex: Geosynthetic Research Institute – GRI) provide guidelines for material endurance impacted by climatic conditions such as ultra violet radiation (UV) and weather exposure. These guidelines are incorporated into the design to provide a composite liner that is compatible with the site's climatic conditions.

2.3 Shear Resistance

40 CFR §257.70(b)(2) states that the composite liner must be: "Constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component including on slopes;"

The slope stability of the landfill is predominately controlled by the frictional resistance at the anticipated critical interface of the composite liner system and also by the shear strength parameters of the waste, drainage layer, compacted soil layer and subgrade (base). A global slope stability analysis was conducted by Stantec (dated December 2016) as part of the landfill design process to determine acceptable friction angles for the composite liner. The analysis determined that the minimum friction angle for components of the composite liner remain stable at 12.4 degrees using a factor of safety of 1.25.

2.4 Composite Liner Foundation or Base

40 CFR §257.70(b)(3) states that the composite liner must be: "Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift;"

Site specific geotechnical and hydrogeological investigations were performed for the landfill site to determine suitability. Likewise, a structural integrity analysis was conducted, which included the designed base or foundation (subgrade) of the landfill. The base of the landfill will be mainly constructed of bedrock and/or engineered structural fill. The structural fill will be placed in areas to meet grade requirements. The structural fill layer was modeled with shear strength parameters of 28 degrees and zero cohesion, along with a unit weight of 120 pounds per cubic foot (pcf). The computer analysis was performed with the composite liner components and subgrade (base) under saturated conditions with the following results: A minimum static factor of safety of 2.0 was determined from the stability models compared to a target factor of safety of 2.0. Construction methodologies based on the design and CQA Plan will ensure a competent base is prepared to resist pressure gradients per 40 CFR §257.70 (b)(3).

2.5 Composite Liner Limits

40 CFR §257.70(b)(4) states that the composite liner must be: "Installed to cover all surrounding earth likely to be in contact with the CCR or leachate."

The design limits of the composite liner system specified in the design documents cover all surrounding earth likely to be in contact with CCR or leachate.

2.6 Leachate Collection and Removal System

40 CFR §257.70(d) states "The leachate collection and removal system must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure care period. The leachate collection and removal system must be: (1) Designed and operated to maintain less than a 30-centimeter depth of leachate over the composite liner or alternative composite liner; (2) Constructed of materials that are chemically resistant to the CCR and any non-CCR waste managed in the CCR unit and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying waste, waste cover materials, and equipment used at the CCR unit; and (3) Designed and operated to minimize clogging during the active life and post-closure care period."

2.6.1 Maximum Depth of Leachate

The leachate collection system designed for the landfill was designed to maintain less than 30 centimeters depth of leachate over the composite liner system. The HELP model (Hydrogeologic Evaluation of Landfill Performance) was used to predict leachate production under operational and closed conditions. The model was performed for all composite liner system options included in the design documents.

2.6.2 Chemical Properties, Strength and Thickness of Materials

The leachate collection system design consist of polypropylene, HDPE and naturally occurring durable gravel materials. The man-made materials are chemically stable, do not rot and are resistant to oxidation and microorganisms. Gravel materials incorporated into the design are durable materials resistant to deterioration in a CCR leachate environment. All materials have the appropriate thickness and strength to resist collapse under the pressures of the waste, cover, and equipment.

2.6.3 Minimize Clogging

Materials specified in the design documents are selected to minimize clogging during the active life and 30 year post closure care period. Materials selected to provide filtering of the leachate collection system components have been designed and tested by the manufacturers to minimize clogging when subjected to CCR waste. Representative hydraulic conductivity ratio (HCR) testing has been performed with acceptable results per GRI guidelines for minimal clogging.

3.0 REPORT LIMITATIONS

This report is based on observations made of features that could be visually seen at the time of site reconnaissance, review of previous engineering investigations and design documents, permits and survey information provided by EKPC as well as work performed by Kenvirons for the design of Area C, Phase 4 Cell Construction. The design basis and documents are based on Kenvirons' understanding of current plant operations, maintenance, storm water handling and CCR handling procedures for the landfill, as provided by EKPC. Changes in any of these operations or procedures may result in deviation from the intended design and operation of the landfill.

The design is based on established engineering principles and provided in a manner consistent with the level of care and skill ordinarily exercised by the engineering consultants under similar circumstances. No other representation is intended.

ATTACHMENT 1

AREA C, PHASE 4 CELL CONSTRUCTION PLANS

EAST KENTUCKY POWER COOPERATIVE, INC.

SPURLOCK STATION LANDFILL

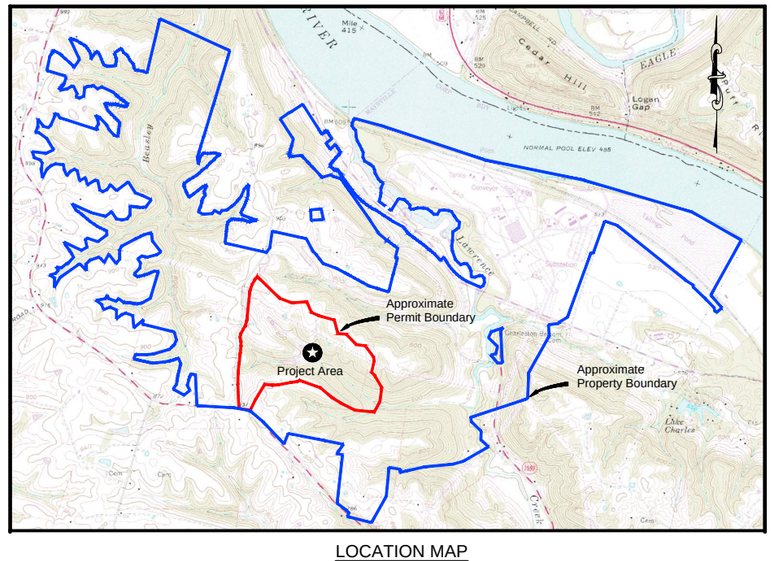
MASON COUNTY, KENTUCKY

PERMIT NO. 081-00005

AREA C, PHASE 4 CONSTRUCTION DRAWINGS

FEBRUARY 2018

INDEX OF SHEETS



LOCATION MAP

SCALE: 1"= 2000'

Prepared For:

East Kentucky Power Cooperative
4775 Lexington Road
P.O. Box 707
Winchester, Kentucky 40392-0707

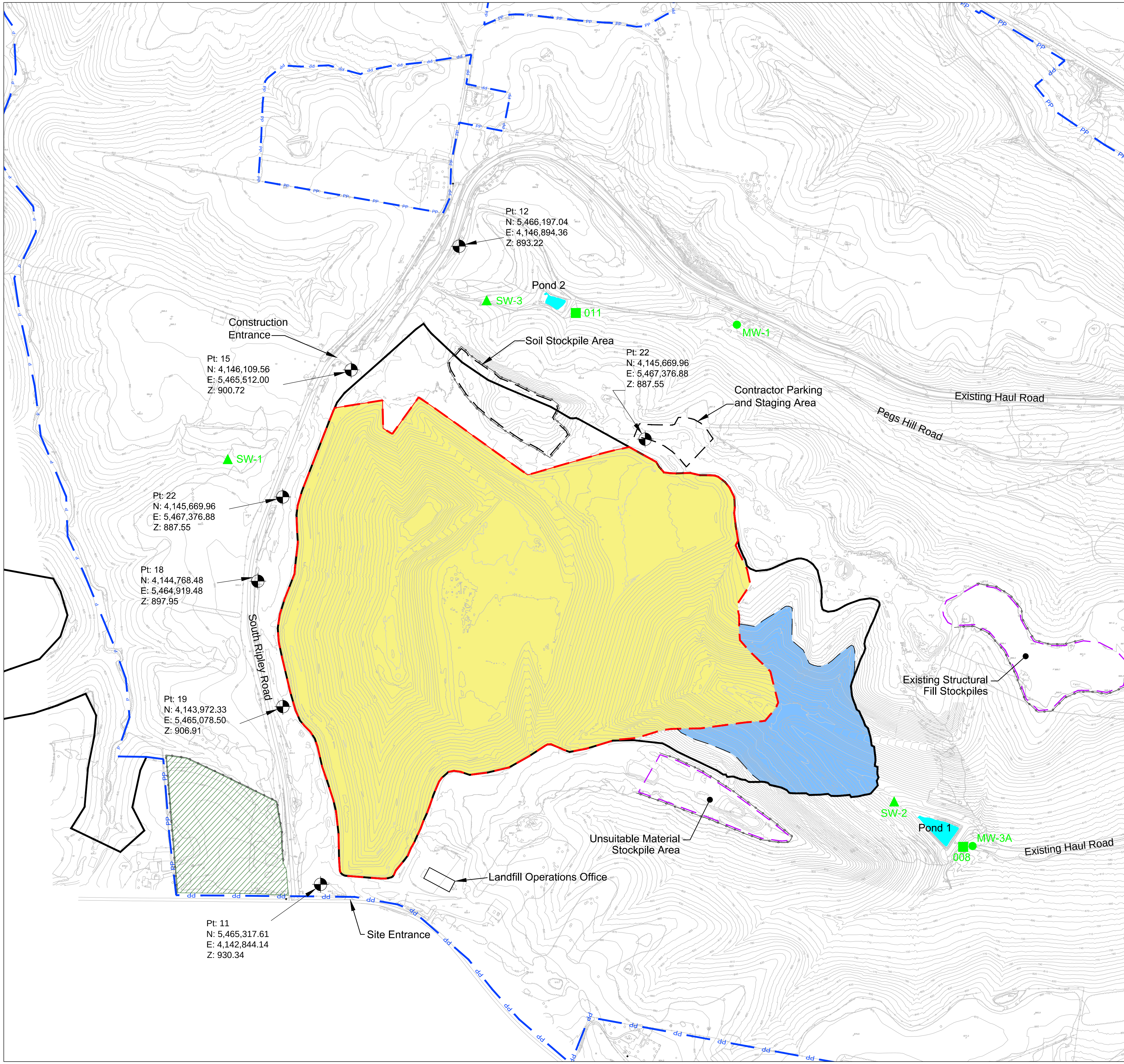
Prepared By:

KENVIRONS, INC.

