Pond Levees

Pond levees will be inspected weekly and after major storm events. Pond levees will be inspected for signs of seepage, rodent damage, and erosion and repaired as needed.

Section D: Site Specific Information

Geological Site Investigation

SECTION D: SITE SPECIFIC INFORMATION

1. SITE SPECIFIC INFORMATION

1: FACILITY INFORMATION

a. **Facility:**

NAME:	C&H Hog Farms
ADDRESS:	HC 72 PO Box 10 Mount Judea, AR 72655
PHONE NUMBER:	(870) 688-1318
PRESIDENT:	Jason Henson

b. **MANAGER:**

NAME:	Jason Henson
ADDRESS:	HC 72 PO Box 10 Mount Judea, AR 72655
PHONE:	(870) 715-9468 (cell)
EMAIL:	jasonh@rittermail.com

2: LEGAL LOCATION OF FACILITY

SW ¼, Section 26, T15N, R20W, Newton County, AR

3: APPROXIMATE LATITTUDE/LONGITUDE OF FACILITY

Latitude: 35° 55' 13.60"
Longitude: -93° 4' 51.00"

4: DRIVING DIRECTIONS:

The location for this project is approximately 1.6 miles west of Mt. Judea AR in Newton County. Driving direction from Mt. Judea is approximately 0.8 miles southwest on County Rd. 54 and right on County Rd. 41 for approximately 0.75 miles. The site is located on the left hand side of the road on a logging trail.

5: SOIL TYPE IN AREA OF CONTROL STRUCTURE

According to the USDA Survey, the soil in the areas of the proposed barn is a Noark very cherty silt loam, 8 to 20% slopes, (43) and Razort loam, occasionally flooded (48). The soil profile for 43 from 0 to 14 inches is very gravelly clay loam, from 14-43 inches is very gravelly silty clay, and from 43-72 inches is very gravelly clay. The soil profile for 48 from 0 to

55 inches is loam, from 55-65 inches is gravelly sandy loam.

6: NAME AND DISTANCE TO THE NEAREST WATERCOURSE

A Tributary to Big Creek is located approximately 355 feet to the southeast.

7: DEPTH TO WATER TABLE AT FACILITY/CONTROL STRUCTURE

The static water level is approximately 189 feet, at a well located approximately 1491.831 feet south and 4320.776 feet east of the Proposed site. (G-128819, see section D3, Well Logs and Registration)

8: SEPARATION DISTANCE FROM CLOSEST RESIDENCES, BUSINESSES, CHURCHES OR SCHOOLS

Mount Judea Elementary school is the nearest local school and is located about 1.103 miles to the east of the site.

2. WELL LOGS and REGISTRATION

See Attached

STATE OF ARKANSAS
VIEW REPORT ON WATER WELL CONSTRUCTION & PUMP INSTALLATION

[HOME PAGE]

A

1. Contractor Name & Number:	ARNOLD WELL DRILLING & PUMP SE (1077)
2. Driller Name & Number:	BENJAMIN D. WOODS (2736)
3. Pump Installer Name & Number:	UNKNOWN
4. Date Well Completed: 08/30/2001	New Well
5. COUNTY: NEWTON (101)	6 FRACTION ¼ of ¼ of 7 SECTION 16N 8 TOWNSHIP 16 9 RANGE 20W
10. LONGITUDE: 93-03-58	11. LATITUDE 35-54-52

B DESCRIPTION OF FORMATION

DESCRIPTION OF FORMATION	DEPTHS IN FEET FROM	TO	WATER BEARING	IF YES, DEPTH
OVERBURDEN	0.00	9.00	No	
WHITE LS	9.00	64.00	No	
WHITE SD	64.00	145.00	No	
WHITE LS	145.00	178.00	No	
WHITE SD	178.00	354.00	No	
GRAY LS	354.00	395.00	No	
RED LS	395.00	415.00	No	
WHITE SD	415.00	436.00	No	
WHITE LS	436.00	720.00	No	
GRAY LS	720.00	830.00	No	
WHITE LS	830.00	846.00	No	

1. DEPTH TO WATER 3@354',7@830' FT
2. TOTAL DEPTH OF WELL: 846.00
3. STATIC WATER LEVEL 189.00 Ft. below land surface
4. YIELD 10 gallons per Y
5. DIAMETER OF BORE HOLE

C PUMP REPORT

1. TYPE PUMP
2. SETTING DEPTH: 0.00 FEET
3. BRAND NAME AND SERIAL NUMBERS:
4. RATED CAPACITY 0.00
5. TYPE LUBRICATION
6. DROP PIPE OR COLUMN PIPE SIZE
7. WIRE SIZE:
8. PRESSURE TANK: SIZE: MAKE: MODEL:
9. DATE OF INSTALLATION OR REPAIR
10. Is there an abandoned water well on the property? No

D

1. LAND OWNER OR OTHER CONTACT PERSON
NAME: GLENDA & LELMER CAMPBELL
STREET ADDRESS: PO BOX 65
CITY: VENDOR, AR 72683

CASING FROM TO W/ CASING FROM 0.00 TO 189.00 W/ TYPE CASING STEEL

3. SCREEN
TYPE: DIA SLOT/GA
SET FROM FT TO FT
TYPE: DIA SLOT/GA
SET FROM FT TO FT

4. GRAVEL PACK FROM: FT TO: FT

5. BACK FILLED WITH: CUTTINGS
FROM: 0.00FT TO: 184.00 FT

6. SEALED WITH: BENTONITE
FROM: 184.00 FT FT TO: 189.00 FT 6. SEALED WITH:
FROM: FT TO: FT FROM: FT TO: FT

7. DISINFECTED WITH: CHLORINE

8. USE OF WELL:

9. A/C HEATPUMP TYPE WELLS

(For A/C only)Will system also be used for purposes other than Heating and Air Conditioning?
No

(For A/C open-loop only) Into what medium is water returned?

11. REMARKS

12. SIGNED DATE

STATE OF ARKANSAS
VIEW REPORT ON WATER WELL CONSTRUCTION & PUMP INSTALLATION

[HOME PAGE]

A

1. Contractor Name & Number:	VALLEY WATER WELL DRILLING (1322)
2. Driller Name & Number:	UNKNOWN
3. Pump Installer Name & Number:	UNKNOWN
4. Date Well Completed: 08/11/2003	New Well

5. COUNTY: NEWTON (101) | 6 FRACTION ¼ of ¼ of | 7 SECTION 14N | 8 TOWNSHIP 8S | 9 RANGE 20W

11. LONGITUDE: 93-03-52 11. LATITUDE 36-04-18

B DESCRIPTION OF FORMATION

DEPTHS IN FEET FROM	TO	WATER BEARING	IF YES.. DEPTH
NONE			

2. TOTAL DEPTH OF WELL 200.00
3. STATIC WATER LEVEL Ft. below land surface
4. YIELD
5. DIAMETER OF BORE HOLE

C PUMP REPORT

1. TYPE PUMP
2. SETTING DEPTH 0.00 FEET
3 BRAND NAME AND SERIAL NUMBERS:
4 RATED CAPACITY 0.00
5 TYPE LUBRICATION
6 DROP PIPE OR COLUMN PIPE SIZE
7 WIRE SIZE:
8 PRESSURE TANK:
SIZE: MAKE: MODEL:
9 DATE OF INSTALLATION OR REPAIR
10 Is there an abandoned water well on the property? No

D

1 LAND OWNER OR OTHER CONTACT PERSON
NAME: KAREN BRISTER
STREET ADDRESS:
CITY.

CASING FROM TO W/ ID
CASING FROM TO W/ ID
TYPE CASING Well_Co_12

3. SCREEN
TYPE: DIA SLOT/GA
SET FROM FT TO FT
TYPE: DIA SLOT/GA
SET FROM FT TO FT

4. GRAVEL PACK FROM: FT TO: FT
5. BACK FILLED WITH:
FROM: FT TO: FT
6. SEALED WITH:
FROM: FT TO: FT FROM: FT TO: FT
7. DISINFECTED WITH:
8. USE OF WELL:
9. A/C HEATPUMP TYPE WELLS

(For A/C only)Will system also be used for purposes other than Heating and Air Conditioning?
No

(For A/C open-loop only) Into what medium is water returned?

11. REMARKS

12. SIGNED DATE

STATE OF ARKANSAS
VIEW REPORT ON WATER WELL CONSTRUCTION & PUMP INSTALLATION

[HOME PAGE]

A

1. Contractor Name & Number:	VALLEY WATER WELL DRILLING (1332)
2. Driller Name & Number:	JOHN KING (2312)
3. Pump Installer Name & Number:	UNKNOWN
4. Date Well Completed: 05/20/1997	New Well

5. COUNTY: NEWTON (101) | 6 FRACTION SE ¼ of SW ¼ of | 8 TOWNSHIP 14N
7 SECTION 35 | 9 RANGE 19W

11. LONGITUDE: 93-08-12 11. LATITUDE 36-04-24

B DESCRIPTION OF FORMATION

DESCRIPTION OF FORMATION	DEPTHS IN FEET FROM	TO	WATER BEARING	IF YES, DEPTH
CL	0.00	22.00	No	
SH	22.00	52.00	No	
LS	52.00	504.00	No	
LS	504.00	560.00	No	
LS	560.00	655.00	No	
SD	655.00	930.00	No	
LS	930.00	1035.00	No	

1. DEPTH TO WATER 1020 FT
2. TOTAL DEPTH OF WELL 1035.00
3. STATIC WATER LEVEL 350.00 Ft. below land surface
4. YIELD 8 gallons per X
5. DIAMETER OF BORE HOLE 6.25 IN

C PUMP REPORT

1 TYPE PUMP
2 SETTING DEPTH: 0.00 FEET
3 BRAND NAME AND SERIAL NUMBERS
4 RATED CAPACITY 0.00
5 TYPE LUBRICATION
6 DROP PIPE OR COLUMN PIPE SIZE
7 WIRE SIZE:
8 PRESSURE TANK
SIZE: MAKE: MODEL:
9 DATE OF INSTALLATION OR REPAIR
10 Is there an abandoned water well on the property? No

D

1 LAND OWNER OR OTHER CONTACT PERSON
NAME: KENT MEYER
STREET ADDRESS: 221 W. FAIRBANKS
CITY: OKLAHOMA CITY OK

CASING FROM TO W/ CASING FROM TO 130.50 W/ TYPE CASING STEEL

3. SCREEN
TYPE: DIA SLOT/GA
SET FROM FT TO FT
TYPE: DIA SLOT/GA
SET FROM FT TO FT

4. GRAVEL PACK FROM: FT TO: FT
5. BACK FILLED WITH: drill cuttings
FROM: 0.00FT TO: 126.00 FT
6. SEALED WITH: CEMENT
FROM: 126.00 FT FT TO: 130.00 FT 6. SEALED WITH:
FROM: FT TO: FT FROM: FT TO: FT
7. DISINFECTED WITH: CHLORINE
8. USE OF WELL:
DOMESTIC
9. A/C HEATPUMP TYPE WELLS

(For A/C only)Will system also be used for purposes other than Heating and Air Conditioning?
No

(For A/C open-loop only) Into what medium is water returned?

11. REMARKS

12. SIGNED DATE

3. Geologic Investigation

The USDA Soil Survey predicts that the soil in the location of the storage structures is primarily a Noark very cherty silt loam, 3 to 8% slopes, (42). The soil profile for 42 from 0 to 14 inches is very gravelly silt loam, from 14-43 inches is very gravelly silty clay, and from 43-72 inches is very gravelly clay.

The holding ponds will be constructed with an 18-inch thick liner.

Geotechnical & Testing Services conducted laboratory tests on some of the samples. Atterburg limits were run on the soil samples for the sandy lean clay. The results were as follows:

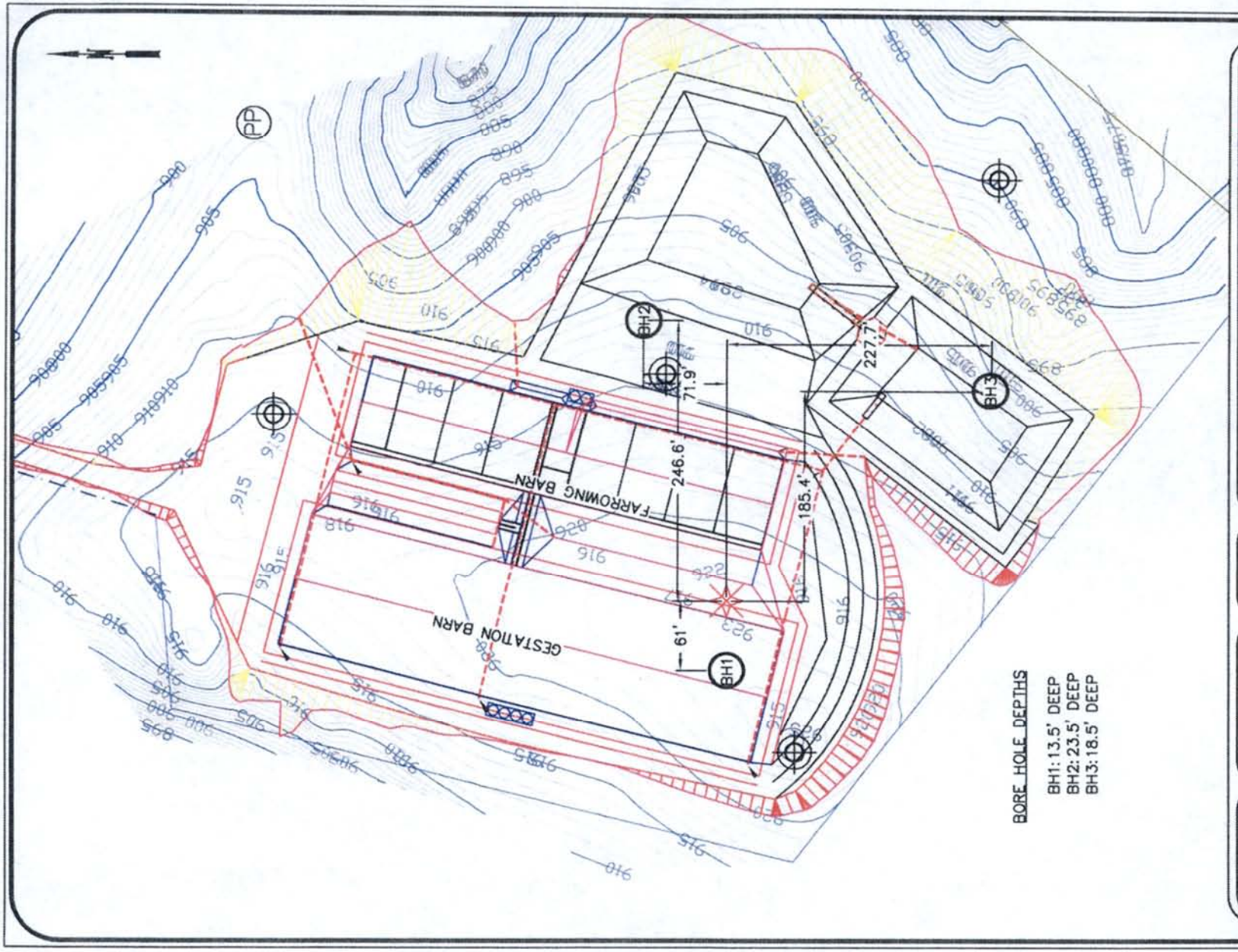
Boring #	Depth (ft)	Description	LL	PL	PI
2	3.0– 4.5'	Silty Lean Clay	38	22	16
2	4.5 – 6.0'	Sandy Lean Clay	44	24	20
2	7.0 – 8.5'	Fat Clay w/sand	93	38	55
2	9.5-11'	Sandy Fat Clay	64	23	41
3	7-8.5'	Fat Clay w/sand	58	36	22
3	9.5-11'	Clayey Gravel with Sand	81	44	37

The soil proposed for the holding pond liner is Fat Clay w/sand and Fat Clay w/sand (CL) identified in the soils report at the depths of 7-11' feet in boring numbers 2-3.

Recompacted soil test are currently being run to determine the Coefficient of Permeability using Darcy's Law. Results will be forwarded on once they are completed by the testing lab.

Currently it is recommended that the liner be constructed at 95% compaction +-2% Optimum Moisture to meet seepage requirements. This may change based off results from the Recompacted Permeability.

The seepage rate of any compacted liner that will be used will be less than the maximum allowable seepage rate of 5,000 Gallons/acre/per day as required by Arkansas Department of environment Quality.



BORE HOLE DEPTHS

BH1: 13.5' DEEP
BH2: 23.5' DEEP
BH3: 18.5' DEEP

GENERAL NOTES

LEGEND

- BENCHMARK
- BUILDINGS
- FENCELINE
- CULVERT/PIPE
- DRAINAGE ARROW

SCALE, FEET

0 40 80 120 160

DeHaan, Grabs & Associates, LLC
Registration Number: C-1341

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgaengineering.com

JASON HENSON
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

DETAILED
PROPOSED SITE PLAN

DATE: APR 30, 2012	SHEET: 3
SCALE: 1" = 80'	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/BARNE/NEWTON/CFILES/PLAN

LOG OF BORING NO.B-1

Proposed Pond and Building Pads
Mt. Judea, Arkansas

GTS, Inc.
Geotechnical & Testing Services
Fayetteville, AR

Project No.: 12-15049 Location: Shown on Boring Location Diagram

DEPTH, FT	SYMBOL	SAMPLES	SAMPLE No.	RECOVERY (in.)	DESCRIPTION OF MATERIAL	USCS	%<#200	HAND PENETROMETER, TSF ■ / LAB. COHESION, TSF ▲ (0.4 0.8 1.2 1.6) / WATER CONTENT, % ● (PL 20 40 60 80 LL)	BLOWS PER FT
0					Surface Description=Grass Cover Rootmat = 4"				
			1	12	SILTY SAND medium dense, brown with organics	SM			17
					SILTY CLAY very stiff, tan and orange with organics	CL-ML			
2.5			2	16	LEAN CLAY, with sand very stiff, gray, red and tan	CL			18
			3	18	SANDY LEAN CLAY, with gravel very stiff, orangish brown and red with sandstone fragments	CL			21
5			4	16	SANDY LEAN CLAY, with trace gravel very stiff, brown, tan and red with rootlets and sandstone fragments	CL			30
7.5			5	18	SANDY LEAN CLAY, with gravel very stiff, orange, brown and light gray with chert and sandstone fragments	CL			48
10			6	18					47
12.5			7	18					50
					BOTTOM OF BORING AT 13½ FEET				
15									
17.5									

COMPLETION DEPTH: 13.5 ft.
DATE: 5/14/2012
RIG: Diedrich D-50

DEPTH TO WATER: DURING DRILLING: DRY
AT COMPLETION: DRY
AT 24 HOURS: N/A

LOG OF BORING NO.B-2

Proposed Pond and Building Pads
Mt. Judea, Arkansas

GTS, Inc.
Geotechnical & Testing Services
Fayetteville, AR

Project No.: 12-15049 Location: Shown on Boring Location Diagram

DEPTH, FT	SYMBOL	SAMPLES	SAMPLE No.	RECOVERY (in.)	DESCRIPTION OF MATERIAL	USCS	%<#200	HAND PENETROMETER, TSF ▣ LAB. COHESION, TSF ▲ 0.4 0.8 1.2 1.6 WATER CONTENT, % ● PL 20 40 60 80 LL	BLOWS PER FT
0					Surface Description=Grass Cover Rootmat = 2"				
			1	13	SILT, with sand medium dense, brown with organics	SM			25
2.5			2	15	CLAYEY GRAVEL, with sand dense, red and tan with chert fragments	GC			30
			3	18	CLAYEY SAND / SANDY LEAN CLAY dense, very stiff, red and tan with extremely weathered sandstone fragments and chert fragments	CL			30
5			4	18		SC			26
7.5			5	18	FAT CLAY, with sand very stiff, light gray, red and orangish tan	CH			22
10			6	17	SANDY FAT CLAY very stiff, light gray, red and orangish tan	CH			25
12.5			7	15	GRAVELLY FAT CLAY very stiff, light gray, red and orangish tan with chert fragments	CH			65
15			8	18	FAT CLAY, with gravel very stiff, light gray and tan with chert fragments	CH			34
17.5					FAT CLAY very stiff, tan with ferrous nodules	CH			

COMPLETION DEPTH: 18.5 ft.
DATE: 5/15/2012
RIG: Diedrich D-50

DEPTH TO WATER: DURING DRILLING: DRY ▽
AT COMPLETION: DRY ▽
AT 24 HOURS: N/A ▽

LOG OF BORING NO.B-2

Proposed Pond and Building Pads
Mt. Judea, Arkansas

GTS, Inc.
Geotechnical & Testing Services
Fayetteville, AR

Project No.: 12-15049 Location: Shown on Boring Location Diagram

DEPTH, FT	SYMBOL	SAMPLES	SAMPLE No.	RECOVERY (in.)	DESCRIPTION OF MATERIAL	USCS	%<#200	HAND PENETROMETER, TSF ■ LAB. COHESION, TSF ▲ 0.4 0.8 1.2 1.6 WATER CONTENT, % ● PL LL 20 40 60 80	BLOWS PER FT
			9	18					20
					BOTTOM OF BORING AT 18½ FEET				
20									
22.5									
25									
27.5									
30									
32.5									
35									

LOG OF BORING NO.B-3

Proposed Pond and Building Pads
Mt. Judea, Arkansas

GTS, Inc.
Geotechnical & Testing Services
Fayetteville, AR

Project No.: 12-15049 Location: Shown on Boring Location Diagram

DEPTH, FT	SYMBOL	SAMPLES	SAMPLE No.	RECOVERY (in.)	DESCRIPTION OF MATERIAL	USCS	%<#200	HAND PENETROMETER, TSF ■ / LAB. COHESION, TSF ▲ (0.4 0.8 1.2 1.6) / WATER CONTENT, % ● (PL — LL, 20 40 60 80)	BLOWS PER FT
0					Surface Description=Grass Cover Rootmat = 4"				
			1	10	SILT, with sand and trace gravel medium dense, orangish brown with organics and chert fragments	ML			13
2.5			2	18	CLAYEY SAND, with gravel medium dense, orangish tan and brown with chert fragments	SC			29
			3	16	CLAYEY GRAVEL, with sand dense, red and brown with sandstone and chert fragments	GC			38
5			4	16					72
					CHERT SEAM = 6"				
7.5			5	18	FAT CLAY, with sand very stiff, light gray, brown and orangish tan, blocky	CH			24
10			6	11	CLAYEY GRAVEL, with sand very dense, brown and tan with chert fragments	GC			50/5"
12.5					AUGER REFUSAL AT 11½ FEET				
15									
17.5									

COMPLETION DEPTH: 11.5 ft.
DATE: 5/14/2012
RIG: Diedrich D-50

DEPTH TO WATER: DURING DRILLING: DRY
AT COMPLETION: DRY
AT 24 HOURS: N/A

GTS, Inc.
Geotechnical & Testing Services

1915 N. Shiloh Dr. Suite 1
Fayetteville, Arkansas 72704
Office: (479) 521-7645
Fax: (479) 521-6232

Office Locations
Fayetteville, Arkansas
Van Buren, Arkansas
Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

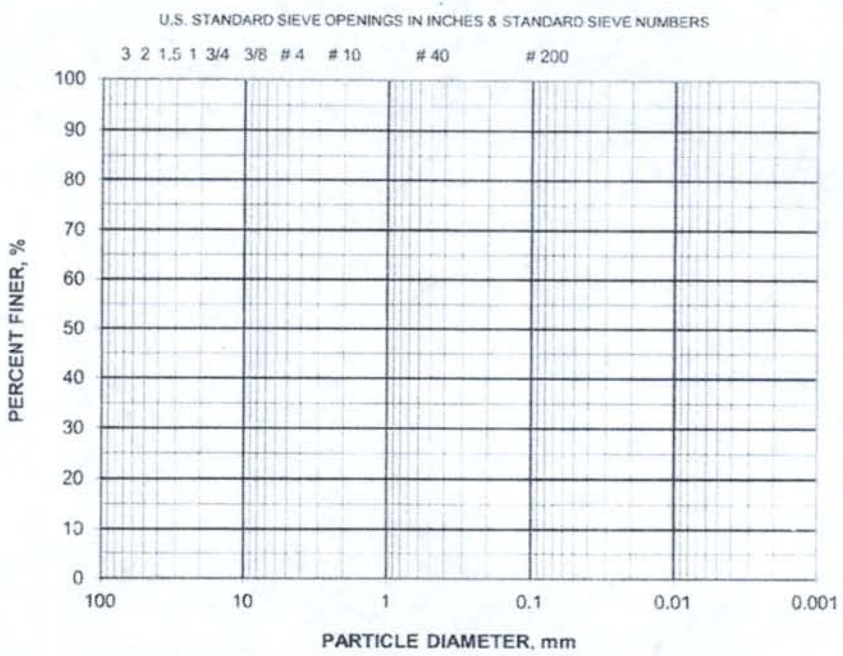
BORING NO.	B-2
SAMPLE NO.	S-3
DEPTH (FT)	3-4.5
PLASTIC LIMIT	22
LIQUID LIMIT	38
PLASTICITY INDEX	16

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

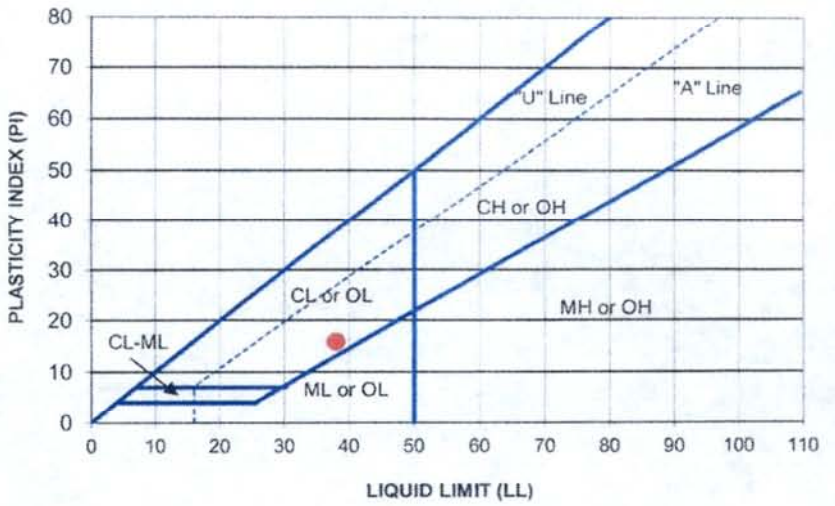
VISUAL CLASSIFICATION	Red and Tan Clayey Sand / Sandy Lean Clay with Extremely Weathered Sandstone Fragments and Chert

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



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Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

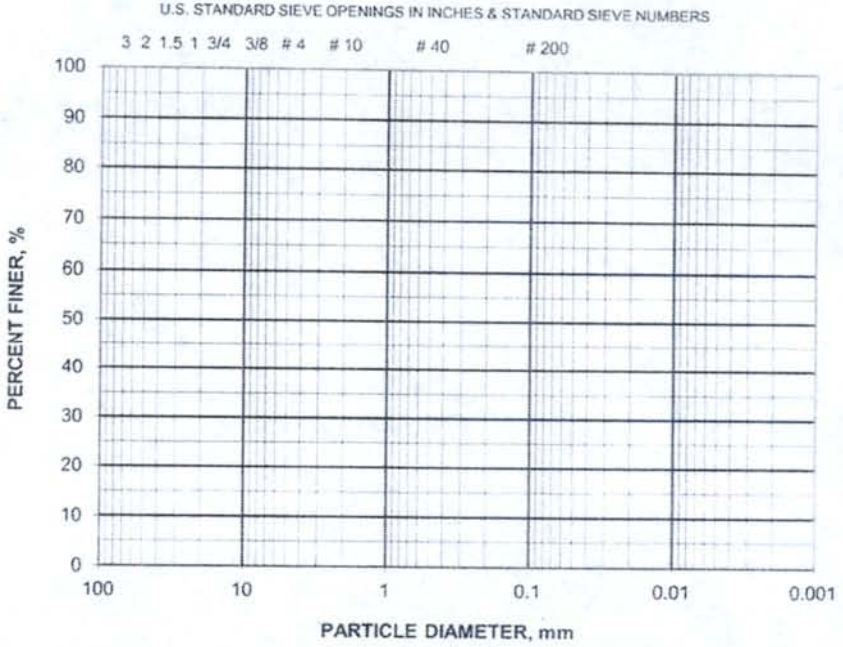
BORING NO.	B-2
SAMPLE NO.	S-4
DEPTH (FT)	4.5-6
PLASTIC LIMIT	24
LIQUID LIMIT	44
PLASTICITY INDEX	20

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

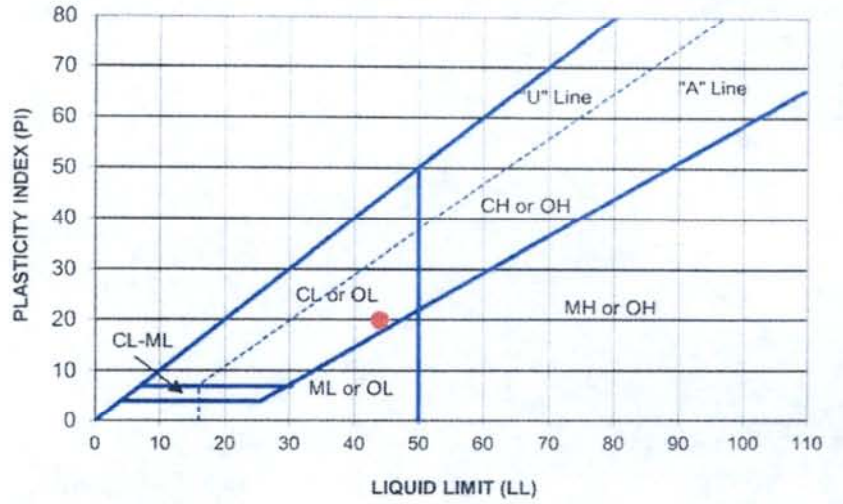
VISUAL CLASSIFICATION	Red and Tan Clayey Sand / Sandy Lean Clay with Extremely Weathered Sandstone Fragments and Chert

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



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Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

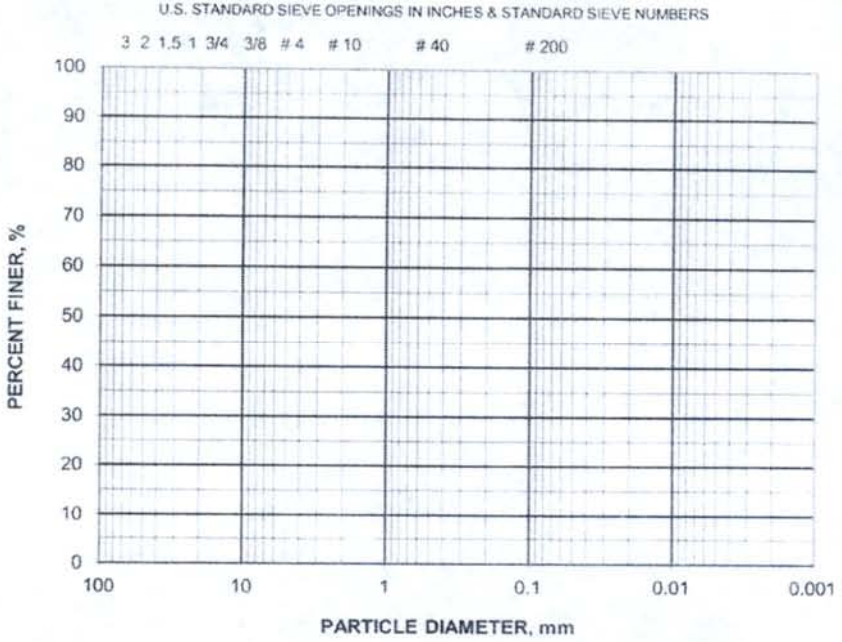
BORING NO.	B-2
SAMPLE NO.	S-5
DEPTH (FT)	7-8.5
PLASTIC LIMIT	38
LIQUID LIMIT	93
PLASTICITY INDEX	55

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

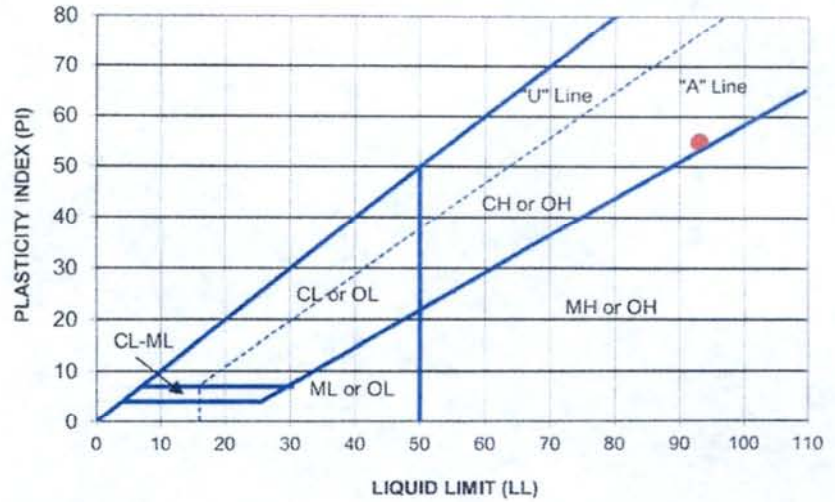
VISUAL CLASSIFICATION	Light Gray, Red and Orangish Tan Fat Clay with Sand

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



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Van Buren, Arkansas
Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

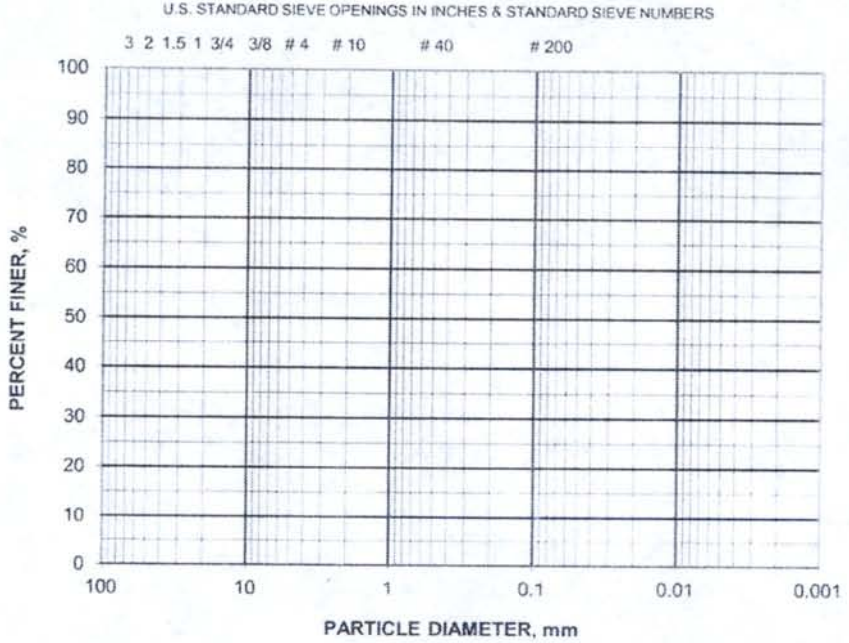
BORING NO.	B-2
SAMPLE NO.	S-6
DEPTH (FT)	9.5-11
PLASTIC LIMIT	23
LIQUID LIMIT	64
PLASTICITY INDEX	41

