HYDROLOGY STUDY FOR
CCLAY, INC.

SKELTON CREEK OPERATION
P-3934
JEFFERSON COUNTY, ALABAMA

BY
PERC ENGINEERING CO., INC.
1606 HWY 78 WEST
JASPER, ALABAMA 35501

BASIN 006P
DETAILED DESIGN PLANS
ATTACHMENT III-B-2(a)

MARCH 21, 2012

PERC
ENGINEERING CO., INC.

Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com

March 21, 2012

Mr. Gary Heaton, P.E.
Alabama Surface Mining Commission
Post Office Box 2390
Jasper, Alabama 35502-2390

RE: CClay, Inc.
Skelton Creek Operation
P-3934

Dear Gary:

I hereby certify the attached detailed design plans for Basin 006P for the above referenced location are in accordance with the Regulations of the Alabama Surface Mining Commission as adopted by Act 81-435 of December 18, 1981 and amended to date, and are true and correct to the best of my knowledge and belief.

If you have any questions or required additional information, please feel free to call.

Sincerely,
PERC Engineering Co., Inc.

Leslie G. Stephens, P.E., P.L.S.
Alabama Registration No. 14117-E

Pond Construction Criteria

The embankment for sediment basins (temporary and permanent) shall be designed and built using the following as minimum criteria:

1. The top of the dam shall be no less than 12 feet wide.

2. See design sheet for maximum and minimum embankment slopes.

3. The foundation and abutments for the impounding structure shall be designed to be stable under all conditions of construction and operation of the impoundments, with a minimum static safety factor of 1.3 for the normal pool with steady seepage saturation conditions.

4. The dam shall be constructed with a cutoff trench based upon prudent engineering practices for the site. The cutoff shall be located on the dam centerline and be of sufficient depth to extend into a relatively impervious material from which the core of the dam shall also be constructed.

5. The embankment foundation area shall be cleared of all organic matter, all surfaces sloped to no steeper than lv:lh, and the entire foundation surface scarified.

6. The entire embankment and cutoff trench shall be compacted to 95 percent density, based on standard proctor as outlined in ASTM.

7. The material placed in the embankment shall be free of sod, roots, stones over 6 inches in diameter, and other objectionable materials. The fill material shall be placed and spread over the entire fill area, starting at the lowest point of the foundation, in layers not to exceed 12 inches in thickness. Construction of the fill shall be undertaken only at such times that the moisture content of the fill material will permit satisfactory compaction in accordance with paragraph 5.

8. The pool area of the basin will be cleared of timber and large undergrowth.

9. The primary decant system when consisting of a pipe shall be installed according to Class C pipe installation for embankment bedding.

10. The primary decant system shall be equipped with a device, or constructed, such as to insure that subsurface withdrawal is accomplished to prevent discharge of floating solids. If a channel is used as the primary decant a skimmer shall be installed to prevent floating solids from discharging.

11. A splash pad or riprap may be required under the discharge of the primary decant system where necessary to insure that the discharge does not erode the embankment.

12. The combination primary and secondary decant system shall be designed to safely carry the expected peak flow from a 25 year - 6 hour storm. The entire emergency overflow spillway channel will be a stabilized channel and will be stabilized upon completion of construction as specified within the detailed design plans using prudent engineering measures. These measures may consist of lining the spillway with concrete or a durable rock riprap, or the spillway being constructed in consolidated non-erodible material and planted with a mixture or both annual and perennial grasses, or a combination of any or all of the above.

13. Sediment basins using a single spillway system shall be an open channel of non-erodible construction consisting of concrete, durable rock riprap or its being constructed in consolidated non-erodible material as specified in the detailed design plans.

14. The settled embankment for temporary impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 25 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff). The settled embankment for permanent impoundments shall be a minimum of 1.0 foot above the maximum water elevation for the runoff from a 25 year - 6 hour, or a 10 year - 24 hour precipitation event (whichever has the greatest runoff).

15. If basins are built in series, then the combined decant system for each shall be designed to accommodate the entire contributing drainage area.

16. The dam and all disturbed areas shall be seeded with both perennial and annual grasses, fertilized and mulched in order to insure erosion is minimized. Hay bales or riprap may be placed at the toe of the dam immediately upon completion of construction.

17. The constructed height of the dam shall be increased a minimum of 5 percent over the design height to allow for settlement over the life of the embankment.

18. Final graded slopes of the entire permanent water impoundment area shall not exceed 2.5H-1.0V to provide for adequate safety and access for proposed water users.

19. Prior to Phase II bond release, additional data concerning water quality, water quantity, depth, size, configuration, post mining land use, etc., for each proposed permanent water impoundment, shall be submitted to the Regulatory Authority for permanent water impoundment approval.

20. All sediment basins will be inspected for stability, erosion, etc. two (2) times a month until removal of the structure or release of the reclamation bond.

21. The embankment and spillway will be maintained by repairing any damage such

as erosion, slope failure or spillway damage until removal of the structure or release of the performance bond.

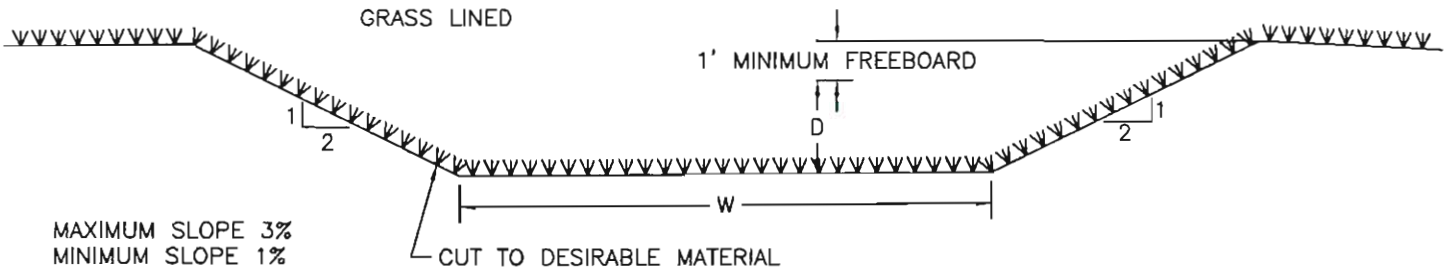
22. All ponds shall be examined quarterly for structural weakness, instability, erosion, or other hazardous conditions and maintenance performed as necessary. Formal inspections shall be made on an annual basis, including any reports or modifications, in accordance with 880-X-10C-.20[l(j)] of the Alabama Surface Mining Commission Regulations.

23. Sediment will be removed from each pond when the accumulated sediment reaches the sediment storage volume as shown on the detailed design sheet.

24. Upon completion of mining, successful reclamation and effluent standards being met, each sediment basin not remaining as a permanent water impoundment will be dewatered in an environmentally safe manner (such as siphoning, pumping, etc.) and reclaimed to approximate original contours by the following procedure: A permanent diversion channel (designed for a 10 year - 24 hour precipitation event) shall be cut along the outer edge of the basin to re-route drainage around the basin and back through the stabilized spillway to allow reclamation of the sediment basin. The diversion channel shall be designed and grassed as per enclosed information. (See permanent diversion for basin disposal).Upon completion of the diversion channel the back slope of the dam shall be graded to a minimum 3H to 1V slope. The dewatered sediment basin area shall be seeded with some combination of the following: Fescue, bermuda, rye grass, canary grass and willows. After seeding the area shall be mulched. Any additional sediment or embankment material not used to meet original contour, if non-toxic, shall be spread in thin layers within the permit area and vegetated as stated in the approved reclamation plan. All toxic material encountered in the basin disposal shall be buried and covered with 4 feet of non-toxic material and vegetated as stated in the approved reclamation plan.

25. A qualified registered professional engineer or other qualified professional specialist, under the direction of the professional engineer shall conduct regular inspections during construction and upon completion shall inspect each basin for certification purposes.

