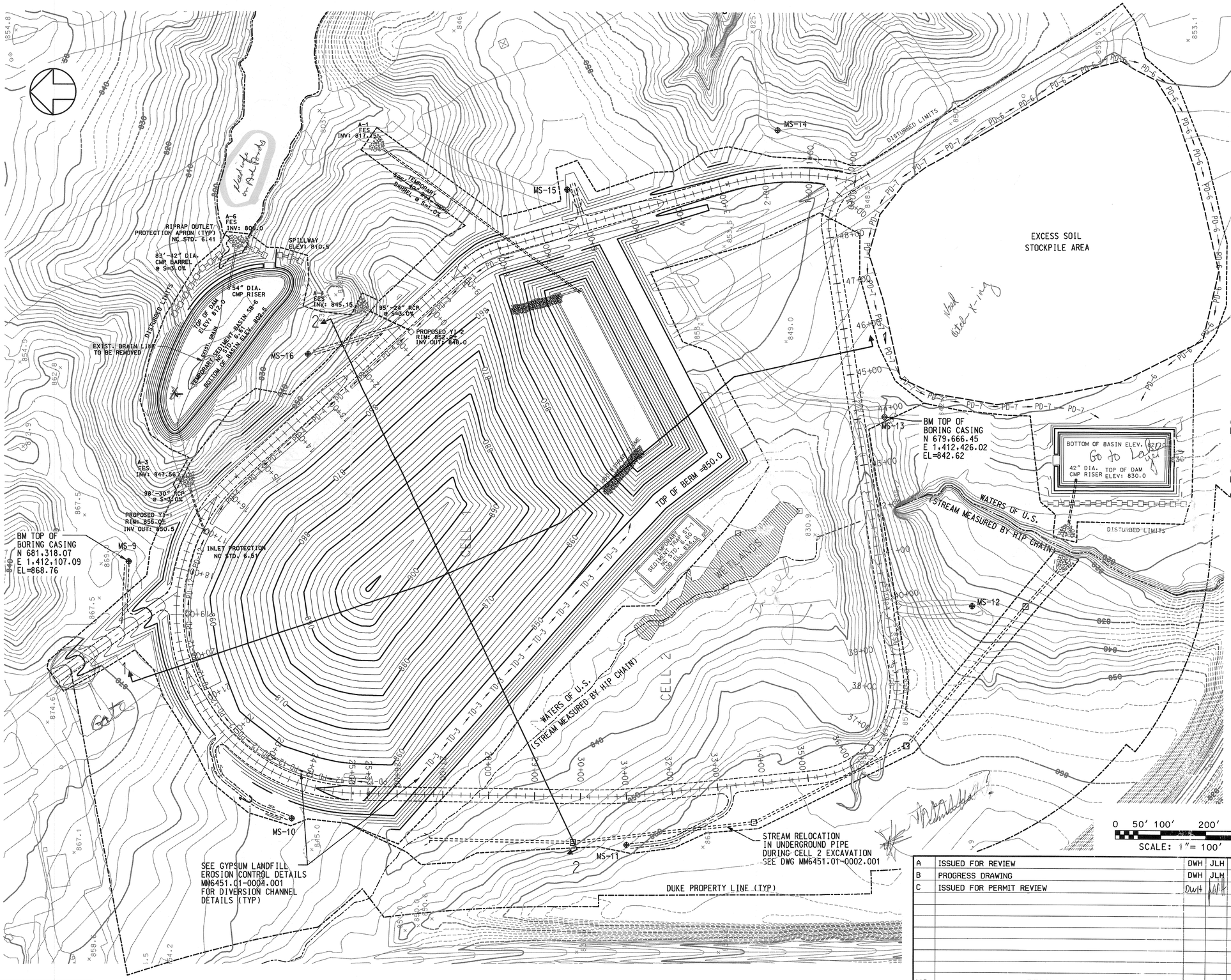
DWG. NO. M-6024-01.00 REV. C



REFERENCE DRAWINGS

GYPSUM LANDFILL FINAL CLOSURE DETAILS	MM6451.00-0001.001
GYPSUM LANDFILL GAS VENTING SYSTEM PLAN	MM6451.00-0002.001
GYPSUM LANDFILL CELL 1 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0001.001
GYPSUM LANDFILL CELL 2 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0002.001
GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0003.001
GYPSUM LANDFILL EROSION CONTROL DETAILS	MM6451.01-0004.001

NOTES:

1. HORIZONTAL DATUM IS NAD 27 (1927), N.C. STATE PLANE COORDINATES, US FEET.
2. VERTICAL DATUM IS NGVD 29 (1929), US FEET.
3. REFER TO EROSION AND SEDIMENT CONTROL PLAN DRAWING, AND EROSION CONTROL DETAILS DRAWING FOR STORM WATER RUNOFF AND EROSION CONTROL MEASURES.

Received APR 2004 Solid Waste Section

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOHN A. LAPERRIERE-HUNT

APPROVED DIVISION OF WASTE MANAGEMENT SOLID WASTE SECTION DATE 11/14/05 BY MRD 15-09

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. — Shaw Stone & Webster, Inc.

DUKE ENERGY CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 GYPSUM FILL
FINAL CONFIGURATION

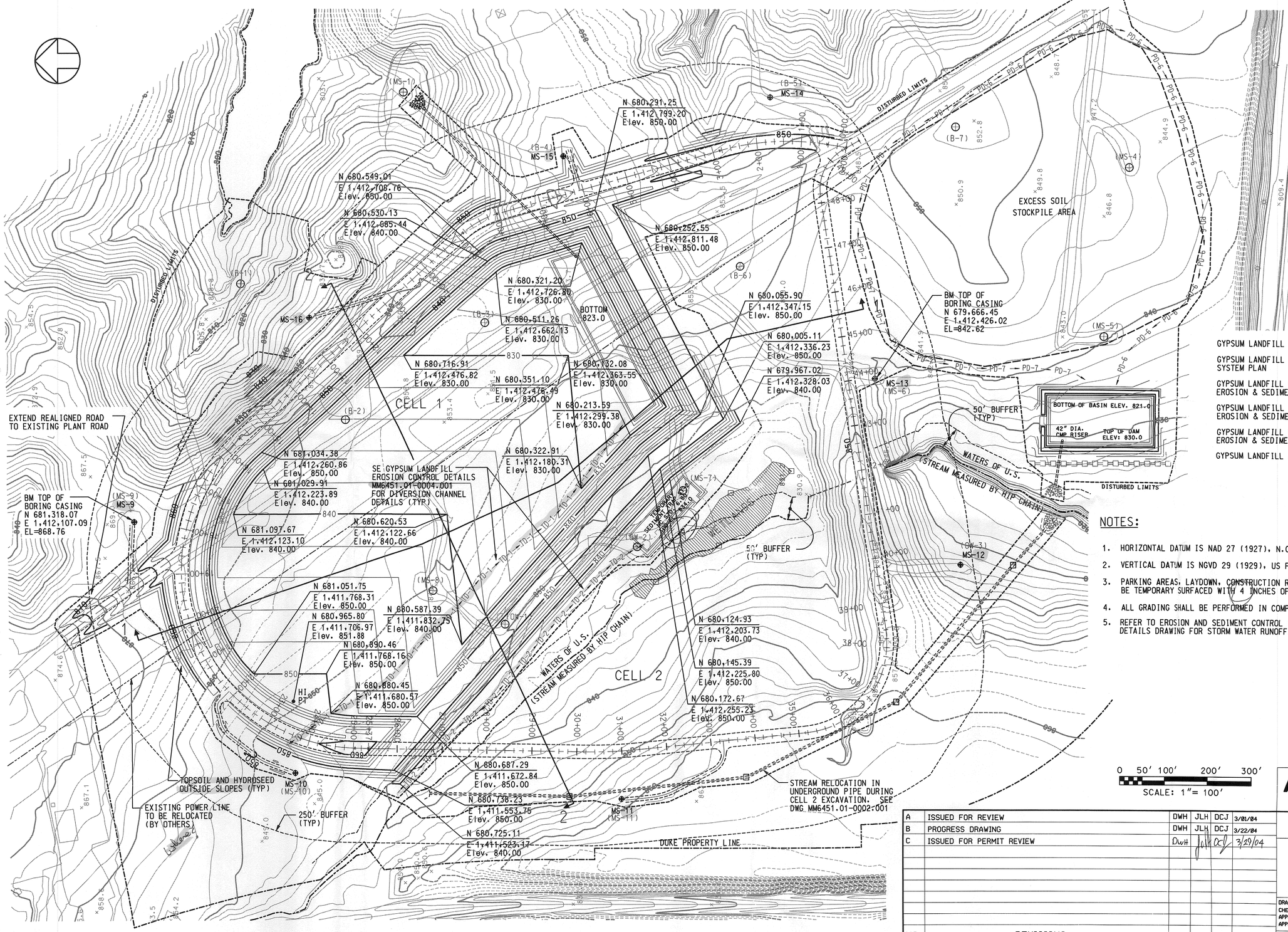
DRAWN	D. HAYES	DATE	3/01/04
CHECKED	J. LAP-HUNT	DATE	3/01/04
APPR.	D. C. JORDAN	DATE	3/01/04
APPR.		DATE	3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE — DWG. NO. M-6024-01.00 — REV. C

ERN: FHS0004F

DWG. NO. M-6024-02.00 REV. C



REFERENCE DRAWINGS

GYPSUM LANDFILL FINAL CLOSURE DETAILS	MM6451.00-0001.001
GYPSUM LANDFILL GAS VENTING SYSTEM PLAN	MM6451.00-0002.001
GYPSUM LANDFILL CELL 1 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0001.001
GYPSUM LANDFILL CELL 2 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0002.001
GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0003.001
GYPSUM LANDFILL EROSION CONTROL DETAILS	MM6451.01-0004.001

NOTES:

1. HORIZONTAL DATUM IS NAD 27 (1927), N.C. STATE PLANE COORDINATES, US FEET.
2. VERTICAL DATUM IS NGVD 29 (1929), US FEET.
3. PARKING AREAS, LAYDOWN, CONSTRUCTION ROADS AND CONSTRUCTION OFFICE AREAS SHALL BE TEMPORARY SURFACED WITH 4 INCHES OF GRAVEL SURFACING.
4. ALL GRADING SHALL BE PERFORMED IN COMPLIANCE WITH SPECIFICATION MS-6451.00-00-0001.
5. REFER TO EROSION AND SEDIMENT CONTROL PLAN DRAWING, AND EROSION CONTROL DETAILS DRAWING FOR STORM WATER RUNOFF AND EROSION CONTROL MEASURES.

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOHN A. LAPERRIERE-HUNT

0 50' 100' 200' 300'
SCALE: 1"= 100'