452 Versailles Road - Frankfort, Kentucky 40601
502 695-4357 502 695-4363 Fax

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED
PROFESSIONAL ENGINEER

N:\PROJECTS\PHASE 4 PLANS\1-COVER.dwg 3/7/2018 9:44:44 PM



LEGEND

Existing Contours	810
Tree Line	Trees / Open
Tree	
Utility Pole	
℄ Drain	
Fence	
Spot Elevation	812.3
Existing Access Road	
Approximate Property Boundary	
Approximate Permit Boundary	P
Approximate Property & Permit Boundary	PP
Permitted Waste Limits	
Phase Limits	
Previously Constructed Liner Area	
Proposed Area C, Phase 4	
Soil Layer Borrow Area	
Permanent Survey Marker	
Groundwater Monitoring Well	MW-2A
Surface Water Monitoring Point	SW-2
KPDES Monitoring Point	008
Proposed Silt Fence	

NOTES

1. Contractor may only perform tree clearing activities within the identified borrow area(s) between October 15th and March 31st.
2. Grading of Borrow Areas shall maintain positive drainage without any standing water. Proper sediment control shall be used to prohibit the migration of sediments per the site's existing Stormwater Pollution Prevention Plan (SWP3). All disturbed areas shall be re-vegetated to a minimum of 90% vegetative growth.
3. Sediment controls shown are minimum required controls. Contractor shall be responsible for providing and maintaining as many structures as needed to eliminate the migration of sediment offsite and/or into Waters of the Commonwealth. This is incidental to construction activities and therefore the responsibility of the Contractor to provide at no expense to EKPC beyond those items addressed on the Bid Schedule.
4. No equipment allowed on grout mat ditch.
5. All horizontal coordinates listed are projected in NAD83 State Plane Kentucky Single Zone (US Foot). Elevation data is based on the NAVD88 vertical datum.
6. Topography from Aerial Surveys performed on Feb. 24, 2013 by Photo Science, Inc. and in 2016 by Kucera International, Inc.

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.

GENERAL SITE LAYOUT

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED PROFESSIONAL ENGINEER

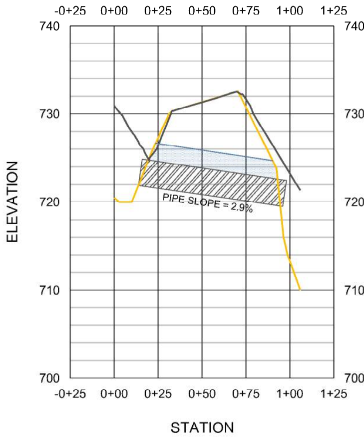
DRAWN BY: JRB/SMR
CHECKED BY: JAM/SMR
CHECKED BY: STO
DATE: MARCH 2018
SCALE: 1"= 400'
REVISIONS

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SHEET NO.
2 of 13

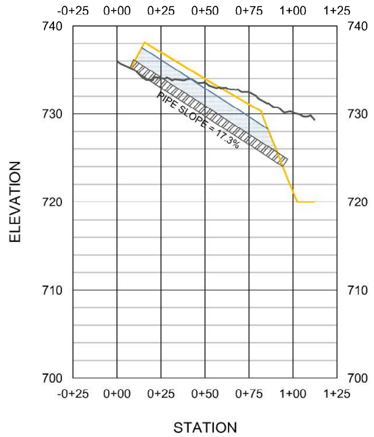
7/12/18



CULVERT GROUP 1 PROFILE

(THREE (3) 36" HDPE PIPE GROUP)

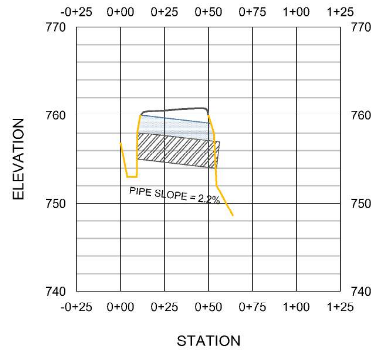
SCALE:
HORZ.: 1" = 50'
VERT.: 1" = 10'



CULVERT 3 PROFILE

(ONE (1) 12" HDPE PIPE)

SCALE:
HORZ.: 1" = 50'
VERT.: 1" = 10'



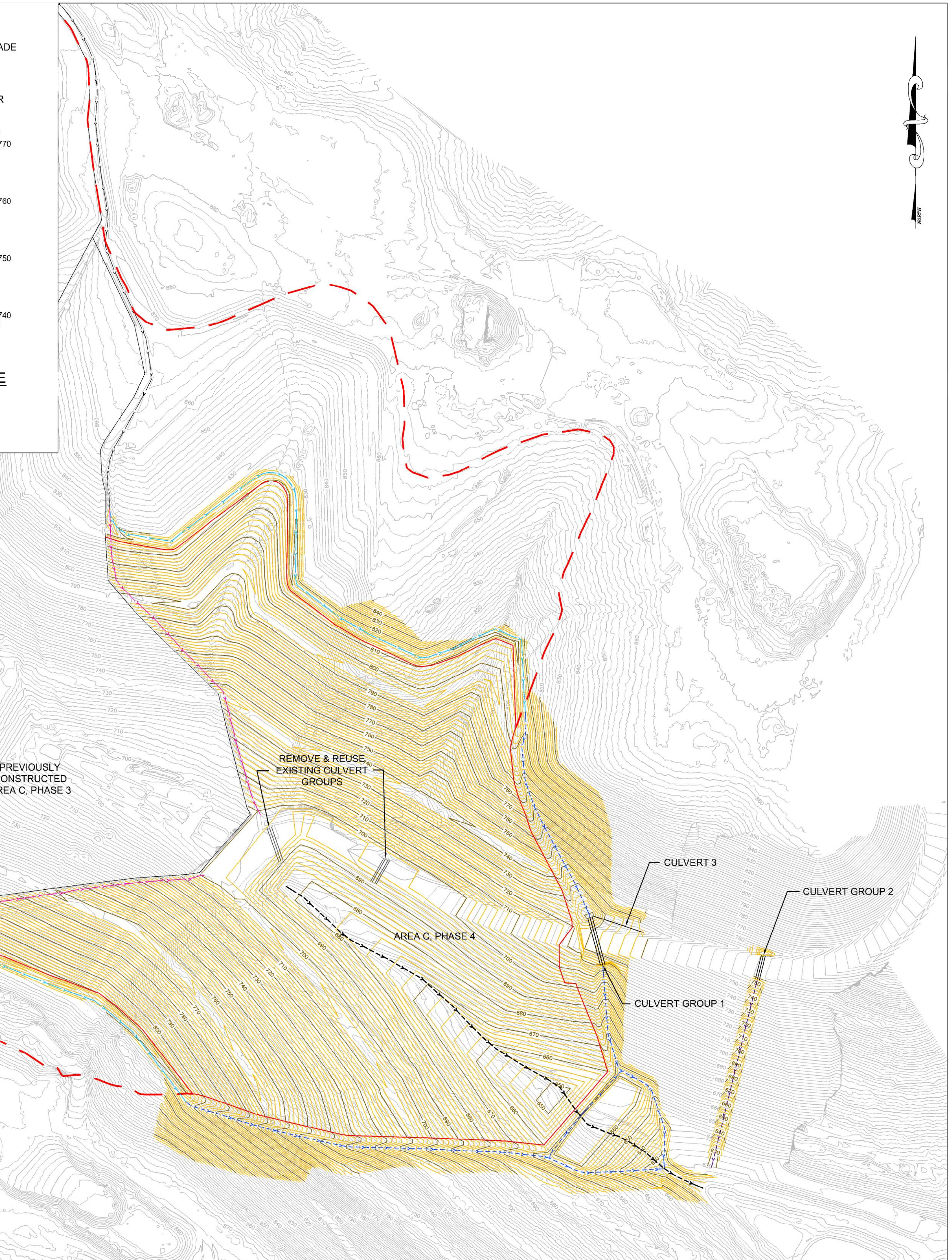
CULVERT GROUP 2 PROFILE

(THREE (3) 36" HDPE PIPE GROUP)

SCALE:
HORZ.: 1" = 50'
VERT.: 1" = 10'

LEGEND

- AREA C, PHASE 4 SUBGRADE
- EXISTING GROUND
- PROPOSED CULVERT
- MIN. TWO (2) FOOT COVER



LEGEND

- EXISTING CONTOURS
- TREE LINE
- TREE
- UTILITY POLE
- FENCE
- PERMITTED WASTE LIMIT
- PREVIOUSLY CONSTRUCTED WASTE LIMITS
- AREA C, PHASE 4 WASTE LIMIT (15.14 ac.)
- AREA C, PHASE 4 SUBGRADE CONTOURS
- EXISTING GEOMEMBRANE LINED DITCH
- EXISTING GEOMEMBRANE LINED DITCH (To Be Removed)
- PROPOSED GEOMEMBRANE LINED DITCH
- PROPOSED GROUTED RIPRAP LINED DITCH
- EXISTING GROUT-MAT LINED DITCH (To Be Removed)
- PROPOSED CULVERT OUTLET DOWNDRAIN

NOTES

1. THE LOCATIONS OF ALL UTILITIES SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ANY EXCAVATION OR DRILLING ACTIVITIES.
2. CONTRACTOR SHALL BE AWARE OF POSSIBLE TRAFFIC CONGESTION DUE TO THE CONTRACTOR'S OPERATIONS AND THE LANDFILL OPERATIONS.
3. ALL SPOIL MATERIAL ENCOUNTERED WITHIN THE BORROW AREA SHALL BE STOCKPILED IN THE AREA SHOWN AND/OR AS DIRECTED BY OWNER. CONTRACTOR IS LIMITED TO THE BORROW AREAS AUTHORIZED BY THE OWNER.
4. WATER FOR CONSTRUCTION MAY BE OBTAINED FROM THE EXISTING PONDS SHOWN. ANY ADDITIONAL WATER FOR CONSTRUCTION MAY BE OBTAINED AT THE POWER PLANT. CONTRACTOR WILL BE RESPONSIBLE FOR ALL WATER HAULING NEEDS. CONTRACTOR WILL REPAIR ANY DAMAGE TO HAUL ROAD CAUSED BY WATER TRUCK OR ANY OTHER EQUIPMENT.
5. CONTRACTOR SHALL REPAIR ANY DAMAGE TO LANDFILL STRUCTURES, MONITORING WELLS, ROADS, ETC. DUE TO THE CONTRACTOR'S EQUIPMENT AND/OR PERSONNEL AT NO COST TO THE OWNER.
6. ALL TOP SOIL ENCOUNTERED DURING CONSTRUCTION SHALL BE STOCKPILED AT THE DIRECTION OF THE OWNER. NO SOIL MATERIAL MAY BE REMOVED FROM THE SITE.
7. OWNER WILL PROVIDE SURVEYING FOR CERTIFICATION AND AS-BUILT PURPOSES.
8. CONTRACTOR SHALL PROVIDE EQUIPMENT AND OPERATORS FOR ALL INSPECTION ACTIVITIES BY STATE PERSONNEL (SUBGRADE PROOF-ROLLS, ETC.)
9. CONTRACTOR SHALL HAUL ALL REJECTED EXCAVATED MATERIAL TO THE CURRENT WORKING FACE STOCKPILE AREAS SHOWN, OR AS DIRECTED BY OWNER.