26. Point source discharge embankments shall be constructed and abutments keyed into desirable material if at all possible. In the event that undesirable material is encountered, addition design and construction criteria shall be submitted prior to certification.



$Q = \frac{1.49}{N} A R^{2/3} S^{1/2}$

N(LOOSE STONE OR GRASS LINED) = 0.035

A = AREA

R = AREA/WETTED PERIMETER

S = SLOPE

* GRASS LINING: FESCUE, BERMUDA, RYE GRASS

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 8.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
1–15	0.5
15–50	1.0
50–100	1.5
100–180	2.0
180–270	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 10.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0–15	0.5
15–60	1.0
60–120	1.5
120–210	2.0
210–320	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 12.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0–20	0.5
20–70	1.0
70–150	1.5
150–250	2.0
250–383	2.5

DIVERSION CHANNEL DEPTH (D) FOR WIDTH (W) 15.0 FT.	
PEAK FLOW Q (CFS)	DEPTH D (FT)
0–20	0.5
20–90	1.0
90–180	1.5
180–300	2.0
300–450	2.5

PERC ENGINEERING CO., INC.

TYPICAL PERMANENT DIVERSION FOR BASIN DISPOSAL

DRAWN BY: J.W.T. DWG. NAME: TYPICALS	DATE: 04–16–2009
APPROVED BY: L.G.S.	SCALE: NONE

X:\Eng\08\Typicals\III-B-2(e)\Attachment III-B-2(e).dwg 04/19/09 11:15

NOTES

1) The primary spillway and emergency spillways of Basin 006P will consist of one (1) 24-inch & one (1) 18-inch corrugated metal pipe. The primary spillway will be at current ground elevation. The joints of the discharge pipe will be sealed using rubber "boots" type gaskets. To prevent the movement of the discharge pipes, the portions of the discharge pipes that are exposed along the downstream slope of the embankments will be covered with a minimum of 2 feet as measured from the top of the pipes. The discharge end of the pipes will be equipped with spring loaded flap valves to prevent the back flow of Skelton Creek during high flow events.

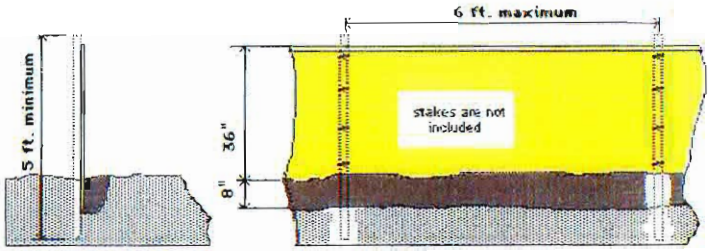
2) A splash pad consisting of durable, non-erodible sandstone or limestone riprap will be located at the discharge point of the primary and emergency spillways of Basin 006P.

3) Due to Basin 006P being totally incised, no stability analysis is required.

4) Basin 006P is proposed to be constructed in the location where coal fines exist. During the construction of Basin 006P all rainfall run-off from the construction site will be pumped to Basin 005P. An impervious barrier will be placed at the 25' setback location from the stream adjacent to Basin 006P, as shown later in this document, prior to any disturbance in order to route all run-off back to Basin 005P during construction of Basin 006P and until Basin 006P is completed and certified to the regulatory authority. These coal fines will be removed down to natural ground elevation and a key constructed for the embankment. Construction of the embankment will then follow in approximately 100' sections up through Step 2. The area between the downstream slope of the embankment and the impervious barrier, located at the 25' setback, shall be filled and compacted back to existing ground level as a part of the embankment construction. As Step 3 is completed, immediately following Step 2, the drainage structures will be installed and Basin 006P embankment certified to the regulatory authority prior to beginning mining cuts 12-19. Any surface runoff will be pumped into Basin 005P, until the completion of mining cuts 12-19. A Phase II certification of Basin 006P will be submitted after all coal fines are removed and the storage volume & surface area have been established. Upon the Phase II certification of Basin 006P, the pumping equipment and pump lines will be removed the area in which the equipment and lines was located will regarded & revegetated as necessary to prevent the disturbed soil from washing.

CCLAY, INC.
SKELTON CREEK OPERATION
P-3934
ATTACHMENT III-A-1

Staked Barriers

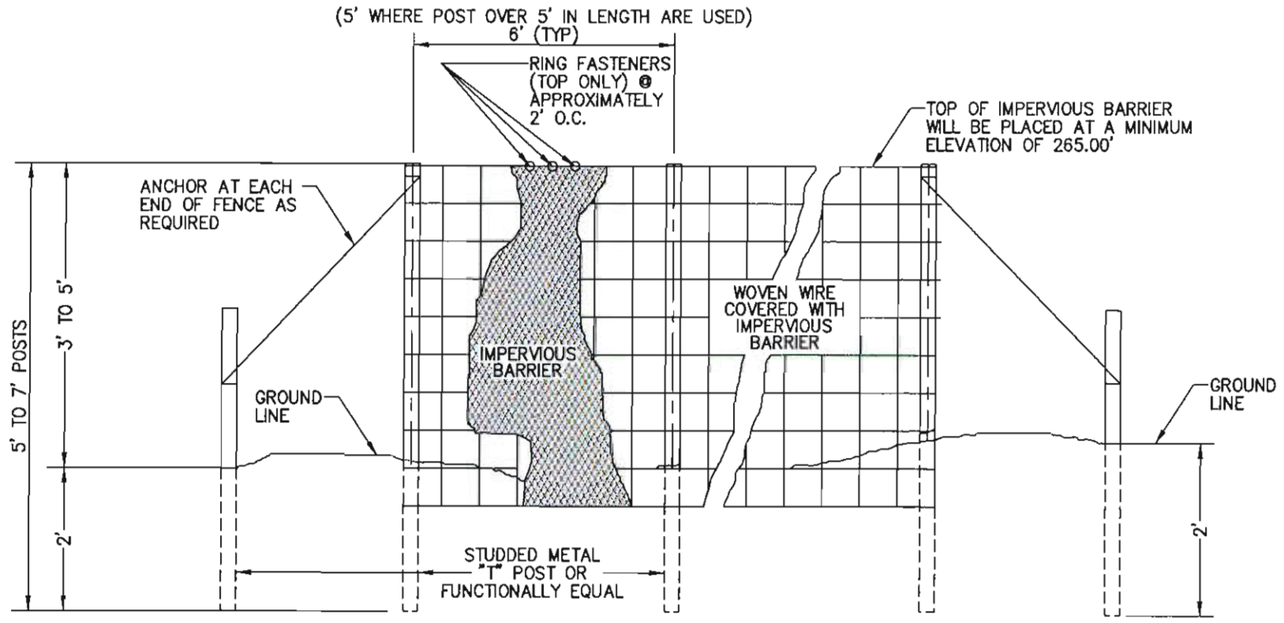


STAKED BARRIERS are continuous panels of impervious vinyl-polyester fabric that, installed correctly, can contain stormwater runoff or re-direct it to proper channels or retention areas. On-land installation is similar to that of silt fence, with 8 inches below grade and 36 inches above grade attached to stakes. Staked Barriers can also be installed in up to 18 inches of water.