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

DUKE ENERGY CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 EXCAVATION

DRAWN D HAYES DATE 3/01/04
CHECKED J LAP-HUNT DATE 3/01/04
APPR. D C JORDAN DATE 3/01/04
APPR. C. Burnell DATE 3/29/04

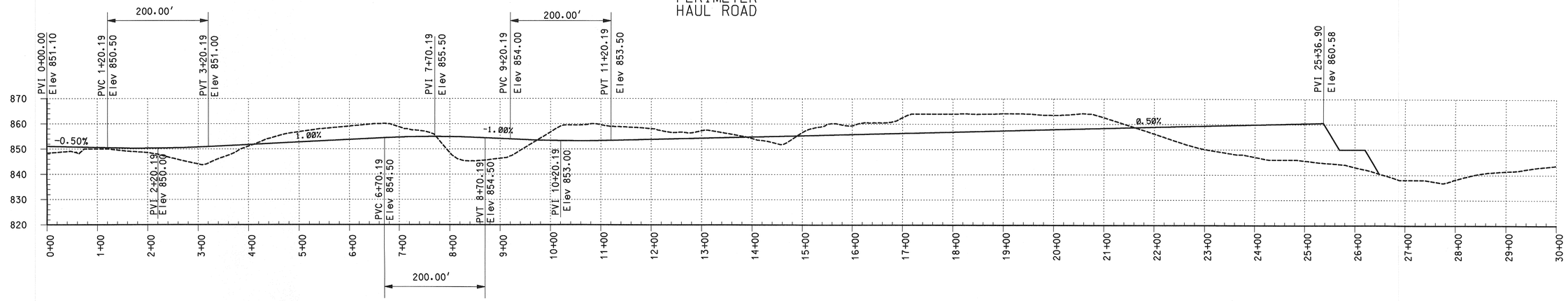
JOB REF. NO: 10154
STATION: MARSHALL

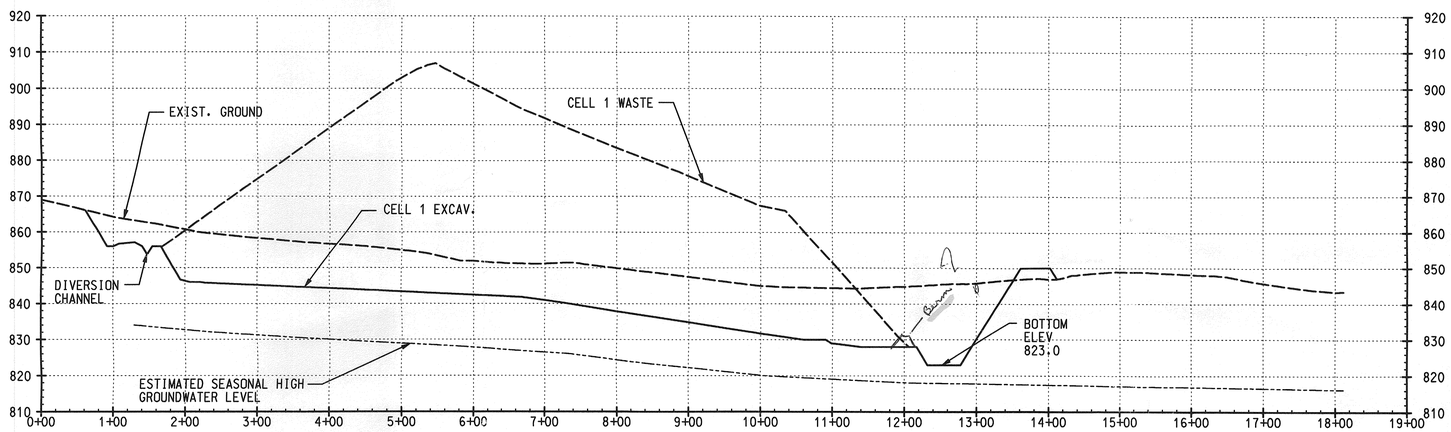
SCALE DWG. NO. M-6024-02.00 REV. C

ERN:FHS0004G

DWG. NO. M-6024-03.00 REV. C

PERIMETER HAUL ROAD





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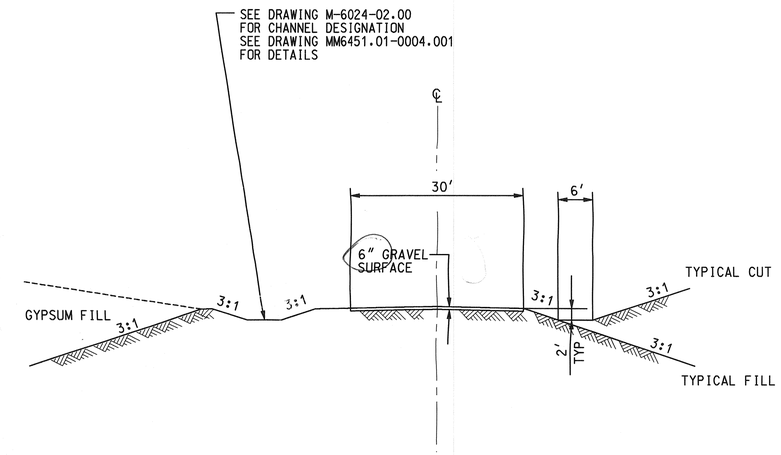
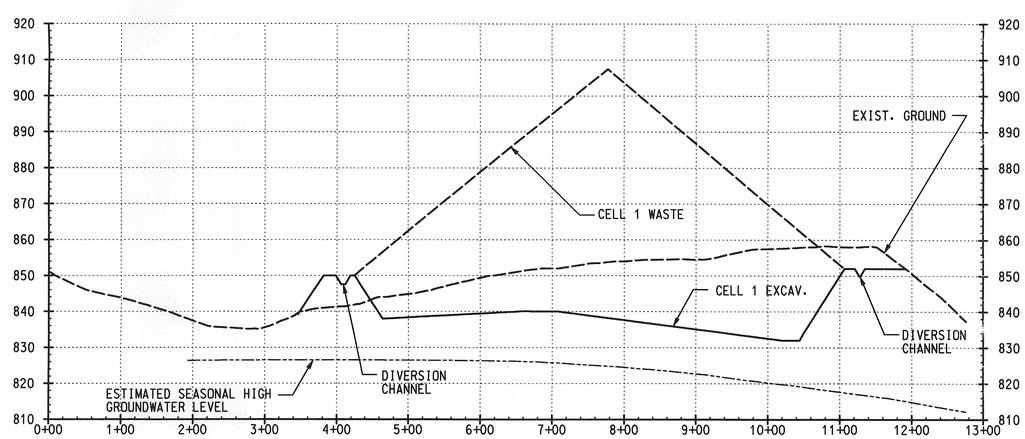




2-2

NOTES:

1. SEE DRAWING M-6024-02.00 FOR GENERAL NOTES.

VERTICAL
0 10' 20' 40' 60'
SCALE: 1"= 20'

HORIZONTAL
0 50' 100' 200' 300'
SCALE: 1"= 100'

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

DUKE ENERGY
CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 PROFILE AND SECTIONS

DRAWN D HAYES DATE 3/01/04
CHECKED J LAP-HUNT DATE 3/01/04
APPR. D C JORDAN DATE 3/01/04
APPR. DATE 3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE
DWG. NO. M-6024-03.00 REV. C

ERN: FHS0004H

DWG. NO. M-6024-04.00 REV. C

HORIZONTAL DATUM IS NAD 27, N.C. STATE PLANE COORDINATES, US FEET

VERTICAL DATUM IS NGVD 29, US FEET

```
Review Horizontal Alignment All
            Project Name: perimhaul
             Description:
Horizontal Alignment Name: perimhaul
             Description:
              Preference: default
                                        STATION      NORTHING       EASTING
Element: Linear
            POB (        )              0+00.00     679732.86    1412938.58
             PC (        )              0+43.10     679775.44    1412945.28
      Tangent Direction:   N  8°56'35.71" E
         Tangent Length:                 43.10

Element: Circular
             PC (        )              0+43.10     679775.44    1412945.28
             CC (        )                          679862.34    1412393.08
             PT (        )              2+85.15     680015.16    1412930.79
                 Radius:                559.00
                  Delta:        24°48'31.42" Left
  Degree of Curvature(Arc):         10°14'58.89"
                 Length:                242.04
                Tangent:                122.95
                  Chord:                240.16
        Middle Ordinate:                 13.05
               External:                 13.36
      Tangent Direction:   N  8°56'35.69" E
       Radial Direction:   S 81°03'24.31" E
        Chord Direction:   N  3°27'40.02" W
       Radial Direction:   N 74°08'04.27" E
      Tangent Direction:   N 15°51'55.73" W

Element: Linear
             PT (        )              2+85.15     680015.16    1412930.79
             PC (        )              7+98.03     680508.50    1412790.58
      Tangent Direction:   N 15°51'55.73" W
         Tangent Length:                512.88

Element: Circular
             PC (        )              7+98.03     680508.50    1412790.58
             CC (        )                          680456.56    1412607.81
             PT (        )              8+85.91     680584.60    1412748.19
                 Radius:                190.00
                  Delta:        26°30'11.53" Left
  Degree of Curvature(Arc):         30°09'20.42"
                 Length:                 87.89
                Tangent:                 44.74
                  Chord:                 87.11
        Middle Ordinate:                  5.06
               External:                  5.20
      Tangent Direction:   N 15°51'55.72" W
       Radial Direction:   N 74°08'04.28" E
        Chord Direction:   N 29°07'01.48" W
       Radial Direction:   N 47°37'52.75" E
      Tangent Direction:   N 42°22'07.25" W

Element: Linear
             PT (        )              8+85.91     680584.60    1412748.19
             PC (        )             15+63.67     681085.37    1412291.48
      Tangent Direction:   N 42°21'53.26" W
         Tangent Length:                677.76

Elements Are Not Colinear

Element: Circular
             PC (        )             15+63.67     681085.37    1412291.48
             CC (        )                          680816.12    1411999.75
             PT (        )             25+04.14     680826.96    1411602.90
                 Radius:                397.00
                  Delta:       135°43'49.00" Left
  Degree of Curvature(Arc):         14°25'55.87"
                 Length:                940.47
                Tangent:                975.99
                  Chord:                735.48
        Middle Ordinate:                247.42
               External:                656.64
      Tangent Direction:   N 42°42'18.34" W
       Radial Direction:   N 47°17'41.66" E
        Chord Direction:   S 69°25'47.16" W
       Radial Direction:   N 88°26'07.34" W
      Tangent Direction:   S  1°33'52.66" W

Element: Linear
             PT (        )             25+04.14     680826.96    1411602.90
            POE (        )             25+36.90     680794.22    1411602.00
      Tangent Direction:   S  1°33'52.71" W
         Tangent Length:                 32.76
```

NOTES:

1. SEE DRAWING M-6024-02.00 FOR GENERAL NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOHN A. LAPERRIERE-HUNT

ALSTOM Power Inc. | Shaw Stone & Webster, Inc.

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

DUKE ENERGY
CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 PERIMETER ROAD REALIGNMENT

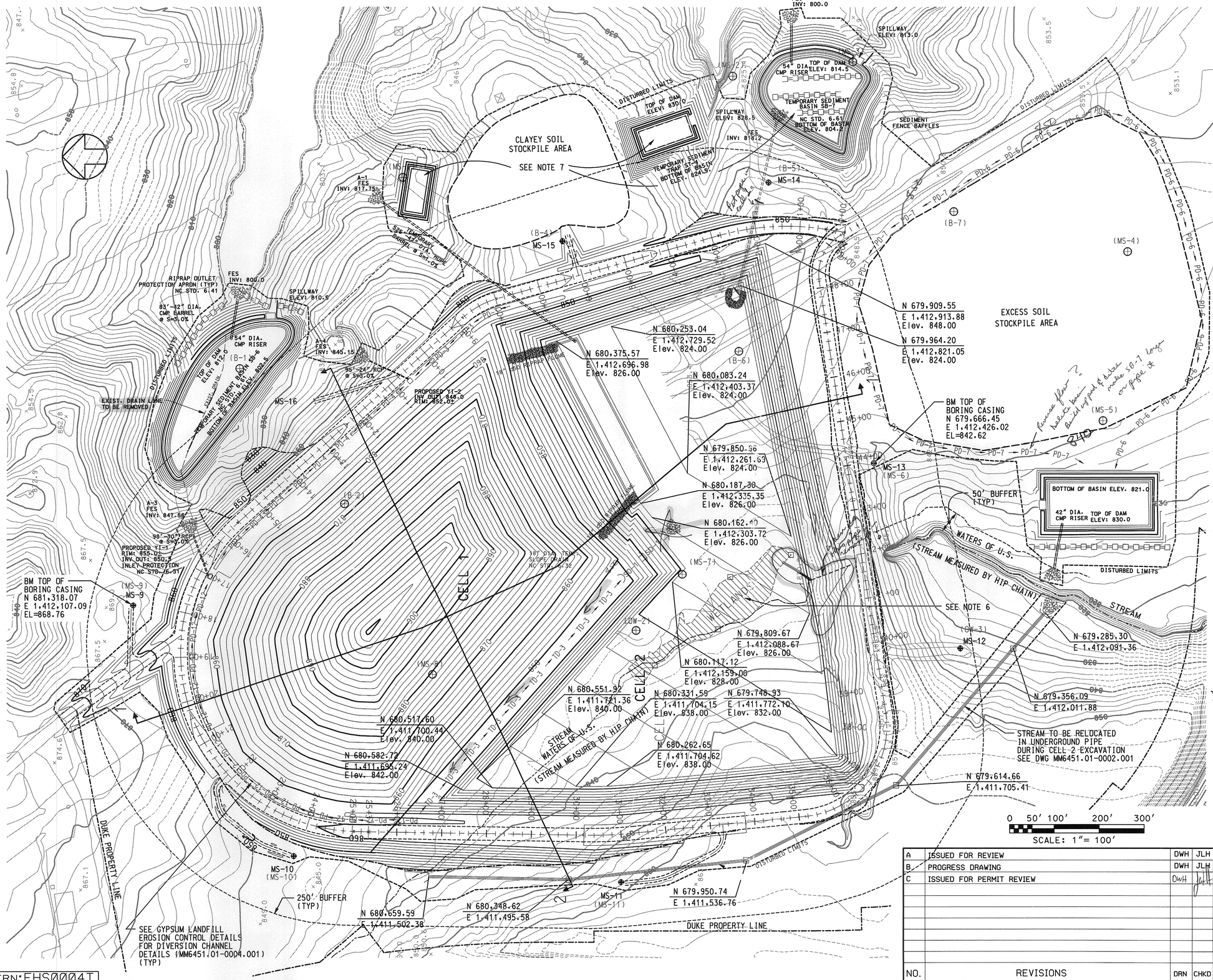
DRAWN D. HAYES DATE 3/01/04
CHECKED J. LAP-HUNT DATE 3/01/04
APPR. D. C. JORDAN DATE 3/01/04
APPR. C. Brunnell DATE 3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE
DWG. NO. M-6024-04.00 REV. C