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

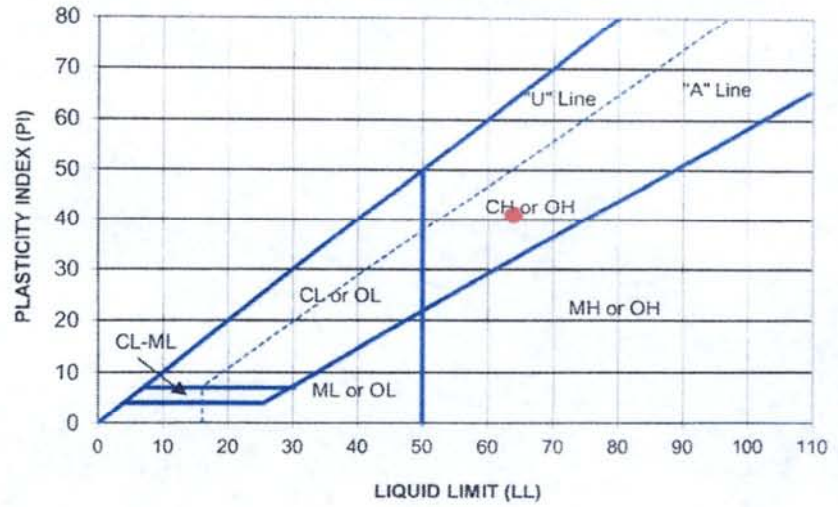
VISUAL CLASSIFICATION	Light Gray, Red and Orangish Tan Sandy Fat Clay

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



GTS, Inc.
Geotechnical & Testing Services

1915 N. Shiloh Dr. Suite 1
Fayetteville, Arkansas 72704
Office: (479) 521-7645
Fax: (479) 521-6232

Office Locations
Fayetteville, Arkansas
Van Buren, Arkansas
Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

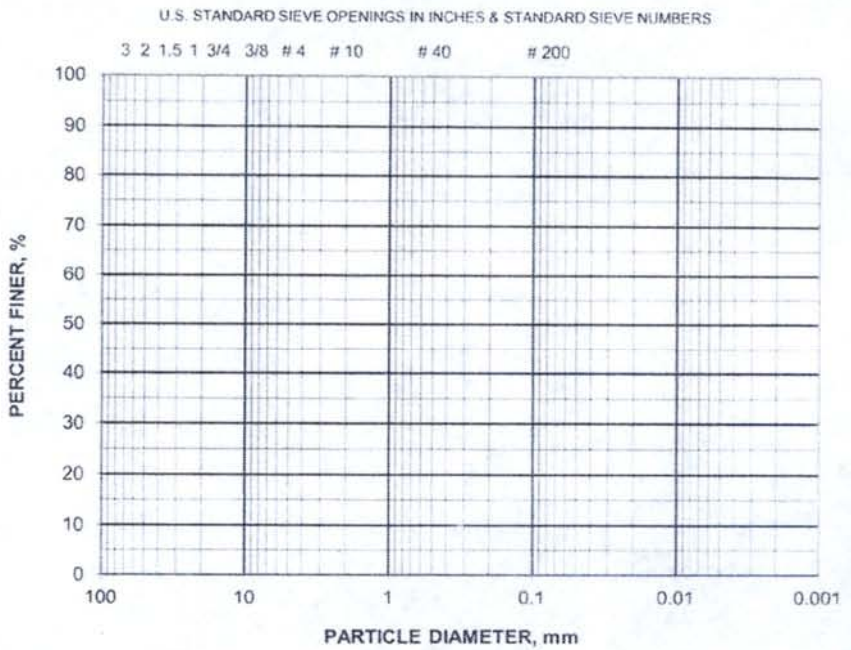
BORING NO.	B-3
SAMPLE NO.	S-5
DEPTH (FT)	7-8.5
PLASTIC LIMIT	36
LIQUID LIMIT	58
PLASTICITY INDEX	22

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

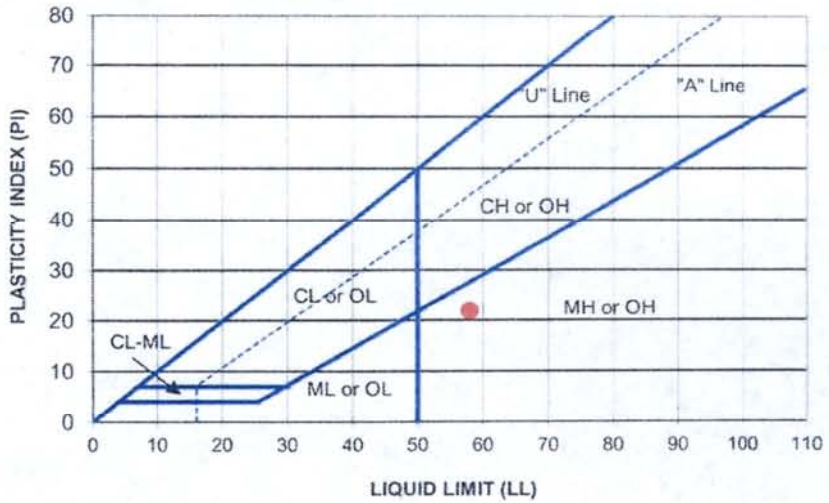
VISUAL CLASSIFICATION	Light Gray, Brown and Orangish Tan, Blocky, Fat Clay with Sand

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



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1915 N. Shiloh Dr. Suite 1
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Office: (479) 521-7645
Fax: (479) 521-6232

Office Locations
Fayetteville, Arkansas
Van Buren, Arkansas
Tulsa, Oklahoma

PROJECT Proposed Pond and Building Pads

JOB NO. 12-15049 **DATE** 5/22/2012

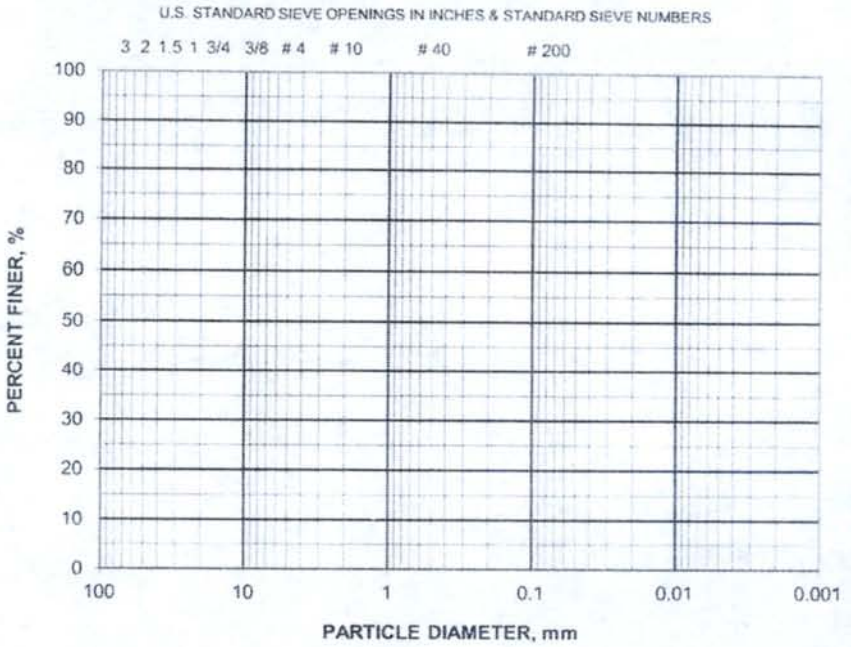
BORING NO.	B-3
SAMPLE NO.	S-6
DEPTH (FT)	9.5-11
PLASTIC LIMIT	44
LIQUID LIMIT	81
PLASTICITY INDEX	37

SIEVE SIZE	PERCENT PASSING
3.00"	N/A
1.50"	N/A
1.00"	N/A
3/4"	N/A
3/8"	N/A
No. 4	N/A
No. 10	N/A
No. 40	N/A
No. 200	N/A

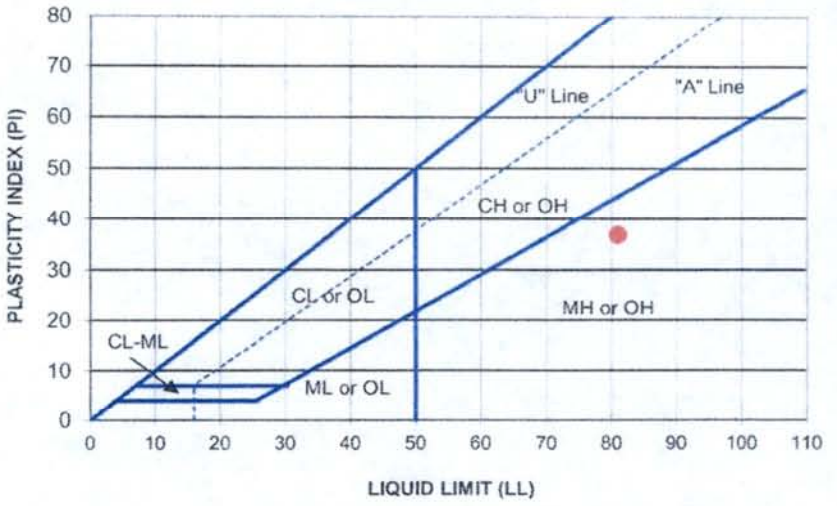
VISUAL CLASSIFICATION	Brown and Tan Clayey Gravel with Sand and Chert Fragments

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
N/A	N/A	N/A

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



C & H HOG FARMS
GESTATION-FARROWING FARM

ENGINEERING PLAN SHEETS

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, ARKANSAS

DATE: JUNE 1, 2012

SHEET INDEX

GENERAL NOTES

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
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www.dgaengineering.com

C & H HOG FARMS
GESTATION-FARROWING FARM

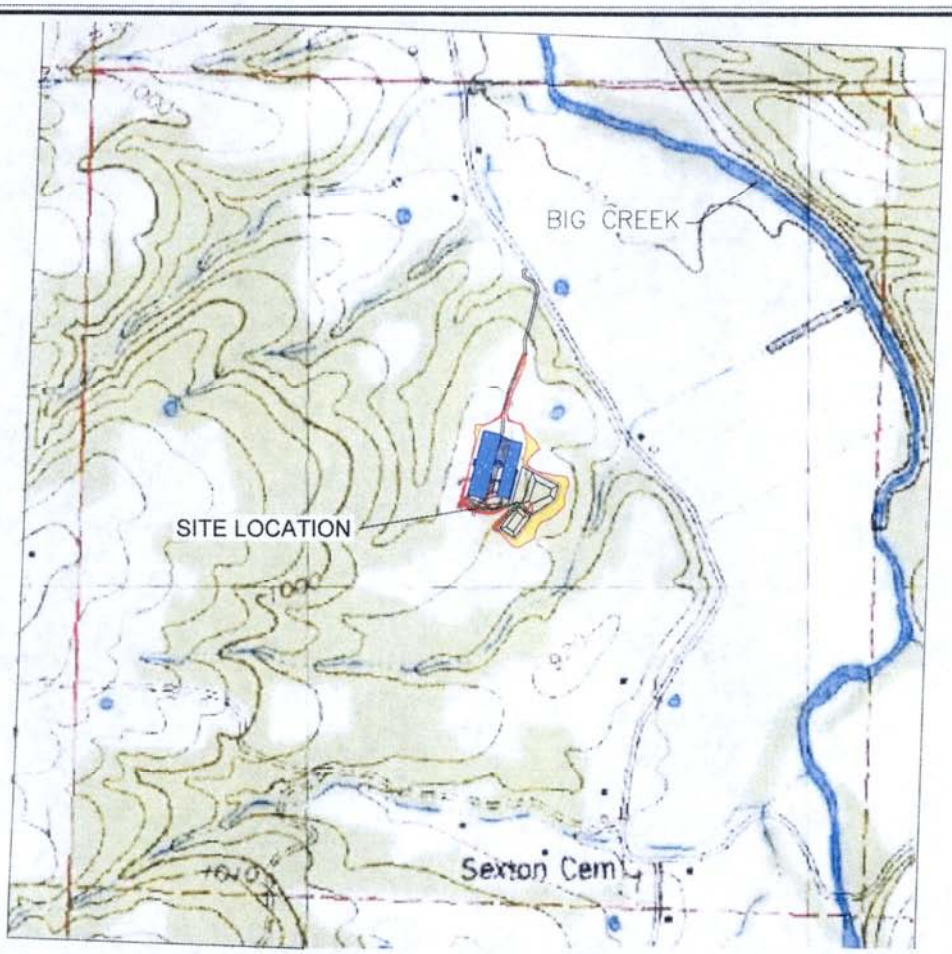
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

COVER SHEET

DATE: JUN 1, 2012	SHEET: COVER
SCALE: NONE	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/DWG/NEWTON/OFILES/PLAN

Construction Plans
for
Waste Management
System



GENERAL NOTES

N

SCALE, FEET
0 500 1000 1500 2000

No.	Revision/Issue	Date

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Consulting Engineers
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C&H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

USGS MAP

DATE: MAY 22, 2012	SHEET: 1
SCALE: 1" = 1000'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME:

COUNTY ROAD 41
DRAW
LOGGING ROAD
DRAW
APPROXIMATE MIDDLE OF SECTION 26
APPROXIMATE PROPERTY BOUNDARY
TBM1
TBM2
TBM3
TBM4
Benchmarks
TBM # | Northing | Easting | Elevation | Description
1 | 580,264.50 | 994,267.97 | 925.68 | Elevation
2 | 580,715.06 | 994,563.20 | 915.64 | Elevation
3 | 580,375.60 | 994,600.06 | 914.71 | Elevation
4 | 580,090.02 | 994,770.77 | 888.80 | Elevation
GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
DRAINAGE ARROW
SCALE, FEET
0 100 200 300 400
No. | Revision/Issue | Date
DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 332, Mandan, ND 58554
(701) 663-7116, FAX (701) 667-1366
www.dgoengineering.com
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR
EXISTING SITE PLAN
DATE: APR 30, 2012
SCALE: 1" = 200'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 2

GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
DRAINAGE ARROW
SCALE, FEET
0 75 150 225 300
No. Revision/Issue Date
DeHaan, Grabs & Associates, LLC
Consulting Engineers
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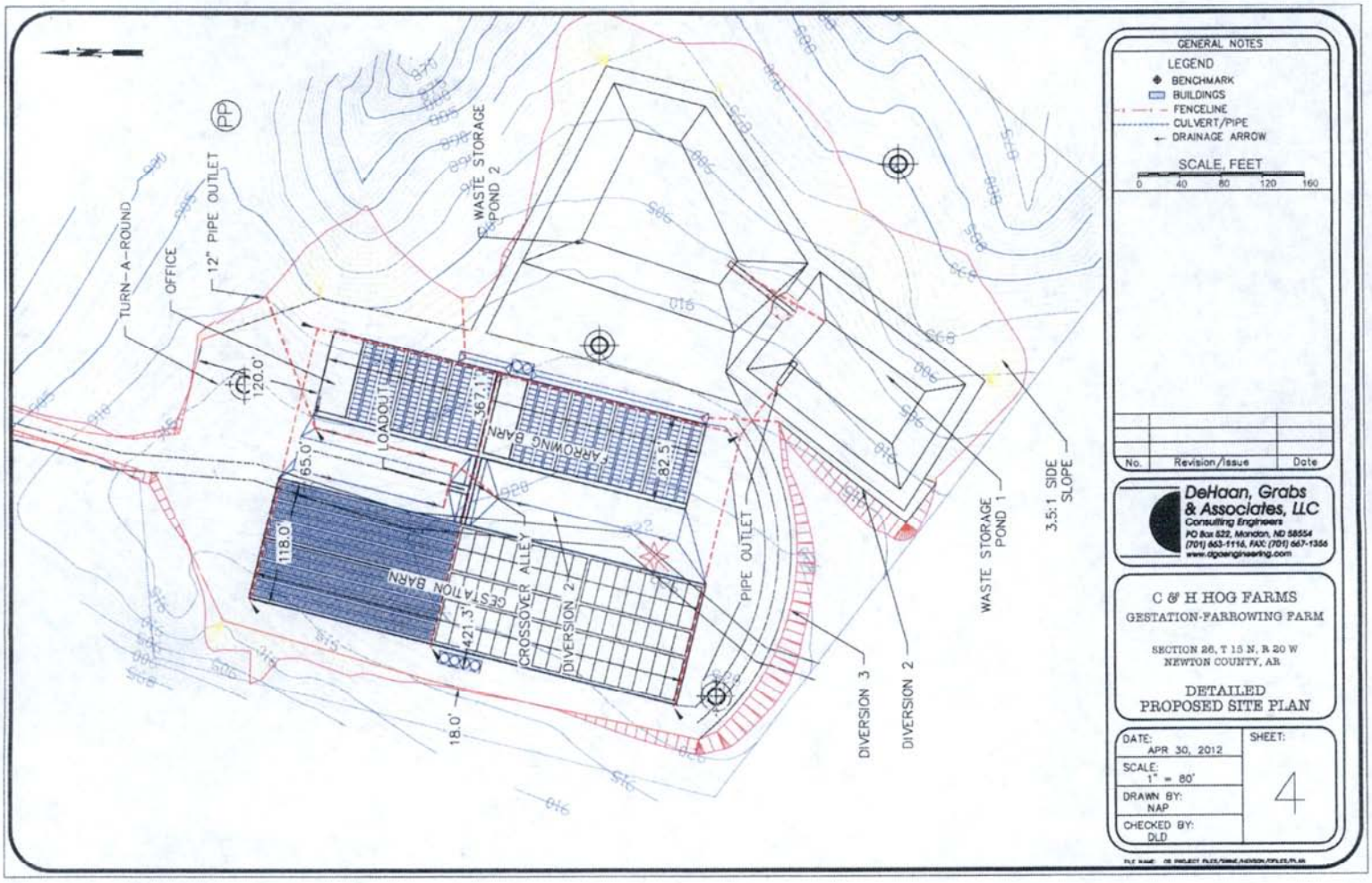
www.dgaengineering.com
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 16 N, R 20 W
NEWTON COUNTY, AR
PROPOSED SITE PLAN
DATE: APR 30, 2012
SCALE: 1" = 150'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 3
Benchmarks
TBM # Northing Easting Elevation Description
1 580,264.50 994,267.97 925.68 Elevation
2 580,715.06 994,563.20 915.64 Elevation
3 580,375.60 994,600.08 914.71 Elevation
4 580,090.02 994,770.77 889.80 Elevation
TBM1
TBM2
TBM3
TBM4
FARROWING BARN
GESTATION BARN
WASTE STORAGE POND 1
WASTE STORAGE POND 2
APPROXIMATE PROPERTY BOUNDARY


TURN-A-ROUND
OFFICE
12" PIPE OUTLET
WASTE STORAGE POND 2
120.0'
65.0'
LOADOUT
367.1'
FARROWING BARN
82.5'
118.0'
GESTATION BARN
421.3'
CROSSOVER ALLEY
DIVERSION 2
18.0'
PIPE OUTLET
DIVERSION 3
DIVERSION 2
WASTE STORAGE POND 1
3.5:1 SIDE SLOPE
GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
DRAINAGE ARROW
SCALE, FEET
0 40 80 120 160
No. Revision/Issue Date
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Consulting Engineers
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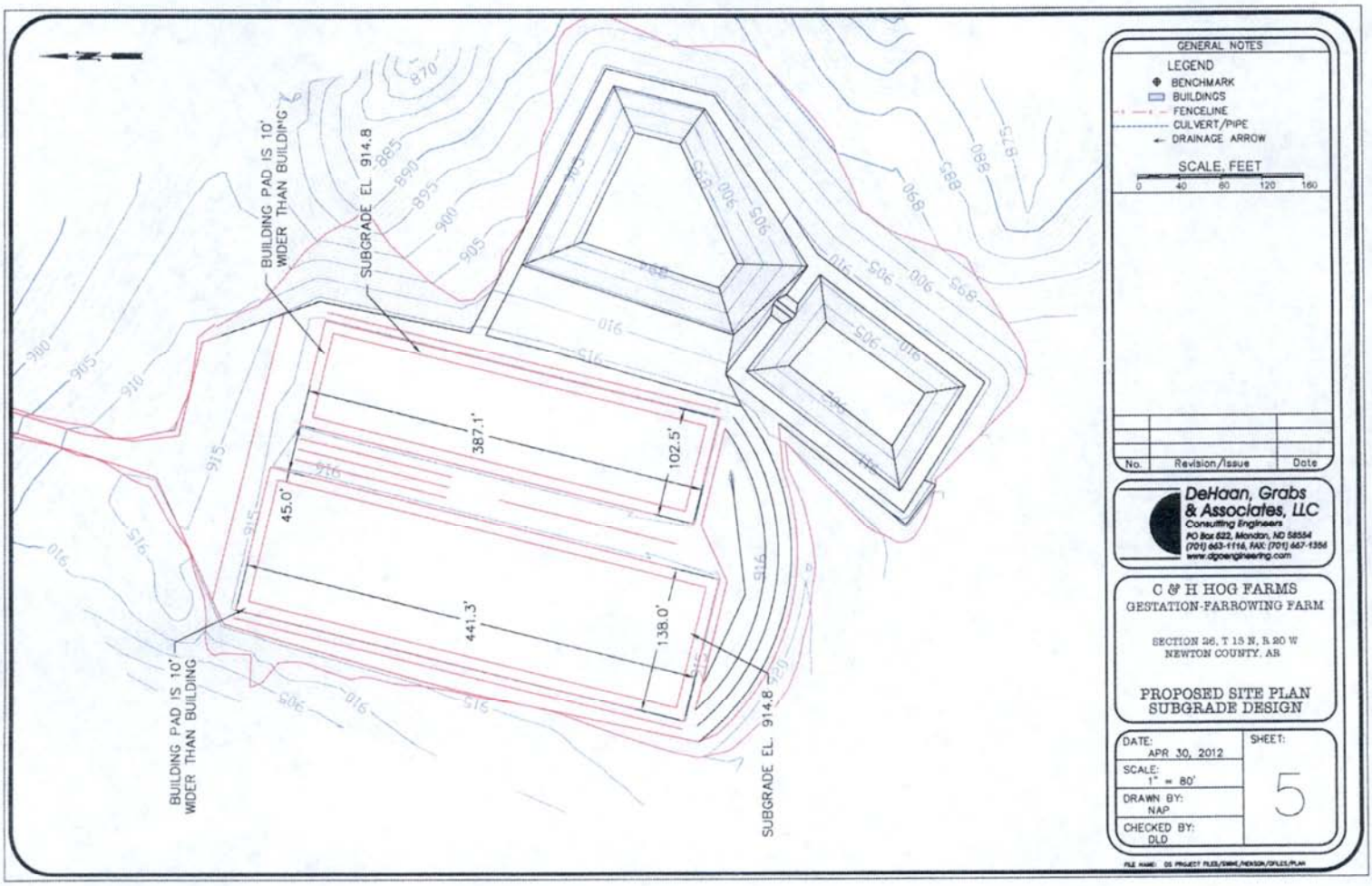
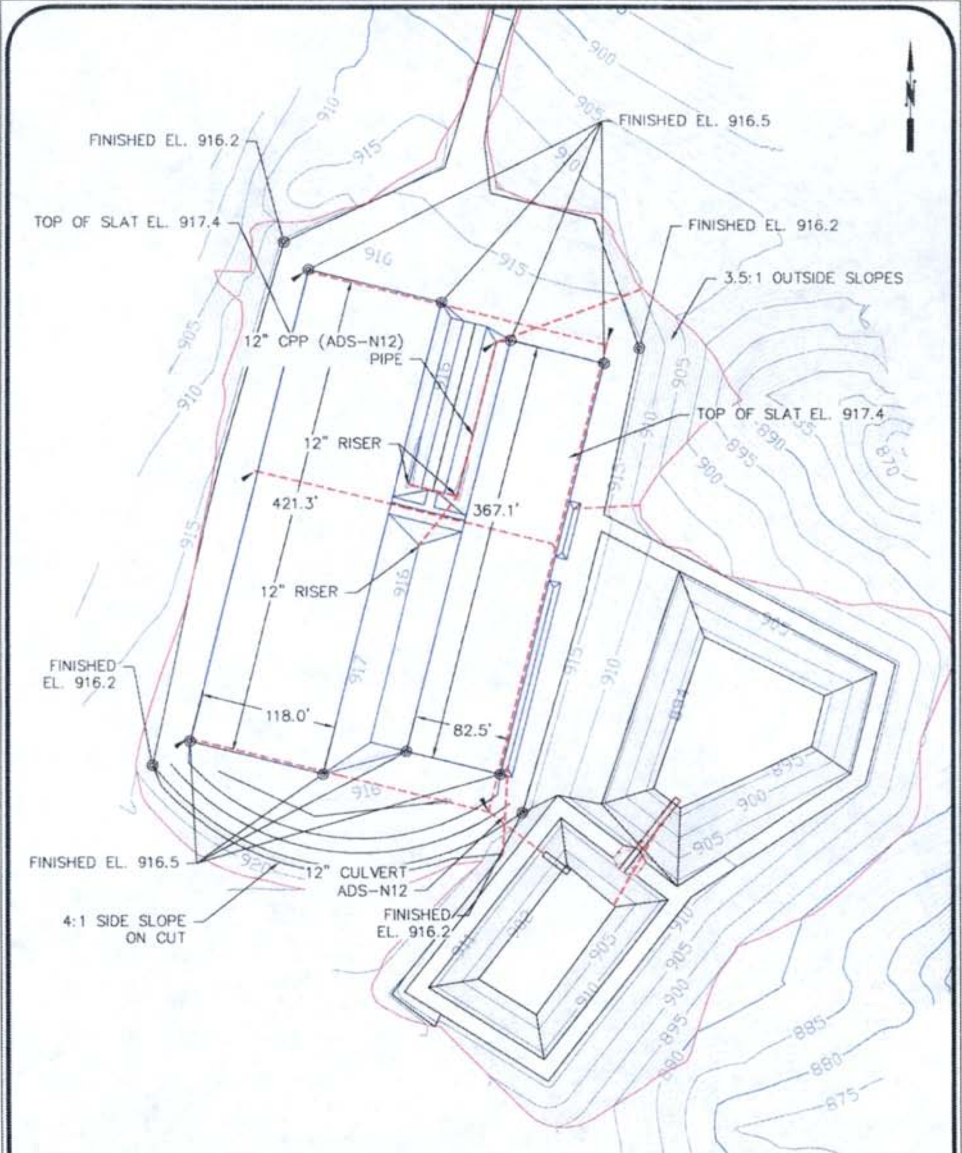
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR
DETAILED
PROPOSED SITE PLAN
DATE: APR 30, 2012
SCALE: 1" = 80'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 4


BUILDING PAD IS 10' WIDER THAN BUILDING
SUBGRADE EL. 914.8
387.1'
102.5'
45.0'
441.3'
138.0'
BUILDING PAD IS 10' WIDER THAN BUILDING
SUBGRADE EL. 914.8
GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
DRAINAGE ARROW
SCALE, FEET
0 40 80 120 160
No. Revision/Issue Date
DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 822, Mandan, ND 58554
(701) 663-1116, FAX (701) 667-1356
www.dgoengineering.com
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR
PROPOSED SITE PLAN
SUBGRADE DESIGN
DATE: APR 30, 2012
SCALE: 1" = 80'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 5



NOTE: ELEVATIONS ARE FINISHED GRADE
NOT INCLUDING 9" OF ROCK AND GRAVEL FILL

GENERAL NOTES

LEGEND
- BENCHMARK
- BUILDINGS
- FENCELINE
- CULVERT/PIPE
- DRAINAGE ARROW

SCALE, FEET
0 40 80 120 160

No.	Revision/Issue	Date

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C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

PROPOSED SITE PLAN
FINAL DESIGN

DATE: APR 30, 2012
SCALE: 1" = 80'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 6

3.5:1 SIDE SLOPE
3:1 SIDE SLOPE
14" TOP EL. 905.8
14" TOP EL. 905.8
8" CPP ADS-N12 EL. 916.0
21.5'
18.0'
115.4'
BOTTOM EL. 893.1
138.2'
5' WIDE SPLASHPAD & RAMP
28.4'
OVERFLOW SPILLWAY 5' WIDE, EL. 909.9
15" PIPE & RISER
EL. 900.8
14" TOP EL. 911.5
3:1 SIDE SLOPE
3.5:1 SIDE SLOPE
12" CULVERT ADS-N12
CONCRETE SPLASHPAD
EL. 901.8
55.1'
OUTLET EL. 910.1
124.0'
115.9'
EL. 901.8
58.2'
CLEANWATER DIVERSION
EL. 915.4
EL. 912.9
CLEANWATER DIVERSION
4:1 SIDE SLOPE
EL. 901.8
GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
DRAINAGE ARROW
SCALE, FEET
0 25 50 75 100
No. Revision/Issue Date
DeHaan, Grabs & Associates, LLC
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PO Box 832, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
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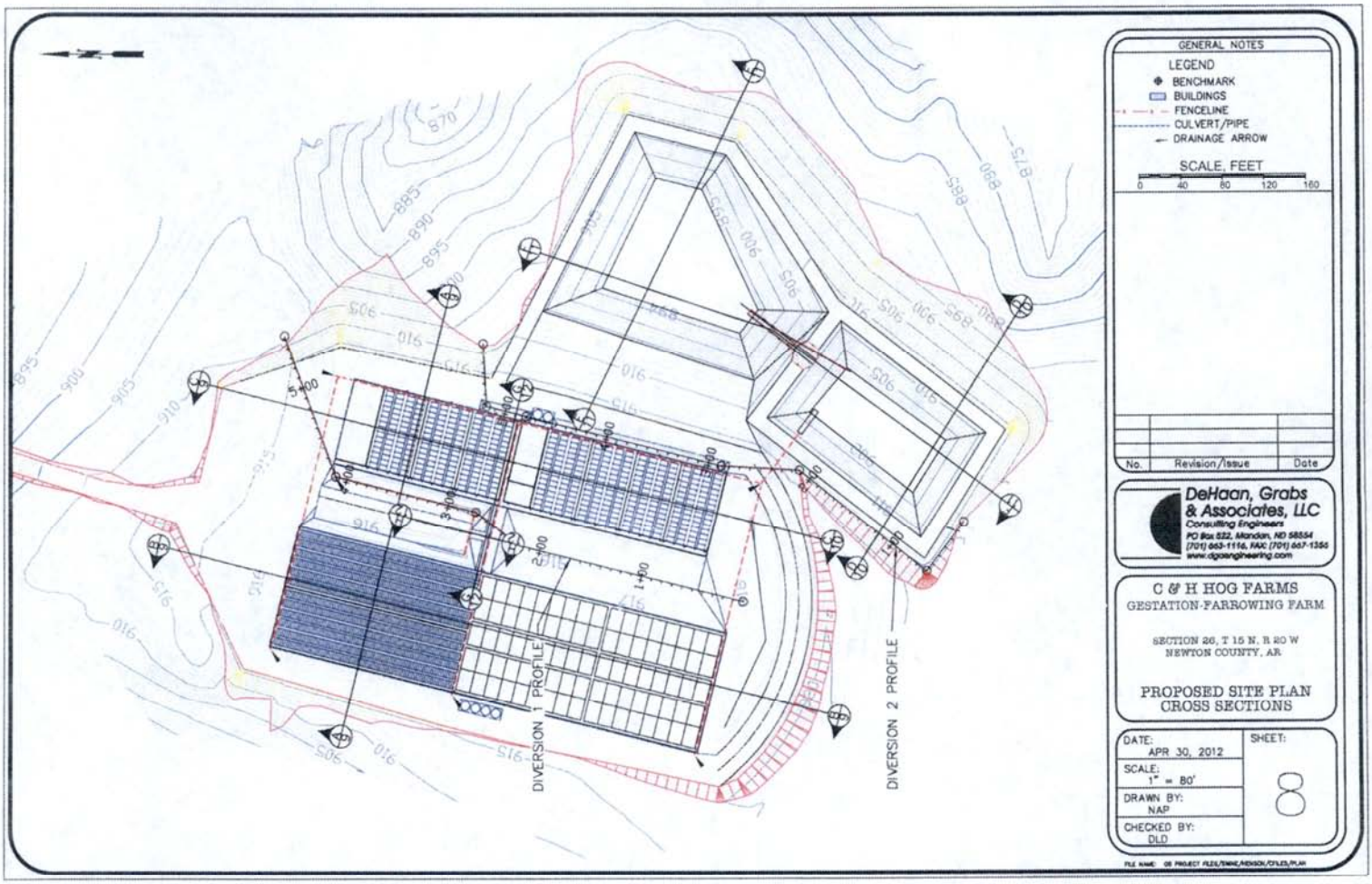
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 18 N, R 20 W
NEWTON COUNTY, AR
WASTE STORAGE POND
FINAL DESIGN
DATE: APR 30, 2012
SCALE: 1" = 50'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 7



GENERAL NOTES

LEGEND

- BENCHMARK
- BUILDINGS
- FENCELINE
- CULVERT/PIPE
- DRAINAGE ARROW

SCALE, FEET

0 40 80 120 160

No.	Revision/Issue	Date

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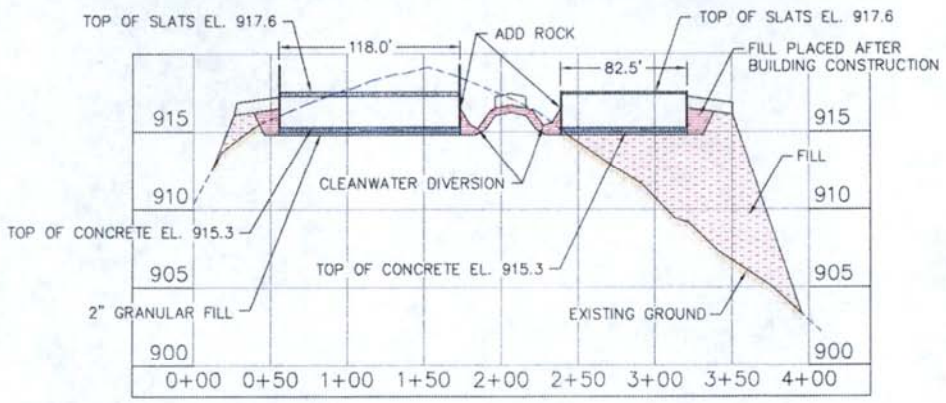
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