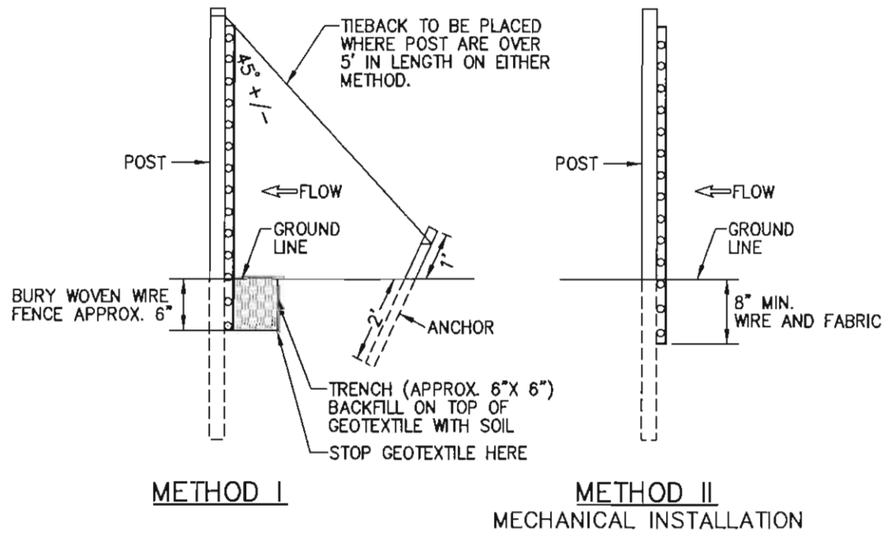
The fabric curtain has a heat sealed hem along the top edge and is approximately 44 inches wide. A narrow trench 8 inches deep is dug along the perimeter line and stakes are driven every 6 feet along the down slope side of the trench. The upper portion of the barrier is attached to the stakes with staples, wires or nylon ties, keeping the top of the barrier 36 inches above grade. The lower edge of the curtain is placed in the trench which is then backfilled. This system works best in porous soils on moderately sloped sites. The stakes may be wood, metal T-Posts, or re-bar if the loading against the barrier is low. The stakes for installing these barriers must be purchased separately.

Standard Color: Yellow

Available from Sunshine Supplies, Inc.
1409 Republic Road
Birmingham, AL 35214
205-674-5656 –OR- 800-844-7547
www.erosioncontrolproducts.com



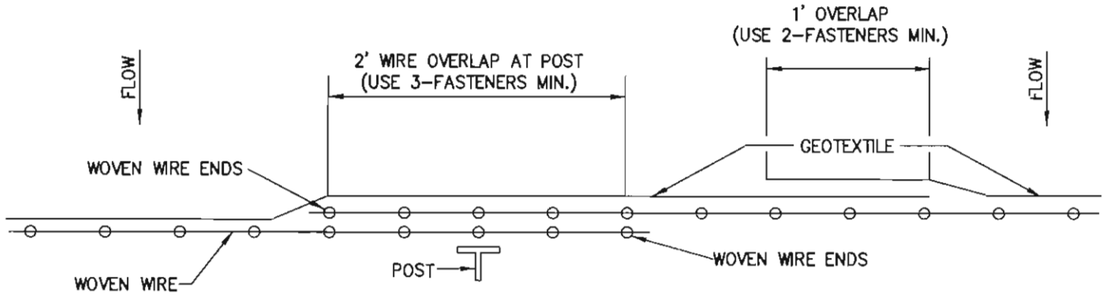
ELEVATION VIEW



METHOD I

METHOD II
MECHANICAL INSTALLATION

SIDE VIEW



PLAN VIEW

REQUIRED LAPPING

PERC ENGINEERING CO., INC.

CCLAY, INC.
SKELTON CREEK OPERATION
DETAILS OF IMPERVIOUS BARRIER INSTALLATION

DRAWN BY: J.W.T. DWG. NAME: IBDET1161-C	DATE: 03/19/2012
APPROVED BY: L.G.S.	SCALE: not to scale

V:\Engl05\Mines\PMS Resources\BASIN 008\IBDET1161-C.dwg 03/19/12 11

CClay, Inc.

Skelton Creek Mine

P-3934

Attachment III-A-I

Specifications

Fabric - 18 oz. vinyl/ polyester, laminated having the following characteristics:

Construction - vinyl laminate 1000D x1300D, 18 X 17 denier scrim

Weight - 18 oz. per sq. yd. minimum, per FS-191-5512

Adhesion - 12 lb. per inch. X 10 lb. per inch per FS-191-5041

Strip Tensile - 300 lb. per inch x 300 lb. per inch per FS-191-5512

Grab Tensile- 410 lb. per inch x 410 lb. per inch, per FS-191-5100

Tongue Tear Strength - 100 lbs. x 100 lb., per FS-191-5134

Hydrostatic - 600 lbs. per sq. inch minimum, per FS-191-5512

Abrasion – 400 Cycles minimum, per FS-191-5306

Cold Crack- Minus 40 degrees F, per FS-191-5874

If you want grommets, they will be #5 brass grommets.

Wellscroft Fence Systems LLC.

Monday, Mar 19, 2012

Main
- Energizers
- Energizer Accessories
- Solar Panels
- Insulated Wire
- Electrified Netting
- Conductors
- Acc Tape & Rope
- Supatube & Insulators
- SuperWide Tape
- Posts - Rods - Battens
- Wood Posts
- Steel T-Posts
- Acc Strainers/Switches
- Acc Anchors - Staples
- HD Tube Gates
- HD Mesh Gates
- Electric Gates
- Tenax
- Fencing Tools
- Premier Wire Products

Woven Wire
- Bekaert Fixed Knot
- Bekaert Horseman 2x4
- Bekaert Hinge Joint

Centaur
- Centaur HTP® 5"
- PolyCharge® HTP®
- PolyPlus HTP®
- White Lightning
- Hot-Rail
- Hot-Site

King Hitter
- Series I
- Series II
- Series III

Maple Producers

New Products

Steel T-Posts - painted and galvanized, clips included

We carry T-posts in 5 ft. to 12 ft. lengths in either galvanized or painted coatings.

Painted Steel T-posts (1.25# per foot)

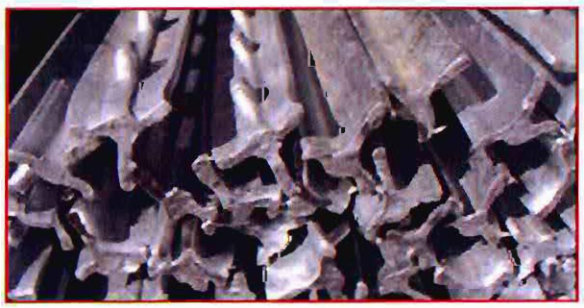
Painted Steel T-posts

PST06P	Steel T-post, HD painted, 6', 7.50#.....	6.85
PST07P	Steel T-post, HD painted, 7', 8.73#.....	7.80

Galvanized Steel T-posts (1.33# per foot, clips included)

Galvanized Steel T-posts

PST05G	Steel T-post, HD galv., 5', 7.09#.....	8.60
PST55G	Steel T-post, HD galv., 5'6", 7.76#	9.70
PST06G	Steel T-post, HD galv., 6', 8.42#.....	10.50
PST65G	Steel T-post, HD galv., 6'6", 9.09#.....	10.90
PST07G	Steel T-post, HD galv., 7', 9.74#.....	11.40
PST08G	Steel T-post, HD galv., 8', 10.65#.....	12.95
PST09G	Steel T-post, HD galv., 9', 12.00#.....	14.85
PST10G	Steel T-post, HD galv., 10', 13.70#.....	16.50
PST11G	Steel T-post, HD galv., 11', 15.10#.....	17.90
PST12G	Steel T-post, HD galv., 12', 16.00#.....	19.85
PSTC	Steel T-post clips, 25/pkg.....	1.00