ERN:FHS0004I

DWG. NO. M-6024-05.00 REV. C



REFERENCE DRAWINGS

GYPSUM LANDFILL FINAL CLOSURE DETAILS	MM6451.00-0001.001
GYPSUM LANDFILL GAS VENTING SYSTEM PLAN	MM6451.00-0002.001
GYPSUM LANDFILL CELL 1 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0001.001
GYPSUM LANDFILL CELL 2 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0002.001
GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0003.001
GYPSUM LANDFILL EROSION CONTROL DETAILS	MM6451.01-0004.001

NOTES:

1. HORIZONTAL DATUM IS NAD 27 (1927), N.C. STATE PLANE COORDINATES, US FEET.
2. VERTICAL DATUM IS NGVD 29 (1929), US FEET.
3. PARKING AREAS, LAYDOWN, CONSTRUCTION ROADS AND CONSTRUCTION OFFICE AREAS SHALL BE TEMPORARY SURFACED WITH 4 INCHES OF GRAVEL SURFACING.
4. ALL GRADING SHALL BE PERFORMED IN COMPLIANCE WITH SPECIFICATION MS-6451.00-00-0002.
5. REFER TO EROSION AND SEDIMENT CONTROL PLAN DRAWING, AND EROSION CONTROL DETAILS DRAWING FOR STORM WATER RUNOFF AND EROSION CONTROL MEASURES.
6. WETLANDS MITIGATION PENDING.
7. SEE GYPSUM LANDFILL CELL 2 EROSION & SEDIMENT CONTROL PLAN FOR CONSTRUCTION SEQUENCE OF SEDIMENT BASINS AND SEDIMANT TRAPS.
8. DIVERSION CHANNELS ARE TO BE REWORKED PER CELL 2 EROSION & SEDIMENT CONTROL PLAN.

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOHN A. LAPERRIERE-HUNT

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

DUKE ENERGY CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 2 LANDFILL EXCAVATION

DRAWN D. HAYES DATE 3/01/04
CHECKED J. LAP-HUNT DATE 3/01/04
APPR. D. C. JORDAN DATE 3/01/04
APPR. DATE 3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE DWG. NO. M-6024-05.00 REV. C

ERN: FHS0004T

DWG. NO. M-6024-06.00 REV. C

STOCKPILE AND SEDIMENT TRAPS TO BE REMOVED PER GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN MM6451.01-0003.001

FES INV: 800.0

SPILLWAY ELEV: 813.0

54" DIA. CMP RISER

TOP OF DAM ELEV: 814.5

TEMPORARY SEDIMENT BASIN SB-7
NC STD. 6.61
BOTTOM OF BASIN ELEV. 804.5

DISTURBED LIMITS

MS-14

MS-15

850

REWORK DIVERSION CHANNEL'S PER GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN MM6451.01-0003.001 (TYP)

EXCESS SOIL STOCKPILE AREA

ARMORED CHANNEL SEE DWG MM6451.00-0001.0001 (TYP)

LIMITS OF WASTE

BM TOP OF BORING CASING
N 679,666.45
E 1,412,426.02
EL=842.62

MS-13

BOTTOM OF BASIN ELEV. 821.0

42" DIA. CMP RISER

TOP OF DAM ELEV: 830.0

STREAM WATERS OF U.S. (STREAM MEASURED BY HIP CHAIN)

DISTURBED LIMITS

MS-12

STREAM RELOCATED IN UNDERGROUND PIPE

SEE GYPSUM LANDFILL EROSION CONTROL DETAILS MM6451.01-0004.001 FOR DIVERSION CHANNEL DETAILS (TYP)

EXIST. DRAIN LINE TO BE REMOVED

TOP OF DAM ELEV: 812.0

TEMPORARY SEDIMENT BASIN SB-6
NC STD. 6.61
BOTTOM OF BASIN ELEV. 802.5

MS-16

CELL 1

CELL 2

BM TOP OF BORING CASING
N 681,318.07
E 1,412,107.09
EL=868.76

MS-9

ARMORED CHANNEL SEE DWG MM6451.00-0001.0001 (TYP)

MS-10

MS-11

EROSION CONTROL BENCH, SEE DWG MM6451.00-0001.001 (TYP)

DUKE PROPERTY LINE

0 50' 100' 200' 300'
SCALE: 1"= 100'

REFERENCE DRAWINGS

GYPSUM LANDFILL FINAL CLOSURE DETAILS	MM6451.00-0001.001
GYPSUM LANDFILL GAS VENTING SYSTEM PLAN	MM6451.00-0002.001
GYPSUM LANDFILL CELL 1 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0001.001
GYPSUM LANDFILL CELL 2 EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0002.001
GYPSUM LANDFILL FINAL CLOSURE EROSION & SEDIMENT CONTROL PLAN	MM6451.01-0003.001
GYPSUM LANDFILL EROSION CONTROL DETAILS	MM6451.01-0004.001

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029024 JOHN A. LAPERRIERE-HUNT

NOTES:

1. HORIZONTAL DATUM IS NAD 27 (1927), N.C. STATE PLANE COORDINATES, US FEET.
2. VERTICAL DATUM IS NGVD 29 (1929), US FEET.
3. REFER TO EROSION AND SEDIMENT CONTROL PLAN DRAWING, AND EROSION CONTROL DETAILS DRAWING FOR STORM WATER RUNOFF AND EROSION CONTROL MEASURES.
4. SEE DRAWING'S MM6451.00-0001.001, MM6451.00-0002.001 AND MM6451.01-0003.001 FOR FINAL CLOSURE PLANS AND DETAILS.

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

DUKE ENERGY CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 AND CELL 2 GYPSUM FILL
FINAL CONFIGURATION

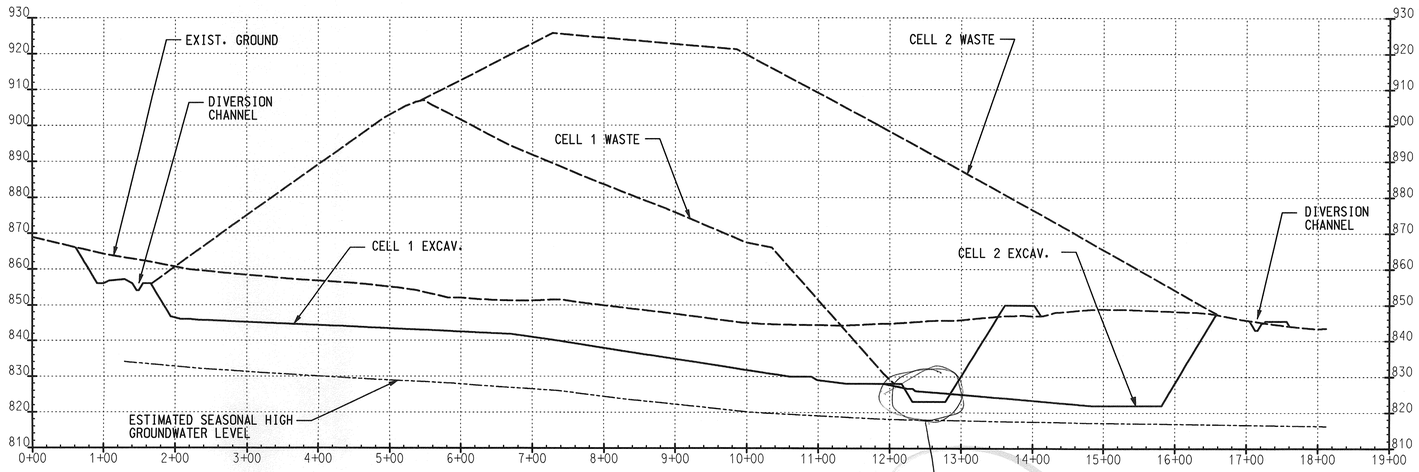
DRAWN D. HAYES DATE 3/01/04
CHECKED J. LAP-HUNT DATE 3/01/04
APPR. D. C. JORDAN DATE 3/01/04
APPR. DATE 3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE
DWG. NO. M-6024-06.00 REV. C

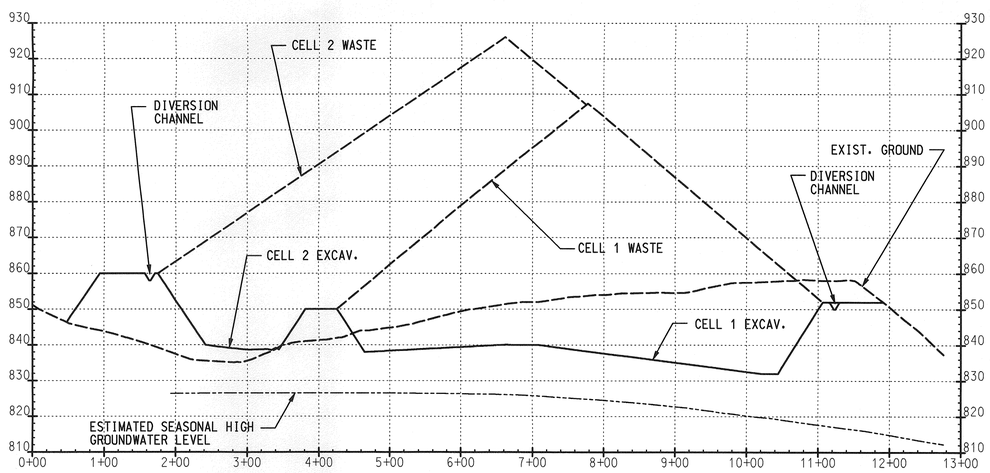
ERN:FHS0004U

DWG. NO. M-6024-07.00 REV. C



1-1

clay fill excavate unstable material pipe?



2-2

VERTICAL
0 10' 20' 40' 60'
SCALE: 1"= 20'

HORIZONTAL
0 50' 100' 200' 300'
SCALE: 1"= 100'

NOTES:

1. SEE DRAWING M-6024-05.00 FOR GENERAL NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOANA LAPERRIERE-HUNT

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

DUKE ENERGY
CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 AND CELL 2 GYPSUM FILL SECTIONS

DRAWN D. HAYES DATE 3/01/04
CHECKED J. LAP-HUNT DATE 3/01/04
APPR. D. C. JORDAN DATE 3/01/04
APPR. DATE 3/29/04

JOB REF. NO: 10154
STATION: MARSHALL

SCALE DWG. NO. M-6024-07.00 REV. C

ERN:FHS0004V

DWG. NO. M-6024-08.00 REV. C

HORIZONTAL DATUM IS NAD 27, N.C. STATE PLANE COORDINATES, US FEET

VERTICAL DATUM IS NGVD 29, US FEET

Project Name: perroad
Description: perimeter haul road
Horizontal Alignment Name: 2
Description:
Style: default