DEMOLITION / STORMWATER PLAN

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JRB
CHECKED BY: SMR
CHECKED BY: STO
DATE: MARCH 2018
SCALE: AS NOTED

REVISIONS	
04/02/18	Add. No. 1

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SHEET NO.
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AREA C PHASE 2
(CONSTRUCTED)

AREA C PHASE 1
(CONSTRUCTED)

AREA C PHASE 3
(CONSTRUCTED)

AREA C PHASE 5
(FUTURE CONSTRUCTION)

HDPE UNDERDRAIN
FUSION WELDED END CAP

HDPE UNDERDRAIN
FUSION WELDED END CAP

HDPE UNDERDRAIN
FUSION WELDED END CAP

TIE INTO EXISTING
UNDERDRAIN SYSTEM

AREA C PHASE 5
(FUTURE CONSTRUCTION)

UNDERDRAIN PIPE OUTLET
ELEVATION = 638.0'

LEGEND

- PROPOSED UNDERDRAIN PIPE
- EXISTING UNDERDRAIN PIPE
- AREA C PHASE 4 WASTE LIMITS (15.14 AC.)
- AREA C PHASE 4 CLAY LIMITS (15.37 AC.)
- CONSTRUCTED WASTE LIMITS
- PERMITTED WASTE LIMITS
- PROPOSED SUBGRADE CONTOURS 900
- EXISTING GROUND CONTOURS (2016 AERIAL SURVEY/HAUL ROAD CONTOURS) 900

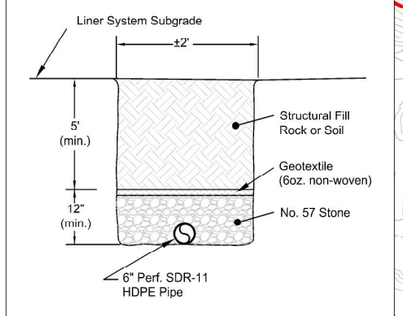
NOTES

1.) 2016 Aerial Survey contours of existing ground provided to Kenvirons, Inc. by EKPC personnel.
2.) Proposed haul road contouring and alignment was developed by CSI and provided to Kenvirons, Inc. by EKPC for inclusion with this work.
3.) The 2016 aerial survey contours were merged with CSI's haul road design contours to compare against design subgrade to produce cut/fill volume estimates.
4.) Actual location and length of the underdrain shall be field determined by the CQA Engineer and Owner prior to final installation.
5.) Underdrain piping shall extend a minimum of ten (10) feet beyond soil liner limits.

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.



UNDERDRAIN TRENCH DETAIL (IF NEEDED)
NTS

Note: Trench to Daylight to Existing Ground outside of Cell Limits.

UNDERDRAIN PLAN

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
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CHECKED BY: STO	
DATE: MARCH 2018	
SCALE: AS NOTED	REVISIONS
04/02/18	Add No. 1

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

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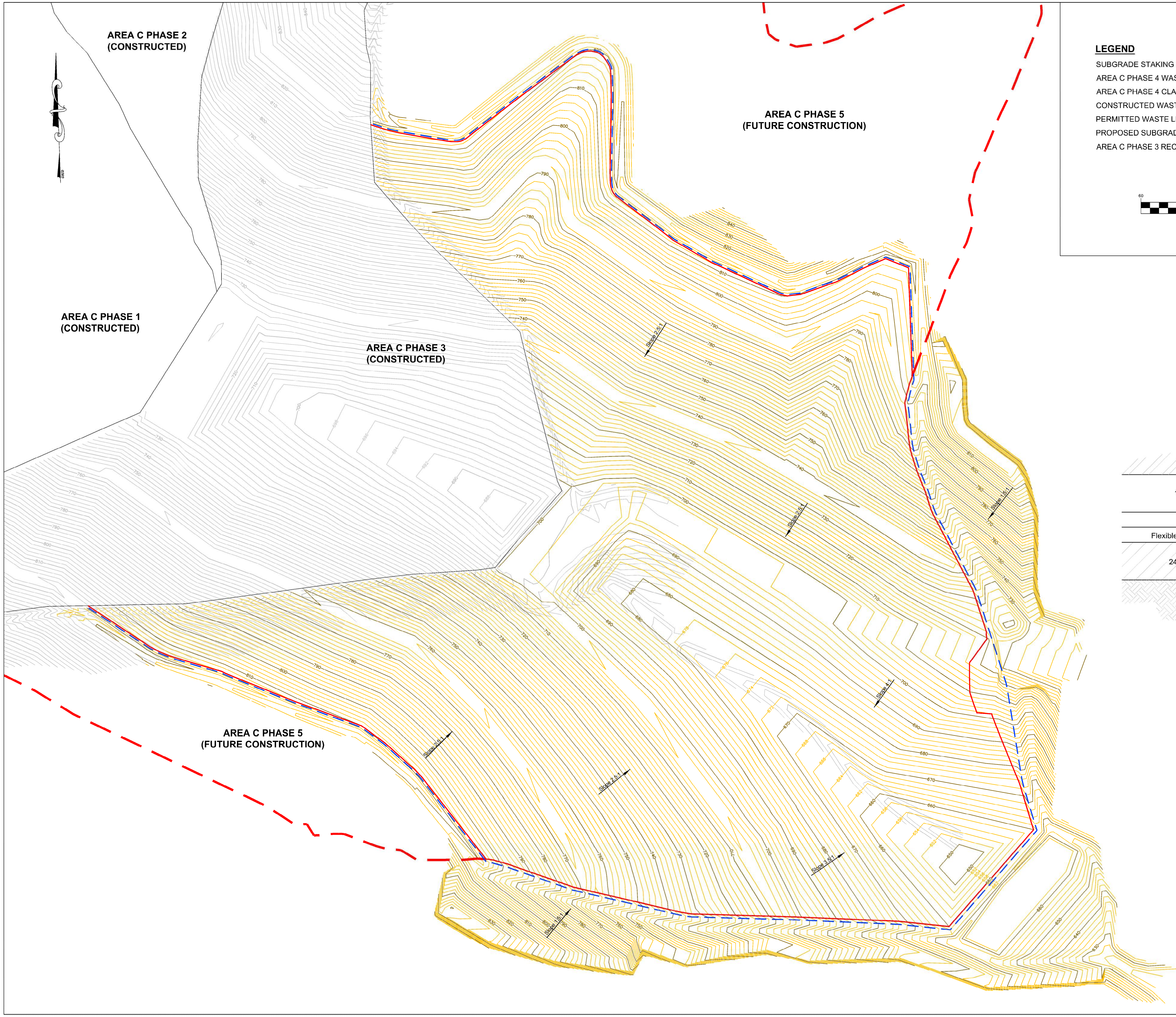

LEGEND

SUBGRADE STAKING POINT	⊠ 1010
AREA C PHASE 4 WASTE LIMITS (15.14 AC.)	
AREA C PHASE 4 CLAY LIMITS (15.37 AC.)	
CONSTRUCTED WASTE LIMITS	
PERMITTED WASTE LIMITS	
PROPOSED SUBGRADE CONTOURS	900
AREA C PHASE 3 RECORD SUBGRADE	900

GRAPHIC SCALE

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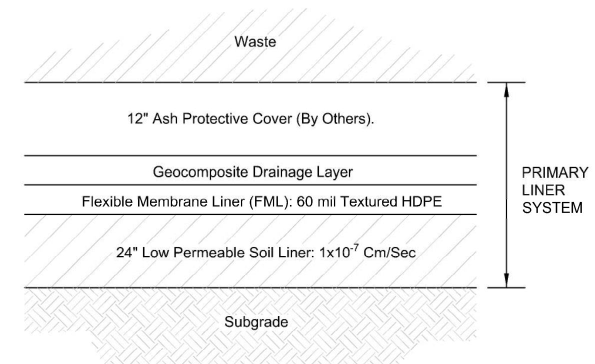
(IN FEET)
1 inch = 60 ft.



LINER SYSTEM DESIGN
N.T.S.

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

EAST KENTUCKY
POWER COOPERATIVE

STATE OF KENTUCKY
SAMUEL T. OAKES
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LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM
CHECKED BY: SMR
CHECKED BY: STO
DATE: MARCH 2018
SCALE: AS NOTED

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03/27/18	Addendum 1

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FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SUBGRADE STAKING PLAN

SHEET NO.
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AREA C PHASE 2
(CONSTRUCTED)

AREA C PHASE 1
(CONSTRUCTED)

AREA C PHASE 3
(CONSTRUCTED)

LEGEND

- AREA C PHASE 4 WASTE LIMITS (15.14 AC.)
- AREA C PHASE 4 CLAY LIMITS (15.37 AC.)
- CONSTRUCTED WASTE LIMITS
- PERMITTED WASTE LIMITS
- ISOPACH CUT CONTOURS
- ISOPACH FILL CONTOURS
- ISOPACH ZERO CUT/FILL CONTOUR
- EXISTING GROUND CONTOURS

NOTES

1.) 2016 Aerial Survey contours of existing ground provided to Kenvirons, Inc. by EKPC personnel.
2.) Proposed haul road contouring and alignment was developed by CSI and provided to Kenvirons, Inc. by EKPC for inclusion with this work.
3.) The 2016 aerial survey contours were merged with CSI's haul road design contours to compare against design subgrade to produce cut/fill volume estimates.