PROPOSED SITE PLAN
CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 8
SCALE: 1" = 80'	
DRAWN BY: NAP	
CHECKED BY: DLD	

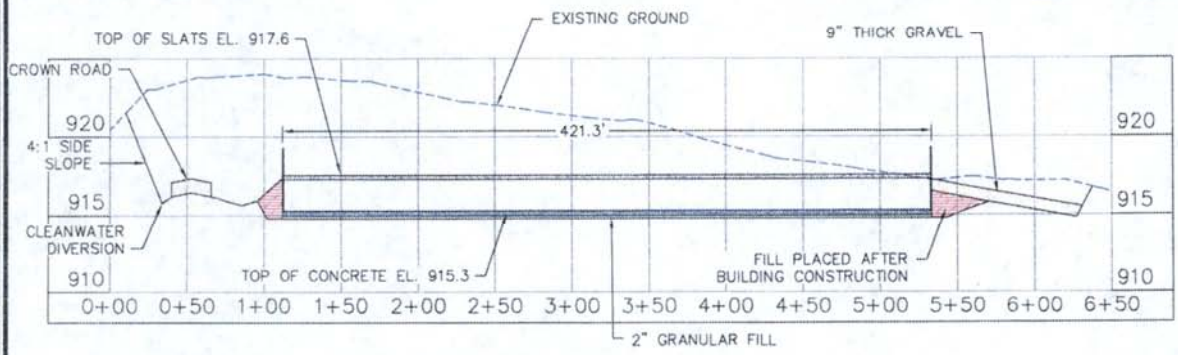
FILE NAME: G:\PROJECT FILES\TWINE\REVISION\CFILES\PLAN



A-A / 8 BARN CROSS SECTION

SCALE:
VERTICAL: 1"=6'
HORIZONTAL: 1"=60'

VERTICAL SCALE, FEET
0 3 6 9 12
HORIZONTAL SCALE, FEET
0 30 60 90 120



B-B / 8 BARN CROSS SECTION

GENERAL NOTES
GRAVEL
FILL
CONCRETE
STRIPPING
EXISTING GROUND

No.	Revision/Issue	Date

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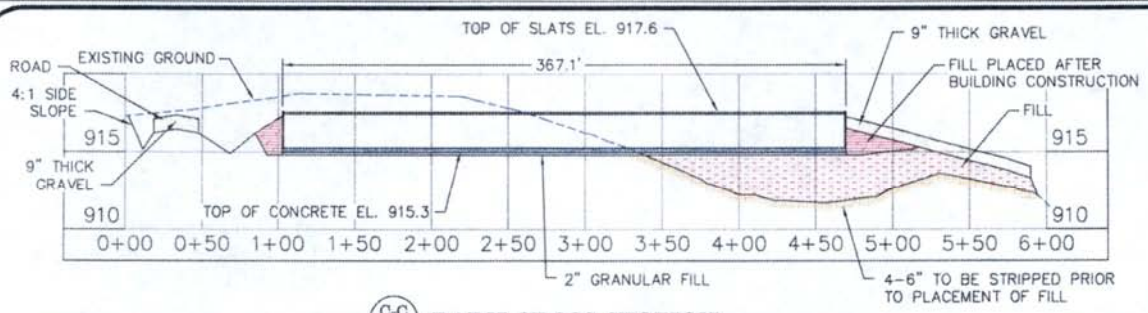
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

BARN CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 9
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

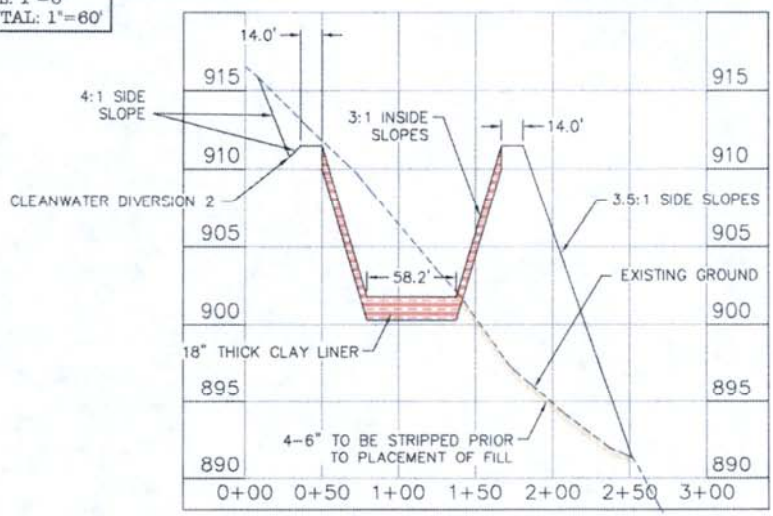
FILE NAME: 08 PROJECT FILES/BARNS/NEWTON/OFFICE/PLAN



C-C / 8 BARN CROSS SECTION

SCALE:
VERTICAL: 1"=6'
HORIZONTAL: 1"=60'

VERTICAL SCALE, FEET
0 3 6 9 12
HORIZONTAL SCALE, FEET
0 30 60 90 120



D-D / 8 WASTE STORAGE POND 1 CROSS SECTION

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

No.	Revision/Issue	Date

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Consulting Engineers
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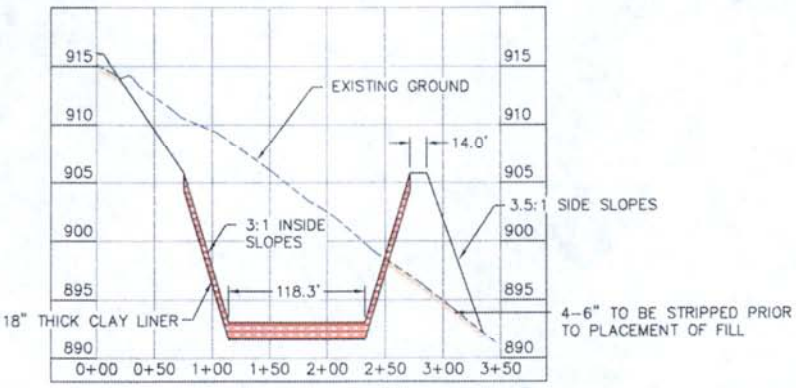
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND & BARN CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 10
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

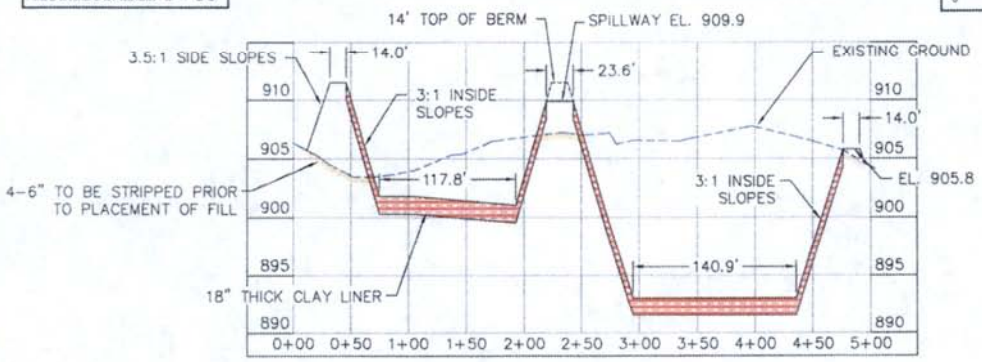
FILE NAME: 06 PROJECT FILES\BARN_NEWTON\CFILES\PLAN



E-E / 8 WASTE STORAGE POND 2 CROSS SECTION

SCALE:
VERTICAL: 1"=8'
HORIZONTAL: 1"=80'

VERTICAL SCALE, FEET
0 4 8 12 16
HORIZONTAL SCALE, FEET
0 40 80 120 160



F-F / 8 WASTE STORAGE POND 1 & 2 CROSS SECTION

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

No.	Revision/Issue	Date

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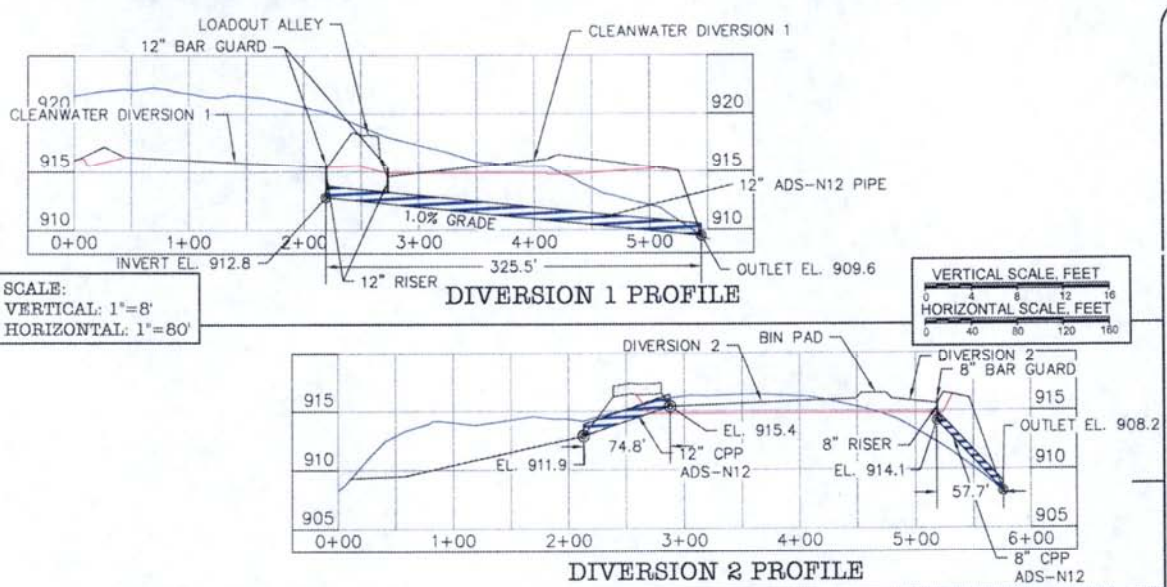
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 11
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/SWINE/NEWTON/DFILES/PLAN

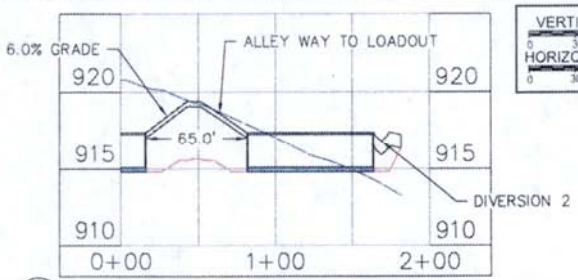


DIVERSION 1 PROFILE

SCALE:
VERTICAL: 1"=8'
HORIZONTAL: 1"=80'

VERTICAL SCALE, FEET
0 4 8 12 16
HORIZONTAL SCALE, FEET
0 40 80 120 160

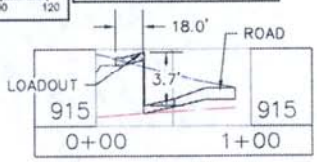
DIVERSION 2 PROFILE



G-G / 8 LOADOUT HALLWAY CROSS SECTION

VERTICAL SCALE, FEET
0 3 6 9 12
HORIZONTAL SCALE, FEET
0 30 60 90 120

SCALE:
VERTICAL: 1"=6'
HORIZONTAL: 1"=60'



H-H / 8 LOADOUT CROSS SECTION

GENERAL NOTES
GRAVEL
FILL
CONCRETE
STRIPPING
EXISTING GROUND

No.	Revision/Issue	Date

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Consulting Engineers
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(701) 663-1116, FAX: (701) 667-1356
www.dgaengineering.com

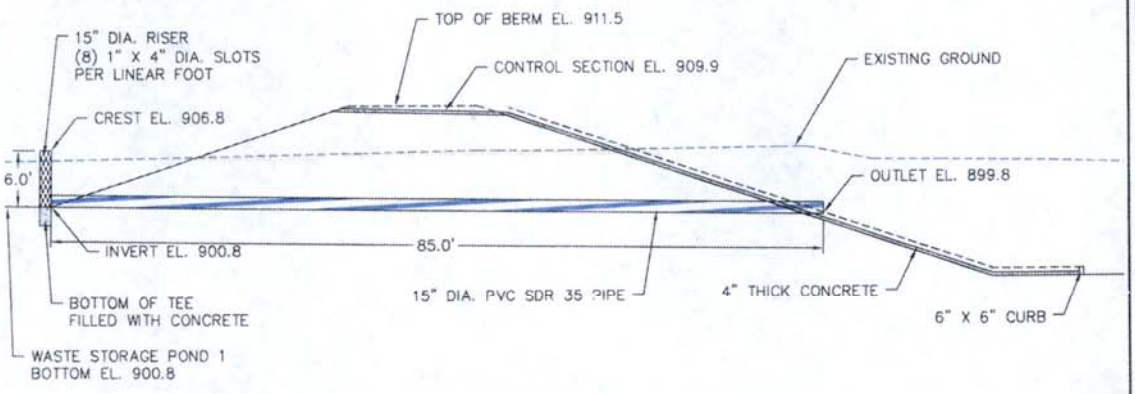
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

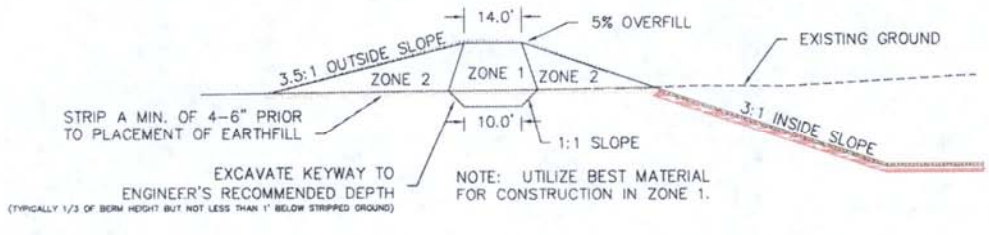
DIVERSION & LOADOUT
CROSS SECTIONS & PROFILES

DATE: APR 30, 2012	SHEET: 12
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: O:\PROJECT FILES\SWINE\NEWTON\CFILES\PLAN



PIPE INLET DETAILS
SCALE: 1" = 10'



TYPICAL HOLDING POND MAXIMUM BERM DETAIL
NOT TO SCALE

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

No.	Revision/Issue	Date

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Consulting Engineers
PO Box 822, Mandan, ND 58554
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C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

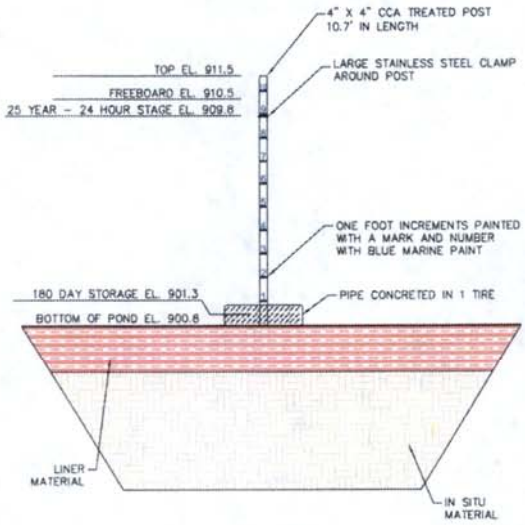
POND INLET & MAXIMUM BERM DETAILS

DATE: APR 30, 2012	SHEET: 13
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: G:\PROJECT FILES\SWINE\NEWTON\STYLES\PLAN

Waste Storage Pond 1 Stage Storage Table

Elevation (ft)	Stage (ft)	Area (ft^2)	Volume (ft^3)	Cum. Volume (ft^3)	Cum. Volume (acre-feet)	
911.5	10.7	20,850	33,002	131,134	3.0	Top
910.5	9.7	19,139	21,770	111,122	2.6	Freeboard
909.8	9.0	17,976	8,780	98,132	2.3	25 Year-24 Hour Stage/Overflow El.
909.3	8.5	17,144	8,376	89,352	2.1	
908.8	8.0	16,360	7,980	80,976	1.9	
908.3	7.5	15,560	7,593	72,996	1.7	
907.8	7.0	14,812	7,217	65,403	1.5	
907.3	6.5	14,056	6,847	58,186	1.3	
906.8	6.0	13,332	6,488	51,339	1.2	
906.3	5.5	12,620	6,138	44,851	1.0	
905.8	5.0	11,932	5,796	38,713	0.9	
905.3	4.5	11,252	5,463	32,917	0.8	
904.8	4.0	10,600	5,140	27,454	0.6	
904.3	3.5	9,960	4,826	22,314	0.5	
903.8	3.0	9,344	4,520	17,488	0.4	
903.3	2.5	8,736	4,224	12,968	0.3	
902.8	2.0	8,160	3,937	8,744	0.2	
902.3	1.5	7,588	3,658	4,807	0.1	
901.8	1.0	7,044	1,005	1,149	0.0	
901.3	0.5	576	144	144	0.0	Sludge El.
900.8	0.0	0	0	0	0.0	Bottom



WASTE STORAGE POND 1

GENERAL NOTES

INSITU MATERIAL

CLAY LINER

SCALE, FEET

0 2 4 6 8

No.	Revision/Issue	Date

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C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 18 N, R 20 W
NEWTON COUNTY, AR

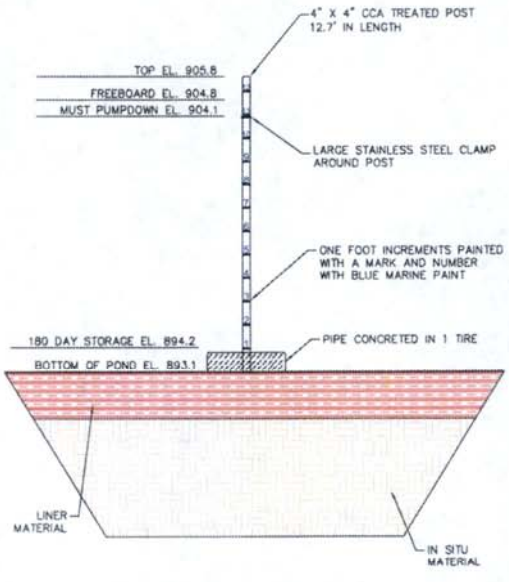
WASTE STORAGE POND 1
STAGE STORAGE TABLE

DATE: MAY 30, 2012	SHEET: 14
SCALE: 1" = 4'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/DWG/REVISION/STAGE/PLAN

Waste Storage Pond 2 Stage Storage Table

Elevation (ft)	Stage (ft)	Area (ft^2)	Volume (ft^3)	Cum. Volume (ft^3)	Cum. Volume (acre-feet)	
905.8	12.7	36,259	56,719	288,788	6.6	**Top**
904.8	11.7	32,994	34,994	254,643	5.8	**Freeboard**
904.1	11.0	31,469	12,420	232,069	5.3	**25 Year-24 Hour Stage/Must Pumpdown**
903.7	10.6	30,631	15,045	219,649	5.0	
903.2	10.1	29,549	14,521	204,604	4.7	
902.7	9.6	28,535	14,005	190,083	4.4	
902.2	9.1	27,486	13,499	176,078	4.0	
901.7	8.6	26,511	13,003	162,579	3.7	
901.2	8.1	25,501	12,516	149,576	3.4	
900.7	7.6	24,563	12,039	137,060	3.1	
900.2	7.1	23,593	11,571	125,021	2.9	
899.7	6.6	22,691	11,114	113,450	2.6	
899.2	6.1	21,765	10,664	102,336	2.3	
898.7	5.6	20,891	10,226	91,672	2.1	
898.2	5.1	20,013	9,796	81,446	1.9	
897.7	4.6	19,171	9,376	71,650	1.6	
897.2	4.1	18,333	8,966	62,274	1.4	
896.7	3.6	17,531	8,566	53,308	1.2	
896.2	3.1	16,733	8,174	44,742	1.0	
895.7	2.6	15,963	7,792	36,568	0.8	
895.2	2.1	15,205	7,420	28,776	0.7	
894.7	1.6	14,475	4,278	21,356	0.5	
894.2	1.1	13,759	9,484	17,078	0.4	**180 Day Stage**
893.7	0.6	13,063	7,594	7,594	0.2	
893.1	0.0	12,252	0	0	0.0	**Bottom**



WASTE STORAGE POND 2

GENERAL NOTES

INSITU MATERIAL

CLAY LINER

SCALE, FEET

0 2 4 6 8

No.	Revision/Issue	Date

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GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND 2
STAGE STORAGE TABLE

DATE: MAY 30, 2012	SHEET: 15
SCALE: 1" = 4'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/ERIK/HOYSON/FILES/PLAN

OUTLET EL. 909.6
8" SEWER PIPE EL. 912.47
8" CPP
OUTLET EL. 908.2
INLET EL. 914.1
INLET EL. 912.2
INLET EL. 912.8
INLET EL. 912.8
12" RISER WITH BAR GUARD
12" RISER WITH BAR GUARD
12" CPP (ADS-N12) PIPE
CLEANOUT LOCATION
8" SEWER PIPE EL. 913.4
8" SEWER PIPE EL. 913.8
FINISHED EL. 916.2
8" SEWER PIPE EL. 913.1
INLET EL. 915.4
8" SEWER PIPE EL. 910.4
OUTLET EL. 910.1
OUTLET EL. 899.8
15" PIPE AND RISER SDR 35
INLET EL. 900.8
OUTLET EL. 912.9
12" CULVERT ADS-N12
CLEANOUT LOCATION
GENERAL NOTES
LEGEND
BENCHMARK
BUILDINGS
FENCELINE
CULVERT/PIPE
CLEANOUT
SCALE, FEET
0 40 80 120 160
No. Revision/Issue Date
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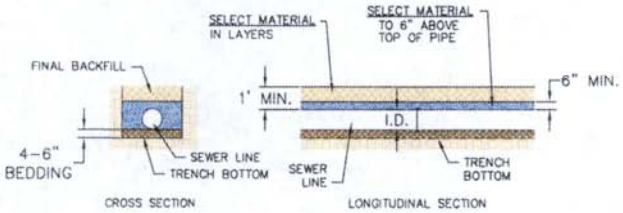
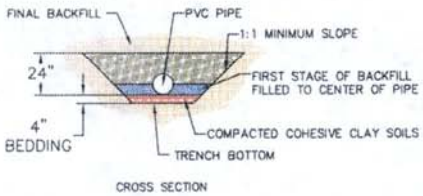
SECTION 26, T 16 N, R 20 W
NEWTON COUNTY, AR
PIPE CLEANOUT LOCATIONS & DETAILS
DATE: APR 30, 2012
SCALE: 1" = 80'
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 16



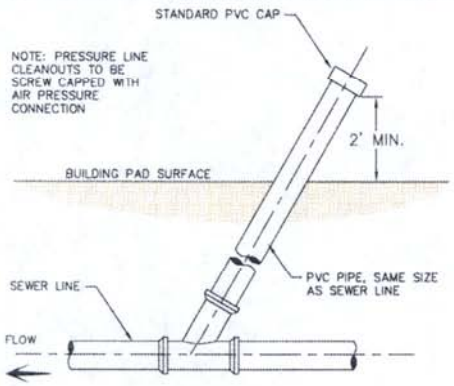
STANDARD BEDDING DETAILS FOR ADS-N12 PIPE OR EQUIVALENT

NOT TO SCALE



STANDARD BEDDING DETAILS FOR PVC PIPE OR EQUIVALENT PLACED THROUGH BERM

NOT TO SCALE



TYPICAL CLEANOUT DETAIL

NOT TO SCALE

ADS DUAL WALL TRENCHING & PIPELINE CONSTRUCTION NOTES

1. Select backfill shall consist of granular soil which meets the USCS soil type GM, GC, SM, or SC. Material shall have a maximum particle size of ½ inch diameter and shall be compacted in 6 inch layers (ma.) to a density not less than 85% of the Standard Proctor Density.

2. Unclassified backfill shall consist of excavated material, provided it is free from lumps of clay, stone, boulders and other debris. Material shall be wetted and compacted with available rubber tired construction equipment until approved by the Engineer.

3. In location where the trench bottom contains rocks or is unsuitable for pipe to rest on, as determined by the engineer, the pipe shall be bedded as shown.

4. In locations where the proposed pipelines cross existing utilities, the utility crossing details shall be determined in the field by the Engineer. Prior to trench excavation, existing utilities shall be located and exposed by the Contractor.

5. Select backfill shall be placed under the haunches of all pipe using the shovel slicing method or other method, approved by the Engineer.

6. All trenching excavation shall be braced and/or shored in accordance with OSHA Trench Safety Regulations.

GENERAL NOTES

No.	Revision/Issue	Date

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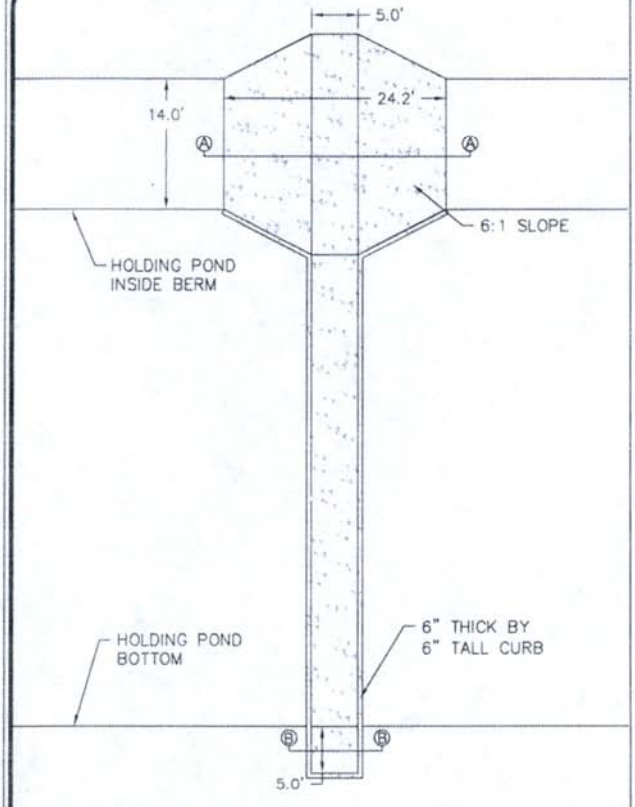
NEWTON COUNTY, AR

CLEANOUT & STANDARD BEDDING DETAIL

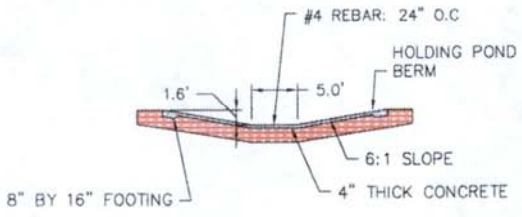
DATE: MAY 30, 2012	SHEET: 17
SCALE: NONE	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/DWNG/REVISION/FIGURES/PLAN



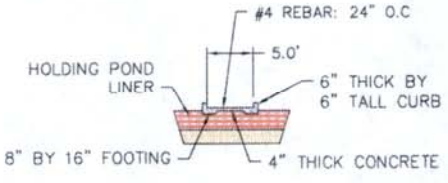
SPILLWAY PLAN VIEW

SCALE 1" = 10'



SECTION (A-A)

SCALE 1" = 10'



SECTION (B-B)

SCALE 1" = 10'

NOTE: SPLASH PAD FROM BARN WILL BE 5' WIDE WITH 6" X 6" CURB

GENERAL NOTES

No.	Revision/Issue	Date

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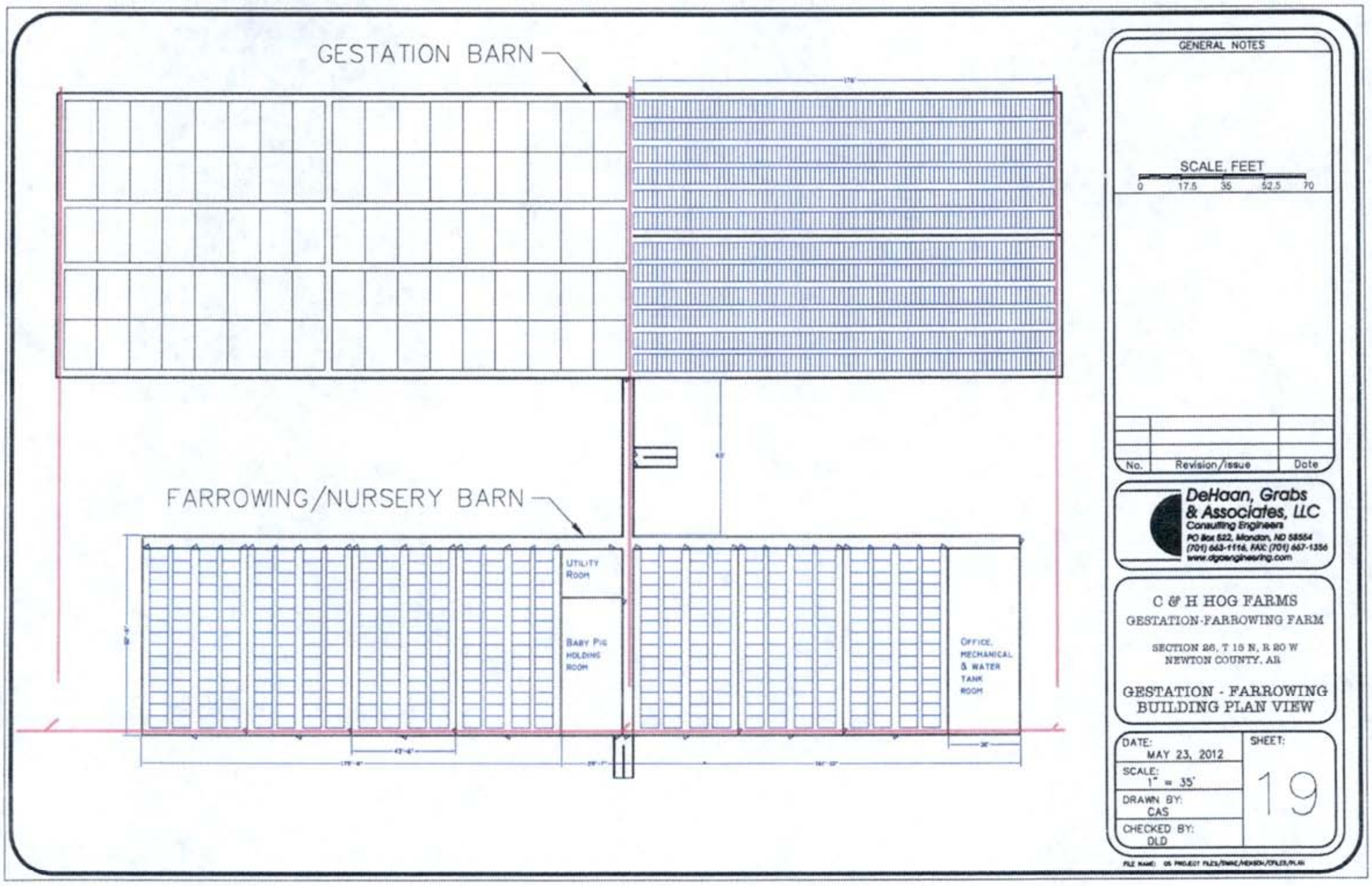
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

SPILLWAY/SPLASHPAD
PLAN VIEW & DETAIL

DATE: MAY 30, 2012	SHEET: 18
SCALE: NONE	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: 08 PROJECT FILES/SWINE/NEWTON/STYLES/PLAN


GESTATION BARN
FARROWING/NURSERY BARN
UTILITY ROOM
BABY PIG HOLDING ROOM
OFFICE, MECHANICAL & WATER TANK ROOM
GENERAL NOTES
SCALE, FEET
0 17.5 35 52.5 70
No. Revision/issue Date
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Consulting Engineers
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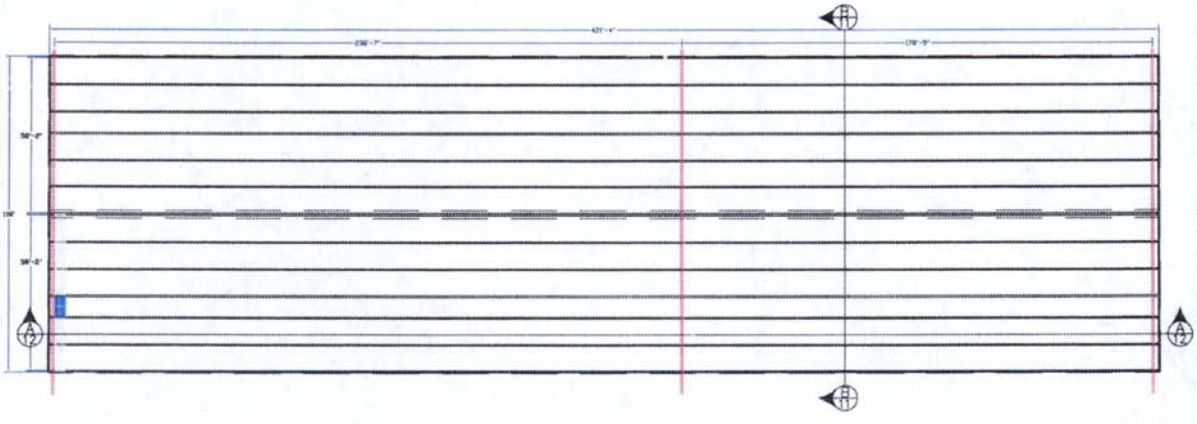
C & H HOG FARMS
GESTATION-FARROWING FARM
SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR
GESTATION - FARROWING
BUILDING PLAN VIEW
DATE: MAY 23, 2012
SCALE: 1" = 35'
DRAWN BY: CAS
CHECKED BY: DLD
SHEET: 19



1. CONCRETE: ***(UNLESS OTHERWISE NOTED)***
   A. CONCRETE WALLS, FLOORS: 4000 PSI MINIMUM 28 DAY STRENGTH
   B. CONCRETE FOOTINGS: 4000 PSI MINIMUM 28 DAY STRENGTH
   C. ALL CONCRETE TO BE AIR ENTRAINED
   D. 3"–4" CONCRETE SLUMP ON HORIZONTAL POURS PRIOR TO ADDITIVES
   E. 5" MAXIMUM CONCRETE SLUMP ON VERTICAL POURS PRIOR TO ADDITIVES
   F. PIT WALL CONCRETE DESIGN BASED OFF OF A 3'–6" BACKFILL DEPTH AGAINST THE 4'–0" PIT WALL
   G. REFER TO ENGINEER SPECIFICATIONS FOR ADDITIONAL CONCRETE CONSTRUCTION REQUIREMENTS

2. REINFORCING STEEL: ***(UNLESS OTHERWISE NOTED)***
   A. ALL REBAR GRADE 60
   B. LAP ALL REINFORCING BAR SPLICES A MIN. OF 40 DIAMETERS
   C. PROVIDE BENT BARS AT ALL CORNERS AND WALL INTERSECTIONS TO MATCH THE HORIZONTAL REINFORCING STEEL. (SEE DETAILS)
   D. EXTERIOR WALL FOOTING: TWO RUNS OF CONTINUOUS #5 HORIZONTAL REBAR
   E. PIT FLOORS : #3 REBAR @ 24" O.C. BOTH WAYS
   F. FOUNDATION WALLS: #3 VERTICAL REBAR @ 24" O.C.
      #3 HORIZONTAL REBAR @ 24" O.C.
   G. PIT WALLS: 2 – #3 HORIZONTAL REBAR
      #3 VERTICAL REBAR @ 24" O.C.