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	0+00.00	679732.86	1412938.58
PC ( )	0+43.10	679775.44	1412945.28
Tangent Direction:	N 8°56'36" E		
Tangent Length:	43.10		
Element: Circular			
PC ( )	0+43.10	679775.44	1412945.28
PI ( )	1+66.05	679896.90	1412964.40
CC ( )		679862.34	1412393.08
PT ( )	2+85.15	680015.16	1412930.79
Radius:	559.00		
Delta:	24°48'31" Left		
Degree of Curvature(Arc):	10°14'59"		
Length:	242.04		
Tangent:	122.95		
Chord:	240.16		
Middle Ordinate:	13.05		
External:	13.36		
Tangent Direction:	N 8°56'36" E		
Radial Direction:	S 81°03'24" E		
Chord Direction:	N 3°27'40" W		
Radial Direction:	N 74°08'04" E		
Tangent Direction:	N 15°51'56" W		
Element: Linear			
PT ( )	2+85.15	680015.16	1412930.79
PC ( )	7+98.03	680508.50	1412790.58
Tangent Direction:	N 15°51'56" W		
Tangent Length:	512.88		
Element: Circular			
PC ( )	7+98.03	680508.50	1412790.58
PI ( )	8+42.77	680551.54	1412778.34
CC ( )		680456.56	1412607.81
PT ( )	8+85.91	680584.60	1412748.19
Radius:	190.00		
Delta:	26°30'12" Left		
Degree of Curvature(Arc):	30°09'20"		
Length:	87.89		
Tangent:	44.74		
Chord:	87.11		
Middle Ordinate:	5.06		
External:	5.20		
Tangent Direction:	N 15°51'56" W		
Radial Direction:	N 74°08'04" E		
Chord Direction:	N 29°07'01" W		
Radial Direction:	N 47°37'53" E		
Tangent Direction:	N 42°22'07" W		
Elements are not colinear			
Element: Linear			
PT ( )	8+85.91	680584.60	1412748.19
PC ( )	15+63.67	681085.37	1412291.48
Tangent Direction:	N 42°21'53" W		
Tangent Length:	677.76		
Elements are not colinear			
Element: Circular			
PC ( )	15+63.67	681085.37	1412291.48
PI ( )	25+39.66	681802.58	1411629.54
CC ( )		680816.12	1411999.75
PT ( )	25+04.14	680826.96	1411602.90
Radius:	397.00		
Delta:	135°43'49" Left		
Degree of Curvature(Arc):	14°25'56"		
Length:	940.47		
Tangent:	975.99		
Chord:	735.48		
Middle Ordinate:	247.42		
External:	656.64		
Tangent Direction:	N 42°42'18" W		
Radial Direction:	N 47°17'42" E		
Chord Direction:	S 69°25'47" W		
Radial Direction:	N 88°26'07" W		
Tangent Direction:	S 1°33'53" W		
Element: Linear			
PT ( )	25+04.14	680826.96	1411602.90
PI ( )	25+36.90	680794.22	1411602.00
Tangent Direction:	S 1°33'53" W		
Tangent Length:	32.76		
Element: Linear			
PI ( )	25+36.90	680794.22	1411602.00
PC ( )	30+16.67	680314.49	1411595.01
Tangent Direction:	S 0°50'06" W		
Tangent Length:	479.78		
Element: Circular			
PC ( )	30+16.67	680314.49	1411595.01
PI ( )	30+73.33	680257.83	1411594.18
CC ( )		680299.92	1412594.90
PT ( )	31+29.87	680201.45	1411599.76
Radius:	1000.00		
Delta:	6°29'09" Left		
Degree of Curvature(Arc):	5°43'46"		
Length:	113.20		
Tangent:	56.66		
Chord:	113.14		
Middle Ordinate:	1.60		
External:	1.60		
Tangent Direction:	S 0°50'06" W		
Radial Direction:	N 89°09'54" W		
Chord Direction:	S 2°24'29" E		
Radial Direction:	S 84°20'56" W		
Tangent Direction:	S 5°39'04" E		
Element: Linear			
PT ( )	31+29.87	680201.45	1411599.76
PI ( )	34+65.98	679866.97	1411632.86
Tangent Direction:	S 5°39'04" E		
Tangent Length:	336.11		
Element: Linear			
PI ( )	34+65.98	679866.97	1411632.86
PC ( )	35+15.09	679818.10	1411637.70
Tangent Direction:	S 5°39'04" E		
Tangent Length:	49.11		
Element: Circular			
PC ( )	35+15.09	679818.10	1411637.70
PI ( )	37+26.37	679607.86	1411658.50
CC ( )		679837.80	1411836.72
PT ( )	38+40.21	679640.15	1411867.29
Radius:	200.00		
Delta:	93°08'27" Left		
Degree of Curvature(Arc):	28°38'52"		
Length:	325.12		
Tangent:	211.28		
Chord:	290.49		
Middle Ordinate:	62.51		
External:	90.92		
Tangent Direction:	S 5°39'04" E		
Radial Direction:	S 84°20'56" W		
Chord Direction:	S 52°13'17" E		
Radial Direction:	S 8°47'31" E		
Tangent Direction:	N 81°12'29" E		
Element: Linear			
PT ( )	38+40.21	679640.15	1411867.29
PC ( )	48+15.39	679789.20	1412831.01
Tangent Direction:	N 81°12'29" E		
Tangent Length:	975.17		
Element: Circular			
PC ( )	48+15.39	679789.20	1412831.01
PI ( )	48+83.70	679799.64	1412898.51
CC ( )		679690.37	1412846.29
PT ( )	49+35.24	679740.55	1412932.79
Radius:	100.00		
Delta:	68°40'22" Right		
Degree of Curvature(Arc):	57°17'45"		
Length:	119.86		
Tangent:	68.31		
Chord:	112.81		
Middle Ordinate:	17.43		
External:	21.10		
Tangent Direction:	N 81°12'29" E		
Radial Direction:	S 8°47'31" E		
Chord Direction:	S 64°27'20" E		
Radial Direction:	S 59°52'51" W		
Tangent Direction:	S 30°07'09" E		
Element: Linear			
PT ( )	49+35.24	679740.55	1412932.79
POE ( )	49+77.77	679703.77	1412954.13
Tangent Direction:	S 30°07'09" E		
Tangent Length:	42.52		

NOTES:

1. SEE DRAWING M-6024-05.00 FOR GENERAL NOTES.

NORTH CAROLINA PROFESSIONAL SEAL 029024 ENGINEER JOHN J. LAPERRIERE-HUNT

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

DUKE ENERGY
CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 AND CELL 2 PERIMETER ROAD DATA

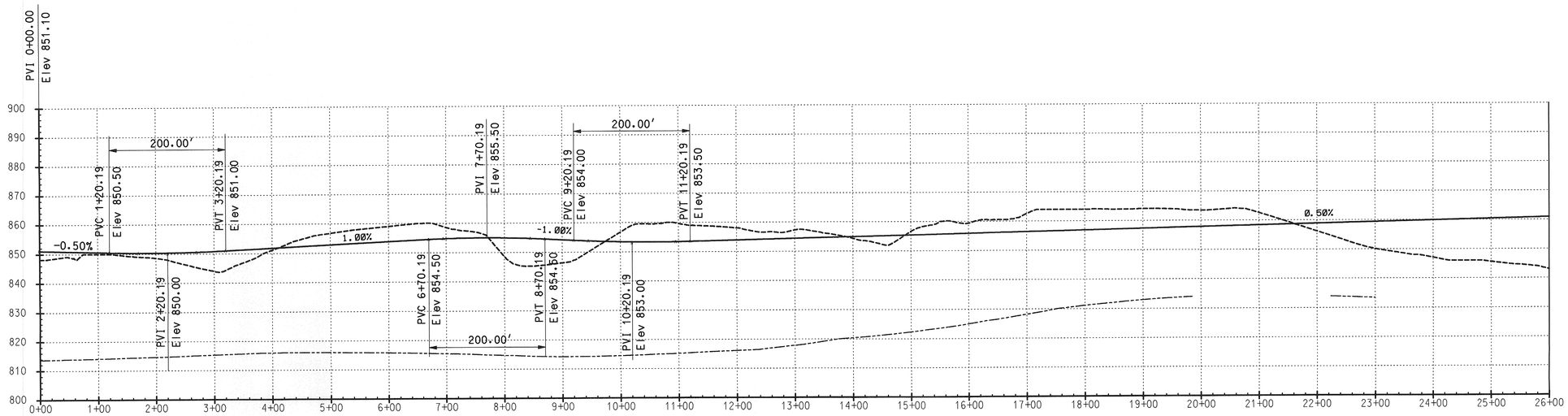
DRAWN D HAYES DATE 3/01/04
CHECKED J LAP-HUNT DATE 3/01/04
APPR. D C JORDAN DATE 3/01/04
APPR. C. Beuner DATE 3/29/04

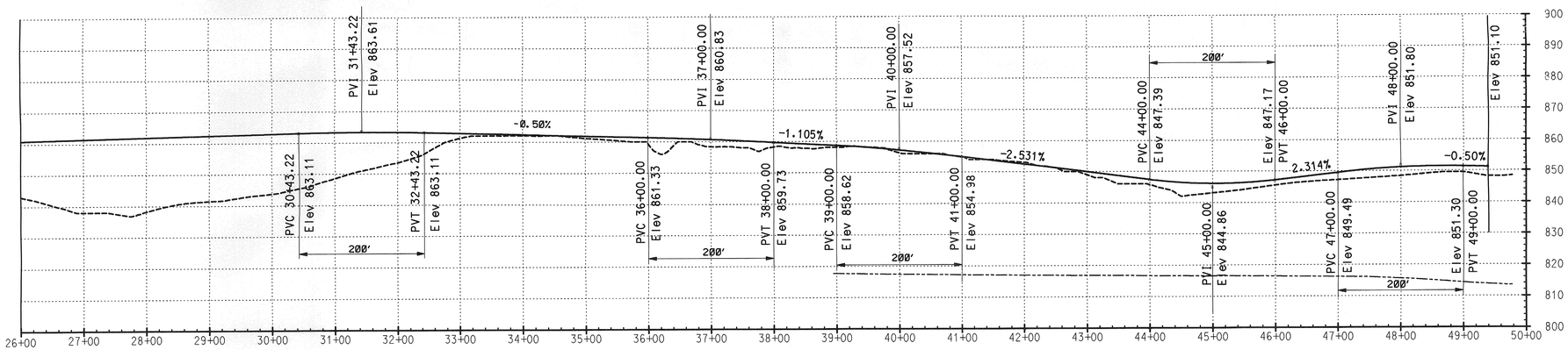
JOB REF. NO: 10154
STATION: MARSHALL

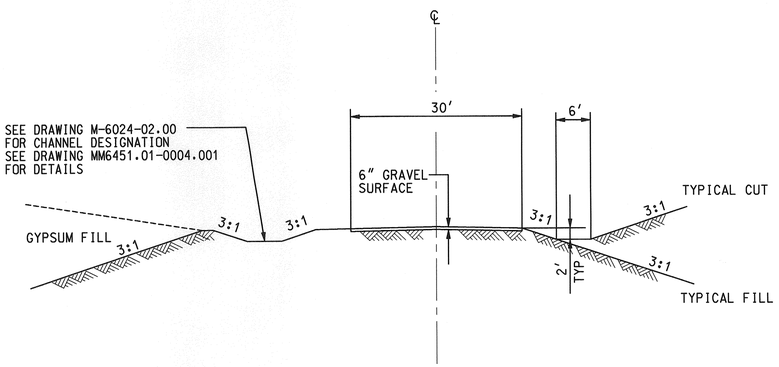
SCALE
DWG. NO. M-6024-08.00 REV. C

ERN:FHS0004W

DWG. NO. M-6024-09.00 REV. C







VERTICAL

0 10' 20' 40' 60'

SCALE: 1"= 20'

HORIZONTAL

0 50' 100' 200' 300'

SCALE: 1"= 100'

NOTES:

1. SEE DRAWING M-6024-02.00 FOR GENERAL NOTES.

NO.	REVISIONS	DRN	CHKD	APPR	DATE
A	ISSUED FOR REVIEW	DWH	JLH	DCJ	3/01/04
B	PROGRESS DRAWING	DWH	JLH	DCJ	3/22/04
C	ISSUED FOR PERMIT REVIEW	DWH	JLH	DCJ	3/29/04

ALSTOM Power Inc. Shaw Stone & Webster, Inc.

DUKE ENERGY
CHARLOTTE, N.C.

WET FLUE GAS DESULFURIZATION PROJECT
GYPSUM LANDFILL
CELL 1 AND CELL 2 PERIMETER ROAD PROFILE

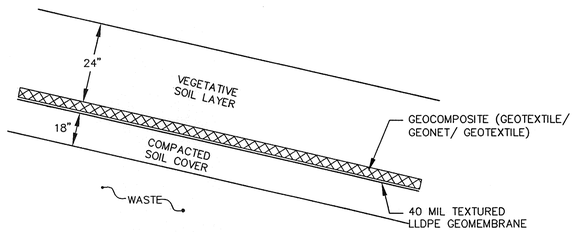
DRAWN D HAYES DATE 3/01/04
CHECKED J LAP-HUNT DATE 3/01/04
APPR. D C JORDAN DATE 3/01/04
APPR. DATE