SUBGRADE CONSTRUCTION VOLUMES

APPROXIMATE SUBGRADE CUT VOLUME:	64,500 CY
APPROXIMATE SUBGRADE FILL VOLUME:	106,935 CY

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

SUBGRADE ISOPACH

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

EAST KENTUCKY POWER COOPERATIVE

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM	
CHECKED BY: SNR	
APPROVED BY: STO	
DATE: MARCH 2018	
SCALE: AS NOTED	REVISIONS
	03/27/18 Addendum 1

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SHEET NO.
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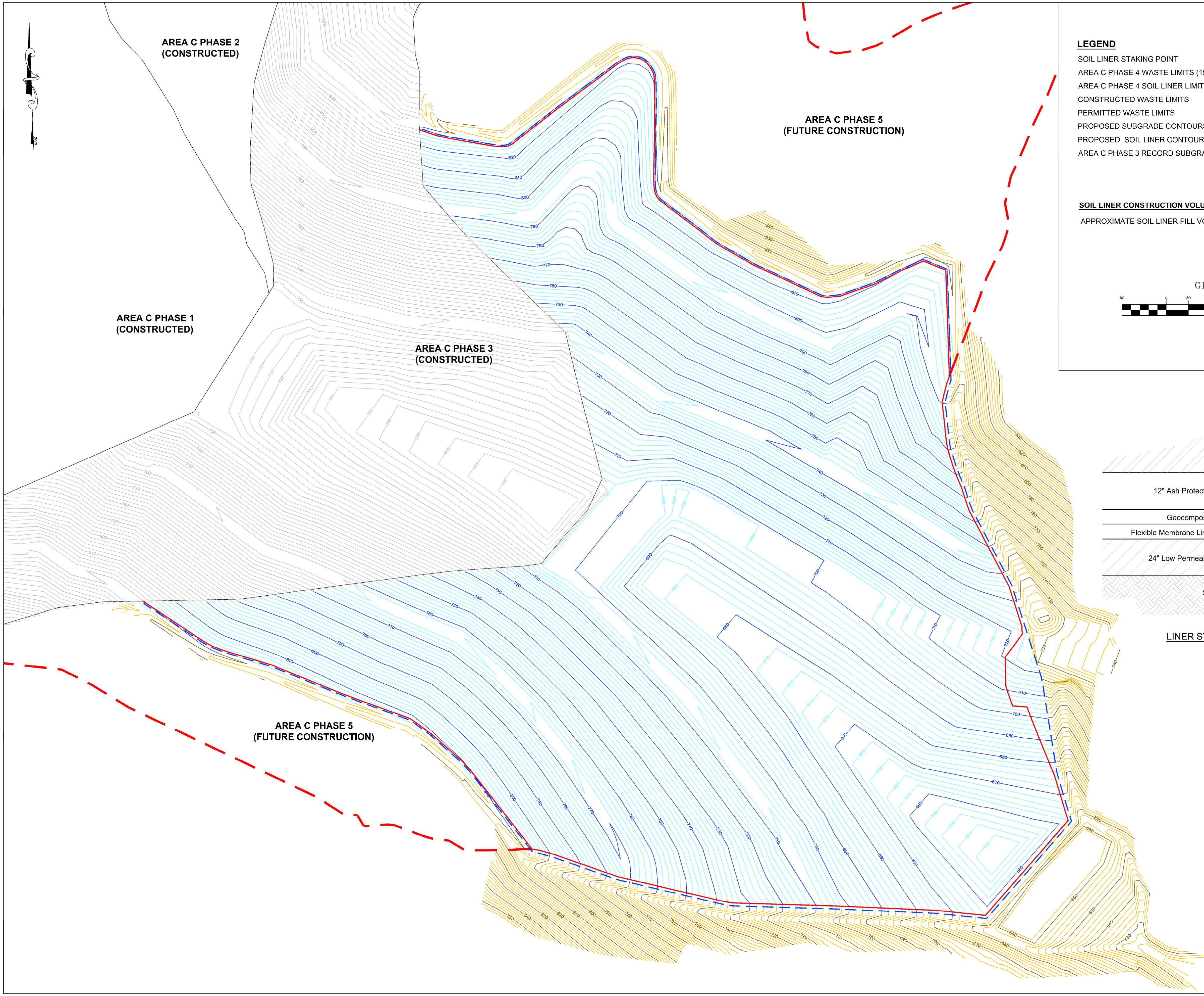

LEGEND

SOIL LINER STAKING POINT	⊠ 2010
AREA C PHASE 4 WASTE LIMITS (15.14 AC.)	
AREA C PHASE 4 SOIL LINER LIMITS (15.37 AC.)	
CONSTRUCTED WASTE LIMITS	
PERMITTED WASTE LIMITS	
PROPOSED SUBGRADE CONTOURS	900
PROPOSED SOIL LINER CONTOURS	900
AREA C PHASE 3 RECORD SUBGRADE	900

SOIL LINER CONSTRUCTION VOLUMES

APPROXIMATE SOIL LINER FILL VOLUME: 52,835 CY

GRAPHIC SCALE

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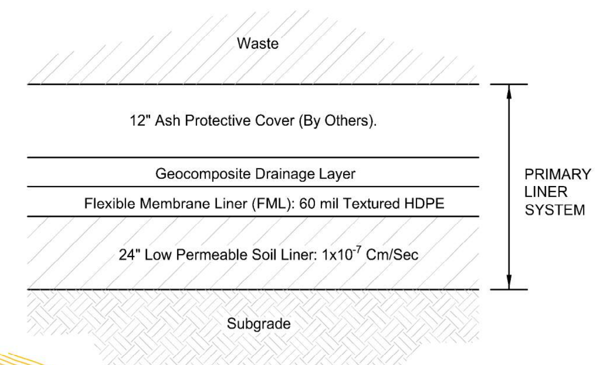
(IN FEET)
1 inch = 60 ft.



LINER SYSTEM DESIGN

N.T.S.

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM/SMR
CHECKED BY: SMR
CHECKED BY: STO
DATE: MARCH 2018
SCALE: AS NOTED

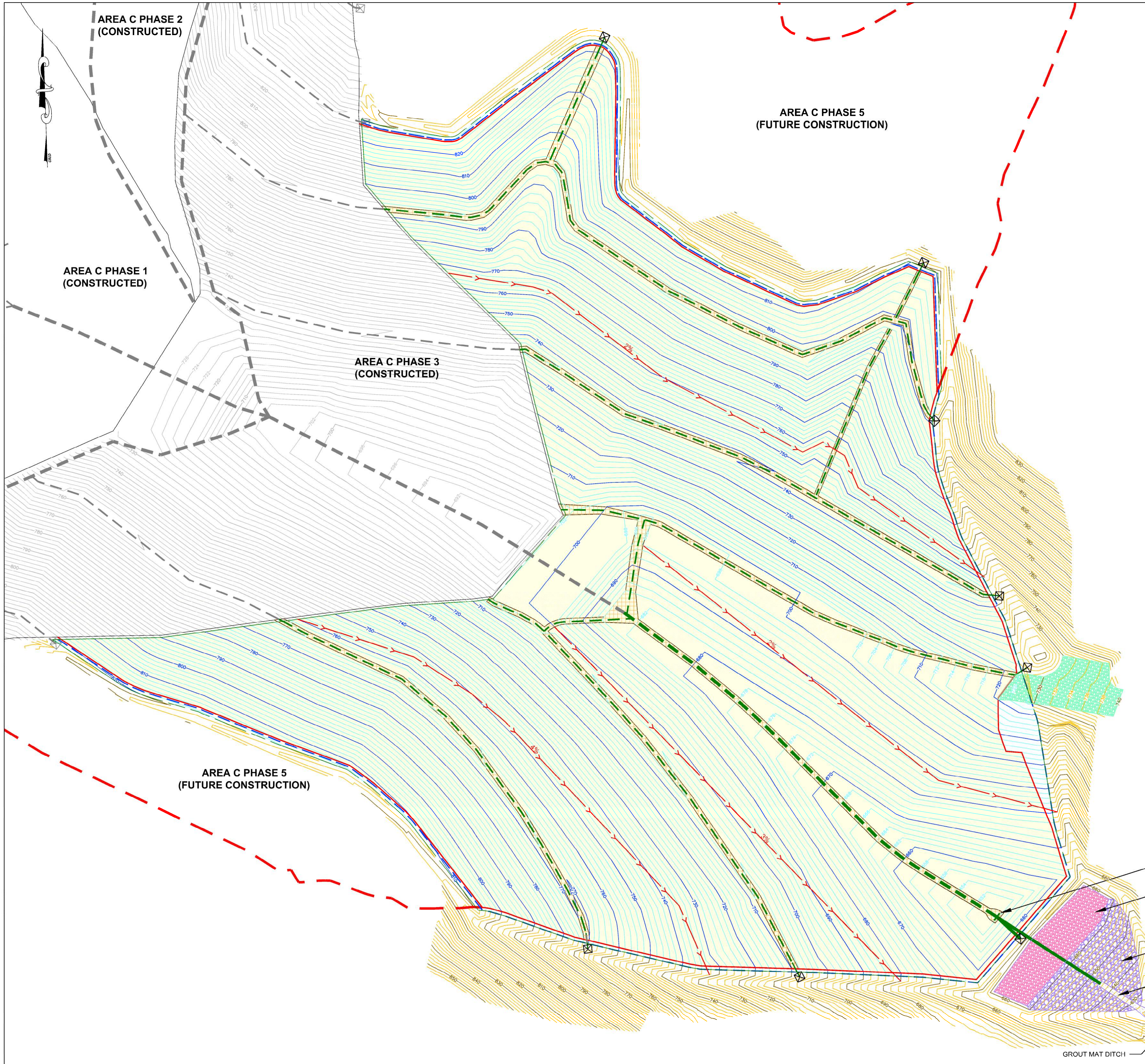
REVISIONS
03/27/18 Addendum 1

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

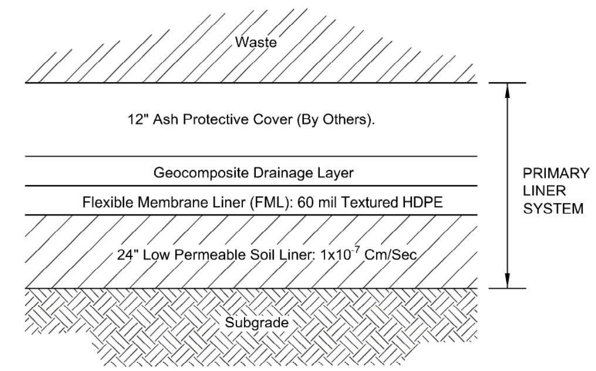
SHEET NO.
7 of 13

SOIL LINER STAKING PLAN



LEGEND

LEACHATE PIPING POINT	1010
PROPOSED LEACHATE PIPE CLEANOUT	
EXISTING LEACHATE PIPE CLEANOUT	
4" PROPOSED LEACHATE COLLECTION PIPE	PERFORATED / SOLID
8" PROPOSED LEACHATE COLLECTION PIPE	PERFORATED / SOLID
4" EXISTING LEACHATE COLLECTION PIPE	PERFORATED / SOLID
8" EXISTING LEACHATE COLLECTION PIPE	PERFORATED / SOLID
AREA C PHASE 4 WASTE LIMITS (15.14 AC.)	
AREA C PHASE 4 SOIL LINER LIMITS (15.37 AC.)	
CONSTRUCTED WASTE LIMITS	
PERMITTED WASTE LIMITS	
LEACHATE COLLECTION GRAVEL	
300-MIL COAL DRAIN GEOCOMPOSITE	
PROPOSED SOIL LINER CONTOURS	900
AREA C PHASE 3 RECORD SUBGRADE	900
12" RAIN GUTTER	
TRUCK TURN AROUND	



LINER SYSTEM DESIGN
N.T.S.