T-post Caps

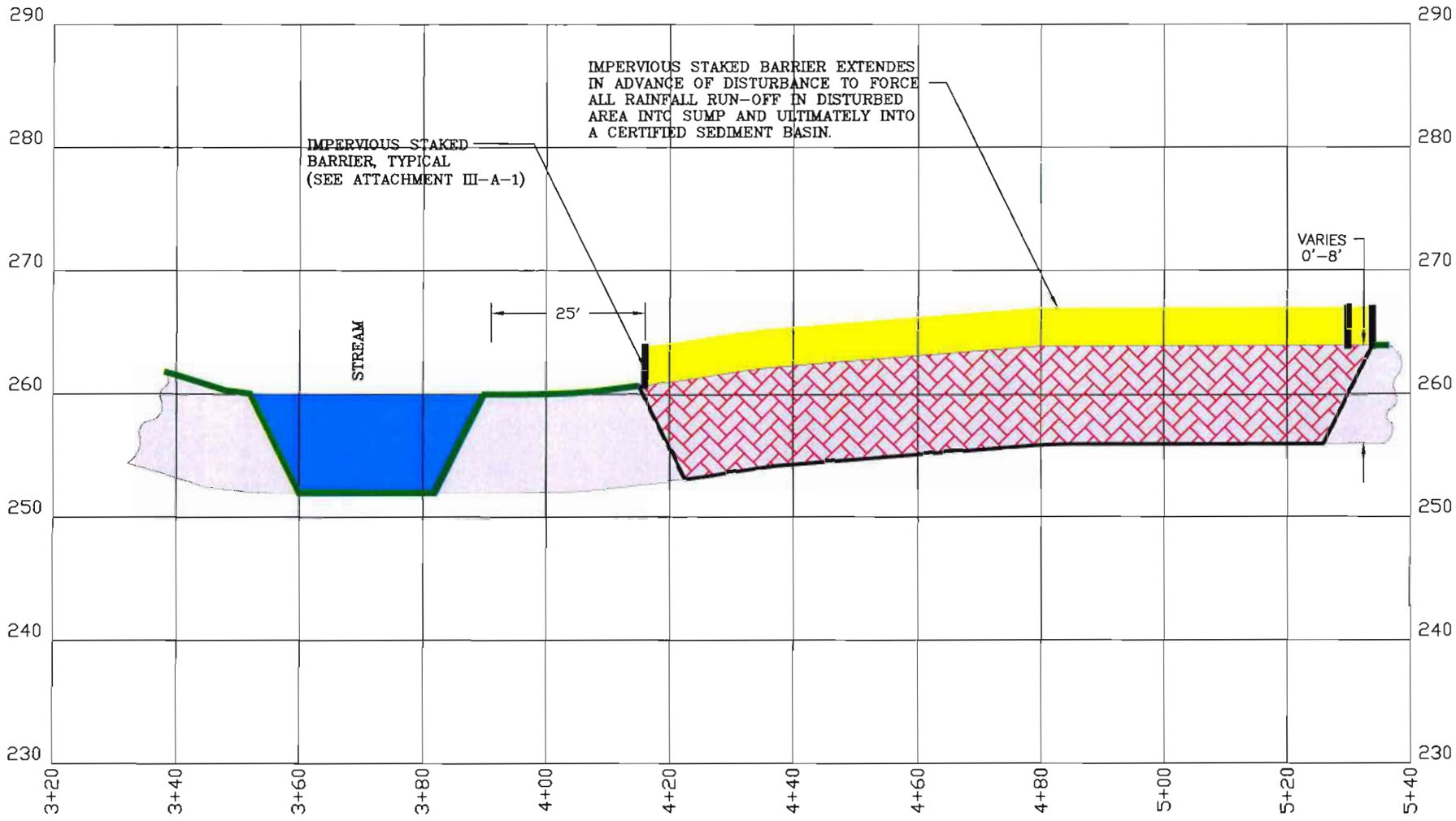
2 x 2" Vinyl T Post Cover

HTSCV	T-Post Sleeve Cover.....	9.85
PSTSC	T-post Safety Cap.....	0.30
PSTTB	T-post topper, insulator, white or black.....	0.68

To Order Call: 603-827-3464

Home | Information | Fencing | Price Lists | Farm

© 2010 Wellscroft Fence Systems LLC | Site Development and Terms



LEGEND

- TOP OF FINES
- CONSTRUCTED EMBANKMENT
- FINES REMOVED
- EXISTING FINES

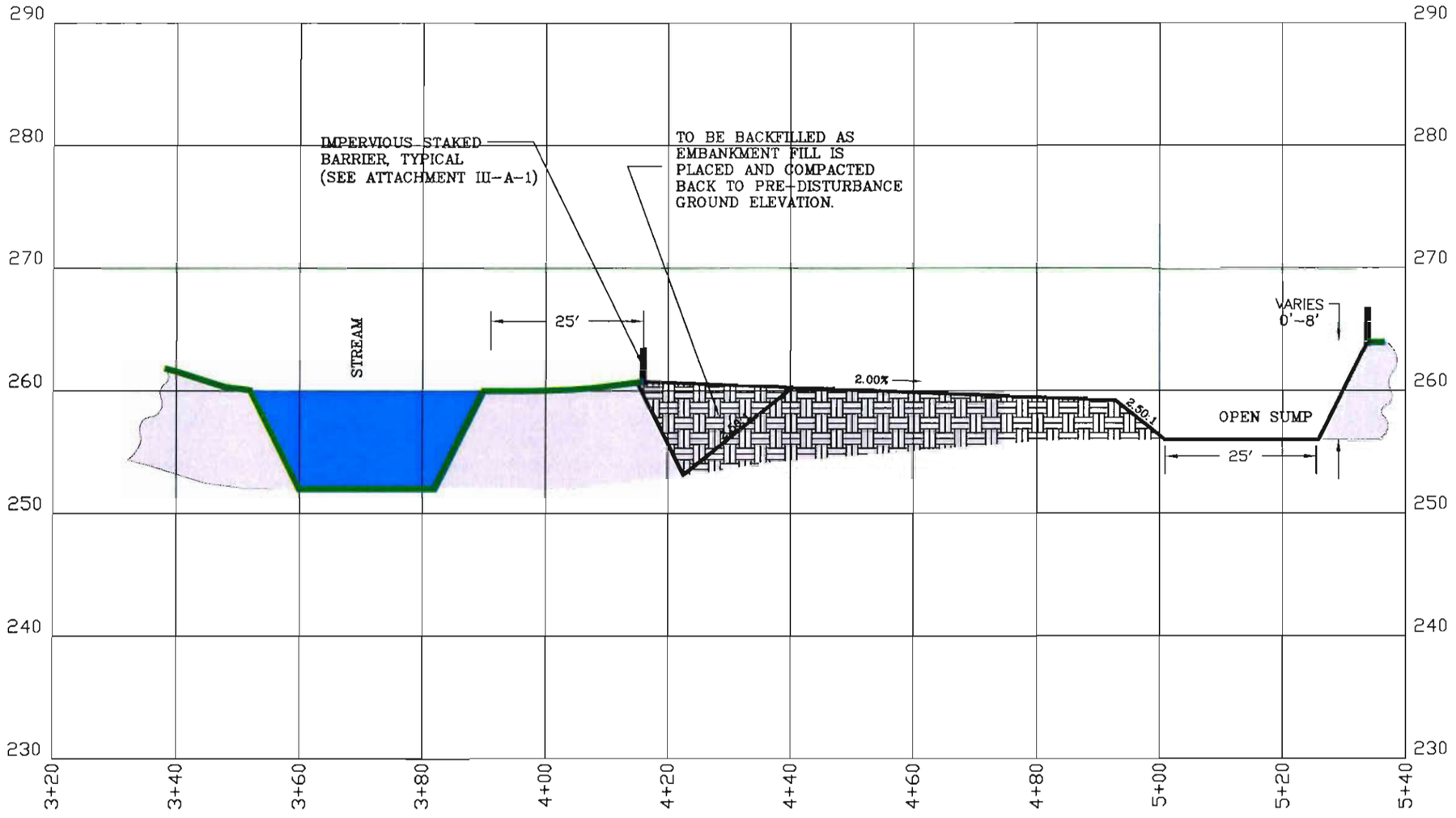
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

ATTACHMENT III-A-1 (STEP 1)

PERC ENGINEERING CO., INC.