JOB REF. NO: 10154
STATION: MARSHALL

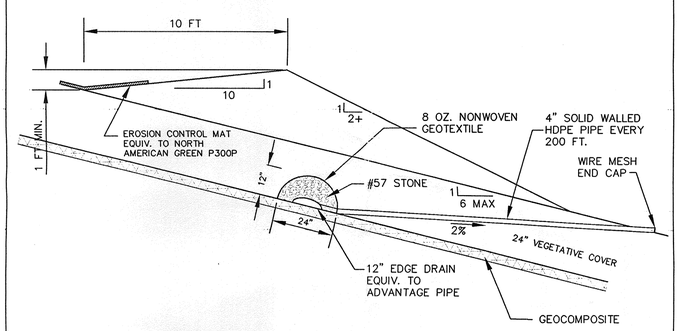
SCALE

DWG. NO. M-6024-09.00 REV. C

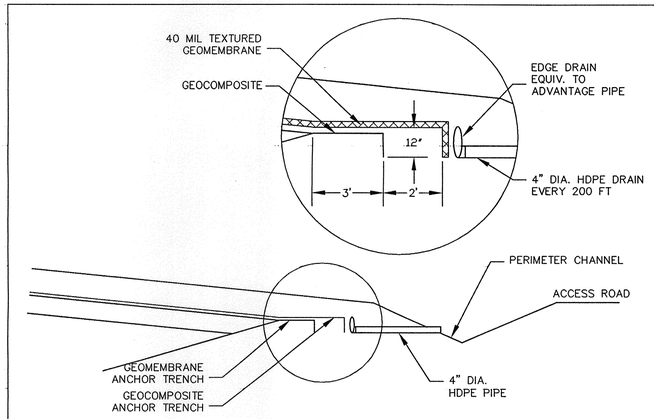
ERN:FHS0004X



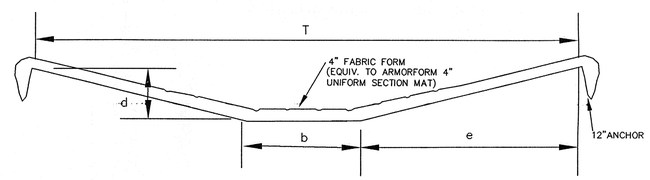
FINAL COVER SECTION
NTS



EROSION CONTROL BENCH
NTS



ANCHOR TRENCH DETAIL
NTS



x-section area(A)= $bd + Zd^2$

top width (T) = $b + 2dz$

$Z = \frac{e}{d}$

CHANNEL DATA BLOCK

CHANNEL DESIGNATION	USM SIZE	b	d	T	Z	LINER
AC-1	4"	3'	1'	13'	5	*ARMORFORM
AC-2	4"	1'	1'	7'	3	*ARMORFORM

*See Manufacturer's Literature

TYPICAL ARMORED CHANNEL SECTION
NTS

ERN: FHS00050

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NORTH CAROLINA PROFESSIONAL SEAL 17582 ENGINEER DAN E. BREWER
3/26/04

MARSHALL STEAM STATION FGD RESIDUE LANDFILL

CHARLOTTE, NORTH CAROLINA

REVISIONS

B	3/26/04	ISSUED FOR PERMIT REVIEW
A	3/24/04	ISSUED FOR DUKE REVIEW

PROJECT #: 046003.001 DATE: 3/24/04

DRAWN BY: PB CHECKED BY: DB

TITLE
FINAL CLOSURE DETAILS

DOCUMENT NO:
MM6451.00-0001.001

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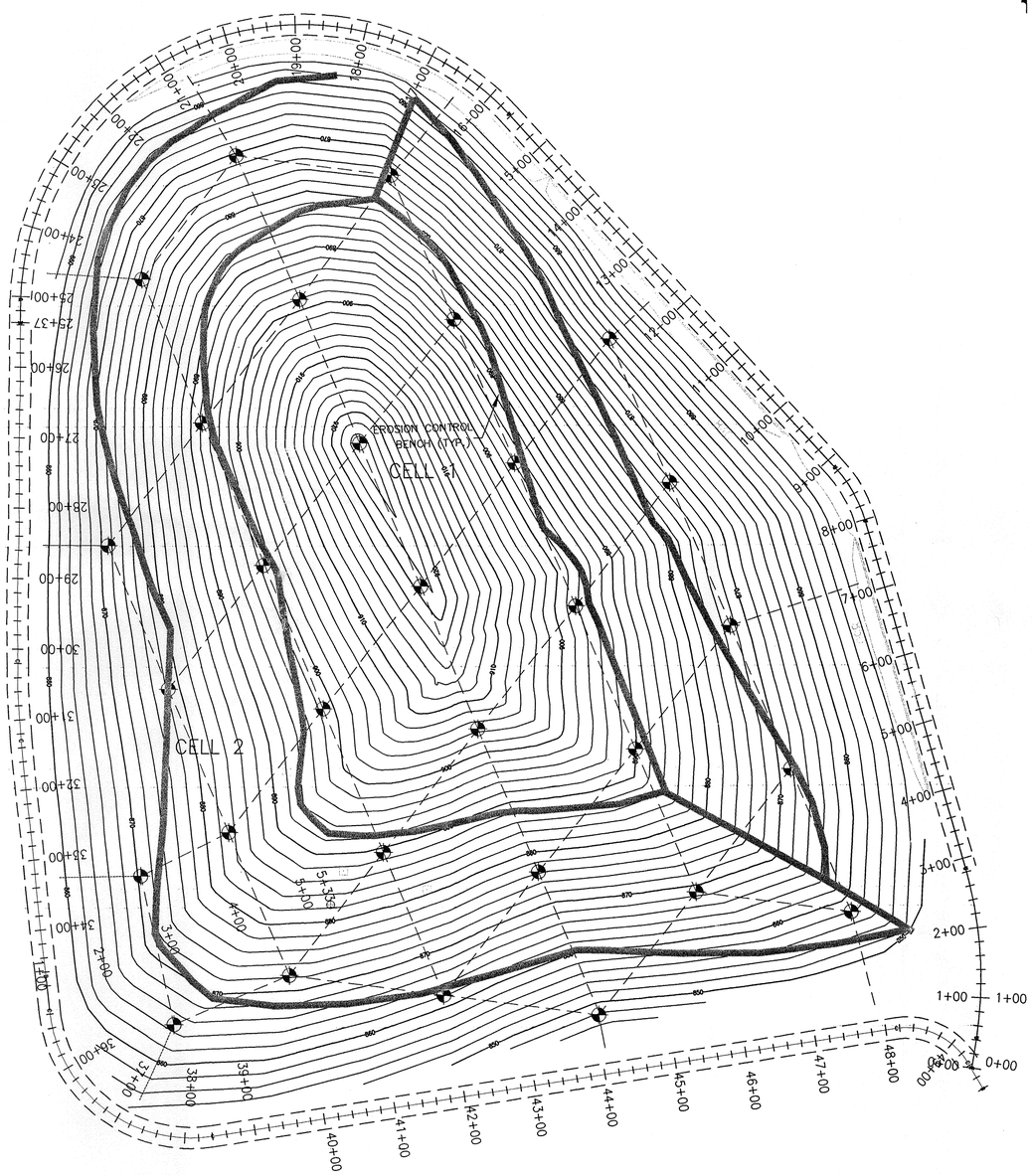
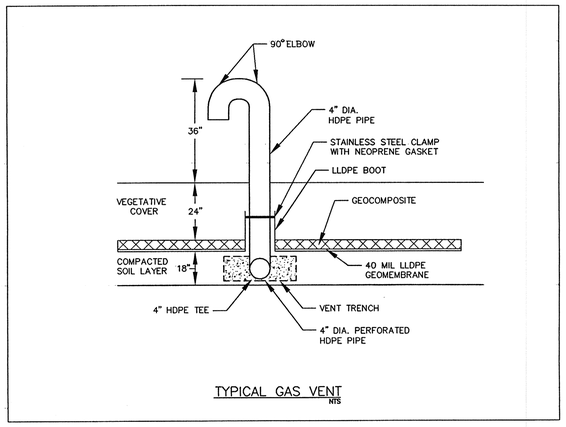
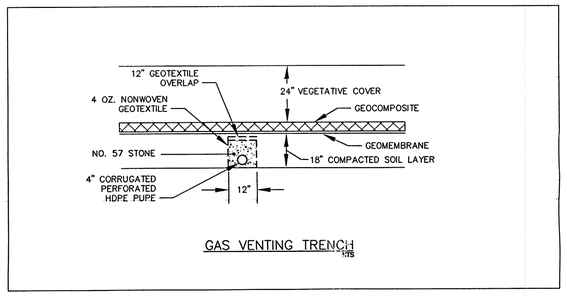
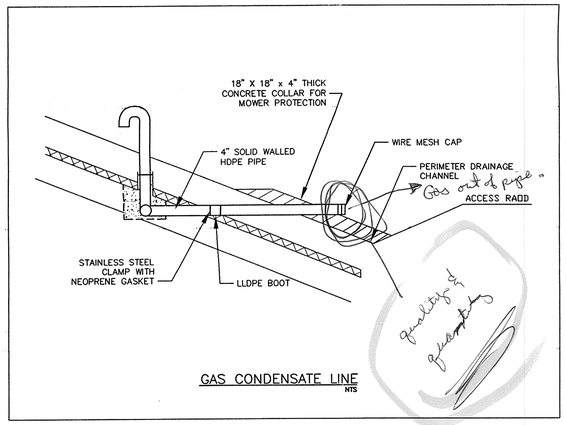




TYPICAL GAS VENT
NTS



GAS VENTING TRENCH
NTS



GAS CONDENSATE LINE
NTS

Air & Permit Test gas concentrations & volume

LEGEND:

- GAS VENT
- GAS VENTING TRENCH
- CONDENSATE LINE

Underground facility

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

ERN: FHS00051

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NORTH CAROLINA PROFESSIONAL SEAL 17592 ENGINEER DAN E. BREWER
3/26/04

MARSHALL STEAM STATION FGD RESIDUE LANDFILL

CHARLOTTE, NORTH CAROLINA

REVISIONS

B	3/26/04	ISSUED FOR PERMIT REVIEW
A	3/24/04	ISSUED FOR DUKE REVIEW

PROJECT #: D46003.001 DATE: 3/24/04

DRAWN BY: PB CHECKED BY: DB

TITLE
GAS VENTING SYSTEM PLAN

DOCUMENT NO:
MM6451.00-0002.001

Vicinity Map Not to Scale

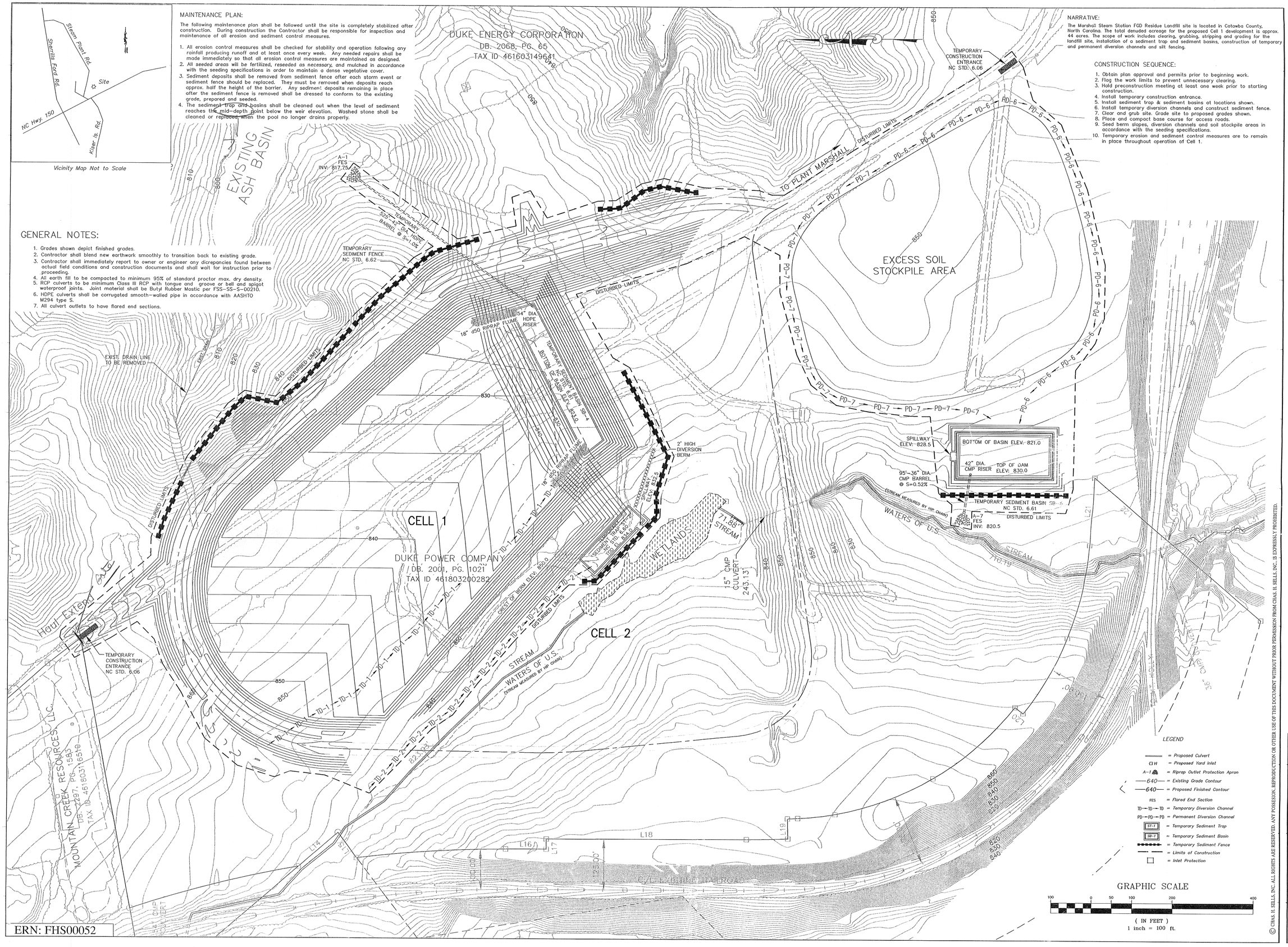
MAINTENANCE PLAN:

The following maintenance plan shall be followed until the site is completely stabilized after construction. During construction the Contractor shall be responsible for inspection and maintenance of all erosion and sediment control measures.