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

LEACHATE COLLECTION SYSTEM & GEOSYNTHETICS LAYOUT

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
SAMUEL T. OAKES
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FRANKFORT, KENTUCKY

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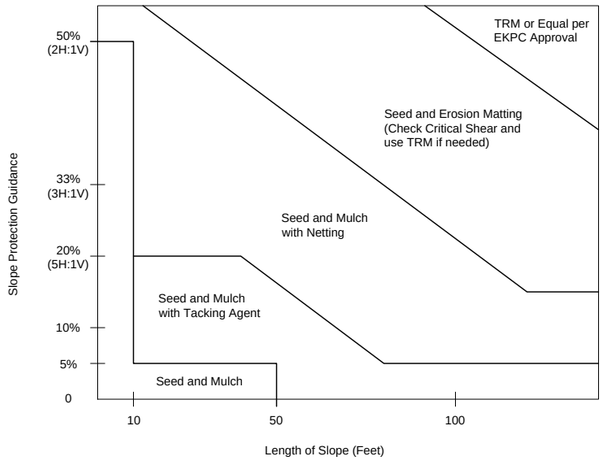
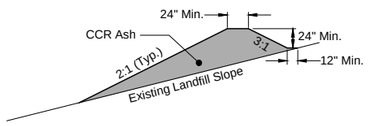


SLOPE PROTECTION GUIDANCE
N.T.S.

Note

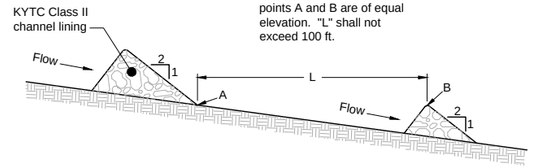
Diversion berm to be constructed on landfill waste slopes (by earthwork contractor) with CCR material supplied by Owner. Location of berm to be determined by Owner at the start of construction.



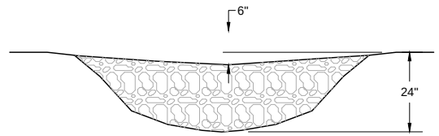
TEMPORARY DRAINAGE BERM DETAIL
N.T.S.

Note

L = The distance such that points A and B are of equal elevation. "L" shall not exceed 100 ft.

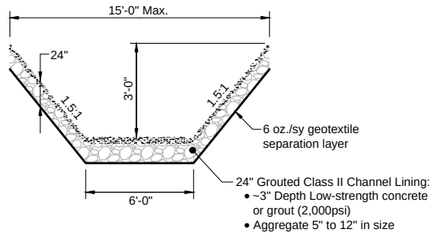


ROCK CHECK SPACING DIAGRAM



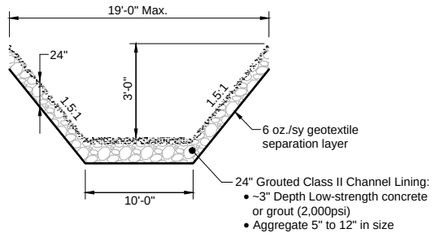
CROSS SECTION

TEMPORARY SILT CHECK
N.T.S.



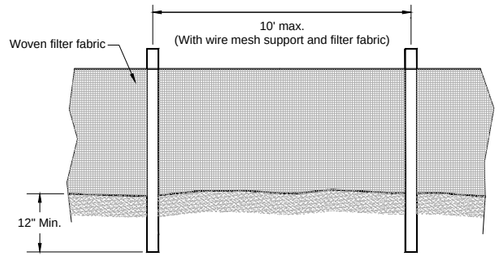
CLASS III - TRAPEZOIDAL

PERMENANT DIVERSION DITCH
N.T.S.



CLASS III - TRAPEZOIDAL

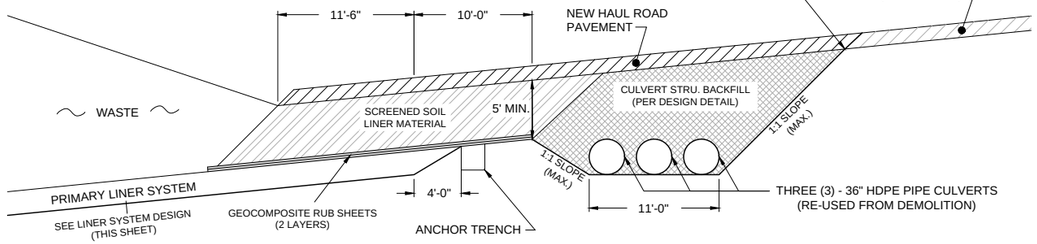
CULVERT OUTLET DOWNDRAIN (CULVERT GROUP 2)
N.T.S.



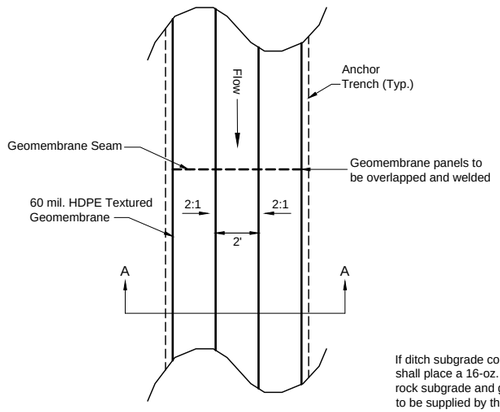
Notes

1. Filter fabric shall be purchased in a continuous roll and cut to the length of the barrier. When joints cannot be avoided, filter fabric shall be spliced together only at a post with 3 ft. (min.) overlap, and securely sealed.
2. Posts shall be spaced at 6 ft. intervals in areas of rapid runoff.
3. Posts shall be at least 5 ft. in length.
4. Steel posts shall have projections for fastening wire and fabric.
5. Wood posts shall be 2 inches by 2 inches or equivalent. Steel posts shall be 1.33 lbs per lineal foot.
6. A wire mesh support fence shall be fastened securely to the up-slope side of the posts using heavy duty wire staples at least 1 inch in length, wire ties or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.
7. Washed stone shall be used to bury skirt when silt fence is used adjacent to a channel, creek, or pond.
8. Turn silt fence up-slope at ends.

SILT FENCE
N.T.S.



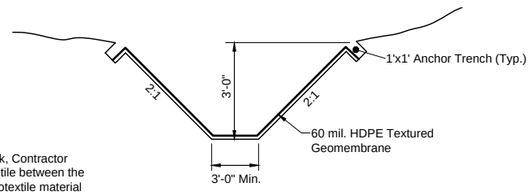
EXISTING HAUL ROAD / LINER SYSTEM TIE-IN DETAIL
N.T.S.



PLAN VIEW

Note

If ditch subgrade consists of in-situ rock, Contractor shall place a 16-oz. non-woven geotextile between the rock subgrade and geomembrane. Geotextile material to be supplied by the Owner.



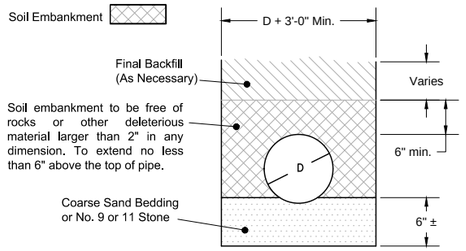
SECTION A-A

GEOMEMBRANE LINED DIVERSION DITCH

Legend

Embankment

Soil Embankment



Note: This Detail applies to all Storm Water Drainage Pipes

TYPICAL PIPE TRENCH DETAIL
N.T.S.

DETAILS

7/02/18

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

EAST KENTUCKY POWER COOPERATIVE

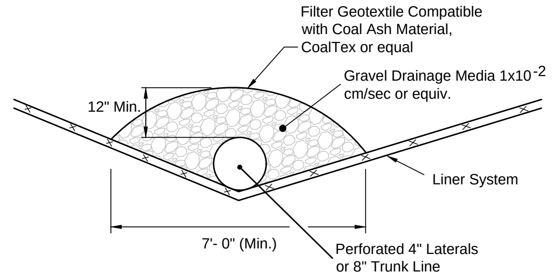
STATE OF KENTUCKY · SAMUEL T. OAKES · 21483 · LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM
CHECKED BY: NVR
CHECKED BY: SWD
DATE: MARCH 2018
SCALE: AS NOTED
REVISIONS

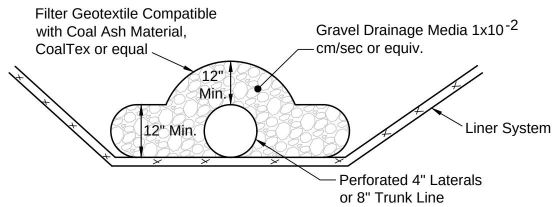
KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SHEET NO.
9 of 13



TRIANGULAR SHAPED AND BENCH DRAINAGE PATHWAY

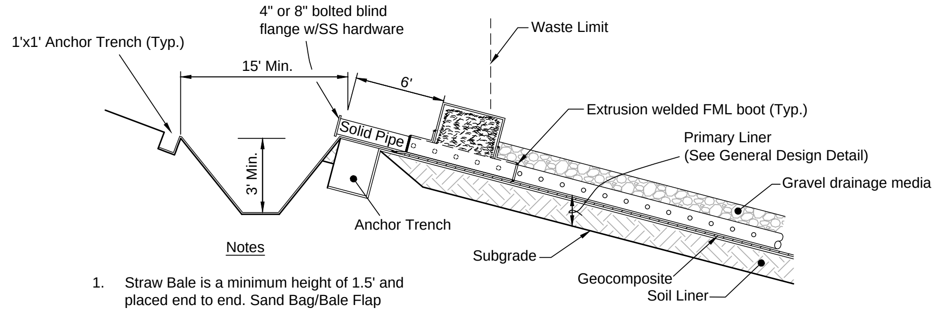


TRAPEZOIDAL SHAPED DRAINAGE PATHWAY

Notes

1. All Gravel shall be placed with equipment that will not exceed ground pressure of 5 psi and must be approved prior to use by the Owner and Engineer.
2. Minimum width of gravel drainage media in trapezoidal pattern shall be 10 feet.
3. Drainage media shall be completely encased inside the geotextile. The geotextile seam shall be sewn or fusion welded. CoalTex geotextle (or equal) shall be placed so the non-woven side will be in contact with the CCR waste.