CCLAY, INC.
SKELTON CREEK FINES RECOVERY PROJECT
TYPICAL EXCAVATION AND EMBANKMENT CONSTRUCTION PLAN
Section 1 & 2, Township 17 South, Range 6 West
Jefferson County, Alabama

DRAWN BY: J.W.T. DWG. NAME: R&SSKELTONECP1	SCALE: AS-SHOWN
APPROVED BY: L.G.S.	DATE: 03/05/2012



LEGEND

- TOP OF FINES
- CONSTRUCTED EMBANKMENT
- EXISTING FINES

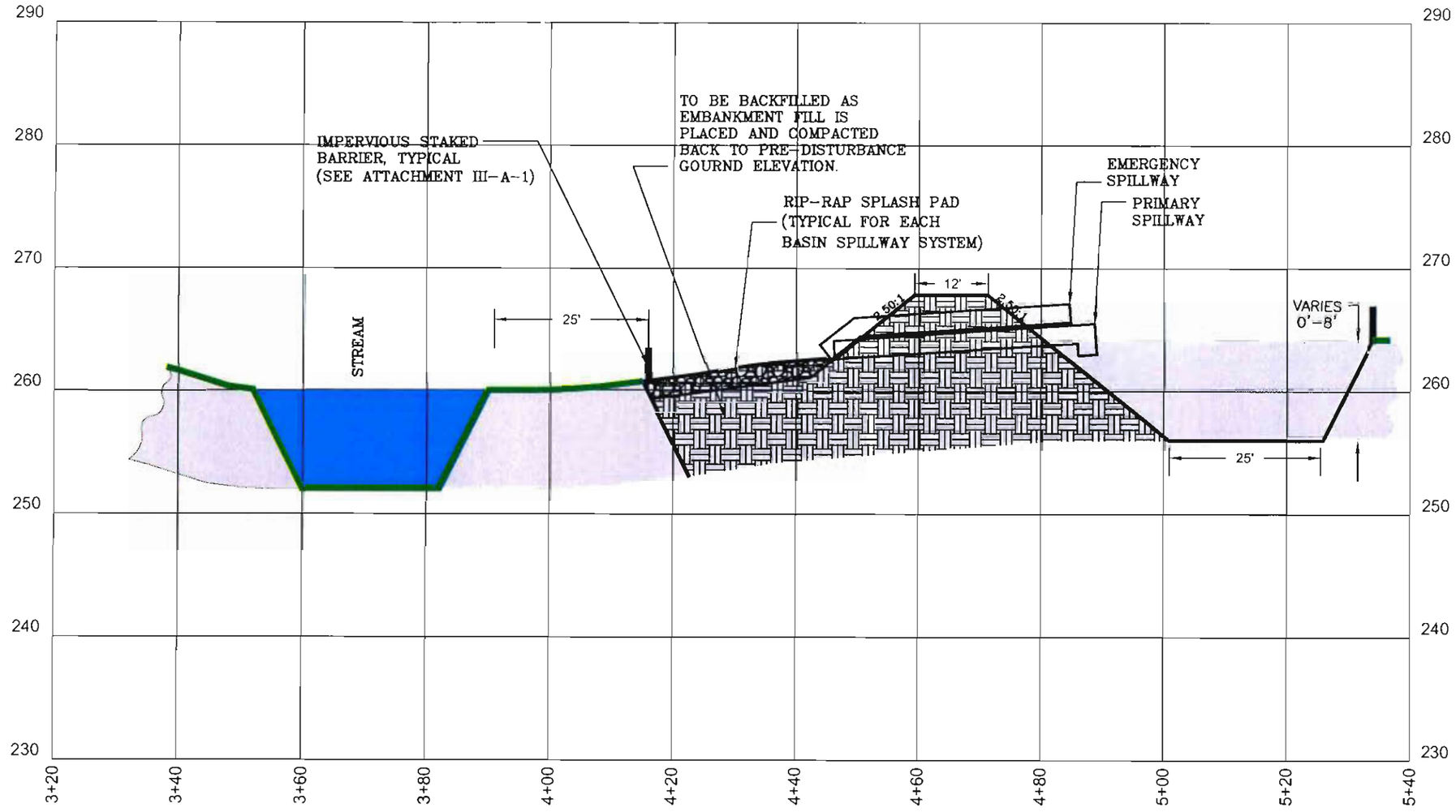
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

ATTACHMENT III-A-1 (STEP 2)

PERC ENGINEERING CO., INC.

CCLAY, INC.
SKELTON CREEK FINES RECOVERY PROJECT
TYPICAL EXCAVATION AND EMBANKMENT CONSTRUCTION PLAN
Section 1 & 2, Township 17 South, Range 6 West
Jefferson County, Alabama

DRAWN BY: J.W.T. DWG. NAME: R&SSKELTONECP2	SCALE: AS-SHOWN
APPROVED BY: L.G.S.	DATE: 03/05/2012



LEGEND

- TOP OF FINES
- CONSTRUCTED EMBANKMENT
- EXISTING FINES

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

ATTACHMENT III-A-1 (STEP 3)

PERC ENGINEERING CO., INC.

CCLAY, INC.
SKELTON CREEK FINES RECOVERY PROJECT
TYPICAL EXCAVATION AND EMBANKMENT CONSTRUCTION PLAN
Section 1 & 2, Township 17 South, Range 6 West
Jefferson County, Alabama

DRAWN BY: J.W.T. DWG. NAME: R&SSKELTONECP3	SCALE: AS-SHOWN
APPROVED BY: L.G.S.	DATE: 03/05/2012

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V:\Eng105\Mines\R&S Resources\BASIN 006\CCSC006WS.dwg 08/08/12 09:08

1/4

SW 1/4 — SW 1/4

SE 1/4 — SW 1/4

Scale: 1" = 300'

35 36
2 1

-AL, L.L.C. (FEE)

ALAWEST-AL, L.L.C. (FEE)

MWI-1

MWI-2

NW 1/4 — NW 1/4

NE 1/4 — NW 1/4

SKELTON CREEK

RSSCSW-3

RROW AREA

ALAWEST-AL, L.L.C. (FEE)

HARD (S)

BASIN 006P

BASIN 005P

SE 1/4 — NE 1/4

SW 1/4 — NW 1/4

SE 1/4 — NW 1/4

25' MINIMUM SETBACK FROM STREAMS TYPICAL

DRUMMOND COAL INC (M)

FLOYD FRANKLIN (S)

400

RSSCSW-2

SE 1/4

ING
IDMENT

LEGEND

- Permit Boundary
- 600 — Surface Contour
- 001 — Sediment Basin
- Perennial Stream
- Intermittent Stream
- Diversion Ditch
- P-3601
- Drainage Divide