1. All erosion control measures shall be checked for stability and operation following any rainfall producing runoff and at least once every week. Any needed repairs shall be made immediately so that all erosion control measures are maintained as designed.
2. All seeded areas will be fertilized, reseeded as necessary, and mulched in accordance with the seeding specifications in order to maintain a dense vegetative cover.
3. Sediment deposits shall be removed from sediment fence after each storm event or sediment fence should be replaced. They must be removed when deposits reach approx. half the height of the barrier. Any sediment deposits remaining in place after the sediment fence is removed shall be dressed to conform to the existing grade, prepared and seeded.
4. The sediment trap and basins shall be cleaned out when the level of sediment reaches the mid-depth point below the weir elevation. Washed stone shall be cleaned or replaced when the pool no longer drains properly.

GENERAL NOTES:

1. Grades shown depict finished grades.
2. Contractor shall blend new earthwork smoothly to transition back to existing grade.
3. Contractor shall immediately report to owner or engineer any discrepancies found between actual field conditions and construction documents and shall wait for instruction prior to proceeding.
4. All earth fill to be compacted to minimum 95% of standard proctor max. dry density.
5. RCP culverts to be minimum Class III RCP with tongue and groove or bell and spigot waterproof joints. Joint material shall be Butyl Rubber Mastic per FSS-SS-S-00210.
6. HDPE culverts shall be corrugated smooth-walled pipe in accordance with AASHTO M294 type S.
7. All culvert outlets to have flared end sections.



NARRATIVE:

The Marshall Steam Station FGD Residue Landfill site is located in Catawba County, North Carolina. The total denuded acreage for the proposed Cell 1 development is approx. 44 acres. The scope of work includes clearing, grubbing, stripping and grading for the landfill site, installation of a sediment trap and sediment basins, construction of temporary and permanent diversion channels and silt fencing.

CONSTRUCTION SEQUENCE:

1. Obtain plan approval and permits prior to beginning work.
2. Flag the work limits to prevent unnecessary clearing.
3. Hold preconstruction meeting at least one week prior to starting construction.
4. Install temporary construction entrance.
5. Install sediment trap & sediment basins at locations shown.
6. Install temporary diversion channels and construct sediment fence.
7. Clear and grub site. Grade site to proposed grades shown.
8. Place and compact base course for access roads.
9. Seed berm slopes, diversion channels and soil stockpile areas in accordance with the seeding specifications.
10. Temporary erosion and sediment control measures are to remain in place throughout operation of Cell 1.

LEGEND

- = Proposed Culvert
- = Proposed Yard Inlet
- A-1 = Riprap Outlet Protection Apron
- 640 = Existing Grade Contour
- 640 = Proposed Finished Contour
- FES = Flared End Section
- TD = Temporary Diversion Channel
- PD = Permanent Diversion Channel
- ST-1 = Temporary Sediment Trap
- SB-1 = Temporary Sediment Basin
- = Temporary Sediment Fence
- = Limits of Construction
- = Inlet Protection

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

ERN: FHS00052

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NORTH CAROLINA PROFESSIONAL SEAL 17582 ENGINEER DAN E. BREWER
3/26/04

MARSHALL STEAM STATION GYPSUM LANDFILL

CATAWBA COUNTY, NORTH CAROLINA

REVISIONS

A	3/26/04	ISSUED FOR PERMIT REVIEW

PROJECT #: 046003.001 DATE: 3/24/04

DRAWN BY: DB CHECKED BY: DB

TITLE
GYPSUM LANDFILL
CELL 1 EROSION
& SEDIMENT
CONTROL PLAN

DOCUMENT NO:
MM6451.01-0001.001

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Vicinity Map Not to Scale

NARRATIVE:

The Marshall Steam Station FGD Residue Landfill site is located in Catawba County, North Carolina. The total denuded acreage for the proposed Cell 2 development is approx. 72 acres. The scope of work includes clearing, grubbing, stripping and grading for the landfill site, installation of a sediment traps and sediment basins, construction of temporary and permanent diversion channels, silt fencing, and storm drainage structures.

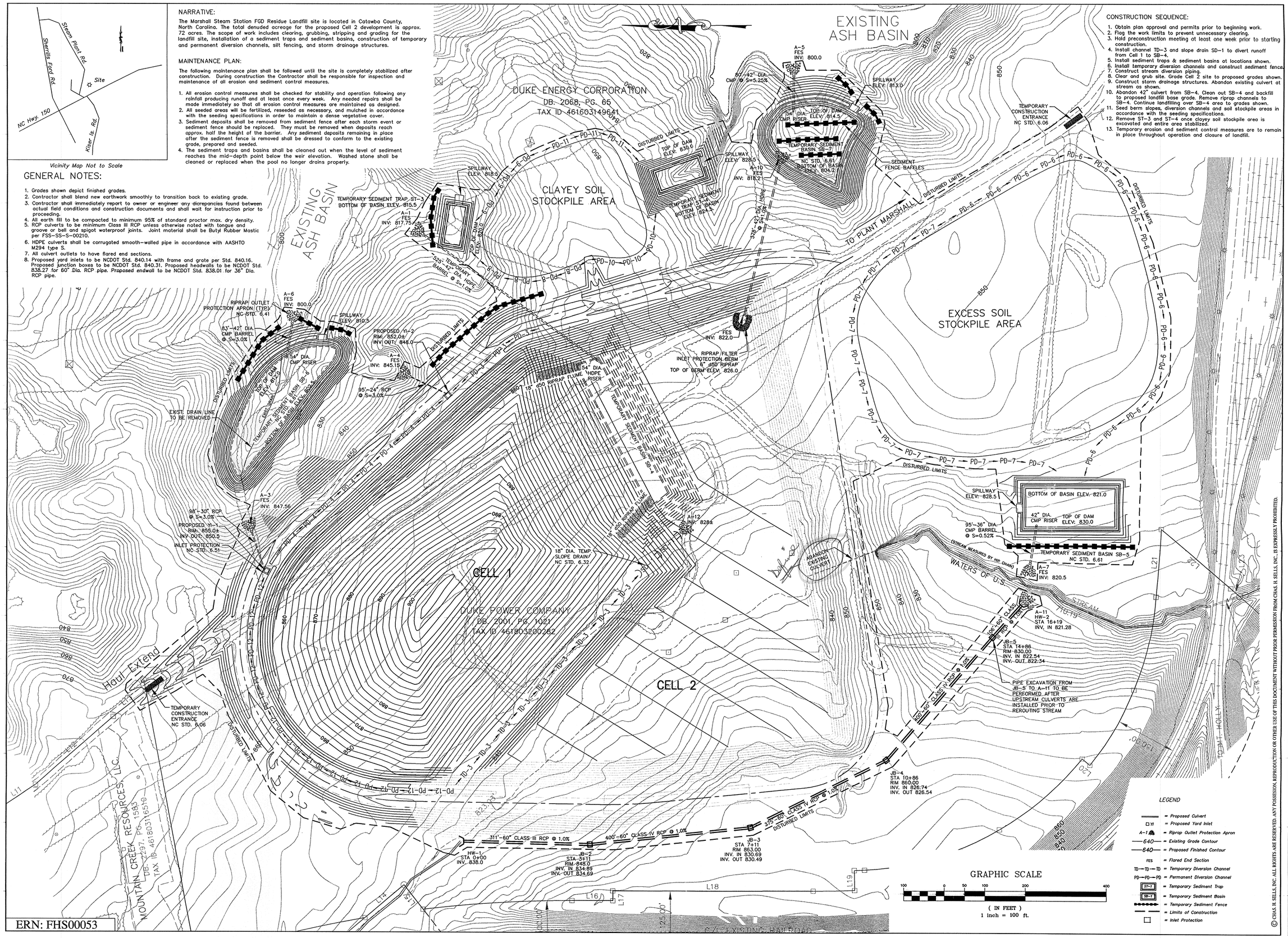
MAINTENANCE PLAN:

The following maintenance plan shall be followed until the site is completely stabilized after construction. During construction the Contractor shall be responsible for inspection and maintenance of all erosion and sediment control measures.

1. All erosion control measures shall be checked for stability and operation following any rainfall producing runoff and at least once every week. Any needed repairs shall be made immediately so that all erosion control measures are maintained as designed.
2. All seeded areas will be fertilized, reseeded as necessary, and mulched in accordance with the seeding specifications in order to maintain a dense vegetative cover.
3. Sediment deposits shall be removed from sediment fence after each storm event or sediment fence should be replaced. They must be removed when deposits reach approx. half the height of the barrier. Any sediment deposits remaining in place after the sediment fence is removed shall be dressed to conform to the existing grade, prepared and seeded.
4. The sediment traps and basins shall be cleaned out when the level of sediment reaches the mid-depth point below the weir elevation. Washed stone shall be cleaned or replaced when the pool no longer drains properly.

GENERAL NOTES:

1. Grades shown depict finished grades.
2. Contractor shall blend new earthwork smoothly to transition back to existing grade.
3. Contractor shall immediately report to owner or engineer any dicrepancies found between actual field conditions and construction documents and shall wait for instruction prior to proceeding.
4. All earth fill to be compacted to minimum 95% of standard proctor max. dry density.
5. RCP culverts to be minimum Class III RCP unless otherwise noted with tongue and groove or bell and spigot waterproof joints. Joint material shall be Butyl Rubber Mastic per FSS-SS-S-00210.
6. HDPE culverts shall be corrugated smooth-walled pipe in accordance with AASHTO M294 type S.
7. All culvert outlets to have flared end sections.
8. Proposed yard inlets to be NCDOT Std. 840.14 with frame and grate per Std. 840.16. Proposed junction boxes to be NCDOT Std. 840.31. Proposed headwalls to be NCDOT Std. 838.27 for 60" Dia. RCP pipe. Proposed endwall to be NCDOT Std. 838.01 for 36" Dia. RCP pipe.



ERN: FHS00053

CONSTRUCTION SEQUENCE:

1. Obtain plan approval and permits prior to beginning work.
2. Flag the work limits to prevent unnecessary clearing.
3. Hold preconstruction meeting at least one week prior to starting construction.
4. Install channel TD-3 and slope drain SD-1 to divert runoff from Cell 1 to SB-4.
5. Install sediment traps & sediment basins at locations shown.
6. Install temporary diversion channels and construct sediment fence.
7. Construct stream diversion piping.
8. Clear and grub site. Grade Cell 2 site to proposed grades shown.
9. Construct storm drainage structures. Abandon existing culvert at stream as shown.
10. Abandon 42" culvert from SB-4. Clean out SB-4 and backfill to proposed landfill base grade. Remove riprap channels to SB-4. Continue landfilling over SB-4 area to grades shown.
11. Seed berm slopes, diversion channels and soil stockpile areas in accordance with the seeding specifications.
12. Remove ST-3 and ST-4 once clayey soil stockpile area is excavated and entire area stabilized.
13. Temporary erosion and sediment control measures are to remain in place throughout operation and closure of landfill.

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NORTH CAROLINA PROFESSIONAL SEAL 17582 ENGINEER DAN E. BREWER
3/26/04

MARSHALL STEAM STATION GYPSUM LANDFILL

CATAWBA COUNTY, NORTH CAROLINA

REVISIONS

A	3/26/04	ISSUED FOR PERMIT REVIEW

PROJECT #: 046003.001 DATE: 3/24/04

DRAWN BY: DB CHECKED BY: DB

TITLE
GYPSUM LANDFILL
CELL 2 EROSION
& SEDIMENT
CONTROL PLAN

DOCUMENT NO:
MM6451.01-0002.001

Vicinity Map Not to Scale

MAINTENANCE PLAN:

The following maintenance plan shall be followed until the site is completely stabilized after construction. During construction the Contractor shall be responsible for inspection and maintenance of all erosion and sediment control measures.