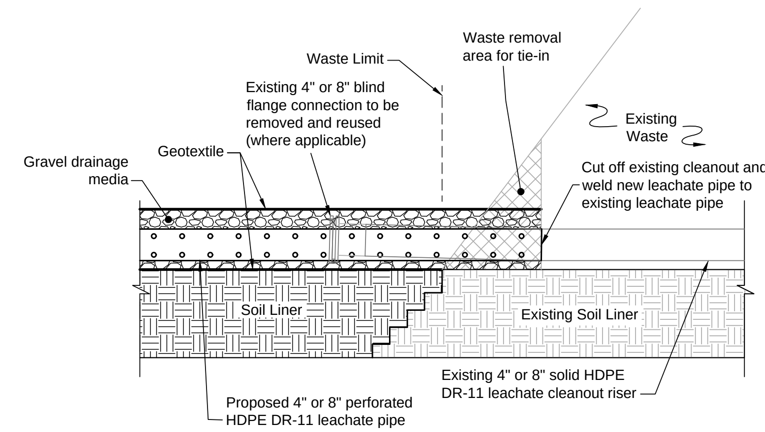
LEACHATE COLLECTION PIPE DETAIL
N.T.S.



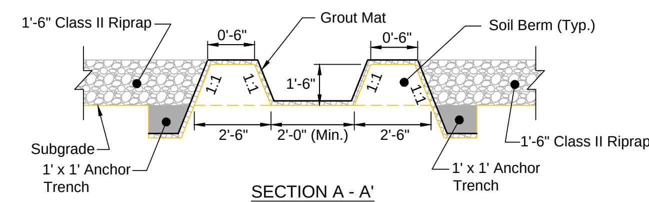
Notes

1. Straw Bale is a minimum height of 1.5' and placed end to end. Sand Bag/Bale Flap width is 12'.
2. Geocomposite shall terminate 1' down slope from the anchor trench.

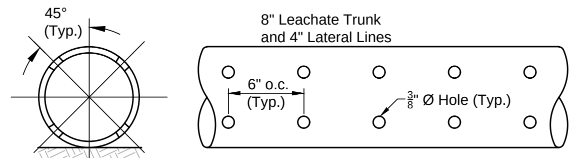
TEMPERARY WASTE LIMIT-LEACHATE PIPE CLEANOUT DETAIL
N.T.S.



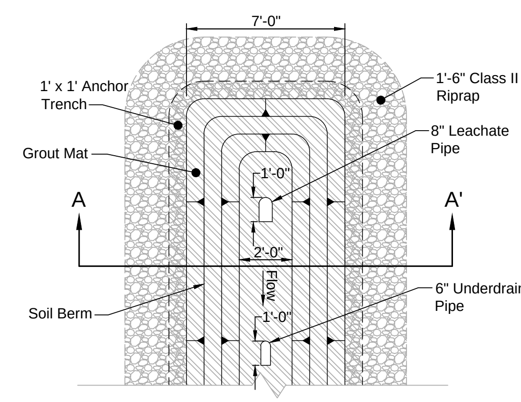
LEACHATE PIPE TIE-IN DETAIL
N.T.S.



SECTION A - A'

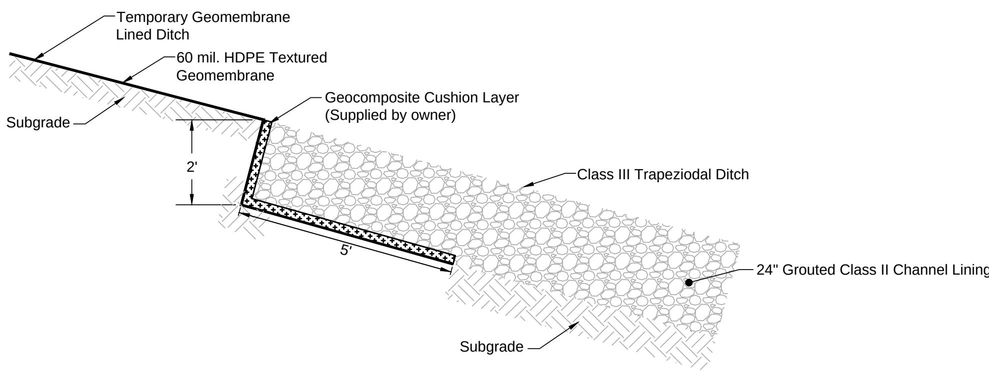


COLLECTION PIPE PERFORATION DETAIL
N.T.S.

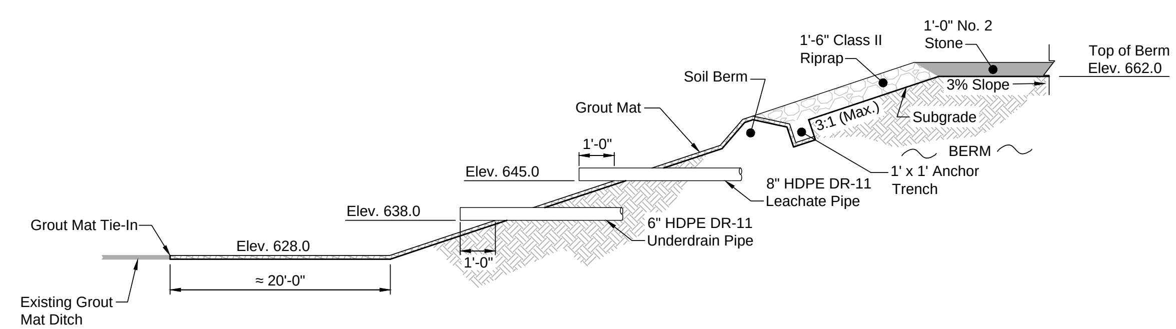


PLAN

GROUTMAT DOWNDRAIN DETAIL
N.T.S.



GEOMEMBRANE LINED DITCH TO CLASS III TRAPEZOIDAL DITCH TRANSITION
N.T.S.



UNDERDRAIN & LEACHATE PIPE TERMINATION DETIAL
N.T.S.

DETAILS

7/12/18

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

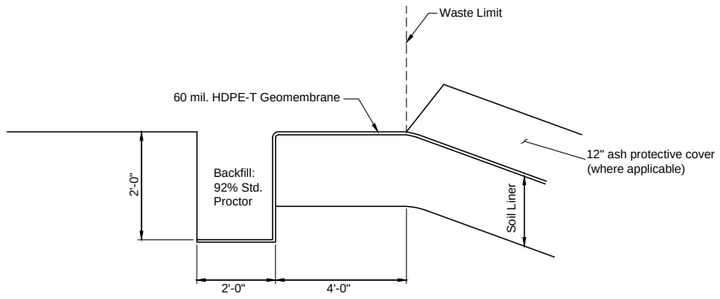
STATE OF KENTUCKY
SAMUEL T. OAKES
21463
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM
CHECKED BY: STO
CHECKED BY: SMR
DATE: MARCH 2018
SCALE: AS NOTED
REVISIONS

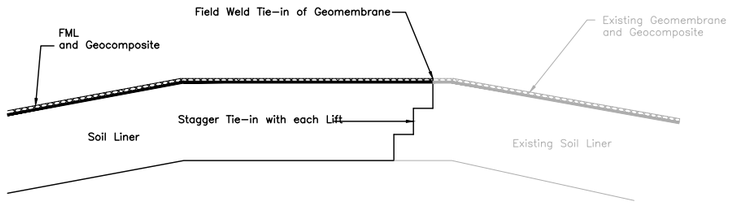
KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016111

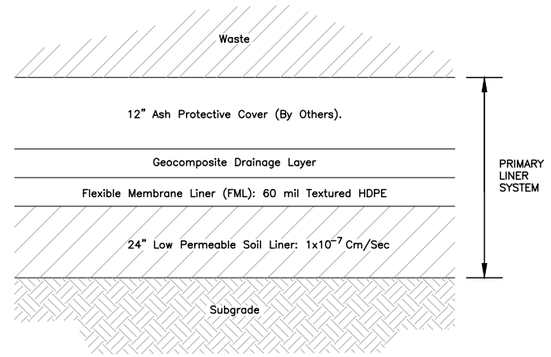
SHEET NO.
10 of 13



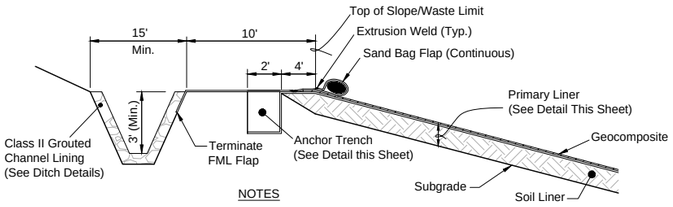
PERMANENT ANCHOR TRENCH DETAIL
N.T.S.



GEOSYNTHETIC LINER TIE-IN DETAIL
N.T.S.