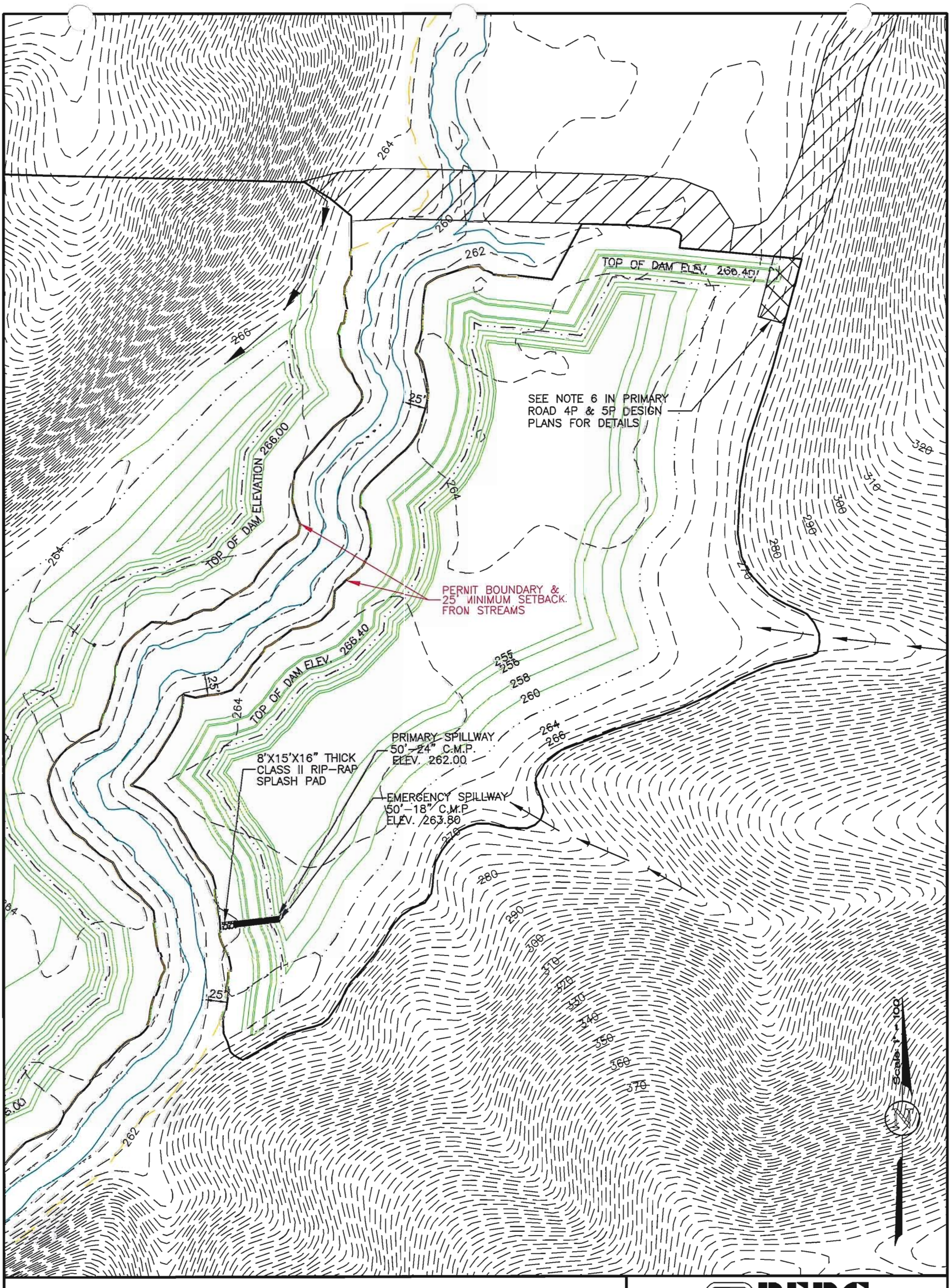
LANDUSE AND CURVE NUMBER INFORMATION

- Unmanaged Timberland, Curve Number 70
- Sediment Basin Curve Number 100
- Previously Disturbed Area
- Pond Embankment/Berm
- Existing Impoundment
- —SBZ— Stream Buffer Zone
- Praco Mines — Mary Lee Seam
- —FRB— Fines Removal Boundary — Located with HandheldNavigation Grade GPS on 1/19/2012.

PERC
ENGINEERING CO., INC.
1606 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-5553 Office (205) 384-9491 Fax

Attachment III-B-2(a)
CClay, Inc.
Skelton Creek Operation
P-3934 / Revision R-1
Basin 006P Watershed Map

DRAWN BY: S.D.M. DWG. NAME: CCSC006WS	DATE: 2/8/2012
APPROVED BY: L.G.S.	SCALE: 1"=300'



LEGEND

- PERMIT BOUNDARY
- NORMAL POOL LEVEL ELEV. 262.0
- 260 EXISTING CONTOURS
- 258 PROPOSED FINISHED GRADE
- MAJOR INFLOW/DIVERSIONS
- 25' STREAM OFFSET
- INTERMITTENT STREAM
- PERENNIAL STREAM
- ANCILLARY ROAD

PERC ENGINEERING CO., INC.
1508 Highway 78 West, Jasper, Alabama 35501
P.O. Box 1711, Jasper, Alabama 35502
(205) 384-6883 Office (205) 384-9114 Fax

CCLAY, INC.
SKELTON CREEK OPERATION
P-3934
BASIN 006P PLANVIEW

DRAWN BY: J.W.T.	DATE: 02/20/2012
DWG. NAME: CCSC006PV	
APPROVED BY: L.G.S.	SCALE: 1" = 100'

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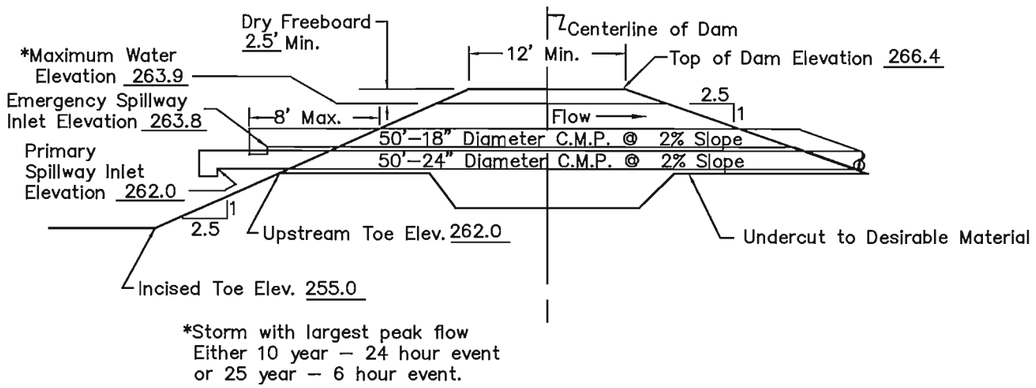
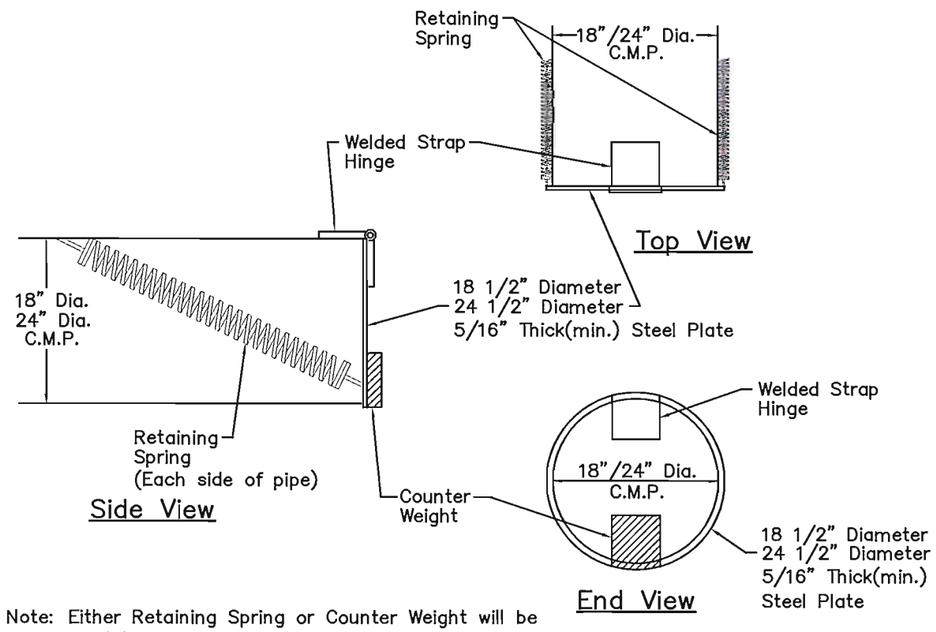


Typical Cross Section Along Primary Spillway



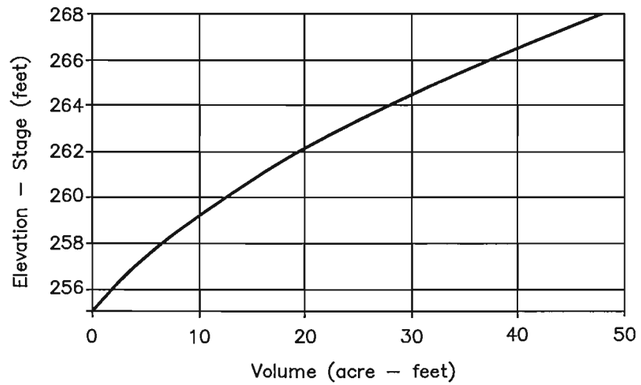
Note: Either Retaining Spring or Counter Weight will be used to ensure Flap closure.