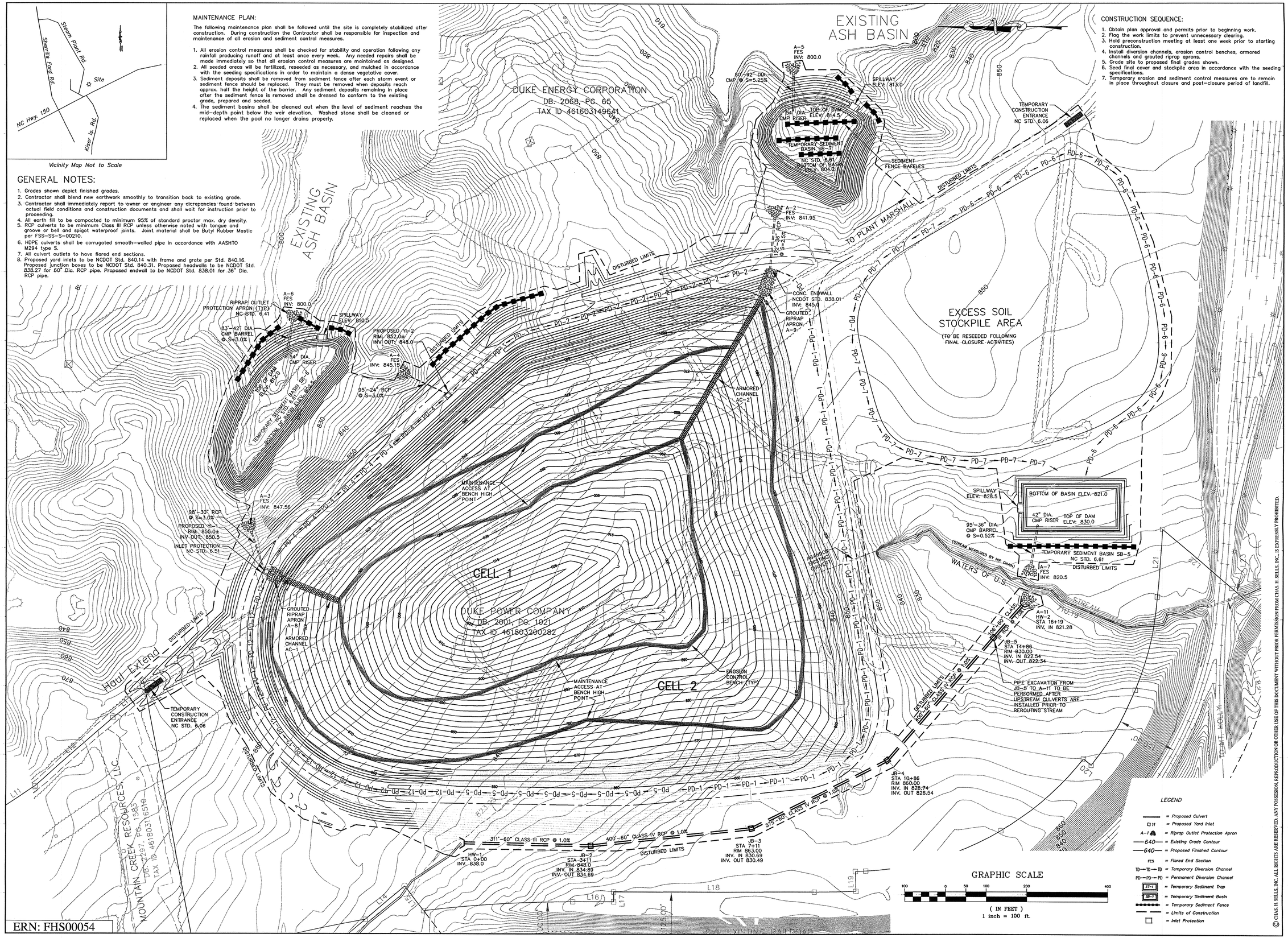
1. All erosion control measures shall be checked for stability and operation following any rainfall producing runoff and at least once every week. Any needed repairs shall be made immediately so that all erosion control measures are maintained as designed.
2. All seeded areas will be fertilized, reseeded as necessary, and mulched in accordance with the seeding specifications in order to maintain a dense vegetative cover.
3. Sediment deposits shall be removed from sediment fence after each storm event or sediment fence should be replaced. They must be removed when deposits reach approx. half the height of the barrier. Any sediment deposits remaining in place after the sediment fence is removed shall be dressed to conform to the existing grade, prepared and seeded.
4. The sediment basins shall be cleaned out when the level of sediment reaches the mid-depth point below the weir elevation. Washed stone shall be cleaned or replaced when the pool no longer drains properly.

CONSTRUCTION SEQUENCE:

1. Obtain plan approval and permits prior to beginning work.
2. Flag the work limits to prevent unnecessary clearing.
3. Hold preconstruction meeting at least one week prior to starting construction.
4. Install diversion channels, erosion control benches, armored channels and grouted riprap aprons.
5. Grade site to proposed final grades shown.
6. Seed final cover and stockpile area in accordance with the seeding specifications.
7. Temporary erosion and sediment control measures are to remain in place throughout closure and post-closure period of landfill.

GENERAL NOTES:

1. Grades shown depict finished grades.
2. Contractor shall blend new earthwork smoothly to transition back to existing grade.
3. Contractor shall immediately report to owner or engineer any dicrepancies found between actual field conditions and construction documents and shall wait for instruction prior to proceeding.
4. All earth fill to be compacted to minimum 95% of standard proctor max. dry density.
5. RCP culverts to be minimum Class III RCP unless otherwise noted with tongue and groove or bell and spigot waterproof joints. Joint material shall be Butyl Rubber Mastic per FSS-SS-S-00210.
6. HDPE culverts shall be corrugated smooth-walled pipe in accordance with AASHTO M294 type S.
7. All culvert outlets to have flared end sections.
8. Proposed yard inlets to be NCDOT Std. 840.14 with frame and grate per Std. 840.16. Proposed junction boxes to be NCDOT Std. 840.31. Proposed headwalls to be NCDOT Std. 838.27 for 60" Dia. RCP pipe. Proposed endwall to be NCDOT Std. 838.01 for 36" Dia. RCP pipe.



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NORTH CAROLINA PROFESSIONAL SEAL ENGINEER 17582 DAN E. BREWER 3/26/04

MARSHALL STEAM STATION GYPSUM LANDFILL

CATAWBA COUNTY, NORTH CAROLINA

REVISIONS

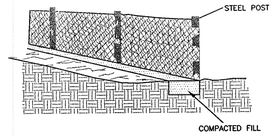
A	3/26/04	ISSUED FOR PERMIT REVIEW

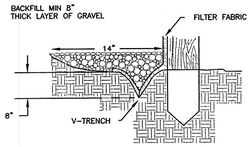
PROJECT #: 046003.001 DATE: 3/24/04

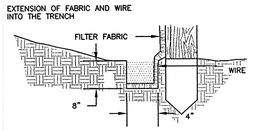
DRAWN BY: DB CHECKED BY: DB

TITLE
GYPSUM LANDFILL
FINAL CLOSURE
EROSION & SEDIMENT
CONTROL PLAN

DOCUMENT NO:
MM6451.01-0003.001







GENERAL NOTES:

1. FILTER FABRIC FENCE SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
2. WOVEN FILTER FABRIC BE USED WHERE SILT FENCE IS TO REMAIN FOR A PERIOD OF MORE THAN 30 DAYS.
3. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
4. WASHED STONE SHALL BE USED TO BURY SKIRT WHEN SILT FENCE IS USED ADJACENT TO A CHANNEL, CREEK OR POND.
5. TURN SILT FENCE UP SLOPE AT ENDS.
6. WHEN FABRIC IS USED WITH WIRE MESH 8' CENTERED POSTS MAY BE USED.

MAINTENANCE NOTES:

1. FILTER BARRIERS SHALL BE INSPECTED BY THE FINANCIALLY RESPONSIBLE PARTY OR HIS AGENT IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS NEEDED SHALL BE MADE IMMEDIATELY.
2. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL IS NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT OR SILT FENCE SHOULD BE REPLACED. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROX. HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS REMOVED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

INSTALLATION DETAIL OF SEDIMENT FENCE

DETAIL #1

SEEDING MIXTURE	RATE (lb/acre)
Tall Fescue	100
Sericea Lespedeza	30
Kobe Lespedeza	10

SEEDING NOTES

After Aug. 15 use unscarified sericea seed. Where periodic mowing is planned or a neat appearance is desired, omit sericea and increase Kobe lespedeza to 40 lb/acre. To extend spring seeding dates into June, add 15 lb/acre hulled Bermudagrass. However, after mid-Apr. it is preferable to seed temporary cover.

NURSE PLANTS

Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15 add 40 lb/acre rye (grain).

SEEDING DATES

	Best	Possible
Fall:	Aug. 25 – Sept. 15	Aug. 20 – Oct. 25
Late Winter:	Feb. 15 – Mar. 21	Feb. 1 – Apr. 15

Fall is best for tall fescue and late winter for lespedezas. Overseeding of Kobe lespedeza over fall-seeded tall fescue is very effective.

SOIL AMENDMENTS

Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.

MULCH

Apply Erosion Control Blanket per manufacturer's recommendations.

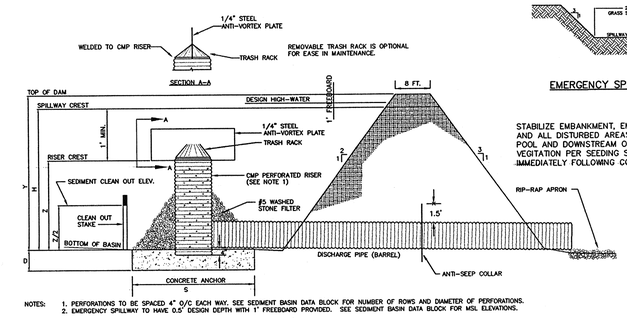
MAINTENANCE

Refertilize in the second year unless growth is fully adequate. May be mowed once or twice a year, but mowing is not necessary. Reseed, fertilize, and mulch damaged areas immediately.

Reference: Table 6.11 i from NC Erosion and Sediment Control Planning and Design Manual, 1988.

SEEDING SPECIFICATIONS

DETAIL #3



EMERGENCY SPILLWAY SECTION
NTS

STABILIZE EMBANKMENT, EMERGENCY SPILLWAY AND ALL DISTURBED AREAS ABOVE THE SEDIMENT POOL AND DOWNSTREAM OF THE BASIN WITH VEGITATION PER SEEDING SPECIFICATIONS IMMEDIATELY FOLLOWING CONSTRUCTION.

NOTES: 1. PERFORATIONS TO BE SPACED 4" O/C EACH WAY. SEE SEDIMENT BASIN DATA BLOCK FOR NUMBER OF ROWS AND DIAMETER OF PERFORATIONS.
2. EMERGENCY SPILLWAY TO HAVE 0.5' DESIGN DEPTH WITH 1' FREEBOARD PROVIDED. SEE SEDIMENT BASIN DATA BLOCK FOR MSL ELEVATIONS.

SEDIMENT BASIN DATA BLOCK

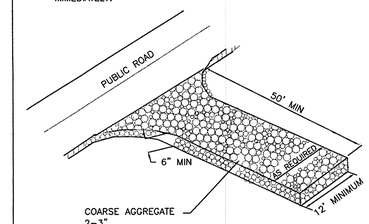
CELL EXCAVATION	BASIN DESIGNATION	TOP OF DAM WIDTH	SPILLWAY LENGTH	SPILLWAY ELEV.	SURFACE AREA	BASIN DIMENSIONS	TOP OF DAM ELEV.	CLEANOUT ELEV.	BOTTOM BASIN ELEV.	RISER DIA.	RISER CREST ELEV.	RISER HEIGHT	BARREL DIA.	BARREL LENGTH	BARREL OUTLET ELEV.	ANTI-FLOTATION ANCHOR DIMS.	PERFORATIONS
CELL 1	SB-4	8'	N/A	N/A	43,059 SF	IRREGULAR S.A.	850.0± MSL	826.0± MSL	823.0± MSL	54"	829.0± MSL	6.0'	42"	467'+/-	818.33 ±MSL	6'x6'x1.5'	8 ROWS 1" DIA.
CELL 1	SB-5	8'	20'	828.5± MSL	29,400 SF	120'x245'x7.5'	830.0± MSL	824.0 ±MSL	821.0 ±MSL	42"	827.0 ±MSL	6.0'	36"	95'+/-	820.5 ±MSL	6'x6'x1.25'	6 ROWS 1" DIA.
CELL 2	SB-6	8'	20'	810.5± MSL	43,355 SF	IRREGULAR S.A.	812.0 ±MSL	805.5 ±MSL	802.5 ±MSL	54"	808.5 ±MSL	6.0'	42"	83'+/-	800.0 ±MSL	6'x6'x1.5'	7 ROWS 1" DIA.
CELL 2	SB-7	8'	20'	813.0 ±MSL	33,818 SF	IRREGULAR S.A.	814.5 ±MSL	807.7 ±MSL	804.2 ±MSL	54"	811.2 ±MSL	7.0'	42"	80'+/-	800.0 ±MSL	6'x6'x1.75'	6 ROWS 1" DIA.