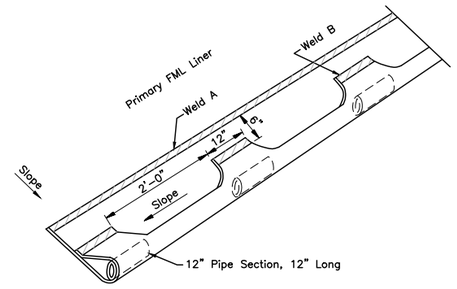
LINER SYSTEM DESIGN
N.T.S.



NOTES

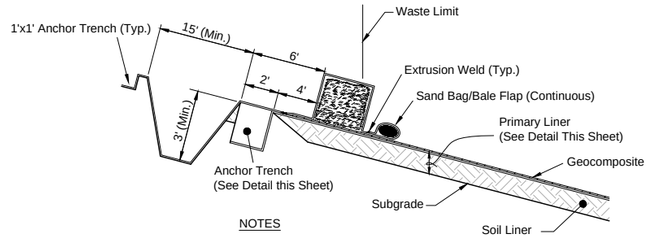
1. The 10' run out shall be sloped (high to low) from top of slope to the ditch.
2. Sand bag flap width is 7'
3. Geocomposite shall terminate 3' outside the top of slope.

PERMANENT WASTE LIMIT - LINER END TREATMENT
N.T.S.



Total Width of Gutter
Approximately 5'-0".

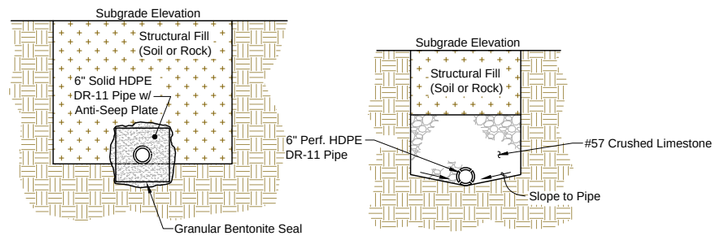
RAIN GUTTER SYSTEM DETAIL
N.T.S.



NOTES

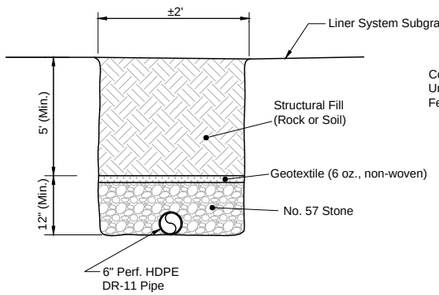
1. Straw Bale is a minimum height of 1.5' and placed end to end. Sand Bag/Bale Flap width is 12'.
2. Geocomposite shall terminate 1' down slope from the anchor trench.

TEMPORARY WASTE LIMIT-LINER END TREATMENT
N.T.S.

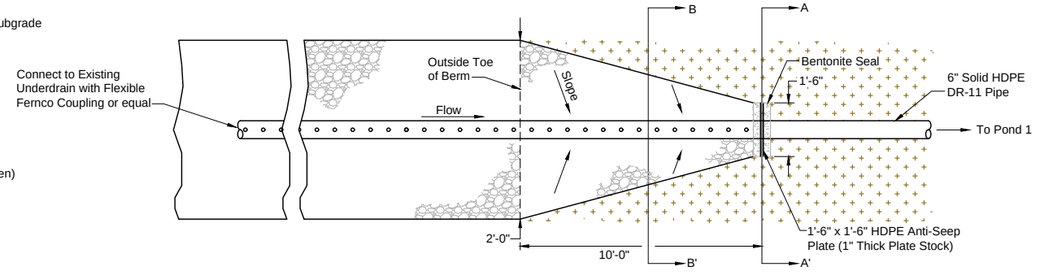


VIEW A-A'

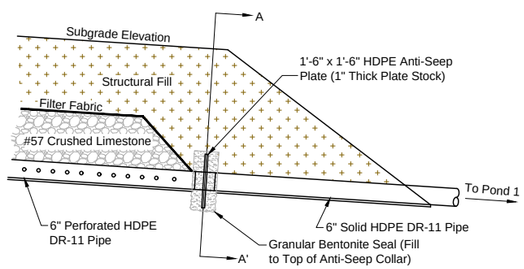
VIEW B-B'



UNDERDRAIN TRENCH DETAIL (IF NEEDED)
N.T.S.



UNDERDRAIN PIPE FLOW TRANSITION DETAIL
N.T.S.



UNDERDRAIN EXIT PIPE DETAIL
N.T.S.

DETAIL

7/02/18

SPURLOCK STATION LANDFILL
MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

EAST KENTUCKY POWER COOPERATIVE

STATE OF KENTUCKY
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LICENSED PROFESSIONAL ENGINEER

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FRANKFORT, KENTUCKY

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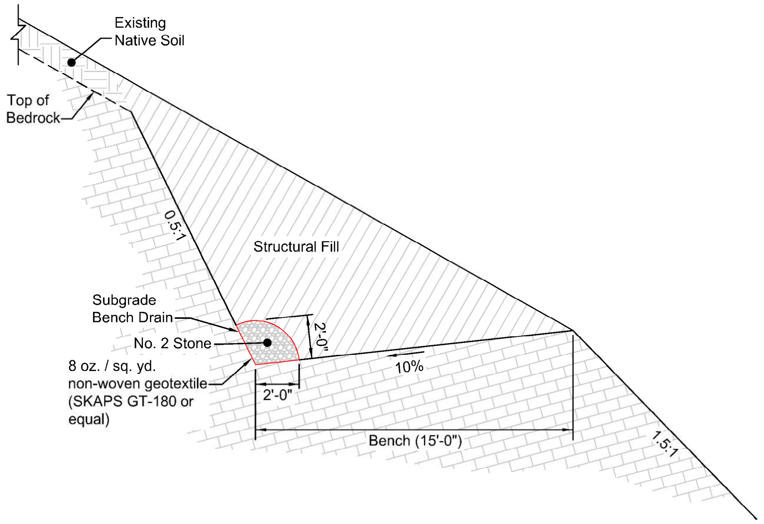
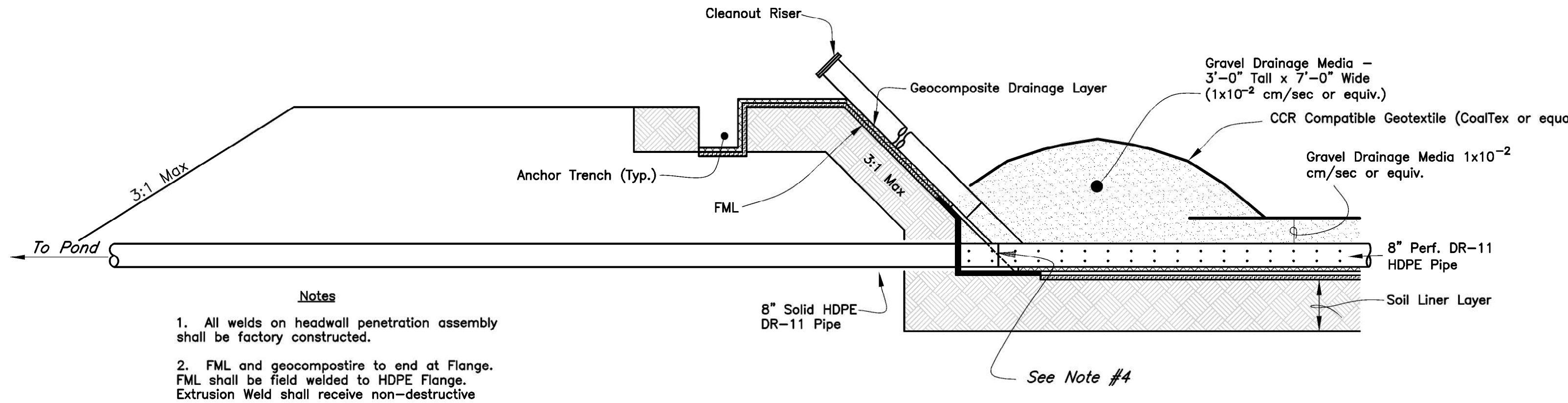
SHEET NO.
11 of 13



SUBGRADE BENCH DETAIL

N.T.S.

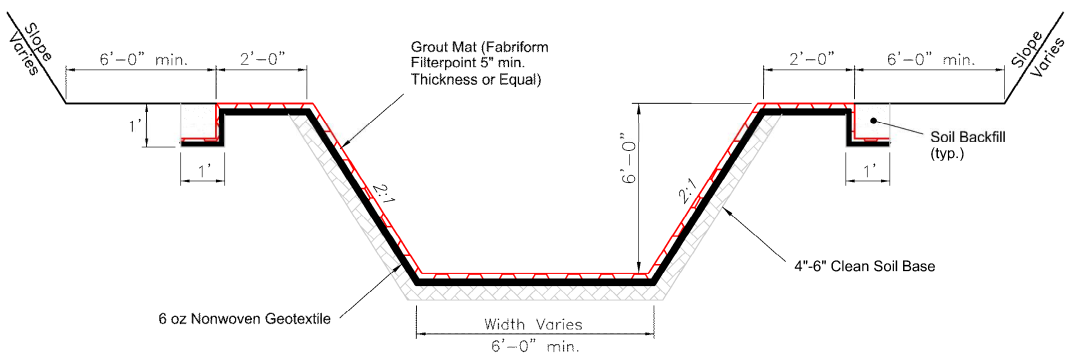


Notes

1. All welds on headwall penetration assembly shall be factory constructed.
2. FML and geocompostire to end at Flange. FML shall be field welded to HDPE Flange. Extrusion Weld shall receive non-destructive testing.
3. All leachate piping shall be cleaned and/or flushed and accepted by the Owner prior to placing leachate collection system into service.
4. 8" perforated leachate collection line shall be connected to the headwall penetration assembly stub out pipe by butt-fusion welding or electrofusion coupling.