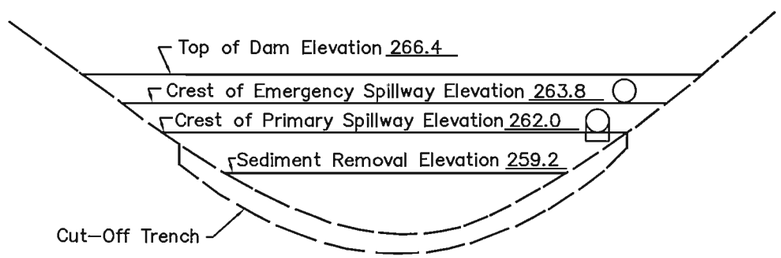
Typical "Flap" Valve

Notes:

1. The sediment shall be removed from the basin when the accumulated sediment reaches the sediment storage volume.
2. Outer slopes of embankment shall be grassed.
3. Fill material shall be placed in 12" lifts and compacted to 95% of standard proctor.
4. The surface beneath the embankment shall be stripped of undesirable material.
5. Upon completion of mining, reclamation and maintenance of water quality standards the pond will be de–watered and reclaimed.
6. See the attached pond construction criteria.
7. See the attached drawings and specifications for diversions.
8. Elevations are based on assumed datum.
9. Channel lining within the control section of the spillway channel will extend to the maximum water elevation.

Stage vs. Storage Curve





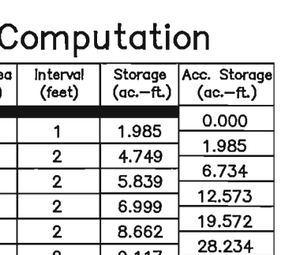
Typical Profile Looking Downstream

Storage Computation

Elevation (feet)	Area (acres)	Avg. Area (acres)	Interval (feet)	Storage (ac.–ft.)	Acc. Storage (ac.–ft.)
255	1.857				0.000
		1.986	1	1.985	
256	2.115				1.985
		2.380	2	4.749	
258	2.644				6.734
		2.924	2	5.839	
260	3.204				12.573
		3.504	2	6.999	
262	3.804				19.572
		4.113	2	8.662	
264	4.421				28.234
		4.785	2	9.117	
266	5.149				37.351

Key Basin Parameters

Drainage Area	53.4 Acres
Disturbed Area	7.3 Acres
Sediment Storage	10.0 Ac. Ft.
Detention Storage	9.6 Ac. Ft.
Permanent Pool Capacity	19.6 Ac. Ft.
Total Basin Capacity	28.2 Ac. Ft.
Peak Inflow	116.7 C.F.S.
Peak Outflow	11.4 C.F.S.



Leslie G. Stephens 06/15/2012

Leslie G. Stephens, P.E., P.L.S. *Date*
AL Registration. #14117–E

PERC ENGINEERING CO., INC.
1605 Highway 78, Post Office Box, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-5333 Office (205) 384-9691 Fax

CCLAY, INC.
SKELTON CREEK OPERATION
P–3934/REVISION R–1
BASIN 006P

DRAWN BY: J.W.T. DWG. NAME: CCSCB006DT	DATE: 03/20/2012
APPROVED BY: L.G.S.	SCALE: NONE

y:\Eng105\Users\R&S Resources\BASIN 006\CCSCB006DT.dwg 03/20/12 02:44

CClay, Inc.
Skelton Creek Operation
P-3934 Revision R-1
Basin 006P

5.9 Inch, 10 Year-24 Hour

DRN 58

JWT

PERC Engineering Co., Inc.
PO BOX 1712
Jasper, AL 35503

Phone: 205-384-5553
Email: John.Taylor@percengineering.com

General Information

Storm Information:

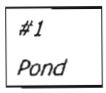
Storm Type:	DRN58
Design Storm:	10 yr - 24 hr
Rainfall Depth:	5.900 inches

Particle Size Distribution:

Size (mm)	TOPSOIL	SPOIL
3.0000	100.000%	100.000%
2.0000	82.000%	89.000%
1.0000	61.000%	68.000%
0.5000	45.000%	51.000%
0.3000	34.000%	41.000%
0.2000	26.000%	34.000%
0.1000	18.000%	25.000%
0.0500	15.000%	22.000%
0.0300	14.000%	19.000%
0.0200	12.000%	17.000%
0.0100	10.000%	14.000%
0.0050	9.000%	12.000%
0.0030	7.000%	9.000%
0.0010	6.000%	6.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 006



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	53.400	53.400	56.65	14.04	10.1	1,009	0.72	0.38
	Out			9.38	13.20	0.4	27	0.00	0.00

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	82.000%	100.000%
1.0000	61.000%	100.000%
0.5000	45.000%	100.000%
0.3000	34.000%	100.000%
0.2000	26.000%	100.000%
0.1000	18.000%	100.000%
0.0500	15.000%	100.000%
0.0300	14.000%	100.000%
0.0200	12.000%	100.000%
0.0100	10.000%	100.000%
0.0050	9.000%	100.000%
0.0030	7.000%	100.000%
0.0010	6.000%	100.000%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 006

Pond Inputs:

Initial Pool Elev:	262.00 ft
Initial Pool:	9.58 ac-ft
*Sediment Storage:	10.00 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
24.00	60.00	2.00	0.0240	262.00	0.90	0.00

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
18.00	60.00	2.00	0.0240	263.80	0.90	0.00

Pond Results:

Peak Elevation:	263.71 ft
H'graph Detention Time:	8.46 hrs
Pond Model:	CSTRS
Dewater Time:	1.52 days
Trap Efficiency:	95.98 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
259.16	2.963	0.000	0.000		Top of Sed. Storage
259.50	3.059	1.015	0.000		
260.00	3.204	2.581	0.000		
260.50	3.349	4.219	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
261.00	3.498	5.930	0.000		
261.50	3.649	7.717	0.000		
262.00	3.804	9.580	0.000		Spillway #1
262.50	3.954	11.519	1.486	15.79*	
263.00	4.107	13.535	4.189	9.35	
263.50	4.263	15.627	7.695	6.90	
263.71	4.329	16.528	9.382	4.45	Peak Stage
263.80	4.358	16.920	10.117		Spillway #2
263.90	4.389	17.357	11.489		
264.00	4.421	17.798	12.400		
264.10	4.456	18.242	13.234		
264.20	4.492	18.689	13.735		
264.50	4.598	20.053	16.066		
265.00	4.779	22.397	23.029		
265.50	4.962	24.832	26.707		
266.00	5.149	27.360	31.076		
266.50	5.264	29.963	33.584		
267.00	5.380	32.624	35.920		
267.50	5.498	35.343	38.114		
268.00	5.617	38.122	40.167		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Straight Pipe (cfs)	Combined Total Discharge (cfs)
259.16	0.000	0.000	0.000
259.50	0.000	0.000	0.000
260.00	0.000	0.000	0.000
260.50	0.000	0.000	0.000
261.00	0.000	0.000	0.000
261.50	0.000	0.000	0.000
262.00	0.000	0.000	0.000
262.50	(3)>1.486	0.000	1.486
263.00	(3)>4.189	0.000	4.189
263.50	(3)>7.695	0.000	7.695
263.80	(3)>10.117	0.000	10.117
263.90	(3)>10.971	(3)>0.518	11.489
264.00	(3)>11.847	(3)>0.553	12.400

Elevation (ft)	Straight Pipe (cfs)	Straight Pipe (cfs)	Combined Total Discharge (cfs)
264.10	(3)>12.645	(3)>0.589	13.234
264.20	(2)>12.928	(3)>0.807	13.735
264.50	(1)>14.220	(3)>1.845	16.066
265.00	(6)>18.900	(3)>4.129	23.029
265.50	(6)>20.713	(1)>5.994	26.707
266.00	(6)>22.369	(6)>8.707	31.076
266.50	(6)>23.904	(6)>9.680	33.584
267.00	(6)>25.356	(6)>10.564	35.920
267.50	(6)>26.742	(6)>11.372	38.114
268.00	(6)>28.038	(6)>12.129	40.167