3. COLD JOINTS ***(UNLESS OTHERWISE NOTED)***
   A. WALLS (SEE DETAIL)
   B. PIT SLAB (SEE DETAIL)

4. CONTROL JOINTS ***(UNLESS OTHERWISE NOTED)***
   A. WALLS (SEE DETAIL)
   B. PIT SLAB (SEE DETAIL)

5. MISC. ***(UNLESS OTHERWISE NOTED)***
   A. WATERSTOP TO BE USED ON ALL EXTERIOR PIT SLAB/PIT WALL JOINTS (SEE DETAILS)
   B. FIELD VERIFY LOCATION OF FRESH WATER PIPE KNOCKOUT: R.O. 6" DIA.

GENERAL NOTES

SCALE, FEET
0 17.5 35 52.5 70

No.	Revision/Issue	Date

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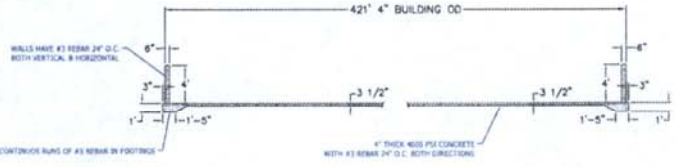
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 28, T 15 N, R 20 W
NEWTON COUNTY, AR

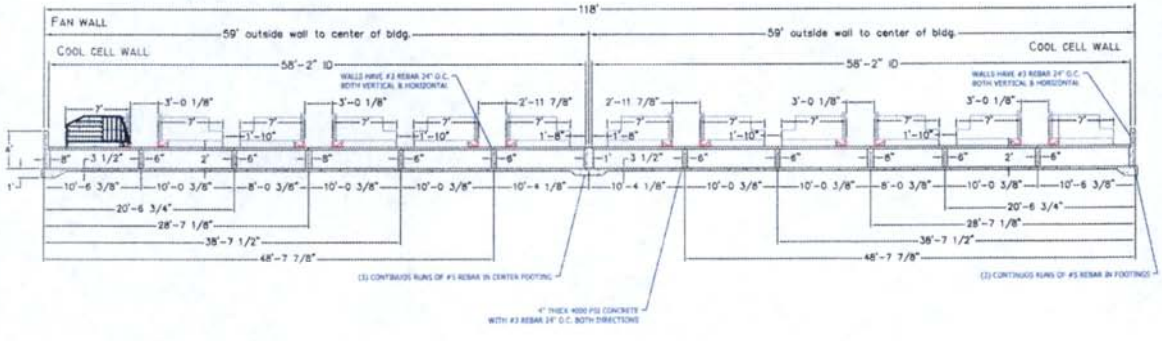
GESTATION
BUILDING PLAN VIEW

DATE: MAY 23, 2012	SHEET: 20
SCALE: 1" = 35'	
DRAWN BY: CAS	
CHECKED BY: OLD	

FILE NAME: G:\ PROJECT FILES\[NAME]\NEWTON\DFILES\PLAN



A-A / 10 GESTATION BARN CROSS SECTION



B-B / 10 GESTATION BARN CROSS SECTION

GENERAL NOTES

SCALE, FEET
0 5 10 15 20

No.	Revision/Issue	Date

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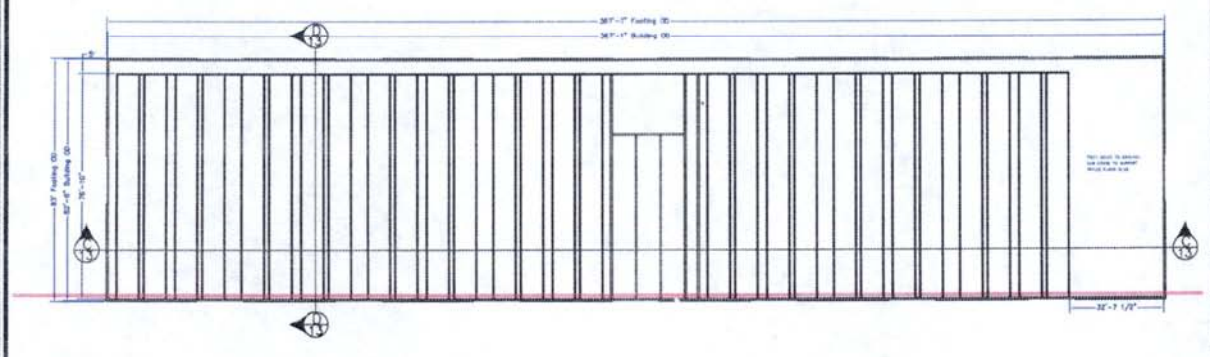
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

GESTATION BUILDING CROSS SECTIONS

DATE: MAY 23, 2012	SHEET: 21
SCALE: 1" = 30'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: I:\05 PROJECT FILES\SWINE\NEWSOW\STYLES\PLAN



1. CONCRETE: ***(UNLESS OTHERWISE NOTED)***
   A. CONCRETE WALLS, FLOORS: 4000 PSI MINIMUM 28 DAY STRENGTH
   B. CONCRETE FOOTINGS: 4000 PSI MINIMUM 28 DAY STRENGTH
   C. ALL CONCRETE TO BE AIR ENTRAINED
   D. 3"-4" CONCRETE SLUMP ON HORIZONTAL POURS PRIOR TO ADDITIVES
   E. 5" MAXIMUM CONCRETE SLUMP ON VERTICAL POURS PRIOR TO ADDITIVES
   F. PIT WALL CONCRETE DESIGN BASED OFF OF A 2'-0" BACKFILL DEPTH AGAINST THE 2'-6" PIT WALL
   G. REFER TO ENGINEER SPECIFICATIONS FOR ADDITIONAL CONCRETE CONSTRUCTION REQUIREMENTS

2. REINFORCING STEEL: ***(UNLESS OTHERWISE NOTED)***
   A. ALL REBAR GRADE 60
   B. LAP ALL REINFORCING BAR SPLICES A MIN. OF 40 DIAMETERS
   C. PROVIDE BENT BARS AT ALL CORNERS AND WALL INTERSECTIONS TO MATCH THE HORIZONTAL REINFORCING STEEL. (SEE DETAILS)
   D. EXTERIOR WALL FOOTING: TWO RUNS OF CONTINUOUS #4 HORIZONTAL REBAR
   E. PIT FLOORS : 6" x 6" #10 WWM
   F. FOUNDATION WALLS: #4 VERTICAL REBAR @ 12" O.C.
      #4 HORIZONTAL REBAR @ 12" O.C.
   G. PIT WALLS: #4 HORIZONTAL REBAR @ 12" O.C.
      #4 VERTICAL REBAR @ 16" O.C.

3. COLD JOINTS ***(UNLESS OTHERWISE NOTED)***
   A. WALLS (SEE DETAIL)
   B. PIT SLAB (SEE DETAIL)

4. CONTROL JOINTS ***(UNLESS OTHERWISE NOTED)***
   A. WALLS (SEE DETAIL)
   B. PIT SLAB (SEE DETAIL)

5. MISC. ***(UNLESS OTHERWISE NOTED)***
   A. WATERSTOP TO BE USED ON ALL EXTERIOR PIT SLAB/PIT WALL JOINTS (SEE DETAILS)
   B. FIELD VERIFY LOCATION OF FRESH WATER PIPE KNOCKOUT: R.O. 6" DIA.

GENERAL NOTES

SCALE, FEET
0 16 32 48 64

No.	Revision/Issue	Date

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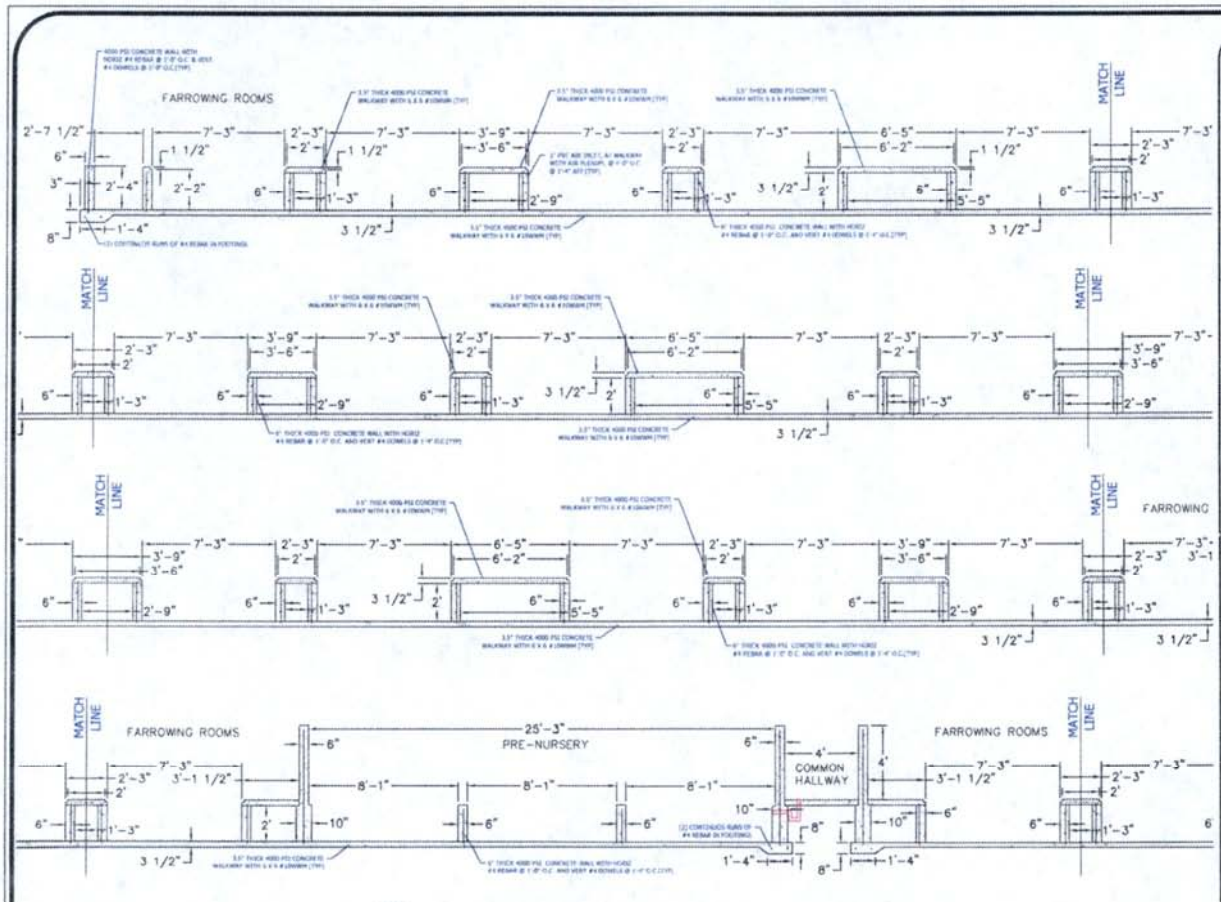
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

FARROWING
BUILDING PLAN VIEW

DATE: MAY 23, 2012	SHEET: 22
SCALE: 1" = 32'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: O:\5 PROJECT FILES\SWINE\NEWTON\SPLES\PLAN



C-C 12 FARROWING/NURSERY CROSS SECTION

GENERAL NOTES

SCALE, FEET
0 2.5 5 7.5 10

No.	Revision/Issue	Date

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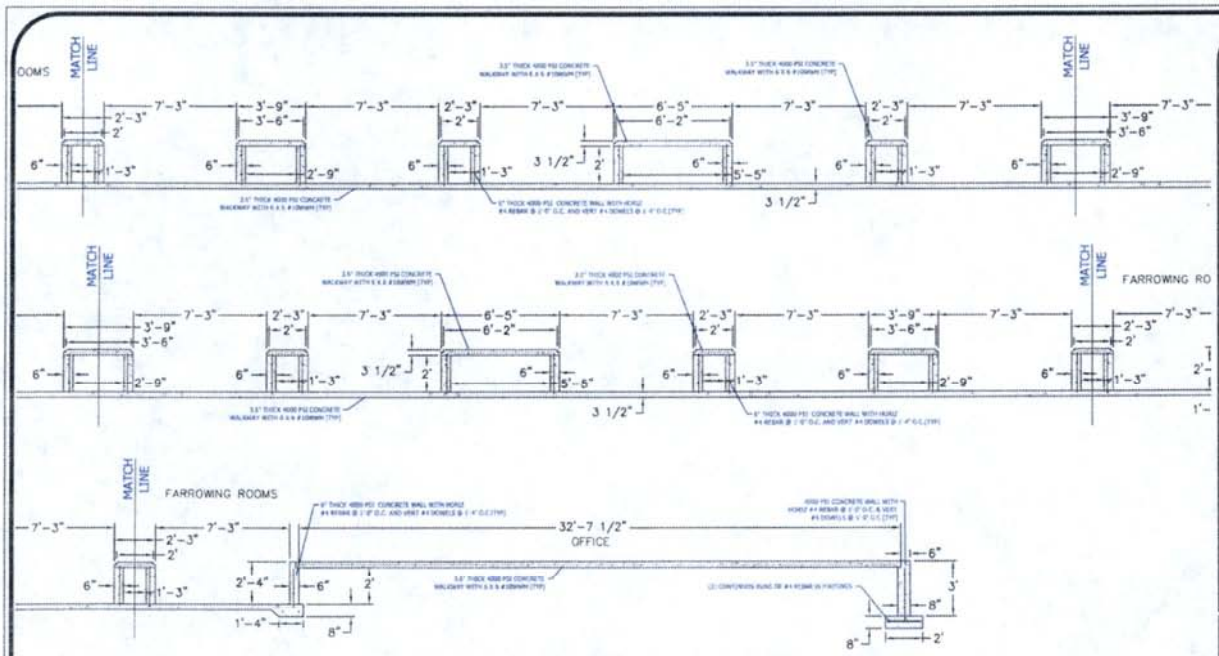
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

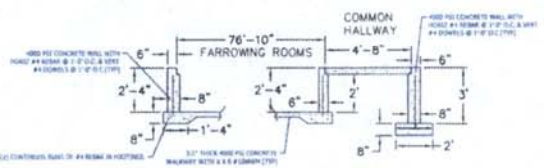
FARROWING BUILDING CROSS SECTIONS 1

DATE: MAY 23, 2012	SHEET: 23
SCALE: 1" = 5'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: 09 PROJECT FILES/SWINE/NEWTON/CFILES/PLAN



C-C / 12 FARROWING/NURSERY CROSS SECTION



D-D / 12 FARROWING/NURSERY CROSS SECTION

GENERAL NOTES

SCALE, FEET
0 2.5 5 7.5 10

No.	Revision/Issue	Date

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C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 18 N, R 20 W
NEWTON COUNTY, AR

FARROWING BUILDING
CROSS SECTIONS 2

DATE: MAY 23, 2012	SHEET: 24
SCALE: 1" = 5'	
DRAWN BY: CAS	
CHECKED BY: DLD	

FILE NAME: G:\PROJECT FILES\TRAVIS\REVISION\DFILES\PLAN

Table of Quantities

Item	Quantity	Unit
Stripping (Includes soil removal, replacement and compaction)		
Stripping Removal	2,460	YD^3
Replacement	1,890	YD^3
Excavation		
Subgrade Design	37,680	YD^3
Earthfill		
Subgrade Design	19,820	YD^3
Backfill: Final Design	2,470	YD^3
2" Granular Fill	620	YD^3
9" Thick Gravel	1,910	YD^3
Concrete		
Gestation Barn Flat work (Floor & Footings)	692	YD^3
Gestation Walls (Pit, Divider & Stem)	288	YD^3
Farrowing Barn Flat work (Floor and Footings)	377	YD^3
Farrowing Barn Walls	132	YD^3
Farrowing Barn Caps	84	YD^3
Overflow Spillway and Splashpad and Ramp	19	YD^3
Pipes (To include all appurtenances and fittings)		
15" PVC Pipe SDR 35	85	LFT
15" Riser PVC SDR 35	1	Lump Sum
12" Corrugated Plastic Pipe (ADS-N12)	440	LFT
12" Riser	3	Lump Sum
8" Corrugated Plastic Pipe (ADS-N12) or Equivalent	58	LFT
8" Riser	1	Lump Sum
8" PVC SDR 35	1,272	LFT
8" PVC SDR 35 Cleanouts	5	Lump Sum
12" Corrugated Plastic Pipe Cleanout	2	Lump Sum
Miscellaneous		
Seeding	2.2	Acres
Staff Gage	2	Lump Sum

GENERAL NOTES

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgaengineering.com

C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

TABLE OF QUANTITIES

DATE: MAY 30, 2012
SCALE: NONE
DRAWN BY: CAS
CHECKED BY: DLD
SHEET: 25

FILE NAME: GS PROJECT FILES/SWINE/NEWSON/GILES/PLAN

DeHaan, Grabs & Associates, LLC
Consulting Engineers
www.dgaengineering.com

April 12, 2013

RE: Jason Henson, C & H Hog Farms, Permit to Construct, SSection 26, T-15-N, R-20-E, Newton County, AR

Stephen Hogan, P.E.
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Stephen Hogan, P.E.:

I have included an update to the certification to address the concerns that range form my engineering stamp to mortality livestock plan to the QA/QC plan. Please call immediately with any concerns.

Cordially

Nathan A. Pesta

Nathan A. Pesta, P.E.
Senior Project Engineer

Enclosures

cc: Jason Henson, w/encl

As-Built
Construction Plans
for
Waste Management
System

North Dakota Office
P.O. Box 522
Mandan, ND 58554-0522
(701) 663-1116
Fax (701) 667-1356

DeHaan, Grabs & Associates, LLC
Consulting Engineers
www.dgaengineering.com

NOTICE OF COMPLETION OF LIVESTOCK MANURE MANAGEMENT SYSTEM'S CONTAINMENT STRUCTURE

Construction of the livestock manure handling system's **containment structure** is completed.

Final construction of C & H Hog Farm manure storage systems located in Section 26, Township 15 N, Range 20 W, which was approved by the Arkansas Department of Environmental Quality on August 3, 2012 is completed. Final construction of the containment structure was in accordance with design plans and technical specification submitted to the AR DEQ, which was approved under the Notice of Intent for coverage under the General Permit No. ARG590000 for a concentrated feeding operation. **I certify that to the best of my knowledge, the livestock manure management system's containment structure was constructed in accordance with the plans and specifications; and in my best professional judgment is in compliance with applicable laws, codes, and ordinances as of the date of construction completion.**

Date of construction completion: April 12, 2013

CERTIFICATE OF AUTHORIZATION DEHAAN, GRABS & ASSOCIATES, LLC 2559 ARKANSAS

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 15552 4/12/13 NATHANA PESTA

Signature of engineer or facility designer:

Name: Nathan A. Pesta (Signature) Date: _____

Name: Nathan A. Pesta

Title and name of company: Senior Project Engineer - DeHaan, Grabs & Associates, LLC

North Dakota Office
P.O. Box 522
Mandan, ND 58554-0522
(701) 663-1116
Fax (701) 667-1356

SECTION C2: DESIGN CALCULATIONS

Waste Production Calculations

A. Facility Information

1. Type of Construction: ☐existing, ☒ proposed-new, or ☐ expansion

2. Building Area, **Barn 1 Gestation Barn** (Proposed): *421.3* feet by *117.5* feet
   Barn 2 Farrowing Barn (Proposed): *367.1* feet by *82.5* feet

3. Animal Capacity (maximum head counts and average weights)

3	head of *Boars*	@ *450*	lbs, *1,350*	lbs Total
2,100	head of *Gestation Sows*	@ *375*	lbs, *787,500*	lbs Total
400	head of *Lactating Sow*	@ *425*	lbs, *170,000*	lbs Total
4,000	head of *Nursery Pig*	@ *10*	lbs, *40,000*	lbs Total
	head of	@	lbs,	lbs Total

Total: *6,503* **head** **Total Animal Weight (TAW):** *998,850* **lbs**

B. Determine Minimum Storage Requirement

The Minimum Storage Requirement is the sum of the animal waste produced (or treatment volume for an anaerobic lagoon), plus the spillage and washwater, plus the pit recharge produced in 180 days. Generally, outside or contributing drainage area runoff is to be diverted. Runoff which is not diverted must be included in the storage requirement.

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No 15552
NATHAN A PESTA
4/2/13

The following is completed for either Liquid Manure Storage or Anaerobic Lagoon

Liquid Manure Storage

Unit Waste Production (UWP) in cubic feet per day per 1,000 pounds of animal:

Cattle	Swine	Poultry	Other
☐Dairy = 1.3	☒ Nursery Pig = 1.4	☐ Layers = 0.9	☐ Horse = 0.8
☐ Beef = 1.0	☐ Grower/Finisher = 1.0	☐ Broiler = 1.3	☐ Sheep = 0.6
	☒ Boar/Gestating Sow = 0.41	☐ Turkey = 0.7	
	☒ Sow and Litter = 0.97		

(a) Manure produced: (TAW x (UWP x 180 days/1,000)) = *97,979* cubic feet / 1,000 lbs
(TAW x UWP for each type calculated separately and added to find total manure produced)

(b) Spillage and Washwater generated in 180 days: *19,596* cubic feet
(If unknown, 20% of (a) is used)

(c) Total Manure plus Spillage and Washwater, (a)+(b): *117,575* cubic feet.

Rainfall Data

(d) 25 Year- 24 Hour Rainfall Event: *0.58* Feet

(e) Precipitation-Evaporation October 1 – April 1) *0.92* *Feet*
(f) Top of Waste Storage Pond 1 *20,153* Square feet
(g) Top of Waste Storage Pond 2 *32,950* Square feet

(h) Waste Storage Pond 1 25 Yr-24 Hr Storage Requirement (d) x (f): *11,689* cubic feet
(i) Waste Storage Pond 2 25 Yr-24 Hr Storage Requirement (d) x (g): *19,111* cubic feet
(j) Waste Storage Pond 1, 180 Day Net Precip. Requirement (e) x (f): *18,541* cubic feet
(k) Waste Storage Pond 2, 180 Day Net Precip. Requirement (e) x (g): *30,314* cubic feet

Recharge Water -The farrowing barn will be pulled once every three weeks and the Gestation Barn will be pulled once every five weeks on a conservative estimate and will be recharged with 2" of fresh water .

(l) Recharge Water Produced Average: *366*(cubic feet per day) x *180* (180 days in storage period) = *65,880* cubic feet per 180 days.

Runoff

(m) Sand Lane and Stacking Pad Area:_____feet x _____feet = _____square feet

(n) Manure Stacking Pad Area:_____feet x _____feet = _____square feet

(o) Feed Stacking Pad Area:_____feet x _____feet = _____square feet

(p) Total Runoff Area:_____square feet

(q) Minimum Runoff (Figure 1 from Appendix):_____inches

NOTE: If a covered storage is used which collects runoff, then the sum of the 25 year, 24 hour storm runoff and the expected runoff for the 180 day storage period is used as the Minimum Runoff in (m).

(r) Minimum Runoff Storage Requirement (l) x (m)/12 = _____cubic feet

Minimum Overall Storage Requirement

(s) Minimum Storage Requirement (c) + (h-l) + (r): *263,110* cubic feet

Waste Storage Calculations

A. Determine Storage Provided

Type of storage: ☐ Earthen Storage Pit ☒ Earthen Lagoon ☐ Concrete Tank
☐ Underfloor Concrete Pit ☐ Outside Concrete Pit
☐ Other (describe) _____

NOTE: A scale drawing, calculations and other supporting information will be included. Indicate the location of all diversions, diversion dimensions, and flow directions of surface runoff for the entire facility. Concrete pit or tank storage is assumed to be covered unless specified otherwise.

Rectangular Concrete Pit or Tank (capacity = length x width x depth)

420.3 feet x *114.3* feet x *1.5* feet = *72,060* cubic feet (Manure Pit #1)
227.3 feet x *76.3* feet x *1.7* feet = *29,483* cubic feet (Manure Pit #2)

= ***101,543*** **cubic feet TOTAL**

Waste Storage Pond 1 Volume = [(4 x sideslope^2 x depth^3) / 3] + (sideslope x bottomlength x depth^2) + (sideslope x bottomwidth x depth^2) + (bottomwidth x bottomlength x depth)

Bottom Length: _____ Bottom Width: _____

Design Full Depth: *9.7* feet, Overflow Depth: *10.7* feet

Side Slopes: *3* :1 and *3* , End Slopes: *3* :1 and *3* :1

Note: Inside slopes for earthen pits or lagoons will be at least 2:1.

Earthen Storage Pit or Lagoon Capacity: *100,065* cubic feet

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 15552
NATHAN A. PESTA
4/12/13

Waste Storage Pond 2 Volume = [(4 x sideslope^2 x depth^3) / 3] + (sideslope x bottomlength x depth^2) + (sideslope x bottomwidth x depth^2) + (bottomwidth x bottomlength x depth)

Bottom Length: _____ Bottom Width: _____

Design Full Depth: *12.2* feet, Overflow Depth: *13.2* feet

Side Slopes: *3* :1 and *3* , End Slopes: *3* :1 and *3* :1

Note: Inside slopes for earthen pits or lagoons will be at least 2:1.

Earthen Storage Pit or Lagoon Capacity: *214,498* cubic feet

NOTE: A minimum of 1.0 foot of freeboard is required for uncovered storage.

TOTAL STORAGE PROVIDED: ***416,106*** **cubic feet**

NOTE: The Total Storage Provided will meet or exceed the Minimum Storage Requirement (item o) from Waste Productions Calculation

SPAW Calculations

A. Facility SPAW Information

SPAW software was used to evaluate the previous weather data to analyze the current proposed design. Weather data used was from weather station AR1900 (Deer, AR). The weather data started in 1960.

1. Pond Depths
   - Pond 1 Overflow Spillway to Pond 2: 9.1'
   - Pond 2 Top of Berm El. 13.2'
   - Initial Water Depth: 1.0'
   - Infiltration into Dry Pond Bottom: 0.5"
   - Irrigation Lower Limit: 0.00'
2. Pond Depth-Area (See Page 14 and 15 of the Plans).
3. Pond Seepage: Rate 0.15 in/day
4. Water Table: Depth: 189 ft
5. External Input (Outflow from the Confinement Barns): The Farrowing barn is pulled once every three weeks for an average of 63,180 gallons. The Gestation barn is pulled once every five weeks for an average of 161,460 gallons.
6. Drawdown Pump (Irrigation for Land Application): The ponds are planned to be pumped April 1 and October 1. The pumping rate is set for 250 GPM and the ponds will be pumped down to 1' of depth.

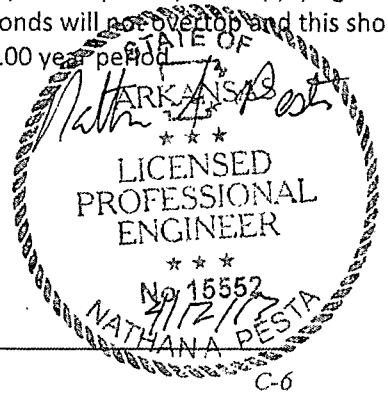
B. Facility SPAW Summary & Calculations

The results were summed up using two different simulations.

2. Simulation 2
   - Pond 1 and Pond 2 were modeled in Series.
   - Results showed that Pond 1 overflowed into Pond 2 and Pond 2 did not overtop using the 47 years of available weather data.
   - The SPAW Model results showed the maximum depth that the pond obtained. I summed up these depths in the attached spreadsheet. The mean maximum depth for each year was 8.99'
   - The standard deviation calculated in EXCEL for this data is 0.96
   - Using statistics namely using the probability normal distribution and using the 68.26-95.44-99.74 rule. The rule goes as follows for property 1: 68.26% of the years all maximum pond depths will be within one standard deviation of the mean. For property 2: 95.44% of the years all maximum pond depths will be within two standard deviations of the mean. For property 3: 99.74% of the years all maximum pond depths will be within three standard deviations of the mean.
   - Using the rules the maximum pond depth for:a 68.26% probability will be 8.99'+0.96'=9.95', for 95.44% probability will 8.99+2*0.96=10.91', for 99.74% probability will be 8.99+3*0.96' = 11.87'
   - Given that the pond overflow depth is 13.2' and at a 99.74% probability that the pond depth will not overtop 11.9' and for the fact that the manager can manage the pond depths by land applying more than what the model shows it is reasonable to expect that the ponds will not overtop and this should conclude that the simulation for the confidence interval over a 100 year period

C. Facility SPAW Results

The results are attached:



C H Hog Farms
Newton County, AR

SPAW Maximum Water Depth

April 5, 2013

Standard Deviation = 0.96

Date	Year	Max Pond Depth (ft)
1960	1	8.5
1961	2	7.8
1962	3	8.6
1963	4	8.6
1964	5	8.7
1965	6	8
1966	7	7.3
1967	8	9.9
1968	9	10.2
1969	10	8.5
1970	11	8.3
1971	12	8.4
1972	13	10.5
1973	14	10.1
1974	15	10.1
1975	16	8.2
1976	17	8.4
1977	18	8.3
1978	19	9.5
1979	20	8.4
1980	21	7.8
1981	22	8.8
1982	23	9.4
1983	24	9
1984	25	10.8
1985	26	8.5
1986	27	8.5
1987	28	10.3
1988	29	10.1
1989	30	9.3
1990	31	8.8
1991	32	9.8
1992	33	9.7
1993	34	9.7
1994	35	10.1
1995	36	7.1
1996	37	9.6
1997	38	10
1998	39	9
1999	40	8.3
2000	41	9.1
2001	42	10.8
2002	43	8.2
2003	44	8.8
2004	45	9.8
2005	46	7.8
2006	47	7
	Mean =	8.99

A SUMMARY OF ACCUMULATIVE MONTHLY POND VOLUMES

SIMULATION BY:
Nathan A. Pesta
Senior Project Engineer
DeHaan, Grabs & Associates, LLC
PO Box 522
Mandan, ND, 58554

SIMULATION FOR:
File : C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Examples\Henson, Jason_Pond 2\Henson, Jason_Pond 2.pnd
File Creation Date : Jul 06, 2012 14:52:33
File Last Modified Date : Apr 05, 2013 16:52:21
Description : Waste Storage Pond
Simulation Start Date : Jan 01, 1960
Simulation End Date : Dec 31, 2006
Simulation Run Date : Apr 05, 2013 16:52
SPAW Interface Version : Apr 05, 2013 16:52:21
Pond Model Version : 6.02.71

WATERSHED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Brookings Pasture -Rainfed (Sample)	0.00

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Examples\Pasture_Henson\Pasture_Henson.fpin Dec 30, 1899 00:00

IRRIGATED FIELDS:

DESCRIPTION/FILE (DATE)	AREA (AC)
Brookings Pasture -Rainfed (Sample)	630.70

C:\Program Files\SPAW Hydrology\SPAW\Projects\Fields\Examples\Pasture\Pasture.fpin Dec 30, 1899 00:00

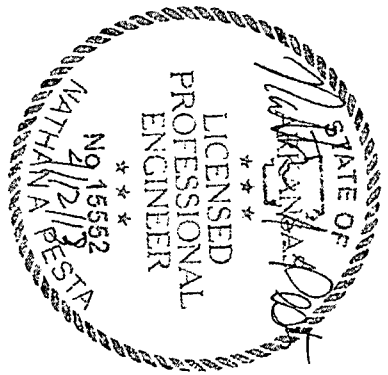
INPUT PONDS:
DESCRIPTION/FILE (DATE)
`Waste Storage Pond
C:\Program Files\SPAW Hydrology\SPAW\Projects\Ponds\Examples\Henson, Jason_Pond 1\Henson, Jason_Pond 1.ppin Apr 05, 2013 16:51

POND PROFILE:

DEPTH (FT)	AREA (AC)	VOLUME (AC-FT)
0.00	0.00	0.00
1.00	0.14	0.07
2.00	0.30	0.29

3.00	0.22	0.55
4.00	0.40	0.86
5.00	0.28	1.20
6.00	0.48	1.58
7.00	0.36	2.00
8.00	0.56	2.46
9.00	0.44	2.96
10.00	0.68	3.52
11.00	0.54	4.13
11.60	0.73	4.51
13.20	0.70	5.66

POND PROFILE
MAX AREA (AC) = 0.70
MAX DEPTH (FT) = 13.20
MAX VOLUME (AC-FT) = 5.66
IRRIGATION LIMIT (FT) = 0.00
EXTERNAL INPUT UPPER LIMIT (FT)= 0.00
EXTERNAL INPUT LOWER LIMIT (FT)= 0.00
SUPPLY PUMP LOWER LIMIT (FT) = 0.00
DRAWDOWN PUMP UPPER LIMIT (FT) = 0.00
DRAWDOWN PUMP LOWER LIMIT (FT) = 2.00
SPILLWAY CREST (FT) = 13.20
INITIAL DEPTH (FT) = 1.00
INFIL. INTO DRY SOIL (IN) = 0.50



SEEPAGE RATE (IN/DAY)
DATE RATE
Jun 14 0.15

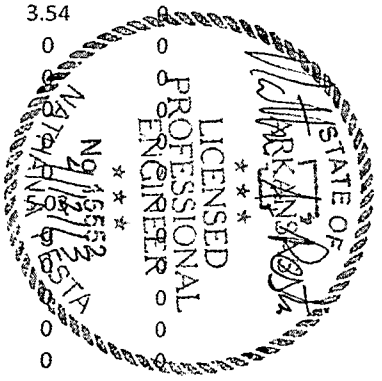
MONTHLY VOLUMES BY MAJOR IMPOUNDMENT PROCESSES