RISER TYPE SEDIMENT BASIN

DETAIL #6

NOTES:

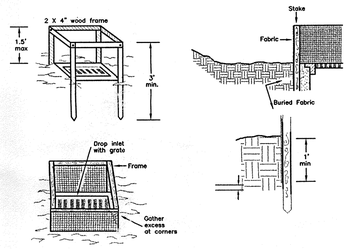
a. GRAVEL PAD TO BE 12'x 50' AND 6" THICK MINIMUM
b. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS IS TO BE PROVIDED (SEE COORDINATE DATA DRAWING).
c. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
d. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE SILL BE NECESSARY; KEEP SOME HANDY.
e. ANY MATERIAL WHICH STILL MAKES IT ONTO THE ROAD MUST BE CLEANED UP IMMEDIATELY.



NOTES: APPLICABLE AT ALL POINTS OF INGRESS & EGRESS UNTIL SITE IS STABILIZED, FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.

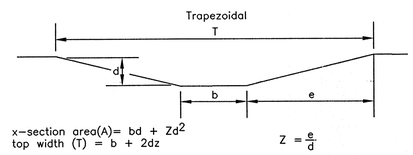
TEMPORARY CONSTRUCTION ENTRANCE

DETAIL #9



FABRIC INLET PROTECTION

DETAIL #4



x-section area(A)= bd + Zd^2
top width (T) = b + 2dz
$Z = \frac{e}{d}$

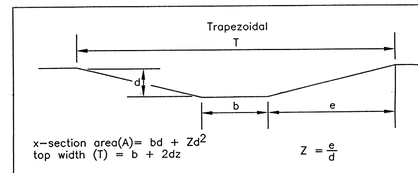
GRASS LINED CHANNEL DATA BLOCK

CHANNEL DESIGNATION	b	d	T	Z
PD-6, PD-7	2'	2'	14'	3
TD-2	3'	2'	15'	3
TD-1	6'	2.5'	21'	3

NOTE: ALL CELL 1 CHANNELS TO RECEIVE STRAW WITH NET TEMPORARY CHANNEL LINER EQUIVALENT TO NORTH AMERICAN GREEN S75. ALL CHANNELS TO RECEIVE TALL FESCUE GRASS LINER INSTALLED PER SEEDING SPECIFICATIONS (SEE DETAIL #2).

CROSS SECTION GEOMETRY OF CELL 1 GRASS-LINED DIVERSION CHANNELS

DETAIL #7



x-section area(A)= bd + Zd^2
top width (T) = b + 2dz
$Z = \frac{e}{d}$

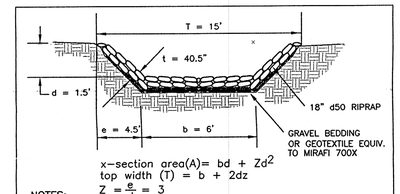
GRASS LINED CHANNEL DATA BLOCK

CHANNEL DESIGNATION	b	d	T	Z
PD-8, PD-9, PD-10, PD-11	2'	1.0'	8'	3
TD-3, PD-2, PD-3, PD-4, PD-5, PD-12	2'	2'	14'	3
PD-1	3'	2'	15'	3

NOTE: CHANNELS PD-8, PD-9 & PD-11 TO RECEIVE SYNTHETIC MAT TEMPORARY CHANNEL LINER EQUIVALENT TO NORTH AMERICAN GREEN P300M. ALL REMAINING CHANNELS TO RECEIVE STRAW WITH NET TEMPORARY CHANNEL LINER EQUIVALENT TO NORTH AMERICAN GREEN S75. ALL CHANNELS TO RECEIVE TALL FESCUE GRASS LINER INSTALLED PER SEEDING SPECIFICATIONS (SEE DETAIL #2).

CROSS SECTION GEOMETRY OF CELL 2 & FINAL CLOSURE GRASS-LINED DIVERSION CHANNELS

DETAIL #8



x-section area(A)= bd + Zd^2
top width (T) = b + 2dz
$Z = \frac{e}{d} = 3$

NOTES:
CHANNELS SHALL BE 18" d50 RIPRAP, dmax = 27", t=40.5".

TRAPEZOIDAL RIPRAP CHANNELS

DETAIL #10

SEEDING MIXTURE	RATE (lb/acre)
Species	200 (4-5/1,000ft²)
Tall Fescue	

NURSE PLANTS

Between May 1 and Aug. 15, add 10 lb/acre Sudangrass or 10 lb/acre German millet. Prior to May 1 or after Aug. 15 add 40 lb/acre rye (grain).

SEEDING DATES

Best: August 25 – October
Possible: February – April 15

Avoid seeding from Nov. to Jan. If seeding must be done at this time, add 40lb/acre rye grain and use a channel lining that offers maximum protection.

SOIL AMENDMENTS

Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer. Operate tillage equipment across the waterway.

MULCH

Use jute, excelsior matting, or other effective channel lining material to cover the bottom of channels and ditches, and staple securely. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary linings, apply 4,000 lb/acre grain straw and anchor straw by stapling netting over the top.

Mulch and anchoring materials must not be allowed to wash down slopes where they can clog drainage devices.

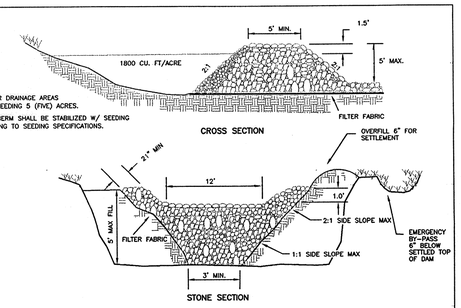
MAINTENANCE

Inspect and repair mulch frequently. Refertilize in late winter of the following year; use soil tests or apply 150 lb/acre 10-10-10. Mow regularly to a height of 2-4 inches.

Refer to Appendix 8.02 for botanical names.

GRASS-LINED DITCH SEEDING SPECIFICATIONS

DETAIL #2



NOTES:
1. USE FOR DRAINAGE AREAS NOT EXCEEDING 5 (FIVE) ACRES.
2. EARTH BERM SHALL BE STABILIZED W/ SEEDING ACCORDING TO SEEDING SPECIFICATIONS.

CROSS SECTION

STONE SECTION

SEDIMENT TRAP DATA BLOCK

CELL EXCAVATION	TRAP DESIGNATION	WEIR LENGTH	WEIR ELEV.	TRAP DIMENSIONS	TOP OF DAM ELEV.	CLEANOUT ELEV.	BOTTOM BASIN ELEV.
CELL 1	ST-2	12'	832.5± MSL	50'x175'	834.0± MSL	831.0±MSL	829.5± MSL
CELL 2	ST-3	6'	818.5± MSL	56'x112'	820.0± MSL	817.0±MSL	815.5 ±MSL
CELL 2	ST-4	6'	828.5± MSL	64'x128'	830.0± MSL	827.0±MSL	825.5 ±MSL

MAINTENANCE

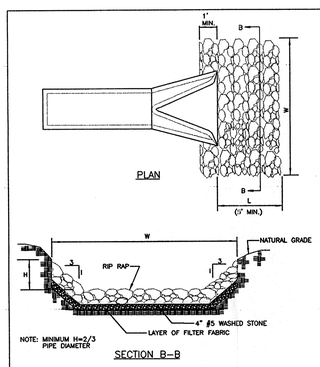
INSPECT TEMPORARY SEDIMENT TRAPS AFTER EACH PERIOD OF SIGNIFICANT RAINFALL. REMOVE SEDIMENT AND RESTORE TRAP TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT THAT IS REMOVED IN A DESIGNATED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING.

CHECK THE STRUCTURE FOR DAMAGE FROM EROSION OR PIPING. PERIODICALLY CHECK THE DEPTH OF THE SPILLWAY TO ENSURE IT IS A MINIMUM OF 1.5 FT. BELOW THE LOW POINT OF THE EMBANKMENT. IMMEDIATELY FILL ANY SETTLEMENT OF THE EMBANKMENT TO SLIGHTLY ABOVE DESIGN GRADE. ANY RIP RAP DISPLACED FROM THE SPILLWAY MUST BE REPLACED IMMEDIATELY.

STABILIZE THE EMBANKMENT AND ALL DISTURBED AREAS ABOVE THE SEDIMENT POOL AND DOWNSTREAM FROM THE TRAP IMMEDIATELY AFTER CONSTRUCTION WITH SEEDING.

GRAVEL AND RIP RAP FILTER BASIN

DETAIL #5



NOTES:

1. CLASS OR MEDIAN SIZE OF RIPRAP, LENGTH, WIDTH AND DEPTH OF APRONS PER THE OUTLET PROTECTION APRON DATA BLOCK BELOW.
2. RIPRAP SHOULD EXTEND UP BOTH SIDES OF THE APRON AND AROUND THE END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO THIRDS THE PIPE DIAMETER OR CULVERT HEIGHT.
3. THERE SHALL BE NO OVERFLOW FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIPRAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF OR TOE WALL AT THE DOWNSTREAM END.
4. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1
5. ALL SUBGRADE FOR STRUCTURE TO BE COMPACTED TO 90% MODIFIED PROCTOR.
6. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.
7. NO BENDS OR CURVES IN THE HORIZONTAL ALIGNMENT OF THE APRON WILL BE PERMITTED.

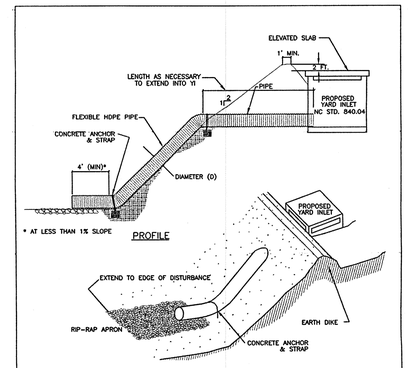
OUTLET PROTECTION APRON DATA BLOCK

APRON A-1 DATA CELL 1	APRON A-2 DATA FINAL CLOSURE	APRON A-3 DATA CELL 2	APRON A-4 DATA CELL 2	APRON A-5 DATA CELL 2	APRON A-6 DATA CELL 2
RIPRAP d50 = 12" dmax = 18" t = 27" L = 26 FT. W = 29.5 FT. H = 28"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 29 FT. W = 32 FT. H = 24"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 24 FT. W = 26.5 FT. H = 20"	RIPRAP d50 = 6" dmax = 6" t = 13.5" L = 12 FT. W = 13.5 FT. H = 12"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 30 FT. W = 33.5 FT. H = 28"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 26 FT. W = 29.5 FT. H = 28"
APRON A-7 DATA CELL 1	*APRON A-8 DATA FINAL CLOSURE	*APRON A-9 DATA FINAL CLOSURE	APRON A-10 DATA CELL 2	APRON A-11 DATA CELL 2	APRON A-12 DATA CELL 2
RIPRAP d50 = 12" dmax = 18" t = 27" L = 22 FT. W = 25.5 FT. H = 28"	RIPRAP d50 = 6" dmax = 9" t = 13.5" L = 17 FT. W = 19.5 FT. H = 20"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 20 FT. W = 23 FT. H = 24"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 30 FT. W = 33.5 FT. H = 28"	RIPRAP d50 = 12" dmax = 18" t = 27" L = 36 FT. W = 41 FT. H = 40"	RIPRAP d50 = 6" dmax = 9" t = 13.5" L = 14 FT. W = 15.5 FT. H = 12"

*APRONS A-8 & A-9 TO BE GROUTED WITH CONCRETE

RIPRAP APRON AT PIPE OUTLETS

DETAIL #9



CONSTRUCTION SPECIFICATIONS:

1. THE TOP OF THE EARTH DIKE OVER THE INLET PIPE AND THOSE DIKES CARRYING WATER TO THE PIPE SHALL BE AT LEAST 1 FOOT HIGHER AT ALL POINTS THAN THE TOP OF THE INLET PIPE.
2. THE PIPE SHALL BE FLEXIBLE WITH WATER TIGHT CONNECTING BANDS. FLEXIBLE PIPE SHOULD BE STAKED ON EITHER SIDE.
3. A RIP RAP APRON SHALL BE PROVIDED AT THE OUTLET, IF EMPTYING INTO A DISTURBED AREA.
4. THE SOIL AROUND AND UNDER THE INLET PIPE AND ENTRANCE SECTION SHALL BE HAND TAMPED IN 4" LIFTS TO THE TOP OF THE EARTH DIKE.
5. FOLLOW-UP INSPECTION AND ANY NEEDED MAINTENANCE SHALL BE PERFORMED AFTER EACH STORM BY THE CONTRACTOR.
6. CONCRETE ANCHOR TO BE 8" CMU FILLED WITH CONCRETE. STRAP TO BE 1-INCH GALVANIZED STEEL ANCHORED IN CONCRETE.

DRAIN DESIGNATION	PIPE DIAMETER
SD-1	18"

FLEXIBLE PIPE SLOPE DRAIN

DETAIL #11

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3/26/04

MARSHALL STEAM STATION GYPSUM LANDFILL

CATAWBA COUNTY, NORTH CAROLINA

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DETAILS

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