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	46.100	0.099	0.000	0.000	70.000	M	45.36	10.455
	2	7.300	0.001	0.000	0.000	100.000	F	11.29	3.586
	Σ	**53.400**						**56.65**	**14.040**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	18.25	0.0030	1.0000	1	10.1	1,260	0.90	0.51
	2	0.001	100.00	0.01	0.0010	1.0000	2	0.0	0	0.00	0.00
	Σ							**10.1**	**1,009**	**0.72**	**0.38**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	36.00	72.00	200.00	1.510	0.036
		8. Large gullies, diversions, and low flowing streams	7.36	136.00	1,849.00	8.130	0.063
#1	**1**	**Time of Concentration:**					**0.099**
#1	2	5. Nearly bare and untilled, and alluvial valley fans	4.00	4.00	100.00	2.000	0.013
#1	**2**	**Time of Concentration:**					**0.001**

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CClay, Inc.

Skelton Creek Operation

P-3934 Revision R-1

Basin 006P

4.9 Inch, 25 Year-6 Hour

SCS 6 Hour

JWT

PERC Engineering Co., Inc.
PO BOX 1712
Jasper, AL 35503

Phone: 205-384-5553
Email: John.Taylor@percengineering.com

General Information

Storm Information:

Storm Type:	Rainfall Event

Accumulated Time (hrs)	Accumulated Depth (in)
0.00	0.0000
0.50	0.1720
1.00	0.3920
1.50	0.6620
2.00	1.1270
2.50	2.9400
3.00	3.4300
3.50	3.8220
4.00	4.0920
4.50	4.3370
5.00	4.5330
5.50	4.7290
6.00	4.9000

Peak 30-minute Intensity: 3.626 in/hr

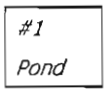
Particle Size Distribution:

Size (mm)	TOPSOIL	SPOIL
3.0000	100.000%	100.000%
2.0000	82.000%	89.000%
1.0000	61.000%	68.000%
0.5000	45.000%	51.000%
0.3000	34.000%	41.000%
0.2000	26.000%	34.000%
0.1000	18.000%	25.000%
0.0500	15.000%	22.000%
0.0300	14.000%	19.000%
0.0200	12.000%	17.000%
0.0100	10.000%	14.000%
0.0050	9.000%	12.000%
0.0030	7.000%	9.000%

Size (mm)	TOPSOIL	SPOIL
0.0010	6.000%	6.000%
0.0001	0.000%	0.000%

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 006



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc. (ml/l)	24VW (ml/l)
#1	In	53.400	53.400	116.68	10.46	12.3	1,575	1.13	0.62
	Out			11.42	10.13	0.4	36	0.00	0.00

Particle Size Distribution(s) at Each Structure

Structure #1:

Size (mm)	In	Out
3.0000	100.000%	100.000%
2.0000	82.000%	100.000%
1.0000	61.000%	100.000%
0.5000	45.000%	100.000%
0.3000	34.000%	100.000%
0.2000	26.000%	100.000%
0.1000	18.000%	100.000%
0.0500	15.000%	100.000%
0.0300	14.000%	100.000%
0.0200	12.000%	100.000%
0.0100	10.000%	100.000%
0.0050	9.000%	100.000%
0.0030	7.000%	100.000%
0.0010	6.000%	100.000%
0.0001	0.000%	0.000%

Structure Detail:

Structure #1 (Pond)

Basin 006

Pond Inputs:

Initial Pool Elev:	262.00 ft
Initial Pool:	9.58 ac-ft
*Sediment Storage:	10.00 ac-ft
Dead Space:	20.00 %

**Sediment capacity was entered by user*

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
24.00	60.00	2.00	0.0240	262.00	0.90	0.00

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
18.00	60.00	2.00	0.0240	263.80	0.90	0.00

Pond Results:

Peak Elevation:	263.89 ft
H'graph Detention Time:	9.63 hrs
Pond Model:	CSTRS
Dewater Time:	1.32 days
Trap Efficiency:	96.43 %

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
259.16	2.963	0.000	0.000		Top of Sed. Storage
259.50	3.059	1.015	0.000		
260.00	3.204	2.581	0.000		
260.50	3.349	4.219	0.000		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
261.00	3.498	5.930	0.000		
261.50	3.649	7.717	0.000		
262.00	3.804	9.580	0.000		Spillway #1
262.50	3.954	11.519	1.486	15.79*	
263.00	4.107	13.535	4.189	9.35	
263.50	4.263	15.627	7.695	4.40	
263.80	4.358	16.920	10.117	1.80	Spillway #2
263.89	4.388	17.335	11.417	0.45	Peak Stage
263.90	4.389	17.357	11.489		
264.00	4.421	17.798	12.400		
264.10	4.456	18.242	13.234		
264.20	4.492	18.689	13.735		
264.50	4.598	20.053	16.066		
265.00	4.779	22.397	23.029		
265.50	4.962	24.832	26.707		
266.00	5.149	27.360	31.076		
266.50	5.264	29.963	33.584		
267.00	5.380	32.624	35.920		
267.50	5.498	35.343	38.114		
268.00	5.617	38.122	40.167		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Straight Pipe (cfs)	Combined Total Discharge (cfs)
259.16	0.000	0.000	0.000
259.50	0.000	0.000	0.000
260.00	0.000	0.000	0.000
260.50	0.000	0.000	0.000
261.00	0.000	0.000	0.000
261.50	0.000	0.000	0.000
262.00	0.000	0.000	0.000
262.50	(3)>1.486	0.000	1.486
263.00	(3)>4.189	0.000	4.189
263.50	(3)>7.695	0.000	7.695
263.80	(3)>10.117	0.000	10.117
263.90	(3)>10.971	(3)>0.518	11.489
264.00	(3)>11.847	(3)>0.553	12.400

Elevation (ft)	Straight Pipe (cfs)	Straight Pipe (cfs)	Combined Total Discharge (cfs)
264.10	(3)>12.645	(3)>0.589	13.234
264.20	(2)>12.928	(3)>0.807	13.735
264.50	(1)>14.220	(3)>1.845	16.066
265.00	(6)>18.900	(3)>4.129	23.029
265.50	(6)>20.713	(1)>5.994	26.707
266.00	(6)>22.369	(6)>8.707	31.076
266.50	(6)>23.904	(6)>9.680	33.584
267.00	(6)>25.356	(6)>10.564	35.920
267.50	(6)>26.742	(6)>11.372	38.114
268.00	(6)>28.038	(6)>12.129	40.167

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	46.100	0.099	0.000	0.000	70.000	M	89.98	7.491
	2	7.300	0.001	0.000	0.000	100.000	F	26.69	2.970
	Σ	**53.400**						**116.68**	**10.461**

Subwatershed Sedimentology Detail:

Stru #	SWS #	Soil K	L (ft)	S (%)	C	P	PS #	Sediment (tons)	Peak Sediment Conc. (mg/l)	Peak Settleable Conc (ml/l)	24VW (ml/l)
#1	1	0.240	200.00	18.25	0.0030	1.0000	1	12.3	2,042	1.46	0.86
	2	0.001	100.00	0.01	0.0010	1.0000	2	0.0	0	0.00	0.00
	Σ							**12.3**	**1,575**	**1.13**	**0.62**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	36.00	72.00	200.00	1.510	0.036
		8. Large gullies, diversions, and low flowing streams	7.36	136.00	1,849.00	8.130	0.063
#1	**1**	**Time of Concentration:**					**0.099**
#1	2	5. Nearly bare and untilled, and alluvial valley fans	4.00	4.00	100.00	2.000	0.013
#1	**2**	**Time of Concentration:**					**0.001**