Mon	Year	Inflow ac-ft	Outflow ac-ft	Change ac-ft	Precip Vol ac-ft	Bank Runoff ac-ft	Seep In ac-ft	Drwdwn In ac-ft	Spill In ac-ft	Vol Evap ac-ft	Vol Infil ac-ft	Vol Seep ac-ft	Drdn Pump ac-ft	Spillway ac-ft
Jan	1960	0.16	0.08	0.08	0.03	0.06	0.07	0	0	0.01	0	0.069	0	0
Feb	1960	0.22	0.12	0.1	0.06	0.06	0.09	0	0	0.02	0	0.091	0	0
Mar	1960	0.3	0.15	0.15	0.05	0.04	0.12	0	0.09	0.04	0	0.108	0	0
Apr	1960	1.85	1.9	-0.05	0.07	0.02	0.07	1.7	0	0.08	0	0.106	1.72	0
May	1960	0.48	0.2	0.28	0.19	0.21	0.08	0	0	0.1	0	0.098	0	0
Jun	1960	0.19	0.22	-0.03	0.05	0.03	0.11	0	0	0.13	0	0.09	0	0

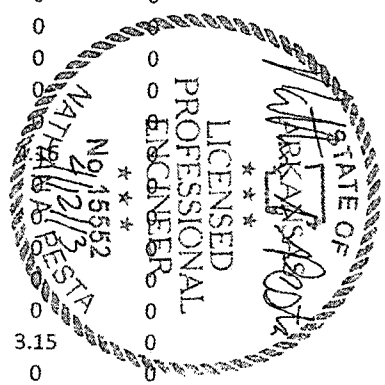
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Jul	1960	0.96	0.36	0.6	0.19	0.08	0.14	0	0.56	0.23	0	0.131	0	0
Aug	1960	0.65	0.43	0.22	0.06	0	0.14	0	0.46	0.27	0.01	0.159	0	0
Sep	1960	1.03	0.34	0.68	0.09	0.01	0.12	0	0.81	0.19	0	0.151	0	0
Oct	1960	1.87	3.71	-1.84	0.06	0	0.07	1.74	0	0.09	0	0.121	3.5	0
Nov	1960	0.12	0.13	-0.02	0.04	0.01	0.07	0	0	0.03	0	0.1	0	0
Dec	1960	0.34	0.11	0.23	0.1	0.13	0.12	0	0	0.01	0	0.101	0	0
Jan	1961	0.67	0.16	0.52	0.03	0.01	0.14	0	0.49	0.02	0	0.139	0	0
Feb	1961	0.9	0.19	0.72	0.11	0.05	0.13	0	0.62	0.04	0	0.147	0	0
Mar	1961	1.32	0.24	1.07	0.22	0.09	0.15	0	0.86	0.07	0	0.174	0	0
Apr	1961	1.93	4.44	-2.51	0.09	0.02	0.07	1.74	0	0.1	0	0.127	4.21	0
May	1961	0.73	0.24	0.49	0.28	0.33	0.11	0	0	0.12	0	0.117	0	0
Jun	1961	0.17	0.28	-0.11	0.05	0	0.12	0	0	0.17	0	0.115	0	0
Jul	1961	0.85	0.35	0.5	0.15	0.04	0.14	0	0.52	0.22	0	0.129	0	0
Aug	1961	0.87	0.45	0.41	0.18	0.02	0.14	0	0.52	0.28	0.01	0.168	0	0
Sep	1961	1.13	0.34	0.79	0.1	0.02	0.13	0	0.87	0.19	0	0.148	0	0
Oct	1961	1.88	3.97	-2.09	0.06	0	0.06	1.76	0	0.09	0	0.126	3.75	0
Nov	1961	0.31	0.14	0.16	0.11	0.12	0.07	0	0	0.04	0	0.107	0	0
Dec	1961	0.36	0.11	0.25	0.08	0.12	0.13	0	0.04	0.01	0	0.1	0	0
Jan	1962	0.92	0.15	0.77	0.08	0.08	0.15	0	0.61	0.02	0	0.129	0	0
Feb	1962	0.81	0.17	0.65	0.07	0.03	0.13	0	0.58	0.04	0	0.134	0	0
Mar	1962	1.02	0.26	0.77	0.1	0.02	0.15	0	0.76	0.07	0	0.18	0	0
Apr	1962	1.86	4.44	-2.58	0.07	0	0.07	1.73	0	0.1	0	0.126	4.21	0
May	1962	0.17	0.19	-0.03	0.05	0.03	0.09	0	0	0.1	0	0.094	0	0
Jun	1962	0.22	0.22	-0.01	0.1	0.03	0.08	0	0	0.13	0	0.091	0	0
Jul	1962	0.58	0.27	0.31	0.09	0.02	0.14	0	0.33	0.17	0	0.098	0	0
Aug	1962	0.86	0.35	0.51	0.14	0.08	0.14	0	0.51	0.22	0	0.132	0	0
Sep	1962	1.36	0.36	1	0.19	0.03	0.13	0	1.01	0.2	0	0.159	0	0
Oct	1962	2.02	3.76	-1.75	0.15	0.06	0.07	1.75	0	0.09	0	0.123	3.55	0
Nov	1962	0.11	0.15	-0.03	0.03	0.01	0.07	0	0	0.04	0	0.11	0	0
Dec	1962	0.15	0.12	0.02	0.03	0.01	0.11	0	0	0.01	0	0.11	0	0
Jan	1963	0.6	0.13	0.47	0.01	0.01	0.14	0	0.44	0.02	0	0.115	0	0
Feb	1963	0.72	0.15	0.57	0.02	0	0.13	0	0.57	0.03	0	0.118	0	0
Mar	1963	1.05	0.22	0.83	0.11	0.04	0.14	0	0.75	0.06	0	0.159	0	0
Apr	1963	1.82	3.7	-1.88	0.04	0.01	0.07	1.7	0	0.09	0	0.117	3.49	0
May	1963	0.26	0.21	0.05	0.1	0.08	0.08	0	0	0.11	0	0.101	0	0
Jun	1963	0.17	0.26	-0.09	0.07	0.02	0.09	0	0	0.16	0	0.106	0	0
Jul	1963	0.48	0.26	0.22	0.05	0	0.13	0	0.31	0.17	0	0.096	0	0
Aug	1963	0.62	0.35	0.27	0.05	0	0.14	0	0.43	0.21	0.01	0.129	0	0

Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Sep	1963	0.98	0.26	0.72	0.05	0	0.12	0	0.8	0.14	0	0.112	0	0
Oct	1963	1.81	3.04	-1.23	0.01	0	0.06	1.74	0	0.08	0	0.113	2.84	0
Nov	1963	0.22	0.13	0.09	0.07	0.08	0.07	0	0	0.03	0	0.095	0	0
Dec	1963	0.18	0.13	0.06	0.04	0.03	0.11	0	0	0.01	0	0.111	0	0
Jan	1964	0.59	0.14	0.45	0.02	0	0.14	0	0.42	0.02	0	0.122	0	0
Feb	1964	0.94	0.2	0.74	0.09	0.05	0.13	0	0.67	0.04	0	0.158	0	0
Mar	1964	1.4	0.25	1.15	0.26	0.11	0.15	0	0.88	0.07	0	0.178	0	0
Apr	1964	2.05	4.51	-2.45	0.15	0.04	0.07	1.8	0	0.1	0	0.127	4.28	0
May	1964	0.22	0.22	0	0.09	0.06	0.08	0	0	0.12	0	0.108	0	0
Jun	1964	0.12	0.21	-0.09	0.04	0	0.08	0	0	0.13	0	0.086	0	0
Jul	1964	0.41	0.31	0.1	0.04	0	0.13	0	0.24	0.19	0	0.111	0	0
Aug	1964	0.86	0.31	0.54	0.18	0.03	0.14	0	0.5	0.19	0	0.116	0	0
Sep	1964	1.25	0.3	0.95	0.12	0.03	0.13	0	0.96	0.17	0	0.13	0	0
Oct	1964	1.82	3.34	-1.53	0.01	0	0.06	1.74	0	0.09	0	0.119	3.14	0
Nov	1964	0.21	0.13	0.07	0.07	0.06	0.07	0	0	0.03	0	0.099	0	0
Dec	1964	0.15	0.13	0.02	0.03	0.02	0.1	0	0	0.02	0	0.114	0	0
Jan	1965	0.75	0.15	0.6	0.07	0.06	0.14	0	0.48	0.02	0	0.133	0	0
Feb	1965	0.92	0.19	0.73	0.1	0.05	0.13	0	0.65	0.04	0	0.152	0	0
Mar	1965	1	0.25	0.75	0.11	0.02	0.14	0	0.73	0.07	0	0.175	0	0
Apr	1965	2.06	4.2	-2.14	0.16	0.03	0.07	1.8	0	0.1	0	0.13	3.97	0
May	1965	0.29	0.23	0.06	0.14	0.08	0.07	0	0	0.12	0	0.11	0	0
Jun	1965	0.21	0.27	-0.06	0.11	0.01	0.09	0	0	0.16	0	0.11	0	0
Jul	1965	0.63	0.27	0.35	0.09	0	0.14	0	0.4	0.17	0	0.099	0	0
Aug	1965	0.68	0.37	0.31	0.08	0	0.14	0	0.46	0.23	0	0.137	0	0
Sep	1965	1.36	0.34	1.02	0.2	0.08	0.13	0	0.95	0.19	0	0.151	0	0
Oct	1965	1.82	3.54	-1.71	0.02	0	0.07	1.74	0	0.09	0	0.117	3.33	0
Nov	1965	0.1	0.12	-0.02	0.03	0	0.07	0	0	0.03	0	0.093	0	0
Dec	1965	0.18	0.11	0.07	0.04	0.04	0.09	0	0	0.01	0	0.095	0	0
Jan	1966	0.98	0.15	0.84	0.12	0.17	0.14	0	0.55	0.02	0	0.13	0	0
Feb	1966	1.25	0.17	1.08	0.2	0.14	0.13	0	0.79	0.04	0	0.137	0	0
Mar	1966	0.92	0.26	0.66	0.06	0.01	0.14	0	0.7	0.07	0	0.187	0	0
Apr	1966	2	4.41	-2.4	0.14	0.11	0.06	1.7	0	0.1	0	0.125	4.18	0
May	1966	0.15	0.21	-0.06	0.06	0.02	0.08	0	0	0.11	0	0.101	0	0
Jun	1966	0.1	0.26	-0.16	0.02	0	0.09	0	0	0.15	0	0.105	0	0
Jul	1966	0.54	0.25	0.28	0.07	0	0.13	0	0.33	0.16	0	0.093	0	0
Aug	1966	0.76	0.38	0.38	0.12	0	0.14	0	0.51	0.23	0.01	0.14	0	0
Sep	1966	1	0.3	0.7	0.06	0	0.12	0	0.82	0.17	0	0.131	0	0
Oct	1966	1.86	3.22	-1.35	0.04	0.01	0.07	1.75	0	0.09	0	0.123	3	0

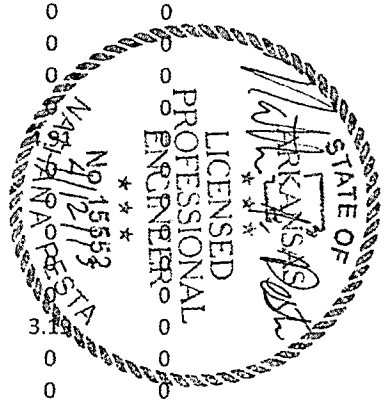
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Nov	1966	0.12	0.13	-0.01	0.04	0.02	0.07	0	0	0.03	0	0.098	0	0
Dec	1966	0.26	0.12	0.14	0.08	0.09	0.1	0	0	0.01	0	0.106	0	0
Jan	1967	0.7	0.15	0.55	0.05	0.03	0.14	0	0.47	0.02	0	0.127	0	0
Feb	1967	0.8	0.19	0.61	0.04	0.01	0.13	0	0.62	0.04	0	0.148	0	0
Mar	1967	0.87	0.24	0.64	0.05	0	0.14	0	0.68	0.07	0	0.17	0	0
Apr	1967	1.93	3.76	-1.84	0.11	0.05	0.06	1.71	0	0.1	0	0.121	3.55	0
May	1967	0.23	0.22	0	0.11	0.05	0.08	0	0	0.12	0	0.109	0	0
Jun	1967	0.3	0.27	0.03	0.15	0.06	0.09	0	0	0.16	0	0.11	0	0
Jul	1967	0.84	0.39	0.44	0.13	0.04	0.13	0	0.54	0.25	0	0.144	0	0
Aug	1967	0.71	0.31	0.4	0.08	0.01	0.13	0	0.49	0.2	0	0.119	0	0
Sep	1967	1.21	0.33	0.88	0.15	0.04	0.13	0	0.88	0.19	0	0.147	0	0
Oct	1967	2.19	3.69	-1.51	0.18	0.21	0.05	1.74	0	0.08	0	0.114	3.5	0
Nov	1967	0.12	0.12	0	0.02	0	0.1	0	0	0.03	0	0.089	0	0
Dec	1967	0.56	0.14	0.42	0.14	0.14	0.14	0	0.14	0.02	0	0.122	0	0
Jan	1968	0.85	0.18	0.67	0.1	0.04	0.14	0	0.57	0.02	0	0.157	0	0
Feb	1968	0.89	0.22	0.67	0.07	0.03	0.13	0	0.66	0.05	0	0.175	0	0
Mar	1968	1.38	0.31	1.07	0.3	0.07	0.15	0	0.87	0.09	0	0.219	0	0
Apr	1968	1.99	5.07	-3.08	0.14	0.04	0.06	1.75	0	0.11	0	0.142	4.82	0
May	1968	0.3	0.22	0.08	0.14	0.08	0.08	0	0	0.11	0	0.105	0	0
Jun	1968	0.29	0.25	0.04	0.13	0.06	0.1	0	0	0.15	0	0.101	0	0
Jul	1968	0.7	0.4	0.31	0.08	0.02	0.13	0	0.47	0.25	0	0.145	0	0
Aug	1968	0.68	0.32	0.36	0.07	0	0.14	0	0.47	0.2	0	0.12	0	0
Sep	1968	1.32	0.36	0.97	0.21	0.06	0.13	0	0.93	0.2	0	0.155	0	0
Oct	1968	1.91	3.75	-1.84	0.08	0.01	0.07	1.75	0	0.09	0	0.119	3.54	0
Nov	1968	0.52	0.13	0.39	0.19	0.26	0.08	0	0	0.03	0	0.099	0	0
Dec	1968	0.7	0.13	0.57	0.18	0.17	0.13	0	0.21	0.02	0	0.117	0	0
Jan	1969	1.14	0.19	0.95	0.18	0.12	0.15	0	0.7	0.02	0	0.165	0	0
Feb	1969	0.89	0.21	0.69	0.09	0.03	0.13	0	0.64	0.04	0	0.164	0	0
Mar	1969	1.11	0.29	0.82	0.16	0.01	0.15	0	0.79	0.08	0.01	0.204	0	0
Apr	1969	1.97	5.3	-3.33	0.14	0.04	0.07	1.72	0	0.12	0	0.147	0	0
May	1969	0.12	0.22	-0.11	0.05	0	0.07	0	0	0.11	0	0.107	0	0
Jun	1969	0.16	0.21	-0.05	0.07	0	0.08	0	0	0.13	0	0.086	0	0
Jul	1969	0.49	0.29	0.2	0.06	0	0.13	0	0.3	0.18	0	0.105	0	0
Aug	1969	0.64	0.32	0.32	0.04	0.01	0.14	0	0.46	0.2	0	0.12	0	0
Sep	1969	0.93	0.26	0.67	0.03	0	0.12	0	0.77	0.15	0	0.115	0	0
Oct	1969	2.09	2.97	-0.88	0.14	0.15	0.06	1.74	0	0.08	0	0.107	2.78	0
Nov	1969	0.13	0.12	0.01	0.03	0.02	0.09	0	0	0.03	0	0.091	0	0
Dec	1969	0.33	0.1	0.23	0.09	0.11	0.13	0	0.01	0.01	0	0.091	0	0



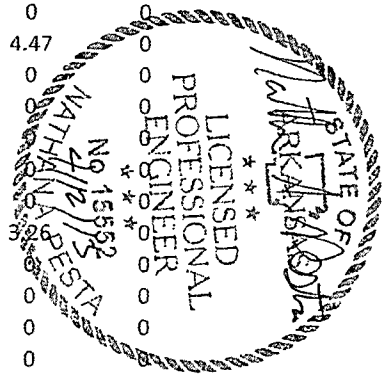
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Jan	1970	0.8	0.14	0.66	0.03	0.02	0.14	0	0.61	0.02	0	0.127	0	0
Feb	1970	0.81	0.17	0.64	0.06	0.02	0.13	0	0.61	0.04	0	0.132	0	0
Mar	1970	1.09	0.25	0.84	0.14	0.04	0.14	0	0.76	0.07	0	0.178	0	0
Apr	1970	2.14	4.43	-2.29	0.18	0.19	0.05	1.72	0	0.1	0	0.121	4.21	0
May	1970	0.14	0.18	-0.04	0.04	0.01	0.09	0	0	0.09	0	0.088	0	0
Jun	1970	0.37	0.25	0.12	0.15	0.1	0.12	0	0	0.15	0	0.102	0	0
Jul	1970	0.64	0.37	0.26	0.03	0	0.13	0	0.47	0.24	0	0.136	0	0
Aug	1970	0.72	0.35	0.37	0.1	0	0.14	0	0.47	0.22	0	0.131	0	0
Sep	1970	1.58	0.33	1.25	0.28	0.13	0.14	0	1.04	0.18	0	0.144	0	0
Oct	1970	2.1	4.2	-2.1	0.17	0.13	0.06	1.74	0	0.1	0	0.132	3.97	0
Nov	1970	0.2	0.12	0.08	0.05	0.05	0.09	0	0	0.03	0	0.091	0	0
Dec	1970	0.18	0.1	0.08	0.03	0.02	0.13	0	0	0.01	0	0.089	0	0
Jan	1971	0.83	0.14	0.69	0.05	0.06	0.15	0	0.57	0.02	0	0.122	0	0
Feb	1971	0.94	0.16	0.78	0.1	0.06	0.13	0	0.64	0.03	0	0.128	0	0
Mar	1971	0.89	0.26	0.63	0.04	0	0.14	0	0.7	0.07	0	0.181	0	0
Apr	1971	1.85	4.25	-2.41	0.06	0.01	0.07	1.7	0	0.1	0	0.128	4.02	0
May	1971	0.2	0.22	-0.02	0.09	0.03	0.08	0	0	0.12	0	0.108	0	0
Jun	1971	0.14	0.22	-0.08	0.05	0	0.08	0	0	0.13	0	0.089	0	0
Jul	1971	0.59	0.28	0.31	0.09	0.03	0.13	0	0.34	0.18	0	0.102	0	0
Aug	1971	0.63	0.37	0.26	0.04	0	0.14	0	0.45	0.23	0.01	0.136	0	0
Sep	1971	0.98	0.26	0.72	0.06	0	0.12	0	0.8	0.14	0	0.114	0	0
Oct	1971	1.94	3.11	-1.17	0.09	0.03	0.07	1.76	0	0.09	0	0.12	2.9	0
Nov	1971	0.14	0.14	0	0.05	0.02	0.07	0	0	0.04	0	0.108	0	0
Dec	1971	0.89	0.14	0.74	0.24	0.33	0.13	0	0.19	0.02	0	0.127	0	0
Jan	1972	0.72	0.19	0.53	0.03	0.01	0.14	0	0.53	0.02	0	0.164	0	0
Feb	1972	0.79	0.2	0.59	0.04	0.01	0.13	0	0.61	0.04	0	0.159	0	0
Mar	1972	0.9	0.26	0.64	0.07	0.01	0.14	0	0.67	0.07	0.01	0.183	0	0
Apr	1972	1.99	4.39	-2.4	0.13	0.07	0.06	1.72	0	0.1	0	0.128	0	0
May	1972	0.15	0.23	-0.07	0.07	0.01	0.07	0	0	0.12	0	0.11	0	0
Jun	1972	0.16	0.25	-0.09	0.07	0	0.09	0	0	0.15	0	0.101	0	0
Jul	1972	0.54	0.25	0.29	0.03	0.01	0.13	0	0.36	0.16	0	0.09	0	0
Aug	1972	0.64	0.37	0.27	0.07	0	0.14	0	0.43	0.23	0	0.139	0	0
Sep	1972	1.25	0.27	0.99	0.14	0.06	0.13	0	0.93	0.15	0	0.118	0	0
Oct	1972	2.08	3.37	-1.28	0.14	0.13	0.07	1.74	0	0.09	0	0.121	3.15	0
Nov	1972	0.4	0.15	0.26	0.13	0.17	0.1	0	0	0.04	0	0.111	0	0
Dec	1972	0.37	0.16	0.21	0.08	0.05	0.13	0	0.11	0.02	0	0.138	0	0
Jan	1973	1.01	0.18	0.83	0.13	0.07	0.15	0	0.65	0.02	0	0.157	0	0
Feb	1973	0.96	0.22	0.74	0.1	0.05	0.13	0	0.68	0.05	0	0.175	0	0



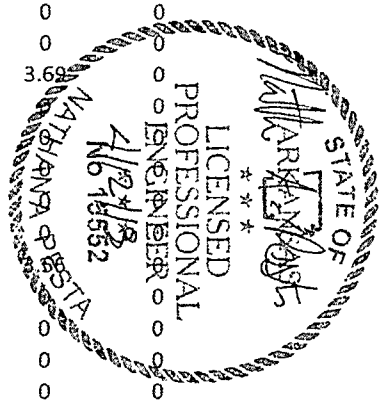
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Mar	1973	1.72	0.3	1.42	0.49	0.1	0.15	0	0.97	0.08	0	0.212	0	0
Apr	1973	2.31	5.6	-3.29	0.25	0.24	0.06	1.76	0	0.11	0	0.142	5.35	0
May	1973	0.36	0.25	0.11	0.17	0.07	0.11	0	0	0.13	0	0.12	0	0
Jun	1973	0.34	0.33	0.01	0.12	0.04	0.13	0	0.05	0.2	0	0.134	0	0
Jul	1973	0.69	0.32	0.36	0.08	0	0.13	0	0.47	0.21	0	0.119	0	0
Aug	1973	0.67	0.41	0.25	0.05	0.01	0.14	0	0.47	0.25	0.01	0.152	0	0
Sep	1973	1.4	0.34	1.06	0.23	0.08	0.13	0	0.96	0.19	0	0.147	0	0
Oct	1973	2.01	4.02	-2.01	0.12	0.1	0.06	1.74	0	0.09	0	0.126	3.81	0
Nov	1973	0.59	0.14	0.45	0.23	0.28	0.08	0	0	0.04	0	0.109	0	0
Dec	1973	0.79	0.16	0.63	0.18	0.13	0.13	0	0.36	0.02	0	0.144	0	0
Jan	1974	0.79	0.17	0.61	0.05	0.02	0.15	0	0.57	0.02	0	0.154	0	0
Feb	1974	0.83	0.21	0.61	0.08	0.02	0.13	0	0.6	0.04	0	0.167	0	0
Mar	1974	1.14	0.3	0.85	0.16	0.03	0.15	0	0.81	0.08	0	0.212	0	0
Apr	1974	1.92	5.18	-3.26	0.12	0.02	0.07	1.71	0	0.12	0	0.147	4.92	0
May	1974	0.29	0.23	0.07	0.15	0.07	0.07	0	0	0.12	0	0.109	0	0
Jun	1974	0.35	0.22	0.13	0.12	0.12	0.11	0	0	0.13	0	0.089	0	0
Jul	1974	0.66	0.39	0.27	0.09	0.01	0.13	0	0.43	0.24	0.01	0.141	0	0
Aug	1974	0.71	0.31	0.4	0.09	0	0.14	0	0.48	0.2	0	0.118	0	0
Sep	1974	1.37	0.32	1.04	0.2	0.07	0.13	0	0.97	0.18	0.01	0.139	0	0
Oct	1974	1.93	3.84	-1.91	0.08	0.03	0.07	1.75	0	0.09	0	0.127	3.62	0
Nov	1974	0.42	0.12	0.3	0.14	0.19	0.09	0	0	0.03	0	0.089	0	0
Dec	1974	0.24	0.12	0.12	0.05	0.05	0.13	0	0.02	0.01	0	0.109	0	0
Jan	1975	0.95	0.15	0.8	0.11	0.09	0.15	0	0.61	0.02	0	0.133	0	0
Feb	1975	1.07	0.21	0.86	0.17	0.06	0.13	0	0.7	0.04	0	0.163	0	0
Mar	1975	1.52	0.31	1.22	0.38	0.06	0.15	0	0.94	0.09	0	0.217	0	0
Apr	1975	1.84	5.17	-3.32	0.05	0	0.07	1.72	0	0.12	0	0.145	0	0
May	1975	0.16	0.21	-0.05	0.08	0	0.08	0	0	0.11	0	0.103	0	0
Jun	1975	0.18	0.21	-0.04	0.08	0.01	0.09	0	0	0.13	0	0.087	0	0
Jul	1975	0.45	0.29	0.16	0.05	0	0.13	0	0.27	0.18	0	0.107	0	0
Aug	1975	0.85	0.36	0.49	0.15	0.04	0.14	0	0.52	0.22	0	0.133	0	0
Sep	1975	1.27	0.32	0.95	0.16	0.05	0.13	0	0.94	0.18	0	0.141	0	0
Oct	1975	1.85	3.4	-1.55	0.03	0.01	0.07	1.75	0	0.09	0	0.119	3.19	0
Nov	1975	0.2	0.14	0.07	0.08	0.05	0.07	0	0	0.03	0	0.101	0	0
Dec	1975	0.39	0.11	0.28	0.11	0.17	0.12	0	0	0.01	0	0.1	0	0
Jan	1976	0.72	0.14	0.58	0.02	0.01	0.14	0	0.55	0.02	0	0.125	0	0
Feb	1976	0.78	0.19	0.59	0.05	0.01	0.13	0	0.59	0.04	0.01	0.143	0	0
Mar	1976	1.08	0.25	0.84	0.14	0.04	0.15	0	0.76	0.07	0.01	0.173	0	0
Apr	1976	1.91	4.16	-2.25	0.08	0.05	0.06	1.72	0	0.1	0	0.129	3.93	0



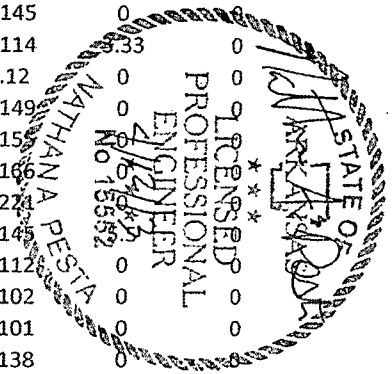
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
May	1976	0.32	0.23	0.09	0.15	0.1	0.07	0	0	0.12	0	0.11	0	0
Jun	1976	0.41	0.24	0.17	0.15	0.14	0.11	0	0.01	0.14	0	0.097	0	0
Jul	1976	0.8	0.34	0.45	0.09	0.02	0.13	0	0.56	0.22	0	0.124	0	0
Aug	1976	0.64	0.38	0.26	0.05	0	0.14	0	0.45	0.24	0	0.141	0	0
Sep	1976	0.96	0.36	0.6	0.05	0	0.12	0	0.79	0.2	0	0.157	0	0
Oct	1976	1.93	3.55	-1.62	0.08	0.03	0.07	1.75	0	0.09	0	0.121	3.34	0
Nov	1976	0.13	0.15	-0.02	0.04	0.02	0.06	0	0	0.04	0	0.111	0	0
Dec	1976	0.2	0.12	0.08	0.05	0.04	0.11	0	0	0.01	0	0.11	0	0
Jan	1977	0.7	0.14	0.56	0.06	0.03	0.14	0	0.46	0.02	0	0.124	0	0
Feb	1977	0.8	0.18	0.61	0.05	0.01	0.13	0	0.61	0.04	0	0.145	0	0
Mar	1977	1.42	0.25	1.17	0.29	0.09	0.15	0	0.89	0.07	0	0.176	0	0
Apr	1977	1.93	4.28	-2.36	0.09	0.04	0.06	1.73	0	0.1	0	0.129	4.05	0
May	1977	0.14	0.23	-0.09	0.06	0	0.07	0	0	0.12	0	0.111	0	0
Jun	1977	0.14	0.21	-0.07	0.06	0	0.08	0	0	0.13	0	0.086	0	0
Jul	1977	0.6	0.26	0.34	0.08	0.02	0.13	0	0.37	0.16	0	0.095	0	0
Aug	1977	0.96	0.34	0.62	0.17	0.06	0.14	0	0.59	0.21	0	0.125	0	0
Sep	1977	1.44	0.37	1.07	0.27	0.06	0.13	0	0.97	0.2	0.01	0.158	0	0
Oct	1977	1.89	3.82	-1.93	0.06	0.03	0.07	1.74	0	0.09	0	0.124	3.61	0
Nov	1977	0.32	0.13	0.18	0.12	0.12	0.08	0	0	0.03	0	0.101	0	0
Dec	1977	0.31	0.11	0.2	0.06	0.09	0.13	0	0.03	0.01	0	0.099	0	0
Jan	1978	0.71	0.14	0.57	0.03	0.02	0.14	0	0.52	0.02	0	0.122	0	0
Feb	1978	0.89	0.16	0.73	0.08	0.04	0.13	0	0.65	0.03	0	0.128	0	0
Mar	1978	1.41	0.25	1.16	0.25	0.11	0.15	0	0.9	0.07	0	0.177	0	0
Apr	1978	1.85	4.7	-2.85	0.07	0	0.07	1.71	0	0.1	0	0.129	4.47	0
May	1978	0.38	0.21	0.17	0.16	0.13	0.08	0	0	0.11	0	0.1	0	0
Jun	1978	0.22	0.23	-0.01	0.09	0.03	0.1	0	0	0.14	0	0.094	0	0
Jul	1978	0.72	0.35	0.37	0.13	0.03	0.14	0	0.42	0.22	0.01	0.126	0	0
Aug	1978	0.68	0.31	0.37	0.06	0	0.14	0	0.48	0.19	0	0.116	0	0
Sep	1978	1.05	0.36	0.69	0.09	0.01	0.13	0	0.83	0.2	0.01	0.158	0	0
Oct	1978	1.93	3.47	-1.54	0.07	0.05	0.07	1.74	0	0.09	0	0.121	0	0
Nov	1978	0.38	0.13	0.24	0.13	0.17	0.08	0	0	0.03	0	0.1	0	0
Dec	1978	0.37	0.12	0.25	0.09	0.1	0.13	0	0.04	0.01	0	0.107	0	0
Jan	1979	0.9	0.16	0.74	0.07	0.05	0.15	0	0.64	0.02	0	0.145	0	0
Feb	1979	1.07	0.2	0.87	0.19	0.07	0.13	0	0.67	0.04	0	0.159	0	0
Mar	1979	1.33	0.29	1.04	0.26	0.05	0.15	0	0.88	0.08	0	0.209	0	0
Apr	1979	2.07	5.24	-3.17	0.18	0.07	0.06	1.76	0	0.12	0	0.144	4.98	0
May	1979	0.45	0.2	0.25	0.19	0.17	0.1	0	0	0.1	0	0.096	0	0
Jun	1979	0.18	0.21	-0.03	0.06	0	0.12	0	0	0.12	0	0.085	0	0



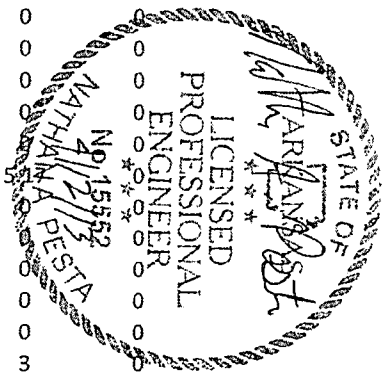
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Jul	1979	0.8	0.41	0.39	0.14	0.03	0.13	0	0.5	0.26	0.01	0.148	0	0
Aug	1979	0.71	0.34	0.37	0.09	0	0.14	0	0.48	0.21	0	0.127	0	0
Sep	1979	1.06	0.35	0.71	0.08	0.01	0.13	0	0.84	0.19	0	0.152	0	0
Oct	1979	1.93	3.58	-1.65	0.08	0.04	0.07	1.74	0	0.09	0	0.118	3.38	0
Nov	1979	0.23	0.14	0.09	0.07	0.08	0.08	0	0	0.03	0	0.101	0	0
Dec	1979	0.33	0.11	0.22	0.08	0.12	0.12	0	0.01	0.01	0	0.099	0	0
Jan	1980	0.73	0.14	0.59	0.02	0	0.14	0	0.56	0.02	0	0.121	0	0
Feb	1980	0.77	0.18	0.6	0.04	0.01	0.13	0	0.59	0.04	0	0.138	0	0
Mar	1980	1.07	0.24	0.82	0.15	0.04	0.15	0	0.74	0.07	0	0.175	0	0
Apr	1980	1.87	4.27	-2.39	0.08	0	0.07	1.73	0	0.1	0	0.13	4.04	0
May	1980	0.27	0.22	0.05	0.12	0.07	0.08	0	0	0.12	0	0.108	0	0
Jun	1980	0.26	0.26	0	0.1	0.07	0.09	0	0	0.16	0	0.106	0	0
Jul	1980	0.49	0.25	0.24	0.01	0	0.13	0	0.35	0.16	0	0.092	0	0
Aug	1980	0.53	0.36	0.17	0.01	0	0.13	0	0.39	0.22	0.01	0.133	0	0
Sep	1980	1.14	0.26	0.87	0.11	0.03	0.13	0	0.87	0.14	0.01	0.113	0	0
Oct	1980	1.93	3.2	-1.28	0.07	0.05	0.07	1.74	0	0.09	0	0.125	2.99	0
Nov	1980	0.16	0.14	0.02	0.06	0.04	0.07	0	0	0.04	0	0.109	0	0
Dec	1980	0.17	0.12	0.05	0.03	0.03	0.11	0	0	0.01	0	0.106	0	0
Jan	1981	0.61	0.15	0.46	0.03	0	0.14	0	0.44	0.02	0	0.127	0	0
Feb	1981	0.87	0.18	0.68	0.08	0.03	0.13	0	0.62	0.04	0	0.145	0	0
Mar	1981	1.03	0.24	0.79	0.12	0.02	0.14	0	0.75	0.07	0	0.173	0	0
Apr	1981	1.88	3.92	-2.04	0.06	0.02	0.07	1.73	0	0.1	0	0.125	3.68	0
May	1981	0.43	0.21	0.22	0.2	0.15	0.08	0	0	0.11	0	0.103	0	0
Jun	1981	0.23	0.22	0.01	0.09	0.03	0.11	0	0	0.13	0	0.088	0	0
Jul	1981	0.76	0.41	0.36	0.13	0.02	0.13	0	0.48	0.26	0	0.149	0	0
Aug	1981	1.15	0.43	0.72	0.27	0.08	0.14	0	0.66	0.27	0	0.161	0	0
Sep	1981	0.92	0.34	0.58	0.02	0	0.12	0	0.78	0.19	0	0.15	0	0
Oct	1981	1.99	3.77	-1.78	0.11	0.07	0.06	1.74	0	0.09	0	0.122	0	0
Nov	1981	0.14	0.14	0	0.04	0.03	0.07	0	0	0.03	0	0.105	0	0
Dec	1981	0.14	0.12	0.02	0.02	0.01	0.11	0	0	0.01	0	0.104	0	0
Jan	1982	1.13	0.15	0.98	0.18	0.18	0.14	0	0.63	0.02	0	0.132	0	0
Feb	1982	0.88	0.17	0.71	0.06	0.03	0.13	0	0.66	0.04	0	0.138	0	0
Mar	1982	0.96	0.25	0.71	0.08	0.02	0.14	0	0.72	0.07	0	0.179	0	0
Apr	1982	1.85	4.41	-2.56	0.07	0	0.07	1.71	0	0.1	0	0.126	4.18	0
May	1982	0.19	0.21	-0.02	0.09	0.01	0.08	0	0	0.11	0	0.1	0	0
Jun	1982	0.32	0.26	0.06	0.16	0.08	0.09	0	0	0.15	0	0.104	0	0
Jul	1982	0.56	0.26	0.3	0.06	0	0.13	0	0.37	0.17	0	0.097	0	0
Aug	1982	0.85	0.34	0.51	0.15	0.05	0.14	0	0.52	0.21	0	0.125	0	0