HEADWALL PENETRATION AND TOE DETAIL

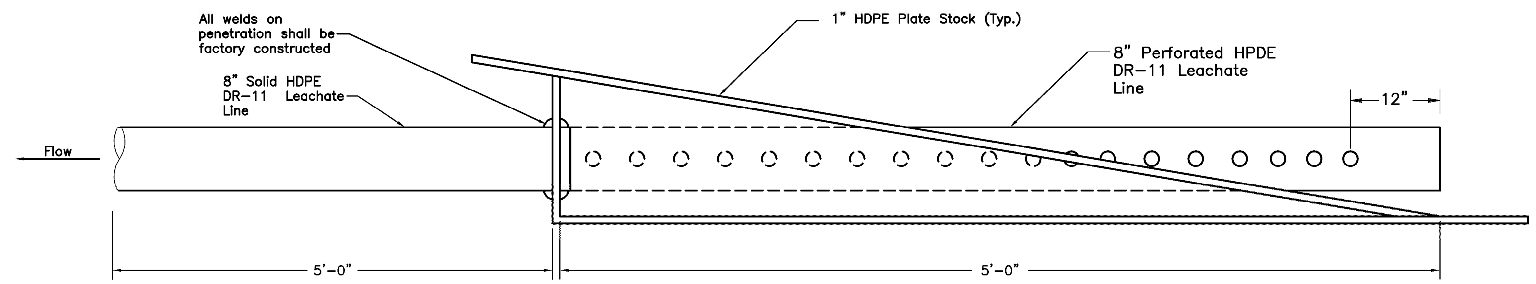
N.T.S.



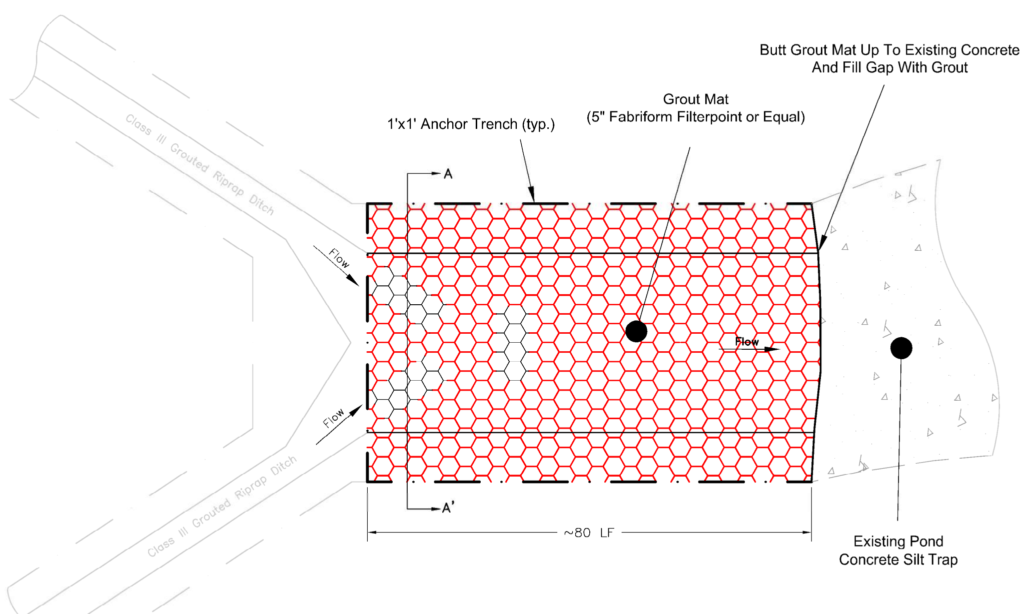
GROUT MAT DITCH

SECTION A - A'

N.T.S.



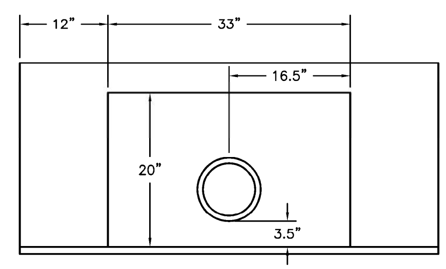
PROFILE VIEW



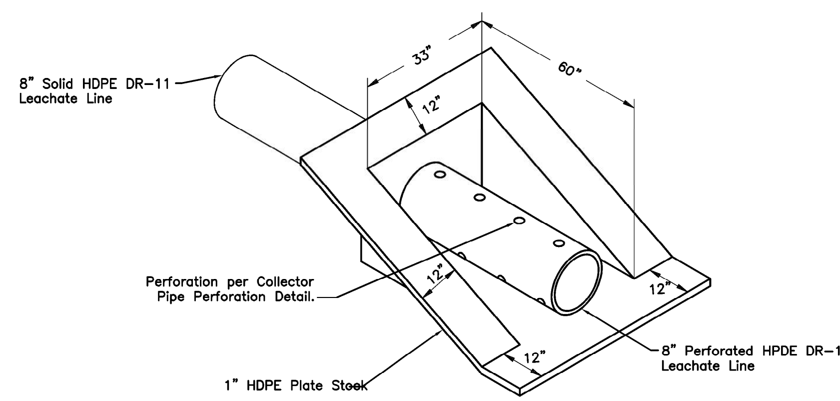
GROUT MAT DITCH TO

POND CONCRETE SILT TRAP

N.T.S.



INLET VIEW



ISOMETRIC VIEW

HEADWALL PENETRATION ASSEMBLY

N.T.S.

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY

PERMIT NO. 081-00005

AREA C, PHASE 4

CONSTRUCTION DRAWINGS

STATE OF KENTUCKY SAMUEL T. OAKES 21483 LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM	
CHECKED BY: SMR	
CHECKED BY: STO	
DATE: MARCH 2018	
SCALE: AS NOTED	
REVISIONS	
03/27/18	Addendum 1

KENVIRONS, INC.

FRANKFORT, KENTUCKY

PROJECT NO.

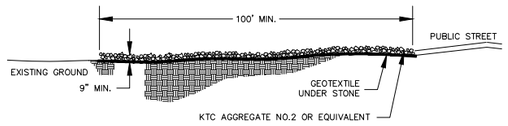
201617

SHEET NO.

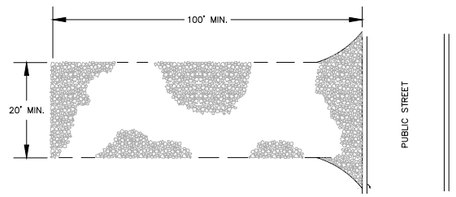
12 of 13

DETAILS

7/12/18



CROSS SECTION



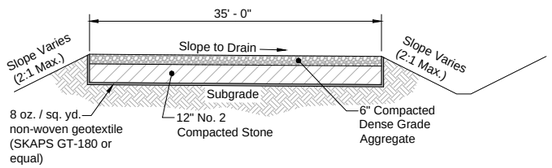
PLAN VIEW

NOTES

1. A STABILIZED ENTRANCE PAD OF CRUSHED STONE SHALL BE LOCATED WHERE TRAFFIC WILL ENTER OR LEAVE THE CONSTRUCTION SITE ONTO A PUBLIC STREET.
2. SOIL STABILIZATION FABRIC SHALL BE USED AS A BASE FOR THE CONSTRUCTION ENTRANCE.
3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC STREETS OR EXISTING PAVEMENT. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS WARRANT AND REPAIR OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
4. ANY SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC STREETS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.
5. WHEN APPROPRIATE, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTERING A PUBLIC STREET. WHEN WASHING IS REQUIRED, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN.

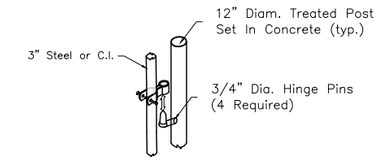
CONSTRUCTION ENTRANCE - GRAVEL PAVEMENT

N.T.S.



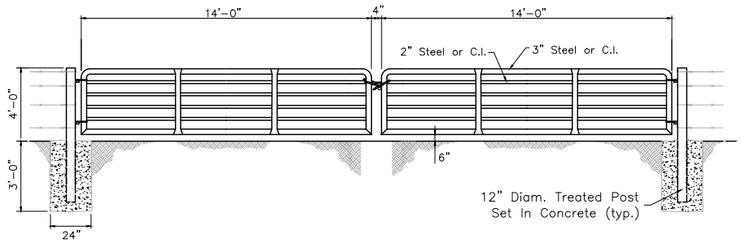
HAUL ROAD DETAIL

N.T.S.



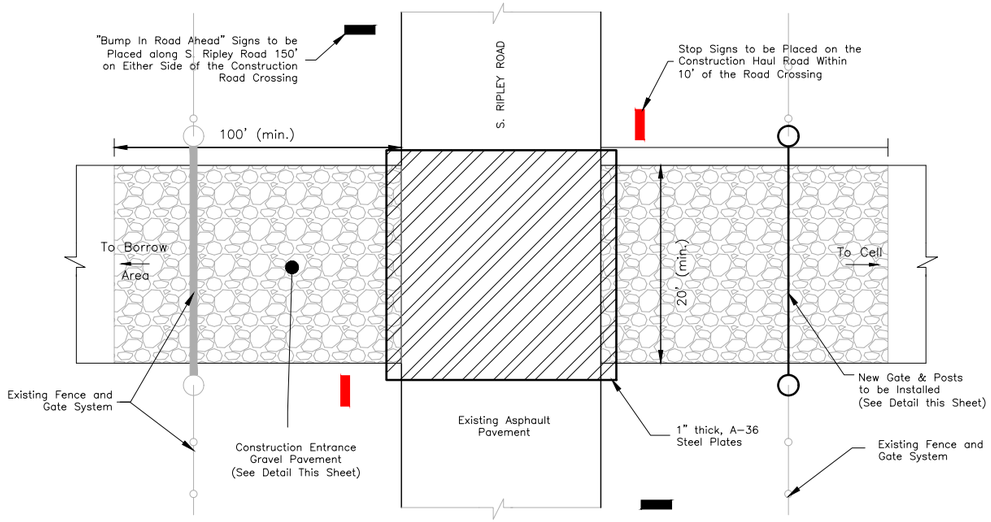
HINGE DETAIL

N.T.S.



CONSTRUCTION ENTRANCE GATE DETAIL

N.T.S.



COUNTY ROAD CROSSING DETAIL

N.T.S.

DETAIL

7/02/18

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK STATION LANDFILL

MASON COUNTY, KENTUCKY
PERMIT NO. 081-00005
AREA C, PHASE 4
CONSTRUCTION DRAWINGS

STATE OF KENTUCKY
SAMUEL T. OAKES
21483
LICENSED PROFESSIONAL ENGINEER

DRAWN BY: JAM
CHECKED BY: SWR
CHECKED BY: SWO
DATE: MARCH 2018
SCALE: AS NOTED
REVISIONS

KENVIRONS, INC.
FRANKFORT, KENTUCKY

PROJECT NO.
2016171

SHEET NO.
13 of 13