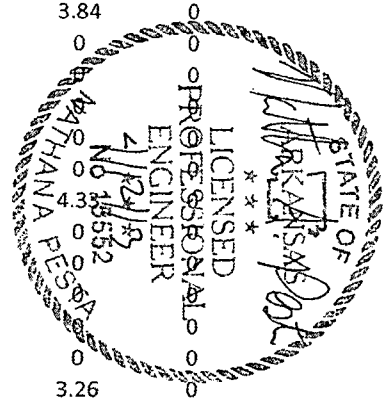
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Sep	1982	0.98	0.35	0.63	0.04	0	0.13	0	0.81	0.19	0.01	0.152	0	0
Oct	1982	1.94	3.41	-1.47	0.09	0.03	0.07	1.74	0	0.09	0	0.121	3.2	0
Nov	1982	0.3	0.14	0.15	0.11	0.11	0.07	0	0	0.04	0	0.109	0	0
Dec	1982	1.03	0.15	0.89	0.27	0.35	0.13	0	0.28	0.02	0	0.13	0	0
Jan	1983	0.72	0.19	0.54	0.02	0	0.14	0	0.56	0.02	0	0.164	0	0
Feb	1983	0.81	0.22	0.59	0.05	0.02	0.13	0	0.61	0.05	0	0.174	0	0
Mar	1983	0.97	0.28	0.69	0.11	0.01	0.14	0	0.71	0.08	0	0.198	0	0
Apr	1983	2.07	4.85	-2.78	0.18	0.05	0.07	1.78	0	0.11	0	0.135	4.61	0
May	1983	0.23	0.23	0	0.12	0.04	0.07	0	0	0.12	0	0.111	0	0
Jun	1983	0.22	0.27	-0.04	0.11	0.03	0.09	0	0	0.16	0	0.109	0	0
Jul	1983	0.56	0.27	0.29	0.03	0	0.13	0	0.39	0.17	0	0.098	0	0
Aug	1983	0.61	0.38	0.22	0.06	0	0.14	0	0.41	0.23	0.01	0.141	0	0
Sep	1983	0.93	0.27	0.66	0.02	0	0.12	0	0.78	0.15	0	0.116	0	0
Oct	1983	1.88	3.09	-1.2	0.06	0.01	0.07	1.74	0	0.09	0	0.121	2.87	0
Nov	1983	0.36	0.14	0.23	0.14	0.15	0.07	0	0	0.03	0	0.101	0	0
Dec	1983	0.29	0.11	0.18	0.05	0.08	0.13	0	0.03	0.01	0	0.101	0	0
Jan	1984	0.69	0.14	0.55	0.02	0.01	0.15	0	0.52	0.02	0	0.121	0	0
Feb	1984	0.94	0.17	0.78	0.11	0.05	0.13	0	0.65	0.03	0	0.13	0	0
Mar	1984	1.19	0.25	0.94	0.17	0.06	0.15	0	0.81	0.07	0	0.176	0	0
Apr	1984	1.96	4.62	-2.65	0.12	0.03	0.07	1.74	0	0.1	0	0.129	4.38	0
May	1984	0.39	0.21	0.18	0.16	0.14	0.08	0	0	0.11	0	0.102	0	0
Jun	1984	0.18	0.24	-0.05	0.06	0.02	0.1	0	0	0.14	0	0.096	0	0
Jul	1984	0.57	0.33	0.24	0.05	0	0.13	0	0.39	0.21	0	0.118	0	0
Aug	1984	0.6	0.37	0.23	0.05	0	0.13	0	0.42	0.23	0	0.137	0	0
Sep	1984	1.28	0.33	0.95	0.18	0.05	0.13	0	0.92	0.18	0	0.145	0	0
Oct	1984	2.35	3.53	-1.18	0.26	0.27	0.05	1.78	0	0.08	0	0.114	3.33	0
Nov	1984	0.44	0.16	0.28	0.19	0.15	0.11	0	0	0.04	0	0.12	0	0
Dec	1984	0.79	0.17	0.62	0.17	0.12	0.13	0	0.36	0.02	0	0.149	0	0
Jan	1985	0.81	0.18	0.64	0.05	0.02	0.15	0	0.59	0.02	0	0.155	0	0
Feb	1985	1.06	0.21	0.85	0.17	0.07	0.13	0	0.69	0.04	0	0.166	0	0
Mar	1985	1.45	0.31	1.13	0.34	0.05	0.15	0	0.91	0.09	0	0.224	0	0
Apr	1985	1.96	5.76	-3.8	0.11	0.05	0.07	1.74	0	0.12	0	0.145	4.63	0
May	1985	0.18	0.23	-0.05	0.08	0.03	0.07	0	0	0.12	0	0.112	0	0
Jun	1985	0.13	0.25	-0.12	0.04	0	0.09	0	0	0.15	0	0.102	0	0
Jul	1985	0.52	0.28	0.24	0.07	0.01	0.13	0	0.31	0.18	0	0.101	0	0
Aug	1985	0.82	0.37	0.46	0.11	0.03	0.14	0	0.55	0.23	0	0.138	0	0
Sep	1985	1	0.3	0.7	0.07	0	0.12	0	0.8	0.16	0	0.13	0	0
Oct	1985	1.95	3.2	-1.25	0.09	0.05	0.07	1.74	0	0.09	0	0.124	2.99	0



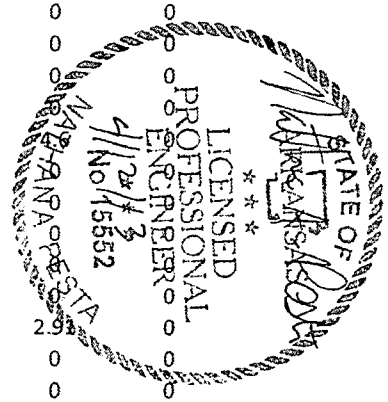
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Nov	1985	0.55	0.14	0.41	0.2	0.27	0.08	0	0	0.04	0	0.107	0	0
Dec	1985	0.36	0.16	0.2	0.04	0.03	0.13	0	0.16	0.02	0	0.138	0	0
Jan	1986	0.67	0.17	0.5	0.01	0	0.14	0	0.51	0.02	0	0.145	0	0
Feb	1986	0.85	0.19	0.67	0.07	0.02	0.13	0	0.63	0.04	0	0.146	0	0
Mar	1986	0.89	0.26	0.63	0.06	0.01	0.14	0	0.68	0.07	0	0.181	0	0
Apr	1986	2.09	4.55	-2.46	0.2	0.07	0.06	1.76	0	0.1	0	0.13	4.31	0
May	1986	0.22	0.24	-0.02	0.12	0.03	0.07	0	0	0.12	0	0.114	0	0
Jun	1986	0.19	0.26	-0.07	0.08	0.02	0.09	0	0	0.15	0	0.105	0	0
Jul	1986	0.49	0.26	0.23	0.02	0	0.13	0	0.34	0.16	0	0.094	0	0
Aug	1986	0.77	0.39	0.38	0.13	0.01	0.14	0	0.49	0.24	0.01	0.144	0	0
Sep	1986	1.07	0.28	0.79	0.08	0.02	0.13	0	0.84	0.16	0	0.123	0	0
Oct	1986	2.01	3.35	-1.34	0.11	0.04	0.07	1.79	0	0.09	0	0.127	3.13	0
Nov	1986	0.15	0.15	0	0.06	0.03	0.07	0	0	0.04	0	0.11	0	0
Dec	1986	0.13	0.13	0	0.02	0.01	0.1	0	0	0.02	0	0.115	0	0
Jan	1987	0.75	0.14	0.6	0.07	0.06	0.14	0	0.47	0.02	0	0.126	0	0
Feb	1987	1.09	0.18	0.91	0.2	0.09	0.13	0	0.68	0.04	0	0.144	0	0
Mar	1987	1.18	0.24	0.94	0.14	0.06	0.15	0	0.84	0.07	0	0.173	0	0
Apr	1987	1.81	4.3	-2.49	0.02	0	0.07	1.71	0	0.1	0	0.127	4.07	0
May	1987	0.3	0.21	0.09	0.13	0.08	0.09	0	0	0.11	0	0.101	0	0
Jun	1987	0.14	0.26	-0.11	0.06	0	0.08	0	0	0.15	0	0.104	0	0
Jul	1987	0.48	0.27	0.21	0.06	0	0.13	0	0.29	0.17	0	0.099	0	0
Aug	1987	0.74	0.36	0.38	0.1	0.02	0.14	0	0.48	0.22	0.01	0.134	0	0
Sep	1987	1.21	0.3	0.91	0.13	0.05	0.13	0	0.91	0.17	0	0.134	0	0
Oct	1987	1.96	3.32	-1.36	0.09	0.06	0.07	1.74	0	0.09	0	0.123	3.11	0
Nov	1987	0.33	0.13	0.2	0.11	0.14	0.08	0	0	0.03	0	0.097	0	0
Dec	1987	0.88	0.13	0.75	0.24	0.26	0.14	0	0.25	0.02	0	0.116	0	0
Jan	1988	0.82	0.18	0.64	0.05	0.02	0.15	0	0.6	0.02	0	0.157	0	0
Feb	1988	0.86	0.23	0.64	0.11	0.02	0.13	0	0.6	0.05	0	0.176	0	0
Mar	1988	1.47	0.29	1.18	0.36	0.06	0.15	0	0.91	0.08	0	0.21	0	0
Apr	1988	1.94	5.43	-3.49	0.1	0.01	0.07	1.76	0	0.12	0	0.147	0	0
May	1988	0.22	0.22	0	0.08	0.06	0.08	0	0	0.11	0	0.105	0	0
Jun	1988	0.12	0.21	-0.09	0.03	0.01	0.08	0	0	0.13	0	0.087	0	0
Jul	1988	0.59	0.28	0.31	0.1	0.04	0.14	0	0.31	0.18	0	0.101	0	0
Aug	1988	0.67	0.38	0.29	0.07	0	0.14	0	0.47	0.23	0.01	0.139	0	0
Sep	1988	1.1	0.27	0.83	0.1	0.01	0.13	0	0.86	0.15	0	0.118	0	0
Oct	1988	1.88	3.22	-1.34	0.05	0.02	0.07	1.74	0	0.09	0	0.126	3	0
Nov	1988	0.47	0.13	0.34	0.17	0.23	0.08	0	0	0.03	0	0.1	0	0
Dec	1988	0.3	0.13	0.18	0.06	0.05	0.13	0	0.05	0.01	0	0.111	0	0



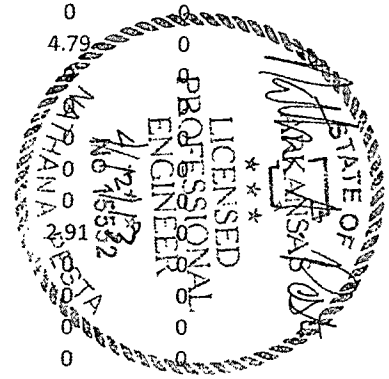
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Jan	1989	0.89	0.15	0.73	0.08	0.05	0.15	0	0.61	0.02	0	0.135	0	0
Feb	1989	1.4	0.21	1.19	0.33	0.11	0.13	0	0.83	0.04	0	0.168	0	0
Mar	1989	1.19	0.3	0.89	0.21	0.03	0.15	0	0.8	0.08	0.01	0.207	0	0
Apr	1989	1.83	5.18	-3.35	0.03	0	0.07	1.74	0	0.12	0	0.144	4.93	0
May	1989	0.32	0.22	0.1	0.15	0.09	0.08	0	0	0.11	0	0.106	0	0
Jun	1989	0.21	0.27	-0.06	0.11	0.02	0.09	0	0	0.16	0	0.109	0	0
Jul	1989	0.68	0.27	0.41	0.12	0.03	0.14	0	0.4	0.17	0	0.099	0	0
Aug	1989	0.65	0.34	0.31	0.07	0	0.14	0	0.45	0.22	0	0.129	0	0
Sep	1989	1.08	0.35	0.73	0.08	0.01	0.13	0	0.86	0.2	0	0.154	0	0
Oct	1989	1.82	3.34	-1.52	0.01	0	0.06	1.74	0	0.09	0	0.117	3.13	0
Nov	1989	0.08	0.11	-0.03	0.01	0	0.07	0	0	0.03	0	0.086	0	0
Dec	1989	0.1	0.09	0	0.01	0	0.09	0	0	0.01	0	0.083	0	0
Jan	1990	0.91	0.13	0.78	0.12	0.17	0.14	0	0.48	0.02	0	0.115	0	0
Feb	1990	1.12	0.17	0.95	0.16	0.11	0.13	0	0.71	0.04	0	0.134	0	0
Mar	1990	1.41	0.25	1.17	0.26	0.1	0.15	0	0.91	0.07	0	0.175	0	0
Apr	1990	2.02	4.71	-2.69	0.15	0.08	0.06	1.73	0	0.1	0	0.127	4.48	0
May	1990	0.75	0.26	0.49	0.31	0.29	0.12	0	0.03	0.13	0	0.125	0	0
Jun	1990	0.18	0.33	-0.15	0.05	0.01	0.13	0	0	0.2	0	0.133	0	0
Jul	1990	0.65	0.34	0.32	0.06	0	0.13	0	0.47	0.22	0	0.124	0	0
Aug	1990	0.77	0.41	0.35	0.1	0.02	0.14	0	0.51	0.26	0.01	0.153	0	0
Sep	1990	1.14	0.35	0.79	0.13	0.03	0.13	0	0.85	0.19	0	0.152	0	0
Oct	1990	2.08	4.05	-1.97	0.17	0.1	0.06	1.75	0	0.09	0	0.122	3.84	0
Nov	1990	0.2	0.13	0.07	0.07	0.05	0.09	0	0	0.03	0	0.1	0	0
Dec	1990	0.43	0.12	0.32	0.1	0.15	0.13	0	0.05	0.01	0	0.102	0	0
Jan	1991	1.07	0.16	0.91	0.11	0.11	0.15	0	0.71	0.02	0	0.143	0	0
Feb	1991	0.74	0.18	0.56	0.03	0	0.13	0	0.58	0.04	0	0.143	0	0
Mar	1991	1.02	0.25	0.78	0.12	0.03	0.14	0	0.73	0.07	0	0.176	0	0
Apr	1991	2.17	4.55	-2.38	0.2	0.17	0.05	1.74	0	0.1	0	0.122	4.33	0
May	1991	0.29	0.19	0.11	0.11	0.08	0.09	0	0	0.1	0	0.091	0	0
Jun	1991	0.14	0.21	-0.07	0.03	0	0.11	0	0	0.12	0	0.085	0	0
Jul	1991	0.62	0.39	0.23	0.08	0	0.13	0	0.4	0.24	0.01	0.139	0	0
Aug	1991	0.65	0.33	0.32	0.07	0	0.14	0	0.45	0.21	0	0.125	0	0
Sep	1991	1.15	0.37	0.79	0.13	0.02	0.13	0	0.88	0.2	0	0.16	0	0
Oct	1991	2.29	3.47	-1.18	0.21	0.28	0.06	1.75	0	0.09	0	0.117	3.26	0
Nov	1991	0.37	0.16	0.2	0.15	0.11	0.11	0	0	0.04	0	0.122	0	0
Dec	1991	0.64	0.15	0.49	0.13	0.11	0.13	0	0.28	0.02	0	0.135	0	0
Jan	1992	0.78	0.18	0.6	0.04	0.02	0.15	0	0.58	0.02	0	0.155	0	0
Feb	1992	0.84	0.23	0.62	0.09	0.01	0.13	0	0.61	0.05	0.01	0.174	0	0



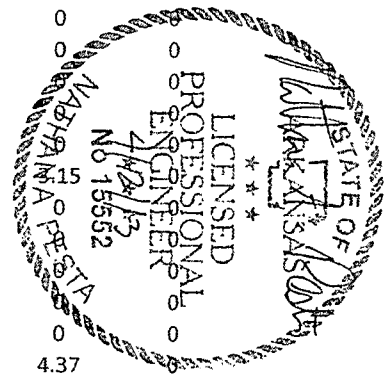
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Mar	1992	0.98	0.29	0.7	0.1	0.01	0.14	0	0.72	0.08	0	0.204	0	0
Apr	1992	1.83	4.83	-3	0.04	0.02	0.07	1.71	0	0.11	0	0.137	4.59	0
May	1992	0.22	0.23	-0.01	0.11	0.03	0.08	0	0	0.12	0	0.11	0	0
Jun	1992	0.39	0.25	0.14	0.18	0.11	0.1	0	0	0.15	0	0.103	0	0
Jul	1992	0.75	0.38	0.38	0.13	0.01	0.13	0	0.47	0.23	0.01	0.135	0	0
Aug	1992	0.72	0.31	0.41	0.09	0	0.14	0	0.49	0.19	0	0.117	0	0
Sep	1992	1.28	0.32	0.97	0.15	0.07	0.13	0	0.93	0.18	0	0.139	0	0
Oct	1992	1.85	3.76	-1.91	0.03	0.01	0.06	1.74	0	0.09	0	0.12	3.55	0
Nov	1992	0.37	0.13	0.23	0.13	0.16	0.08	0	0	0.03	0	0.1	0	0
Dec	1992	0.53	0.14	0.39	0.12	0.16	0.13	0	0.12	0.02	0	0.125	0	0
Jan	1993	1.1	0.19	0.9	0.15	0.11	0.15	0	0.69	0.02	0	0.169	0	0
Feb	1993	0.94	0.22	0.72	0.15	0.03	0.13	0	0.63	0.05	0	0.174	0	0
Mar	1993	1	0.28	0.71	0.1	0.01	0.14	0	0.74	0.08	0	0.201	0	0
Apr	1993	2	4.86	-2.86	0.14	0.05	0.06	1.75	0	0.11	0	0.133	4.62	0
May	1993	0.33	0.2	0.13	0.15	0.1	0.08	0	0	0.1	0	0.098	0	0
Jun	1993	0.19	0.23	-0.04	0.08	0.01	0.1	0	0	0.14	0	0.094	0	0
Jul	1993	0.56	0.34	0.22	0.04	0	0.13	0	0.39	0.21	0.01	0.122	0	0
Aug	1993	0.7	0.33	0.38	0.09	0.02	0.14	0	0.46	0.2	0	0.123	0	0
Sep	1993	1.46	0.36	1.09	0.27	0.06	0.13	0	0.99	0.2	0	0.16	0	0
Oct	1993	1.96	3.78	-1.82	0.09	0.04	0.07	1.76	0	0.09	0	0.124	3.57	0
Nov	1993	0.34	0.13	0.21	0.12	0.13	0.08	0	0	0.03	0	0.098	0	0
Dec	1993	0.28	0.12	0.16	0.05	0.07	0.13	0	0.03	0.01	0	0.104	0	0
Jan	1994	0.93	0.15	0.78	0.11	0.08	0.15	0	0.6	0.02	0	0.131	0	0
Feb	1994	0.91	0.18	0.73	0.11	0.05	0.13	0	0.63	0.04	0	0.144	0	0
Mar	1994	1.26	0.27	0.99	0.21	0.05	0.15	0	0.86	0.08	0	0.195	0	0
Apr	1994	2.03	4.84	-2.81	0.16	0.07	0.07	1.73	0	0.11	0	0.133	0	0
May	1994	0.11	0.23	-0.12	0.04	0	0.07	0	0	0.12	0	0.111	0	0
Jun	1994	0.17	0.24	-0.06	0.06	0.02	0.09	0	0	0.14	0	0.095	0	0
Jul	1994	0.52	0.27	0.25	0.07	0	0.13	0	0.32	0.17	0	0.1	0	0
Aug	1994	0.73	0.37	0.37	0.1	0.01	0.14	0	0.48	0.23	0	0.136	0	0
Sep	1994	0.95	0.28	0.67	0.02	0	0.12	0	0.8	0.15	0.01	0.119	0	0
Oct	1994	1.88	3.12	-1.24	0.06	0.02	0.07	1.74	0	0.09	0	0.117	2.91	0
Nov	1994	0.8	0.18	0.62	0.31	0.37	0.11	0	0	0.04	0	0.134	0	0
Dec	1994	0.59	0.15	0.44	0.1	0.08	0.13	0	0.27	0.02	0	0.133	0	0
Jan	1995	1.08	0.18	0.9	0.16	0.1	0.15	0	0.67	0.02	0	0.159	0	0
Feb	1995	0.77	0.21	0.56	0.06	0.01	0.13	0	0.58	0.04	0	0.168	0	0
Mar	1995	1.06	0.3	0.77	0.13	0.03	0.15	0	0.76	0.08	0	0.209	0	0
Apr	1995	2.05	5.16	-3.12	0.17	0.1	0.06	1.71	0	0.12	0	0.145	4.9	0



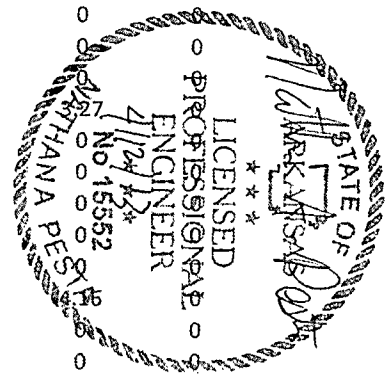
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
May	1995	0.28	0.2	0.09	0.11	0.08	0.09	0	0	0.1	0	0.095	0	0
Jun	1995	0.28	0.21	0.06	0.1	0.06	0.12	0	0	0.13	0	0.087	0	0
Jul	1995	0.71	0.41	0.3	0.1	0.01	0.13	0	0.48	0.25	0.01	0.146	0	0
Aug	1995	0.57	0.31	0.26	0.02	0	0.13	0	0.42	0.2	0	0.119	0	0
Sep	1995	1.22	0.36	0.86	0.17	0.04	0.13	0	0.88	0.2	0	0.157	0	0
Oct	1995	1.96	3.67	-1.71	0.08	0.03	0.07	1.78	0	0.09	0	0.118	3.47	0
Nov	1995	0.17	0.15	0.02	0.06	0.04	0.06	0	0	0.04	0	0.11	0	0
Dec	1995	0.28	0.12	0.16	0.08	0.09	0.11	0	0	0.01	0	0.107	0	0
Jan	1996	0.93	0.14	0.79	0.08	0.1	0.15	0	0.6	0.02	0	0.126	0	0
Feb	1996	0.73	0.18	0.55	0.02	0	0.13	0	0.58	0.04	0	0.141	0	0
Mar	1996	1.06	0.24	0.82	0.15	0.03	0.14	0	0.74	0.07	0	0.175	0	0
Apr	1996	2.01	4.21	-2.2	0.13	0.1	0.06	1.73	0	0.1	0	0.127	3.99	0
May	1996	0.14	0.23	-0.08	0.06	0.01	0.07	0	0	0.12	0	0.109	0	0
Jun	1996	0.19	0.27	-0.07	0.08	0.02	0.1	0	0	0.16	0	0.108	0	0
Jul	1996	0.56	0.25	0.31	0.06	0	0.13	0	0.36	0.16	0	0.091	0	0
Aug	1996	0.65	0.39	0.27	0.07	0	0.14	0	0.45	0.24	0.01	0.142	0	0
Sep	1996	1.82	0.32	1.5	0.36	0.19	0.13	0	1.14	0.18	0	0.14	0	0
Oct	1996	1.87	3.92	-2.05	0.05	0.01	0.07	1.74	0	0.09	0	0.127	3.7	0
Nov	1996	0.55	0.13	0.42	0.19	0.27	0.08	0	0	0.03	0	0.097	0	0
Dec	1996	0.36	0.16	0.2	0.06	0.05	0.13	0	0.12	0.02	0	0.137	0	0
Jan	1997	0.73	0.16	0.57	0.03	0.01	0.15	0	0.54	0.02	0	0.142	0	0
Feb	1997	1.1	0.2	0.9	0.2	0.08	0.13	0	0.68	0.04	0	0.155	0	0
Mar	1997	1.2	0.29	0.91	0.18	0.03	0.15	0	0.84	0.08	0	0.205	0	0
Apr	1997	2.02	5.04	-3.02	0.16	0.02	0.07	1.77	0	0.11	0	0.137	4.79	0
May	1997	0.17	0.2	-0.02	0.07	0.02	0.08	0	0	0.1	0	0.095	0	0
Jun	1997	0.18	0.21	-0.04	0.07	0.02	0.08	0	0	0.13	0	0.086	0	0
Jul	1997	0.44	0.29	0.14	0.05	0	0.13	0	0.26	0.19	0	0.108	0	0
Aug	1997	0.73	0.33	0.4	0.08	0.01	0.14	0	0.51	0.21	0	0.124	0	0
Sep	1997	1.03	0.27	0.77	0.07	0.02	0.12	0	0.81	0.15	0.01	0.115	0	0
Oct	1997	1.9	3.12	-1.22	0.06	0.02	0.07	1.74	0	0.09	0	0.123	0	0
Nov	1997	0.16	0.15	0.01	0.06	0.03	0.06	0	0	0.04	0	0.11	2.91	0
Dec	1997	0.28	0.12	0.16	0.07	0.09	0.11	0	0	0.01	0	0.108	0	0
Jan	1998	1.18	0.15	1.03	0.16	0.19	0.15	0	0.68	0.02	0	0.13	0	0
Feb	1998	1.08	0.21	0.87	0.17	0.08	0.13	0	0.7	0.04	0	0.162	0	0
Mar	1998	1.5	0.31	1.19	0.36	0.07	0.15	0	0.93	0.09	0	0.217	0	0
Apr	1998	1.94	5.15	-3.21	0.1	0.04	0.07	1.74	0	0.12	0	0.147	4.89	0
May	1998	0.19	0.23	-0.05	0.08	0.03	0.07	0	0	0.12	0	0.113	0	0
Jun	1998	0.12	0.23	-0.11	0.04	0	0.08	0	0	0.14	0	0.095	0	0



Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Jul	1998	0.48	0.29	0.19	0.05	0	0.13	0	0.29	0.18	0	0.104	0	0
Aug	1998	0.72	0.36	0.37	0.09	0	0.14	0	0.5	0.22	0	0.132	0	0
Sep	1998	1.02	0.26	0.76	0.06	0.02	0.13	0	0.81	0.14	0.01	0.113	0	0
Oct	1998	2.14	3.35	-1.21	0.16	0.08	0.07	1.83	0	0.09	0	0.124	3.13	0
Nov	1998	0.19	0.15	0.04	0.08	0.04	0.07	0	0	0.04	0	0.11	0	0
Dec	1998	0.29	0.11	0.17	0.07	0.09	0.12	0	0	0.01	0	0.101	0	0
Jan	1999	0.96	0.14	0.82	0.1	0.11	0.15	0	0.6	0.02	0	0.124	0	0
Feb	1999	0.86	0.16	0.7	0.05	0.03	0.13	0	0.65	0.03	0	0.129	0	0
Mar	1999	1.14	0.24	0.89	0.17	0.06	0.15	0	0.77	0.07	0	0.174	0	0
Apr	1999	2.02	4.64	-2.62	0.14	0.04	0.07	1.78	0	0.1	0	0.13	4.41	0
May	1999	0.24	0.23	0	0.12	0.04	0.07	0	0	0.12	0	0.113	0	0
Jun	1999	0.28	0.24	0.04	0.12	0.07	0.09	0	0	0.14	0	0.097	0	0
Jul	1999	0.59	0.3	0.29	0.03	0	0.13	0	0.43	0.19	0	0.11	0	0
Aug	1999	0.57	0.38	0.19	0.05	0	0.13	0	0.39	0.24	0.01	0.142	0	0
Sep	1999	0.94	0.27	0.67	0.03	0	0.12	0	0.79	0.15	0	0.117	0	0
Oct	1999	1.85	3.09	-1.24	0.04	0	0.06	1.74	0	0.08	0	0.115	2.89	0
Nov	1999	0.14	0.13	0.01	0.04	0.03	0.07	0	0	0.03	0	0.094	0	0
Dec	1999	0.43	0.11	0.32	0.12	0.18	0.12	0	0.01	0.01	0	0.095	0	0
Jan	2000	0.78	0.14	0.64	0.05	0.04	0.14	0	0.55	0.02	0	0.121	0	0
Feb	2000	0.83	0.18	0.66	0.07	0.03	0.14	0	0.6	0.04	0	0.138	0	0
Mar	2000	1.01	0.24	0.76	0.09	0.01	0.15	0	0.76	0.07	0	0.174	0	0
Apr	2000	1.83	4.21	-2.37	0.05	0	0.07	1.71	0	0.1	0	0.127	3.98	0
May	2000	0.33	0.21	0.12	0.15	0.1	0.08	0	0	0.11	0	0.103	0	0
Jun	2000	0.39	0.24	0.15	0.16	0.12	0.1	0	0	0.14	0	0.096	0	0
Jul	2000	0.72	0.42	0.3	0.1	0	0.13	0	0.49	0.26	0.01	0.15	0	0
Aug	2000	0.56	0.32	0.23	0.01	0	0.13	0	0.42	0.2	0	0.122	0	0
Sep	2000	1.01	0.33	0.67	0.07	0.01	0.12	0	0.8	0.18	0.01	0.144	0	0
Oct	2000	1.89	3.36	-1.47	0.07	0.01	0.07	1.75	0	0.09	0	0.121	4.15	0
Nov	2000	0.39	0.12	0.27	0.13	0.17	0.09	0	0	0.03	0	0.093	0	0
Dec	2000	0.23	0.11	0.12	0.04	0.05	0.13	0	0.01	0.01	0	0.096	0	0
Jan	2001	0.82	0.14	0.68	0.06	0.05	0.15	0	0.56	0.02	0	0.124	0	0
Feb	2001	1.24	0.19	1.04	0.23	0.11	0.13	0	0.76	0.04	0	0.153	0	0
Mar	2001	0.93	0.28	0.65	0.06	0	0.14	0	0.72	0.08	0	0.197	0	0
Apr	2001	1.81	4.6	-2.79	0.03	0	0.07	1.71	0	0.1	0	0.127	4.37	0
May	2001	0.21	0.21	0.01	0.09	0.04	0.09	0	0	0.11	0	0.1	0	0
Jun	2001	0.19	0.23	-0.04	0.07	0.04	0.09	0	0	0.14	0	0.095	0	0
Jul	2001	0.52	0.27	0.25	0.09	0	0.14	0	0.3	0.17	0	0.1	0	0
Aug	2001	0.68	0.37	0.31	0.07	0.01	0.14	0	0.47	0.23	0.01	0.137	0	0



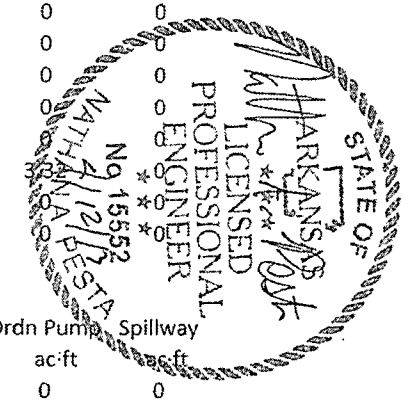
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Sep	2001	1.21	0.32	0.89	0.14	0.06	0.12	0	0.89	0.18	0.01	0.139	0	0
Oct	2001	1.96	3.3	-1.34	0.09	0.05	0.07	1.75	0	0.09	0	0.123	3.09	0
Nov	2001	0.29	0.14	0.15	0.11	0.11	0.07	0	0	0.04	0	0.108	0	0
Dec	2001	0.63	0.13	0.5	0.15	0.19	0.13	0	0.17	0.02	0	0.117	0	0
Jan	2002	0.93	0.17	0.75	0.14	0.06	0.14	0	0.59	0.02	0	0.153	0	0
Feb	2002	0.91	0.22	0.69	0.1	0.03	0.13	0	0.66	0.05	0	0.175	0	0
Mar	2002	1.82	0.3	1.51	0.52	0.09	0.15	0	1.05	0.09	0	0.218	0	0
Apr	2002	2.02	5.66	-3.65	0.21	0.03	0.07	1.71	0	0.12	0	0.147	5.4	0
May	2002	0.23	0.23	0.01	0.11	0.04	0.08	0	0	0.12	0	0.109	0	0
Jun	2002	0.2	0.26	-0.05	0.09	0.01	0.1	0	0	0.15	0	0.104	0	0
Jul	2002	0.65	0.27	0.38	0.09	0	0.14	0	0.42	0.17	0	0.098	0	0
Aug	2002	0.84	0.33	0.51	0.1	0.07	0.14	0	0.53	0.2	0	0.121	0	0
Sep	2002	0.96	0.34	0.61	0.05	0	0.12	0	0.78	0.19	0.01	0.148	0	0
Oct	2002	1.89	3.34	-1.45	0.07	0.02	0.07	1.74	0	0.09	0	0.121	3.13	0
Nov	2002	0.11	0.14	-0.03	0.03	0.02	0.06	0	0	0.04	0	0.108	0	0
Dec	2002	0.38	0.12	0.26	0.12	0.15	0.11	0	0	0.01	0	0.108	0	0
Jan	2003	0.69	0.15	0.54	0.01	0.01	0.14	0	0.53	0.02	0	0.133	0	0
Feb	2003	0.9	0.18	0.72	0.11	0.04	0.13	0	0.61	0.04	0	0.142	0	0
Mar	2003	1.05	0.25	0.81	0.11	0.02	0.15	0	0.78	0.07	0	0.176	0	0
Apr	2003	1.84	4.14	-2.29	0.05	0.02	0.07	1.7	0	0.1	0	0.13	3.9	0
May	2003	0.37	0.22	0.15	0.17	0.12	0.08	0	0	0.11	0	0.105	0	0
Jun	2003	0.21	0.23	-0.02	0.08	0.03	0.1	0	0	0.14	0	0.094	0	0
Jul	2003	0.61	0.33	0.28	0.08	0.02	0.14	0	0.38	0.21	0	0.119	0	0
Aug	2003	0.7	0.32	0.38	0.07	0.01	0.14	0	0.49	0.2	0	0.121	0	0
Sep	2003	1.06	0.36	0.7	0.09	0.01	0.13	0	0.83	0.2	0.01	0.155	0	0
Oct	2003	1.97	3.48	-1.51	0.09	0.05	0.07	1.75	0	0.09	0	0.124	3.27	0
Nov	2003	0.35	0.14	0.22	0.13	0.14	0.08	0	0	0.03	0	0.102	0	0
Dec	2003	0.29	0.11	0.19	0.06	0.08	0.13	0	0.03	0.01	0	0.096	0	0
Jan	2004	0.85	0.14	0.71	0.06	0.05	0.15	0	0.59	0.02	0	0.127	0	0
Feb	2004	0.86	0.18	0.68	0.06	0.03	0.13	0	0.64	0.04	0	0.139	0	0
Mar	2004	1.02	0.26	0.76	0.12	0.03	0.14	0	0.72	0.07	0	0.182	0	0
Apr	2004	2.16	4.38	-2.22	0.19	0.21	0.06	1.71	0	0.1	0	0.121	4.16	0
May	2004	0.15	0.18	-0.03	0.05	0.02	0.09	0	0	0.1	0	0.089	0	0
Jun	2004	0.18	0.21	-0.02	0.08	0	0.11	0	0	0.12	0	0.084	0	0
Jul	2004	0.71	0.41	0.3	0.11	0	0.13	0	0.46	0.26	0	0.149	0	0
Aug	2004	0.67	0.31	0.37	0.06	0	0.14	0	0.48	0.19	0	0.116	0	0
Sep	2004	0.87	0.35	0.52	0	0	0.12	0	0.74	0.19	0.01	0.151	0	0
Oct	2004	2.24	3.58	-1.34	0.24	0.2	0.06	1.74	0	0.09	0	0.124	3.37	0



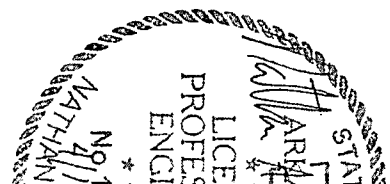
Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Nov	2004	0.41	0.13	0.29	0.13	0.18	0.11	0	0	0.03	0	0.095	0	0
Dec	2004	0.42	0.15	0.27	0.04	0.03	0.13	0	0.22	0.02	0	0.135	0	0
Jan	2005	1.19	0.18	1.02	0.18	0.15	0.15	0	0.72	0.02	0	0.155	0	0
Feb	2005	0.88	0.21	0.67	0.1	0.03	0.13	0	0.63	0.04	0	0.168	0	0
Mar	2005	1.07	0.29	0.78	0.15	0.02	0.15	0	0.76	0.08	0	0.207	0	0
Apr	2005	1.95	5.08	-3.14	0.13	0.02	0.07	1.73	0	0.11	0	0.139	4.83	0
May	2005	0.13	0.2	-0.07	0.04	0.01	0.08	0	0	0.1	0	0.095	0	0
Jun	2005	0.1	0.18	-0.08	0.02	0	0.08	0	0	0.11	0	0.072	0	0
Jul	2005	0.41	0.29	0.12	0.06	0	0.13	0	0.22	0.18	0	0.104	0	0
Aug	2005	0.72	0.29	0.43	0.08	0	0.14	0	0.49	0.18	0	0.107	0	0
Sep	2005	1.21	0.26	0.95	0.11	0.07	0.13	0	0.9	0.14	0.01	0.111	0	0
Oct	2005	1.81	3.2	-1.4	0	0	0.06	1.74	0	0.09	0	0.118	3	0
Nov	2005	0.19	0.13	0.06	0.06	0.05	0.07	0	0	0.03	0	0.095	0	0
Dec	2005	0.1	0.12	-0.02	0.01	0	0.1	0	0	0.01	0	0.107	0	0
Jan	2006	0.68	0.12	0.57	0.07	0.06	0.14	0	0.41	0.01	0	0.105	0	0
Feb	2006	0.78	0.17	0.61	0.03	0	0.13	0	0.62	0.04	0	0.134	0	0
Mar	2006	1.13	0.25	0.88	0.16	0.05	0.15	0	0.77	0.07	0	0.174	0	0
Apr	2006	2.02	3.91	-1.9	0.13	0.09	0.07	1.72	0	0.1	0	0.123	3.69	0
May	2006	0.18	0.21	-0.03	0.06	0.04	0.08	0	0	0.11	0	0.1	0	0
Jun	2006	0.18	0.26	-0.08	0.07	0.02	0.09	0	0	0.16	0	0.106	0	0
Jul	2006	0.53	0.26	0.27	0.05	0.01	0.13	0	0.34	0.17	0	0.097	0	0
Aug	2006	0.74	0.37	0.37	0.12	0.01	0.14	0	0.48	0.23	0	0.136	0	0
Sep	2006	1.31	0.33	0.98	0.17	0.06	0.13	0	0.94	0.19	0	0.147	0	0
Oct	2006	2.07	3.51	-1.44	0.14	0.14	0.05	1.74	0	0.08	0	0.111	3.33	0
Nov	2006	0.46	0.13	0.33	0.17	0.19	0.1	0	0	0.03	0	0.094	0	0
Dec	2006	0.6	0.15	0.45	0.12	0.12	0.13	0	0.23	0.02	0	0.136	0	0

S BY MAJOR IMPOUNDMENT PROCESSES

Mon	Inflow	Outflow	Change	Precip Vol	Bank Runof	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft	ac-ft
Jan	0.83	0.15	0.67	0.07	0.06	0.14	0	0.55	0.02	0	0.135	0	0
Feb	0.91	0.2	0.71	0.1	0.04	0.13	0	0.63	0.04	0	0.153	0	0
Mar	1.15	0.26	0.88	0.18	0.04	0.15	0	0.78	0.08	0	0.188	0	0
Apr	1.96	4.6	-2.64	0.12	0.05	0.06	1.73	0	0.11	0	0.132	4.37	0
May	0.27	0.22	0.05	0.12	0.07	0.08	0	0	0.11	0	0.105	0	0
Jun	0.21	0.24	-0.03	0.08	0.03	0.1	0	0	0.14	0	0.098	0	0
Jul	0.61	0.31	0.3	0.08	0.01	0.13	0	0.39	0.2	0	0.115	0	0
Aug	0.72	0.36	0.36	0.09	0.01	0.14	0	0.48	0.22	0	0.132	0	0



Mon	Year	Inflow	Outflow	Change	Precip Vol	Bank Runoff	Seep In	Drwdwn In	Spill In	Vol Evap	Vol Infil	Vol Seep	Drdn Pump	Spillway
Sep		1.15	0.32	0.84	0.12	0.03	0.13	0	0.87	0.18	0	0.139	0	0
Oct		1.96	3.49	-1.53	0.09	0.06	0.07	1.75	0	0.09	0	0.121	3.28	0
Nov		0.29	0.14	0.15	0.1	0.11	0.08	0	0	0.03	0	0.102	0	0
Dec		0.39	0.13	0.26	0.09	0.1	0.12	0	0.08	0.01	0	0.112	0	0



C & H Hog Farms
Newton County, AR

April 12, 2013

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 15552
2/12/13
NATHAN PESTA

QA/QC Soil testing results

Included in this QA/QC submittal are copies of the recent tests and observations performed during the course of the construction of the manure storage systems. Included are copies of proctor tests and moisture density control which were performed on the completed clay liner lifts, core trench and building pads.

The material used to construct the 18" clay liner is the same material identified in Section 3.D of the approved plans from Boring 2 from 7-11 feet. The preliminary atterburg limit tests on this material had a PI of 55 and 41 respectively. The recompacted permeability had a coefficient of permeability 5.0e-7 cm/sec. Given that it was determined that the liner would be constructed 18 inches thick and with a 98% compaction ration and +-2% optimum moisture to meet seepage requirements.

Waste Storage Pond 1 & 2 have a liner thickness of (18") inches. The ten state standards specifies that the coefficient of permeability (k) in centimeters per second shall not exceed the value derived from the equation $k = 2.6 \times 10^{-9} \times L$, where L equals the thickness of the seal in centimeters. Therefore the value shall not exceed: $k = 2.6 \times 10^{-9} \times 18" \times 2.54$ cm = **1.2×10^{-7} cm/sec.** According to the Appendix 10D of the AWMFH the seepage rate will be reduced in the future by a conservative estimate of ½ order of magnitude based off manure sealing of the liner. It is expected with future manure sealing the minimum coefficient of permeability is equal to 5.0 x 10-7 cm/sec + ½ order of magnitude = 1.0×10^{-7} cm/sec therefore meeting the ten state standard requirements.

For Waste Storage Pond 1, the nuclear density tests, tested the 18" thick liner in two levels from 0-9" and 9"-18". The required amount of tests was 12 tests (4 tests per lift, 3 lifts at 6" thick) as per the approved quality assurance plan and technical specifications. The tests were conducted on 2/12/13 and met the 98% compaction requirement. Test number 3 had a 17.7% moisture content which is -3% below optimum moisture content. All other tests were within the +-2% optimum moisture content. This test 3 outside the specified range for optimum moisture content is considered to be negligible in the performance of the clay liner. The final test results are therefore considered to be satisfactory and the liner meets requirements.

For Waste Storage Pond 2, the nuclear density tests, tested the 18" thick liner in two levels from 0-9" and 9"-18". The required amount of tests was 12 tests (4 tests per lift, 3 lifts at 6" thick) as per the approved quality assurance plan and technical specifications. The tests were conducted on 3/27/13 and 3/28/13 and met the 98% compaction requirement and the +- 2% optimum moisture content. The final test results are therefore considered to be satisfactory and meet the liner requirements.

Moisture density tests were taken on the core trenches for both Waste Storage Ponds respectively to make sure construction met the compaction requirements of the core

trench. During construction when a test failed the contractor would compact the failed area further and the failed area would be retested. The core trench (keyway) density tests were all greater than the required 95%.

Moisture density tests were taken for the fill area of both building pads respectively to make sure construction met the compaction requirements of the core trench. During construction when a test failed the contractor would compact the failed area further and the failed area would be retested. The building pad density tests were all greater than the required 95%.

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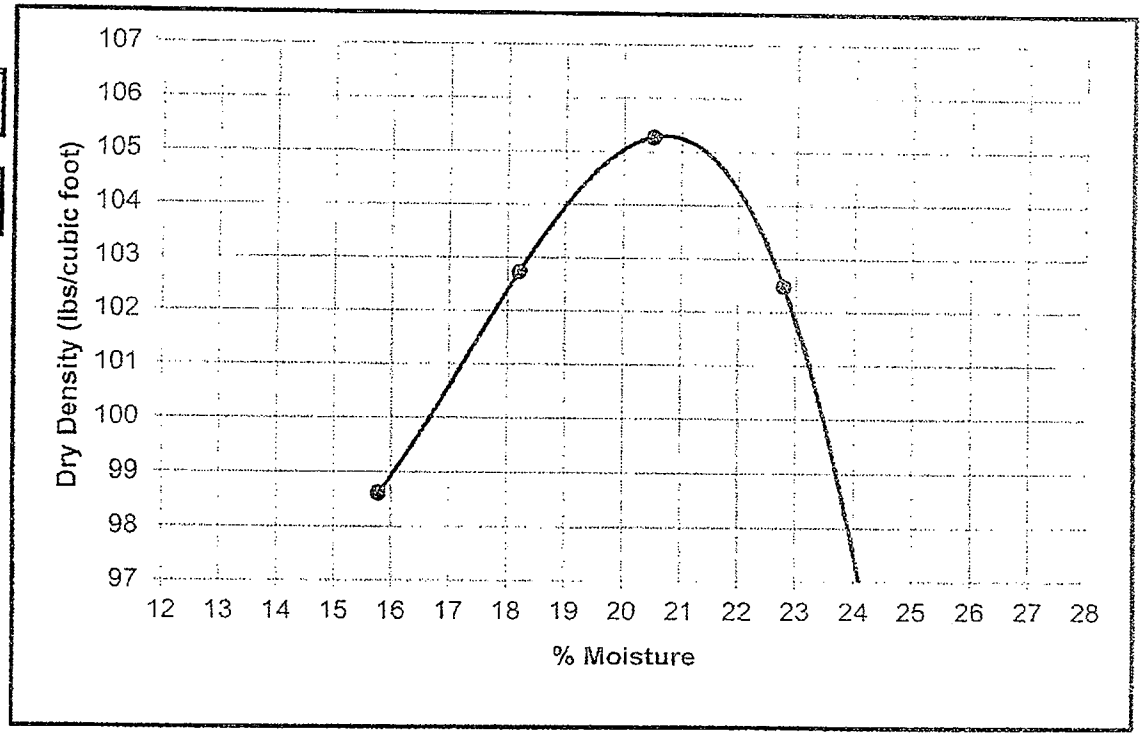
LABORATORY COMPACTION CHARACTERISTICS OF SOIL

CLIENT:	DeHaan, Grabs & Associates, LLC	DATE:	6/14/12	SAMPLE LOCATION:	B-2, Bulk Grab Sample	LL=	64
PROJECT NUMBER:	12-15049	LAB NO.	1	SAMPLE DESCRIPTION:	Red with Light Gray Streaks	PL=	23
PROJECT NAME:	Proposed Pond and Building Pads	TEST METHOD:	ASTM D698	AASHTO CLASS.:	N/A	PI=	41
				VISUAL CLASSIFICATION:	Fat Clay, with Sand		

Maximum Dry Density (lbs./cubic foot)	105.2
Optimum Moisture (percent)	20.7



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Hydraulic Conductivity Test Procedures Performed
In Accordance With ASTM D 5084 Method C
(Flexible Wall - Falling Head - Rising Tail)

HYDRAULIC CONDUCTIVITY TEST RESULTS

PROJECT: Mt. Judea -
Proposed Pond and Building Pads

PROJECT NUMBER: 12-15049

BORING: B-2

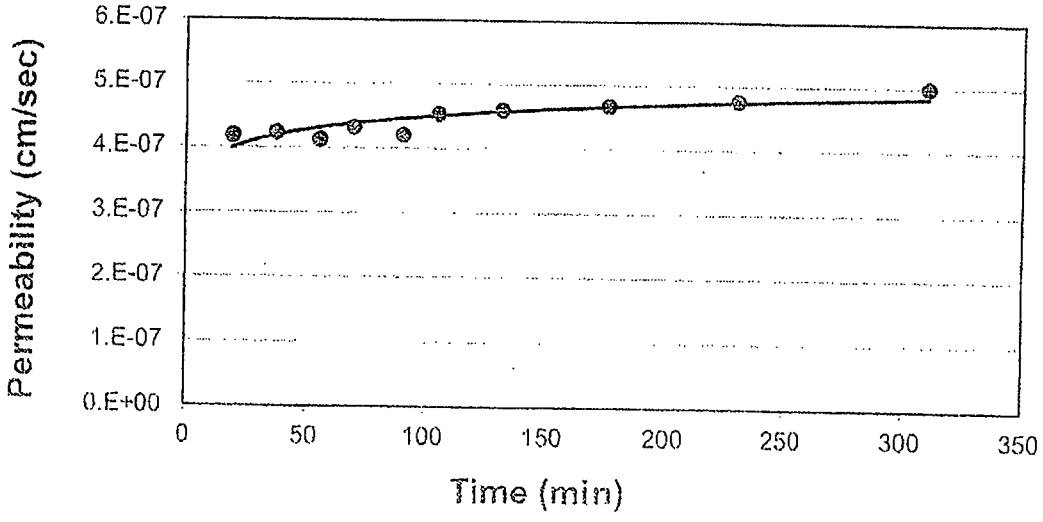
SAMPLE: N/A

DEPTH (ft): 7 - 11

SAMPLE TYPE: Recompacted

Hyrdraulic Conductivity, k (cm/s): 5.E-07

Test Parameters	*Initial Sample Data*	*Final Sample Data* (after consolidation and testing)
Cell Pressure (psi): 8	Diameter (in): 2.57	Diameter (in): 2.55
Inflow Pressure (psi): 4	Length (in): 4.58	Length (in): 4.54
Outflow Pressure (psi): 3	Moisture Content: 21.3%	Moisture Content: 25.3%
Back Pressure (psi): 3	Wet Unit Weight (pcf): 125.2	Wet Unit Weight (pcf): 130.3
Confining Pressure (psi): 4	Dry Unit Weight (pcf): 103.2	Dry Unit Weight (pcf): 103.9
	Initial Hydraulic Gradient: 5.29	Final Hydraulic Gradient: 5.03



Notes: Sample was recompacted at 98.1% of MDD at a moisture content of 21.2% (at OMC +0.5%)

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Arkansas Missouri
Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/12/13	TESTED BY:	Mason Drummond	START TIME:	11:15 AM
REPORT NO:	12-11216.001	CLIENT:	Jason Henson			END TIME:	12:15 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	5 ft. below Finish Subgrade	8	122.1	20.2	101.6	96.6%	95
2	1	Finish Subgrade	8	127.2	19.3	106.6	101.3%	95

Test Number	Location:
1	Ferm. Barn, 30 ft. south and 15 ft. west of northeast corner
2	Gestation Barn, 10 ft. north and 15 ft. east of southwest corner

CC: _____

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Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/17/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.002 Page 1	CLIENT:	Jason Henson		
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson		

START TIME: 11:00 AM
END TIME: 4:30 PM
MILEAGE: 197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	6 ft. below Finish Subgrade	8	126.2	20.8	104.5	99.3%	95
2	1	6 ft. below Finish Subgrade	8	127.3	18.3	107.6	102.3%	95
3	1	6 ft. below Finish Subgrade	8	130.9	20.3	108.8	103.4%	95
4	1	6 ft. below Finish Subgrade	8	130.6	23.4	105.9	100.7%	95
5	1	2 ft. below Finish Subgrade	8	126.6	16.9	108.3	102.9%	95
6	1	3 ft. below Finish Subgrade	8	119.6	18.3	101.1	96.1%	95
7	1	3 ft. below Finish Subgrade	8	122.0	17.9	103.4	98.3%	95
8	1	3 ft. below Finish Subgrade	8	121.3	19.3	101.6	96.6%	95

Test Number	Location:
1	Farrowing Barn pad, 10 ft. south and 7 ft. west of northeast corner
2	Farrowing Barn pad, 20 ft. south and 12 ft. east of northwest corner
3	Farrowing Barn pad, 15 ft. north and 15 ft. east of southwest corner
4	Farrowing Barn pad, 30 ft. north and 11 ft. west of southeast corner
5	N. Keyway, 25 ft. east of start, Pond #2
6	N. Keyway, 50 ft. west of corner to E. Keyway
7	E. Keyway, 15 ft. south of corner ot N. Keyway
8	E. Keyway, 90 ft. south of corner ot N. Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/17/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.002 Page 2	CLIENT:	Jason Henson	START TIME:	11:00 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	4:30 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1	1 ft. below Finish Subgrade	8	132.0	18.0	111.9	106.4%	95
10	1	5 ft. below Finish Subgrade	8	124.2	18.0	105.3	100.1%	95
11	1	5 ft. below Finish Subgrade	8	127.5	20.5	105.8	100.6%	95
12	1	4 ft. below Finish Subgrade	8	130.5	21.6	107.3	102.0%	95
13	1	4 ft. below Finish Subgrade	8	129.4	20.2	107.7	102.4%	95
14	1	4 ft. below Finish Subgrade	8	124.0	18.5	104.7	99.5%	95
15	1	4 ft. below Finish Subgrade	8	127.8	17.2	109.1	103.7%	95

Test Number	Location:
9	W. Keyway for Pond #2, south of Pond #2
10	Farrowing Barn pad, 5 ft. south and 40 ft. east of northwest corner
11	Farrowing Barn pad, 20 ft. south and 15 ft. west of northeast corner
12	Farrowing Barn pad, 10 ft. south and 15 ft. east of northwest corner
13	Farrowing Barn pad, 30 ft. north and 30 ft. east of southwest corner
14	Farrowing Barn pad, 7 ft. south and 15 ft. west of northeast corner
15	Farrowing Barn pad, 20 ft. north and 20 ft. west of southeast corner

CC: _____

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/18/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.003	CLIENT:	Jason Henson	START TIME:	9:30 / 12:00
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	10:00 / 4:30
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	Finish Subgrade	8	125.0	21.2	103.2	98.1%	95
2	1	Finish Subgrade	8	125.4	21.5	103.1	98.0%	95
3	1	4 ft. below Finish Subgrade	8	130.4	18.3	110.2	104.8%	95
4	1	4 ft. below Finish Subgrade	8	126.6	19.4	106.0	100.8%	95
5	1	4 ft. below Finish Subgrade	8	131.2	20.0	109.3	103.9%	95
6	1	4 ft. below Finish Subgrade	8	126.0	17.5	107.2	101.9%	95
7	1	4 ft. below Finish Subgrade	8	126.1	18.6	106.3	101.0%	95
8	1	4 ft. below Finish Subgrade	8	126.9	19.1	106.6	101.3%	95

Test Number	Location:
1	Farrowing Barn pad, 25 ft. south and 10 ft. east of northwest corner
2	Farrowing Barn pad, 40 ft. north and 12 ft. east of southwest corner
3	Farrowing Barn pad, 60 ft. north and 6 ft. west of southeast corner
4	Farrowing Barn pad, 30 ft. south and 15 ft. west of northeast corner
5	Farrowing Barn pad, 25 ft. north and 5 ft. west of southeast corner
6	Farrowing Barn pad, 70 ft. south and 25 ft. east of northwest corner
7	Farrowing Barn pad, 10 ft. south and 25 ft. east of northwest corner
8	Farrowing Barn pad, 30 ft. north and 11 ft. west of southeast corner

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PROJECT C&H Hog Farms

JOB NO. 12-11216 **DATE** 1/19/2013

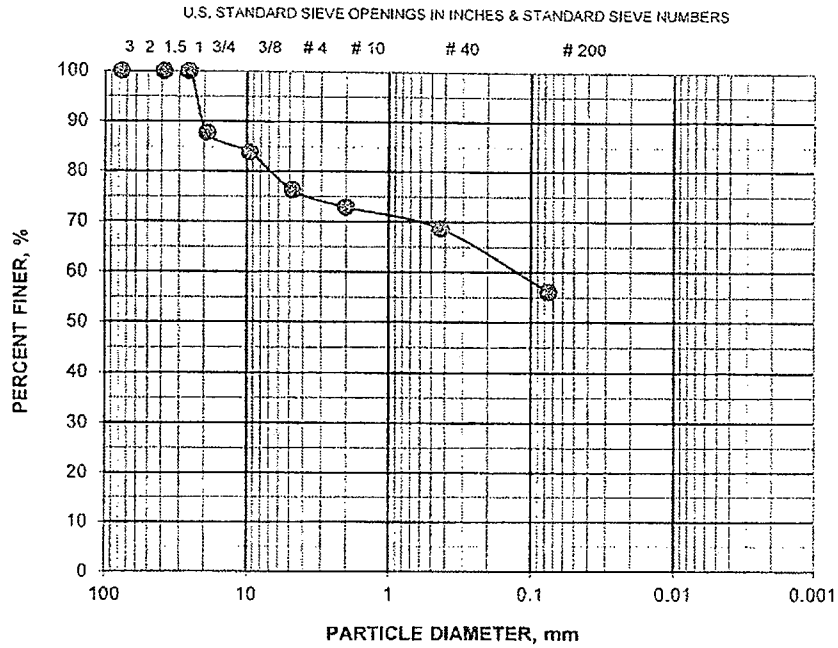
SAMPLE LOCATION	On-Site
SAMPLE NO.	1251
DEPTH (FT)	Not Provided
PLASTIC LIMIT	29
LIQUID LIMIT	64
PLASTICITY INDEX	35

SIEVE SIZE	PERCENT PASSING
3.00"	100.0%
1.50"	100.0%
1.00"	100.0%
3/4"	87.7%
3/8"	83.8%
No. 4	76.2%
No. 10	72.8%
No. 40	68.6%
No. 200	56.1%

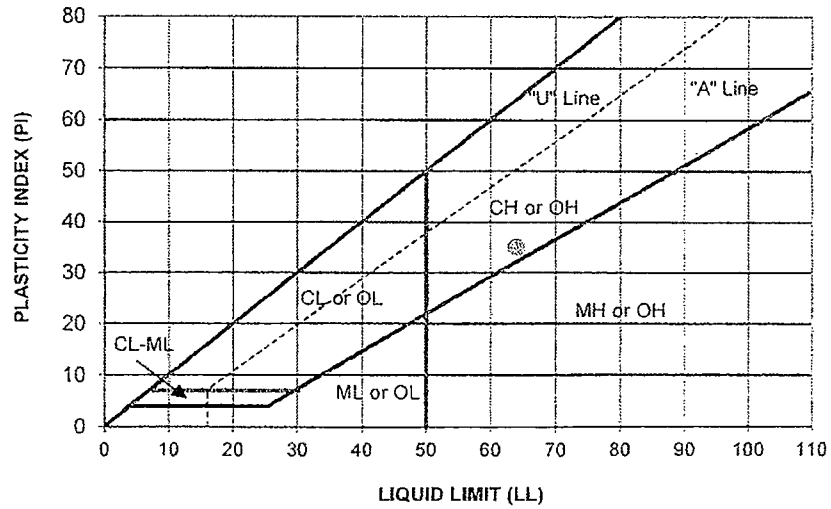
VISUAL CLASSIFICATION	Gray and Red Fat Clay with Sand

ASTM DESCRIPTION	AASHTO CLASSIFICATION	AASHTO GI
Gravelly Fat Clay with Sand, CH	A-7-6	17

GRAIN SIZE DISTRIBUTION CURVE



PLASTICITY CHART



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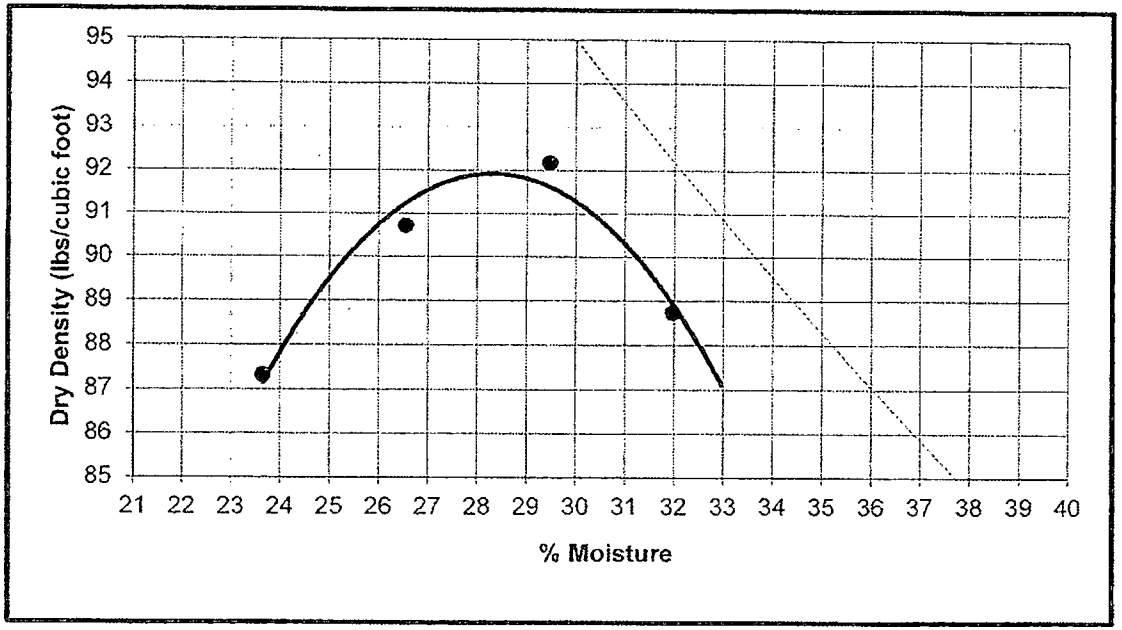
LABORATORY COMPACTION CHARACTERISTICS OF SOIL

CLIENT:	Jason Henson	DATE:	1/19/13	SAMPLE LOCATION:	On-Site	LL=	64
Project Number	12-11216	LAB NO.	1251	SAMPLE DESCRIPTION:	Gravelly Fat Clay with Sand, CH	PL=	29
Project Name	C&H Hog Farms	TEST METHOD:	ASTM D698	AASHTO Class:	A-7-6	PI=	35

Maximum Dry Density (lbs./cubic foot)	92.3
Optimum Moisture (percent)	29.0

Corrected Values

Maximum Dry Density (lbs./cubic foot)	96.4
Optimum Moisture (percent)	26.4



Oversized Rock Specific Gravity	2.26
Oversized Rock Absorption	8.1

ASTM D-4718, Correction for Oversize Particles — % Retained 3/4": 12.3%

% Retained 3/4" Sieve	Corrected Density lbs/ft3	Optimum Moisture
5%	93.9	28.0%
10%	95.6	26.9%
15%	97.4	25.9%
20%	99.2	24.8%
25%	101.0	23.8%
30%	103.0	22.7%

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/19/13	TESTED BY:	Mason Drummond	START TIME:	9:00 AM
REPORT NO:	12-11216.004	CLIENT:	Jason Henson			END TIME:	3:45 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64.41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	3 ft. below Finish Subgrade	8	128.5	17.6	109.3	103.9%	95
2	1	3 ft. below Finish Subgrade	8	123.3	16.9	105.5	100.3%	95
3	1	3 ft. below Finish Subgrade	8	129.4	16.0	111.5	106.0%	95
4	1	Finish Subgrade	8	126.3	18.1	107.0	101.7%	95
5	1	Finish Subgrade	8	126.1	19.7	105.4	100.2%	95
6	1	2 ft. below Finish Subgrade	8	121.3	18.7	102.2	97.1%	95
7	1	Finish Subgrade	8	126.3	19.6	105.6	100.4%	95

Test Number	Location:
1	Farrowing Barn pad, 20 ft. south and 15 ft. west of northeast corner
2	Farrowing Barn pad, 30 ft. south and 10 ft. west of northeast corner
3	Farrowing Barn pad, 30 ft. north and 20 ft. west of southeast corner
4	Farrowing Barn pad, 40 ft. south and 20 ft. east of northwest corner
5	Farrowing Barn pad, 20 ft. south and 15 ft. east of northwest corner
6	Farrowing Barn pad, 20 ft. south and 20 ft. west of northeast corner
7	Farrowing Barn pad, 80 ft. south and 35 ft. west of northeast corner

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/6/13	TESTED BY:	Mason Drummond	START TIME:	10:45 AM
REPORT NO:	12-11216.013	CLIENT:	Jason Henson			END TIME:	11:30 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	Finish Subgrade	8	127.2	20.2	105.9	100.7%	95
2	1	Finish Subgrade	8	124.8	17.2	106.5	101.2%	95
3	1	3 ft. below Finish Subgrade	8	128.9	17.4	109.8	104.4%	95
4	1	3 ft. below Finish Subgrade	8	126.0	17.8	107.3	102.0%	95
5	1	3 ft. below Finish Subgrade	8	127.7	16.8	109.3	103.9%	95

Test Number	Location:
1	Pond #2, East Keyway, 25 ft. south of corner to North Keyway
2	Pond #2, East Keyway, 90 ft. south of corner to North Keyway
3	Pond #1, East Keyway, 95 ft. north of corner to South Keyway
4	Pond #1, East Keyway, 20 ft. north of corner to South Keyway
5	Pond #1, South Keyway, 30 ft. west of corner to East Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/21/13	TESTED BY:	Mason Drummond	START TIME:	12:30 PM
REPORT NO:	12-11216.005	CLIENT:	Jason Henson			END TIME:	3:45 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	7 ft. below Finish Subgrade	8	122.7	20.3	102.0	97.0%	95
2	1	7 ft. below Finish Subgrade	8	123.4	17.2	105.2	100.0%	95
3	1	8 ft. below Finish Subgrade	8	128.0	18.3	108.2	102.9%	95
4	1	7 ft. below Finish Subgrade	8	127.3	19.4	106.6	101.3%	95

Test Number	Location:
1	Pond #2, East Keyway, 25 ft. south of corner to North Keyway
2	Pond #2, East Keyway, 60 ft. south of corner to North Keyway
3	Pond #2, East Keyway, 70 ft. south of corner to North Keyway
4	Pond #2, East Keyway, 5 ft. south of corner to North Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/21/13	TESTED BY:	Mason Drummond	START TIME:	12:30 PM
REPORT NO:	12-11216.005	CLIENT:	Jason Henson			END TIME:	3:45 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	7 ft. below Finish Subgrade	8	122.7	20.3	102.0	97.0%	95
2	1	7 ft. below Finish Subgrade	8	123.4	17.2	105.2	100.0%	95
3	1	8 ft. below Finish Subgrade	8	128.0	18.3	108.2	102.9%	95
4	1	7 ft. below Finish Subgrade	8	127.3	19.4	106.6	101.3%	95

Test Number	Location:
1	Pond #2, East Keyway, 25 ft. south of corner to North Keyway
2	Pond #2, East Keyway, 60 ft. south of corner to North Keyway
3	Pond #2, East Keyway, 70 ft. south of corner to North Keyway
4	Pond #2, East Keyway, 5 ft. south of corner to North Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/22/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.006	CLIENT:	Jason Henson	START TIME:	10:00 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	12:30 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	6 ft. below Finish Subgrade	8	122.0	20.4	101.3	96.3%	95
2	1	10 ft. below Finish Subgrade	8	130.0	22.2	106.4	101.1%	95
3	1	10 ft. below Finish Subgrade	8	124.7	19.7	104.2	99.0%	95
4	1	Finish Subgrade	8	127.6	15.5	110.5	105.0%	95
5	1	Finish Subgrade	8	128.7	16.7	110.3	104.8%	95

Test Number	Location:
1	Pond #2, East Keyway, 30 ft. south of corner to North Keyway
2	Pond #1, East Keyway, 90 ft. north of corner to South Keyway
3	Pond #1, East Keyway, 10 ft. north of corner to South Keyway
4	Farrowing Barn Pad, 7 ft. west of southeast corner, 15 ft. north of south side
5	Farrowing Barn Pad, 15 ft. west of northeast corner, 35 ft. south of north side

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/23/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.007 Page 1	CLIENT:	Jason Henson	START TIME:	9:30 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	4:15 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	9 ft. below Finish Subgrade	8	130.9	24.0	105.5	100.3%	95
2	1	9 ft. below Finish Subgrade	8	127.1	21.4	104.8	99.6%	95
3	1	9 ft. below Finish Subgrade	8	124.1	18.2	104.9	99.7%	95
4	1251	5 ft. below Finish Subgrade	8	119.4	26.7	94.2	97.7%	95
5	1251	5 ft. below Finish Subgrade	8	114.4	26.4	90.5	93.9%	95
6	1251	5 ft. below Finish Subgrade	8	117.9	27.1	92.8	96.3%	95
7	1251	5 ft. below Finish Subgrade	8	119.7	26.3	94.8	98.3%	95
8	1	5 ft. below Finish Subgrade	8	125.1	22.2	102.4	97.3%	95

Test Number	Location:
1	Pond #1, East Keyway, 80 ft. north of corner to South Keyway
2	Pond #1, East Keyway, 15 ft. north of corner to South Keyway
3	Pond #1, South Keyway, 10 ft. west of corner to East Keyway
4	Pond #2, East Keyway, 80 ft. south of corner to North Keyway
5	Pond #2, East Keyway, 40 ft. south of corner to North Keyway - FAILED
6	Pond #2, East Keyway, 10 ft. south of corner to North Keyway
7	Pond #2, East Keyway, 20 ft. south of corner to North Keyway
8	Pond #2, North Keyway, 15 ft. west of corner to East Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/23/13	TESTED BY:	Mason Drummond	START TIME:	9:30 AM
REPORT NO:	12-11216.007 Page 2	CLIENT:	Jason Henson			END TIME:	4:15 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1	8 ft. below Finish Subgrade	8	125.0	17.1	106.7	101.4%	95
10	1	8 ft. below Finish Subgrade	8	129.7	19.9	108.2	102.9%	95
11	1	8 ft. below Finish Subgrade	8	126.4	16.6	108.4	103.0%	95
12	1251	8 ft. below Finish Subgrade	8	115.3	27.7	90.2	93.6%	95

Test Number	Location:
9	Pond #1, East Keyway, 30 ft. north of corner to South Keyway
10	Pond #1, East Keyway, 80 ft. north of corner to South Keyway
11	Pond #1, East Keyway, 15 ft. south of corner to North Keyway
12	Pond #1, North Keyway, 15 ft. west of corner to East Keyway - FAILED

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/26/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.009	CLIENT:	Jason Henson		
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson		

START TIME:	8:30 AM
END TIME:	11:00 AM
MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	7 ft. below Finish Subgrade	8	126.6	19.5	105.9	100.7%	95
2	1	7 ft. below Finish Subgrade	8	126.0	19.0	105.9	100.7%	95
3	1	7 ft. below Finish Subgrade	8	126.2	17.7	107.2	101.9%	95
4	1	4 ft. below Finish Subgrade	8	123.8	17.1	105.7	100.5%	95
5	1	4 ft. below Finish Subgrade	8	124.9	16.9	106.8	101.5%	95
6	1	4 ft. below Finish Subgrade	8	120.5	16.9	103.1	98.0%	95
7	1	6 ft. below Finish Subgrade	8	127.2	17.7	108.0	102.7%	95
8	1	6 ft. below Finish Subgrade	8	124.7	18.0	105.7	100.5%	95

Test Number	Location:
1	Pond #1, South Keyway, 40 ft. west of corner to East Keyway
2	Pond #1, East Keyway, 15 ft. north of corner to South Keyway
3	Pond #1, East Keyway, 8 ft. north of corner to South Keyway
4	Pond #2, East Keyway, 70 ft. south of corner to North Keyway
5	Pond #2, East Keyway, 5 ft. south of corner to North Keyway
6	Pond #2, North Keyway, 25 ft. west of corner to East Keyway
7	Pond #1, East Keyway, 15 ft. north of corner to South Keyway
8	Pond #1, South Keyway, 30 ft. west of corner to South Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/28/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.010 Page 1	CLIENT:	Jason Henson	START TIME:	11:00 / 2:00
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	12:00 / 5:00
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	3 ft. below Finish Subgrade	8	123.0	16.6	105.6	100.4%	95
2	1	3 ft. below Finish Subgrade	8	122.6	18.8	103.2	98.1%	95
3	1	5 ft. below Finish Subgrade	8	122.7	19.4	102.8	97.7%	95
4	1	5 ft. below Finish Subgrade	8	123.1	17.6	104.7	99.5%	95
5	1	5 ft. below Finish Subgrade	8	123.1	19.6	102.7	97.6%	95
6	1	5 ft. below Finish Subgrade	8	122.7	16.8	105.0	99.8%	95
7	1	5 ft. below Finish Subgrade	8	118.9	17.2	101.4	96.4%	95
8	1	6 ft. below Finish Subgrade	8	122.6	16.6	105.1	99.9%	95

Test Number	Location:
1	Pond #2, North Keyway, 30 ft. west of corner to East Keyway
2	Pond #2, East Keyway, 28 ft. south of corner to North Keyway
3	Pond #1, East Keyway, 85 ft. north of corner to South Keyway
4	Pond #1, East Keyway, 40 ft. north of corner to South Keyway
5	Pond #1, East Keyway, 10 ft. north of corner to South Keyway
6	Pond #1, South Keyway, 35 ft. west of corner to East Keyway
7	Pond #1, South Keyway, 10 ft. west of corner to East Keyway
8	Pond #1, East Keyway, 95 ft. north of corner to South Keyway

CC: _____

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office#: 479-521-7645
Fax #: 479-521-6232

Office Locations
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Fort Smith, Arkansas
Tulsa, Oklahoma

Licensed in:
Arkansas Missouri
Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	1/28/13	TESTED BY:	Mason Drummond	START TIME:	11:00 / 2:00
REPORT NO:	12-11216.010 Page 2	CLIENT:	Jason Henson			END TIME:	12:00 / 5:00
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1	6 ft. below Finish Subgrade	8	127.7	17.9	108.3	102.9%	95
10	1	6 ft. below Finish Subgrade	8	130.2	20.5	108.8	103.4%	95
11	1	7 ft. below Finish Subgrade	8	121.7	16.3	104.7	99.5%	95
12	1	3 ft. below Finish Subgrade	8	121.8	19.8	101.7	96.7%	95

Test Number	Location:
9	Pond #1, East Keyway, 65 ft. north of corner to South Keyway
10	Pond #1, East Keyway, 8 ft. south of corner to North Keyway
11	Pond #1, East Keyway, 30 ft. south of corner to North Keyway
12	Pond #1, North Keyway, 30 ft. west of corner to East Keyway

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Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/1/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.011	CLIENT:	Jason Henson	START TIME:	11:45 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	12:45 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	4 ft. below Finish Subgrade	8	128.4	18.2	108.6	103.2%	95
2	1	4 ft. below Finish Subgrade	8	125.5	17.8	106.6	101.3%	95
3	1	4 ft. below Finish Subgrade	8	129.7	20.2	106.3	101.0%	95
4	1	2 ft. below Finish Subgrade	8	126.6	22.8	103.1	98.0%	95
5	1	2 ft. below Finish Subgrade	8	126.8	21.6	104.3	99.1%	95

Test Number	Location:
1	Pond #1, South Keyway, 30 ft. west of corner to East Keyway
2	Pond #1, East Keyway, 30 ft. north of corner to South Keyway
3	Pond #1, East Keyway, 95 ft. north of corner to South Keyway
4	Pond #2, East Keyway, 80 ft. south of corner to North Keyway
5	Pond #2, East Keyway, 10 ft. south of corner to North Keyway

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Licensed in:
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Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/2/13	TESTED BY:	Mason Drummond	START TIME:	10:30 AM
REPORT NO:	12-11216.012	CLIENT:	Jason Henson			END TIME:	11:15 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	1 ft. below Finish Subgrade	8	126.3	16.4	108.4	103.0%	95
2	1	1 ft. below Finish Subgrade	8	126.3	20.8	104.6	99.4%	95
3	1	3 ft. below Finish Subgrade	8	125.6	20.2	104.5	99.3%	95
4	1	3 ft. below Finish Subgrade	8	130.1	20.3	108.1	102.8%	95
5	1251	3 ft. below Finish Subgrade	8	123.4	27.9	96.5	100.1%	95

Test Number	Location:
1	Pond #2, East Keyway, 25 ft. south of corner to North Keyway
2	Pond #2, East Keyway, 80 ft. south of corner to North Keyway
3	Pond #1, East Keyway, 70 ft. north of corner to South Keyway
4	Pond #1, East Keyway, 15 ft. north of corner to South Keyway
5	Pond #1, South Keyway, 30 ft. west of corner to East Keyway

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Licensed in:
Arkansas Missouri
Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/7/13	TESTED BY:	Mason Drummond	START TIME:	10:45 AM
REPORT NO:	12-11216.014	CLIENT:	Jason Henson			END TIME:	12:15 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	Finish Subgrade	8	127.2	20.2	105.9	100.7%	95
2	1	Finish Subgrade	8	124.8	17.2	106.5	101.2%	95
3	1	1 ft. below Finish Subgrade	8	128.9	17.4	109.8	104.4%	95
4	1	1 ft. below Finish Subgrade	8	126.0	17.8	107.8	102.5%	95
5	1	1 ft. below Finish Subgrade	8	127.7	16.8	109.3	103.9%	95
6	1	1 ft. below Finish Subgrade	8	129.9	21.5	106.9	101.6%	95
7	1	1 ft. below Finish Subgrade	8	129.0	24.8	103.4	98.3%	95

Test Number	Location:
1	Pond #2, East Keyway, 25 ft. south of corner to North Keyway
2	Pond #2, East Keyway, 90 ft. south of corner to North Keyway
3	East Keyway, 10 ft. south of South Keyway, runs between Pond #1 and Pond #2
4	East Keyway, 20 ft. north of corner to South Keyway
5	South Keyway, 30 ft. west of corner to East Keyway
6	East Keyway, 65 ft. north of corner to South Keyway
7	East Keyway, 10 ft. north of corner to South Keyway

CC: _____

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Tulsa, Oklahoma

Licensed in:
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Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/12/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.015 Page 1	CLIENT:	Jason Henson	START TIME:	10:30 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	3:15 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1	9 in. below Finish Grade	8	127.4	19.4	106.7	101.4%	98
2	1	9 in. below Finish Grade	8	129.5	21.1	106.9	101.6%	98
3	1	9 in. below Finish Grade	8	123.2	17.7	104.7	99.5%	98
4	1	9 in. below Finish Grade	8	124.9	19.3	104.7	99.5%	98
5	1	9 in. below Finish Grade	8	127.1	19.4	106.4	101.1%	98
6	1	9 in. below Finish Grade	8	125.7	18.8	105.8	100.6%	98
7	1	Finish Grade	8	127.9	21.1	105.6	100.4%	98
8	1	Finish Grade	8	124.9	20.5	103.6	98.5%	98

Test Number	Location:
1	Pond #1 Basin, south
2	Pond #1 Basin, north
3	Pond #1, East bank inline, center
4	Pond #1, North bank incline, center
5	Pond #1, West bank incline, center
6	Pond #1, South bank incline near keyway, center
7	Pond #1, East Keyway, 30 ft. north of corner to South Keyway
8	Pond #1, East Keyway, 90 ft. north of corner to South Keyway

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	2/12/13	TESTED BY:	Mason Drummond	START TIME:	10:30 AM
REPORT NO:	12-11216.015 Page 2	CLIENT:	Jason Henson			END TIME:	3:15 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson			MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1	Red/Gray Fat Clay with Sand	B-2 Bulk Grab Sample	ASTM D698	N/A	64,41	105.2	20.7

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1	Finish Grade	8	127.1	22.4	103.8	98.7%	98
10	1	Finish Grade	8	128.4	22.4	104.9	99.7%	98
11	1	Finish Grade	8	126.3	18.7	106.4	101.1%	98
12	1	Finish Grade	8	135.4	24.7	108.6	103.2%	98
13	1	Finish Grade	8	126.1	21.0	105.1	99.9%	98
14	1	Finish Grade	8	127.6	21.8	104.8	99.6%	98
15	1	Finish Grade	8	128.5	20.9	106.3	101.0%	98

Test Number	Location:
9	Pond #1, East Keyway, 30 ft. north of corner to South Keyway
10	Pond #1, east pond bank incline, center
11	Pond #1, south pond bank incline, center
12	Pond #1, west pond bank incline, center
13	Pond #1, north pond bank incline, center
14	Pond #1 basin, north side
15	Pond #1 basin, south side

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Oklahoma

NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	3/27/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.016 Page 1	CLIENT:	Jason Henson	START TIME:	9:30 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	11:45 AM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1251	9 in. below Finish Subgrade	8	125.6	25.9	99.7	103.4%	98
2	1251	9 in. below Finish Subgrade	8	121.1	25.1	96.7	100.3%	98
3	1251	9 in. below Finish Subgrade	8	124.4	26.6	98.2	101.9%	98
4	1251	9 in. below Finish Subgrade	8	121.6	26.2	96.3	99.9%	98
5	1251	9 in. below Finish Subgrade	8	121.5	25.1	97.1	100.7%	98
6	1251	9 in. below Finish Subgrade	8	121.0	25.7	96.3	99.9%	98
7	1251	9 in. below Finish Subgrade	8	122.1	26.1	96.8	100.4%	98
8	1251	9 in. below Finish Subgrade	8	122.2	26.8	96.3	99.9%	98

Test Number	Location:
1	Pond #2, south pond bank
2	Pond #2, east pond bank on south side
3	Pond #2, east pond bank on north side
4	Pond #2, north pond bank
5	Pond #2, west pond bank on north side
6	Pond #2, pond base, northwest section
7	Pond #2, pond base, middle section, east side
8	Pond #2, pond base, south section, east side

CC: _____

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	3/27/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.016 Page 2	CLIENT:	Jason Henson	START TIME:	9:30 AM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	11:45 AM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1251	9 in. below Finish Subgrade	8	125.1	26.5	98.8	102.5%	98

Test Number	Location:
9	Pond #2, west pond bank, south section

CC: _____

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	3/28/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.017 Page 1	CLIENT:	Jason Henson		
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson		

START TIME:	1:15 PM
END TIME:	2:00 PM
MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
1	1251	Finish Subgrade	8	120.0	25.5	95.5	99.1%	98
2	1251	Finish Subgrade	8	119.6	25.1	95.6	99.2%	98
3	1251	Finish Subgrade	8	124.6	25.1	99.5	103.2%	98
4	1251	Finish Subgrade	8	117.5	24.3	94.5	98.0%	98
5	1251	Finish Subgrade	8	120.9	25.4	96.4	100.0%	98
6	1251	Finish Subgrade	8	122.9	25.3	98.1	101.8%	98
7	1251	Finish Subgrade	8	121.7	24.9	97.4	101.0%	98
8	1251	Finish Subgrade	8	122.4	25.2	97.8	101.5%	98

Test Number	Location:
1	Pond #2, east pond bank on south side
2	Pond #2, east pond bank on north side
3	Pond #2, pond base, northwest section
4	Pond #2, north pond bank
5	Pond #2, east pond bank on north side
6	Pond #2, pond base, middle section, east side
7	Pond #2, east pond bank on south side
8	Pond #2, south pond bank

CC: _____

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NUCLEAR DENSITY REPORT ASTM D 6938-08

PROJECT NAME:	C&H Hog Farm	DATE:	3/28/13	TESTED BY:	Mason Drummond
REPORT NO:	12-11216.017 Page 2	CLIENT:	Jason Henson	START TIME:	1:15 PM
PROJECT LOCATION:	Mt. Judea, Arkansas	CLIENT REPRESENTATIVE:	Jason Henson	END TIME:	2:00 PM
				MILEAGE:	197

Proctor ID	Description	Location	Test Method	USCS	LL, PI	Maximum Dry Density	Optimum Moisture Content
1251	Gravelly Fat Clay with Sand	On-Site	ASTM D698	CH	64,35	96.4	26.4

Test Number	Proctor I.D.	Elevation	Depth of Test (in)	Wet Density, lbs./cu.ft.	Field Moisture %	Dry Density, lbs./cu.ft.	In Place Compaction	Compaction Required (%)
9	1251	Finish Subgrade	8	124.8	27.5	97.9	101.6%	98

Test Number	Location:
9	Pond #2, pond base, southwest section

CC: _____

SECTION J. Livestock Mortality Management Plan

Mortalities will be disposed with an incinerator. The use of an incinerator to dispose of the carcasses uses propane or diesel. The ashes are land applied. Incinerators reduce carcasses to ashes. The Incinerator meets state requirements for burners and emissions. Minimum incinerator capacity shall be based on the average daily weight of animal mortality and the length of time the incinerator will be operated each day.

In the case of emergency when it may not be possible for the incinerator to keep up a proposed emergency burial site will be used.

The primary method of carcass disposal in the future may be In-Vessel Composter called a BIOvator.

The following is an Excerpt from Act 87 of 1963-Code 2-33-101 and Act 150 of 1985-Code 19-6-448 by the Arkansas Livestock and Poultry Commission

Carcasses may be buried at a site at least 100 yards away from a well and in a place where a stream cannot be contaminated. Anthrax carcasses are to be covered with 1 inch of lime. Other carcasses may be covered with lime, particularly when needed to control odors. All carcasses are to be covered with at least 2 feet of dirt. Carcasses are not to be buried in a landfill, without prior approval of the State Veterinarian.

Act 87 of 1963, Act 150 of 1985, and Act 522 of 1993: ***Disposal of carcass of animal dying from contagious or infectious disease.***

9141. Any person that has the care or control of any animal that dies from any contagious disease shall immediately cremate or bury the animal.

9142. An animal which has died from any contagious disease shall not be transported, except to the nearest crematory. The transportation of the animal to the crematory shall be pursuant to such regulations as the director may adopt.

9143. An animal which has died from any contagious disease shall not be used for the food of any human being, domestic animal, or fowl.

C & H HOG FARMS
GESTATION-FARROWING FARM

AS BUILT ENGINEERING PLAN SHEETS

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, ARKANSAS

DATE: APRIL 12, 2013

SHEET INDEX

GENERAL NOTES

CERTIFICATE OF AUTHORIZATION — DEHAAN, GRABS & ASSOCIATES, LLC — 2559 — ARKANSAS

STATE OF ARKANSAS — LICENSED PROFESSIONAL ENGINEER — No. 15652 — NATHANA PORTER — 5/15/13

No.	Revision/Issue	Date
1	AS BUILT	4/12/13

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1114, FAX: (701) 667-1356
www.dgaengineering.com

C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

COVER SHEET

DATE: JUN 1, 2012	SHEET: COVER
SCALE: NONE	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/SHEET/MENSCH/TITLE/PLAN

GENERAL NOTES

LEGEND

- BENCHMARK
- BUILDINGS
- FENCELINE
- CULVERT/PIPE
- DRAINAGE ARROW

SCALE, FEET

0 25 50 75 100

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 15552
NATHAN A. PESTA
9/12/13

No.	Revision/Issue	Date
1	As Built	4/1/13

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgbengineering.com

C & H HOG FARMS
GESTATION-FARROWING FARM

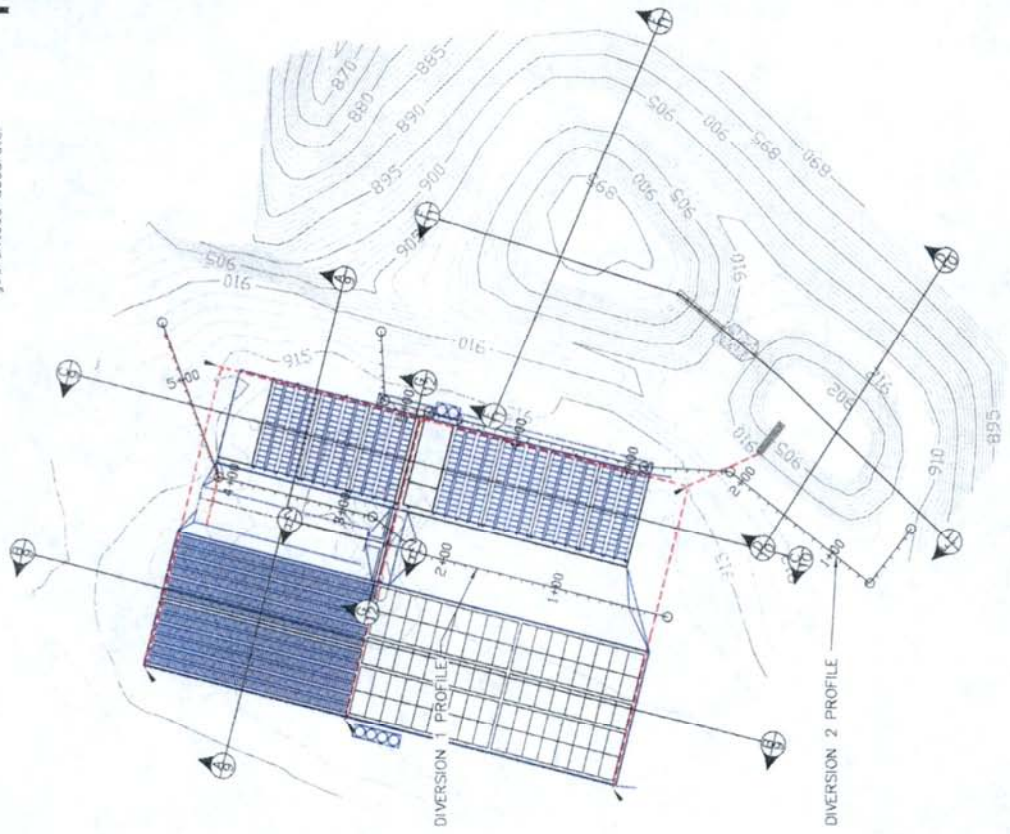
SECTION 26, T 16 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND
FINAL DESIGN

DATE: APR 30, 2012	SHEET: 7
SCALE: 1" = 50'	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: G:\PROJECT FILES\SWINE\NEWTON\OFFICE\PLAN

The drawing is believed to be correct to the best of the professional's knowledge but it cannot be guaranteed accurate.



GENERAL NOTES

LEGEND
- BENCHMARK
- BUILDINGS
- FENCELINE
- CULVERT/PIPE
- DRAINAGE ARROW

SCALE, FEET
0 40 80 120 160

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No 15552
4/1/13
NATHAN A. PESTA

No.	Revision / Issue	Date
1	As Built	4/1/13

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 522, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgdengineering.com

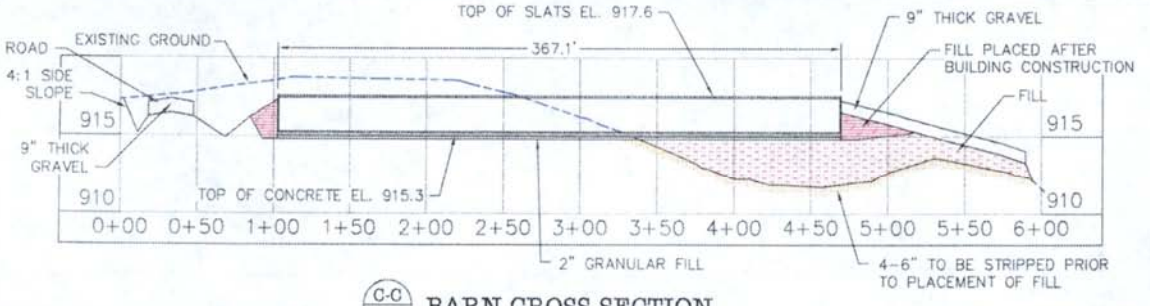
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 18 N, R 20 W
NEWTON COUNTY, AR

PROPOSED SITE PLAN
CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 8
SCALE: 1" = 80'	
DRAWN BY: NAP	
CHECKED BY: DLD	

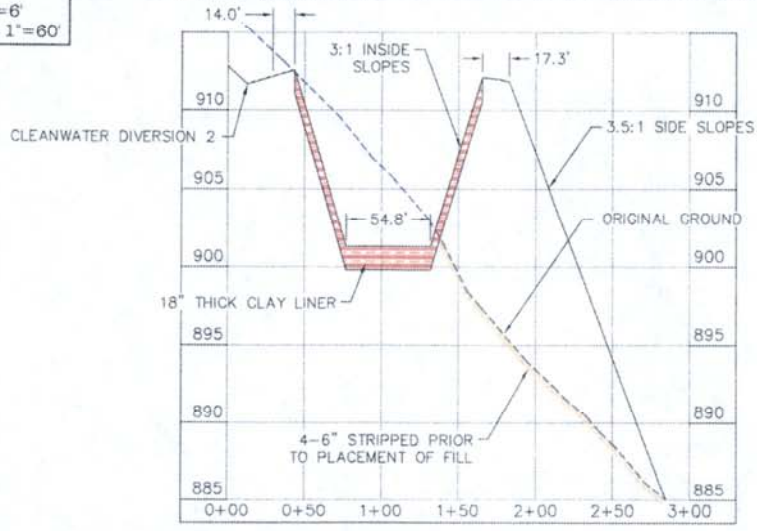
FILE NAME: I:\PROJECT FILES\SWINE\NEWTON\SITE\SITE PLAN



C-C / 8 BARN CROSS SECTION

SCALE:
VERTICAL: 1"=6'
HORIZONTAL: 1"=60'

VERTICAL SCALE, FEET
0 3 6 9 12
HORIZONTAL SCALE, FEET
0 30 60 90 120



D-D / 8 WASTE STORAGE POND 1 CROSS SECTION

The drawing is believed to be correct to the best of the professional's knowledge but it cannot be guaranteed accurate.

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

STATE OF NORTH DAKOTA
LICENSED PROFESSIONAL ENGINEER
No. 16552
4/2/13
NATHAN A. PESTA

No.	Revision/Issue	Date
1	As Built	4/1/13

DeHaan, Grabs & Associates, LLC
Consulting Engineers
PO Box 532, Mandan, ND 58554
(701) 663-1116, FAX: (701) 667-1356
www.dgoengineering.com

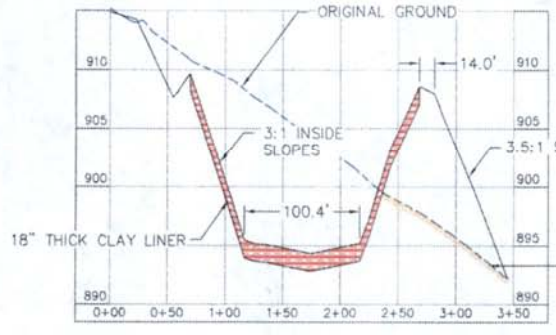
C & H HOG FARMS
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND & BARN CROSS SECTIONS

DATE: APR 30, 2012	SHEET: 10
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 06 PROJECT FILES/SWINE/NEWTON/STYLES/PLAN



The drawing is believed to be correct to the best of the professional's knowledge but it cannot be guaranteed accurate.

SCALE:
VERTICAL: 1"=8'
HORIZONTAL: 1"=80'

E-E / 8 WASTE STORAGE POND 2 CROSS SECTION

VERTICAL SCALE, FEET
0 4 8 12 16
HORIZONTAL SCALE, FEET
0 40 80 120 160

F-F / 8 WASTE STORAGE POND 1 & 2 CROSS SECTION

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No 15552
4/12/13
NATHAN A. PESTA

No.	Revision/Issue	Date
1	As Built	4/1/13

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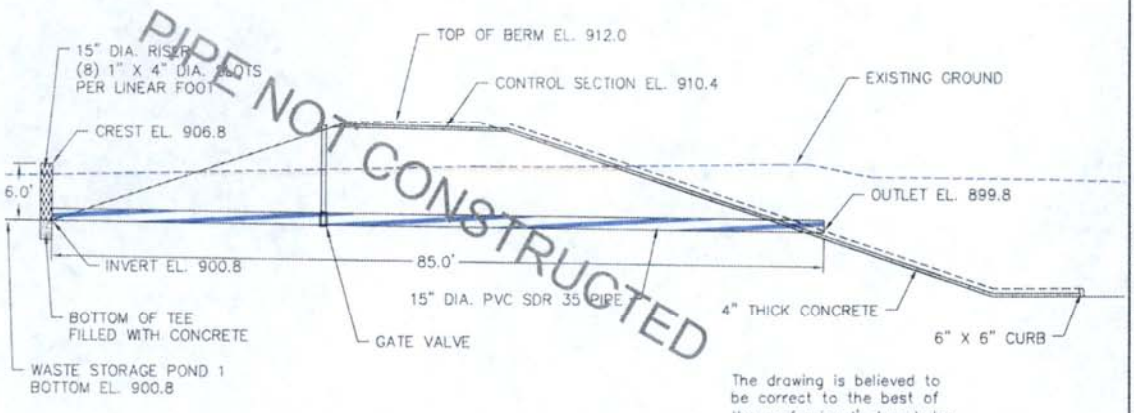
GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND CROSS SECTIONS

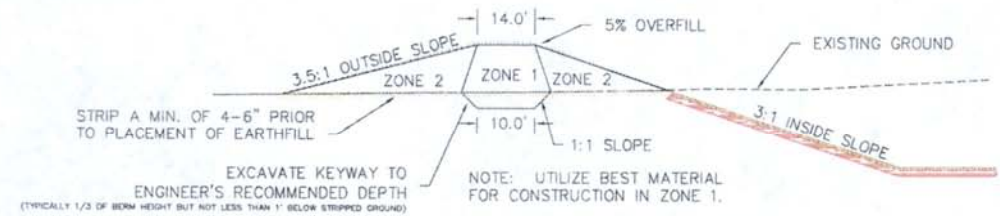
DATE: APR 30, 2012
SCALE: AS SHOWN
DRAWN BY: NAP
CHECKED BY: DLD
SHEET: 11

FILE NAME: 05 PROJECT FILES/SWINE/MDSGN/CFILES/PLAN



The drawing is believed to be correct to the best of the professional's knowledge but it cannot be guaranteed accurate.

PIPE INLET DETAILS
SCALE: 1" = 10'



TYPICAL HOLDING POND MAXIMUM BERM DETAIL
NOT TO SCALE

GENERAL NOTES
- GRAVEL
- FILL
- CONCRETE
- STRIPPING
- EXISTING GROUND

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No 15552
NATHANA PESTA
4/12/13

No.	Revision/Issue	Date

DeHaan, Grabs & Associates, LLC
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GESTATION-FARROWING FARM

SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

POND INLET & MAXIMUM BERM DETAILS

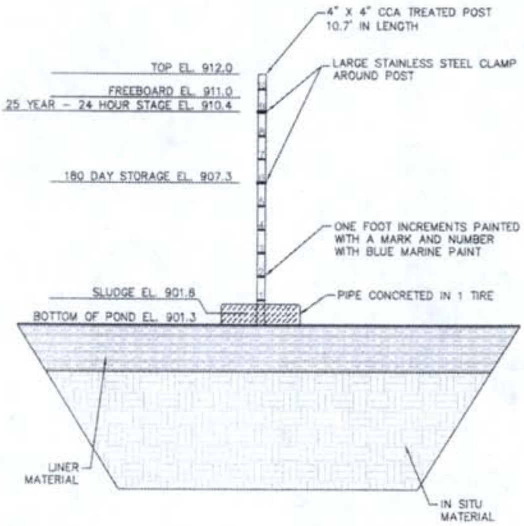
DATE: APR 30, 2012	SHEET: 13
SCALE: AS SHOWN	
DRAWN BY: NAP	
CHECKED BY: DLD	

FILE NAME: 05 PROJECT FILES/SWINE/MEMSOM/FILES/PLAN

The drawing is believed to be correct to the best of the professional's knowledge but it cannot be guaranteed accurate.

Waste Storage Pond 1 Stage Storage Table

Elevation (ft)	Stage (ft)	Area (ft^2)	Volume (ft^3)	Cum. Volume (ft^3)	Cum. Volume (acre-feet)	
912.0	10.7	20,153	28,793	118,918		**Top**
911.0	9.7	17,130	19,227	100,065	2.3	**Freeboard**
910.4	9.1	15,838	16,603	90,125	2.1	**25 Year-24 Hour Stage/Overflow El.**
909.8	8.5	14,915	7,316	80,838	1.9	
909.3	8.0	14,349	6,946	73,522	1.7	
908.8	7.5	13,435	6,585	66,576	1.5	
908.3	7.0	12,905	6,235	59,991	1.4	
907.8	6.5	12,035	5,898	53,756	1.2	
907.3	6.0	11,567	5,570	47,858	1.1	**180 Day Stage**
906.8	5.5	10,723	5,253	42,288	1.0	
906.3	5.0	10,289	4,947	37,035	0.9	
905.8	4.5	9,499	4,648	32,088	0.7	
905.3	4.0	9,093	4,360	27,440	0.6	
904.8	3.5	8,347	4,079	23,080	0.5	
904.3	3.0	7,969	3,808	19,001	0.4	
903.8	2.5	7,263	3,524	15,193	0.3	
903.3	2.0	6,833	3,294	11,669	0.3	
902.8	1.5	6,343	3,060	8,375	0.2	
902.3	1.0	5,897	2,837	5,315	0.1	
901.8	0.5	5,451	2,478	2,478	0.1	**Sludge El.**
901.3	0.0	0	0	0	0.0	**Bottom**



WASTE STORAGE POND 1

GENERAL NOTES

INSITU MATERIAL

CLAY LINER

SCALE, FEET

0 2 4 6 8

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 15652
NATHAN A. PESTA

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SECTION 26, T 15 N, R 20 W
NEWTON COUNTY, AR

WASTE STORAGE POND 1
STAGE STORAGE TABLE

DATE: MAY 30, 2012

SCALE: 1" = 4'

DRAWN BY: CAS

CHECKED BY: DLD

SHEET: 14