

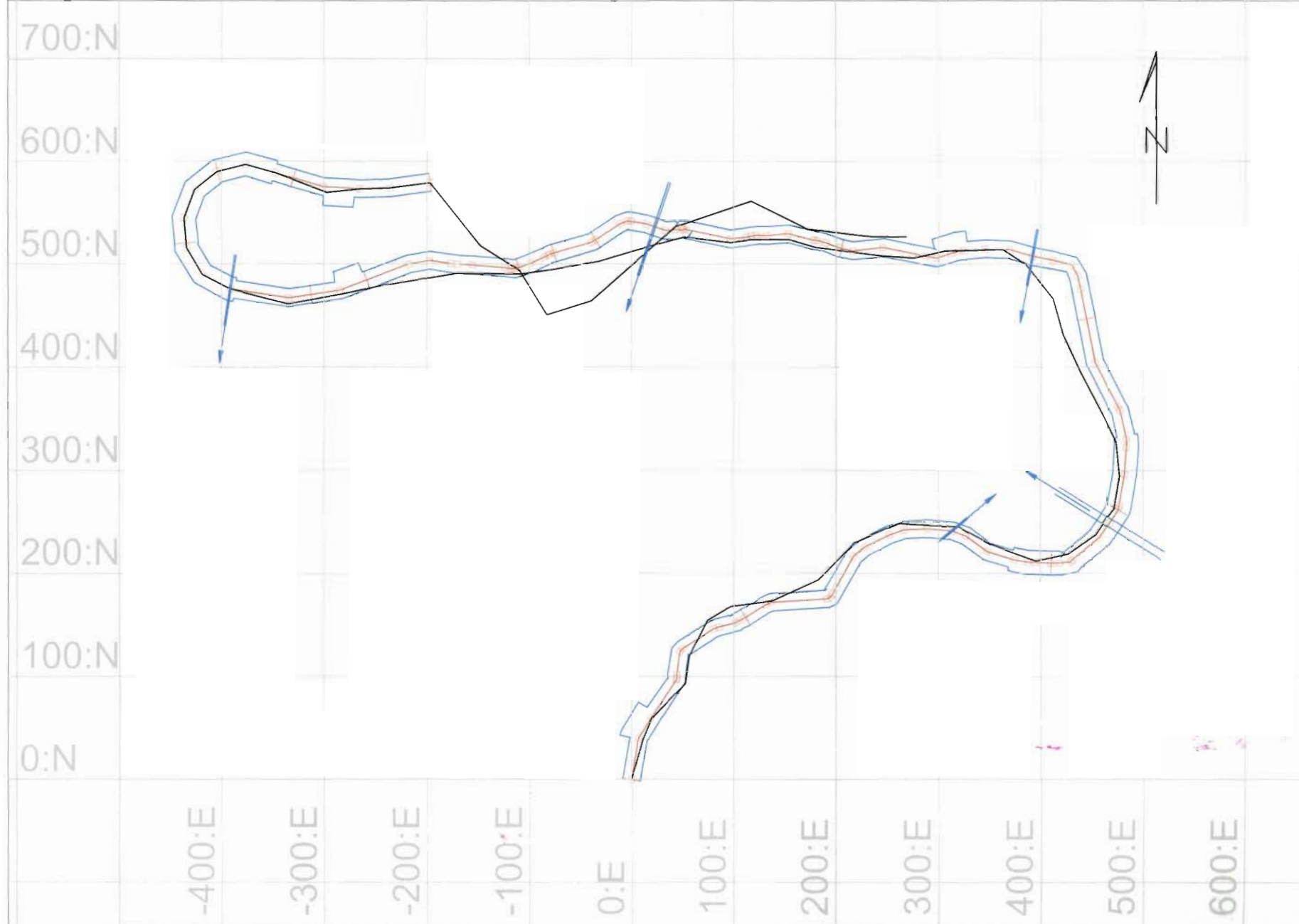
Magruder_3823_Operations
Spring 2008

Road Project
@
St. Edwards State Park

Preliminary Road Design
Subject for Internal Review
May, 2008

Submitted by:
Chris Magruder
9523823





ROADENG Profile

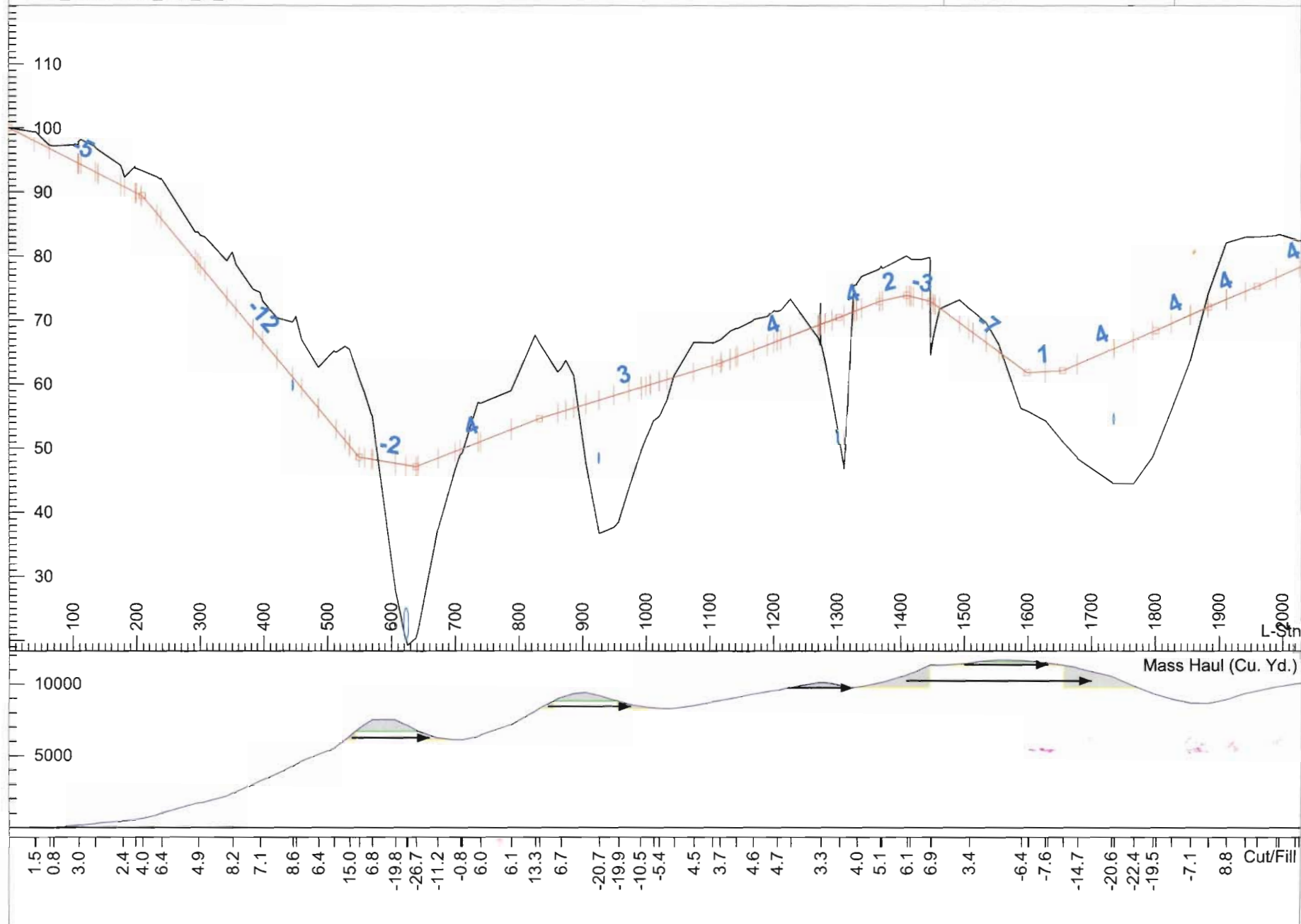
F:\Fe_346\ESRM_468_st_ed

Horz Scale 1:2400

P. 1

Vert Scale 1:240

08/05/06



ROADENG Profile

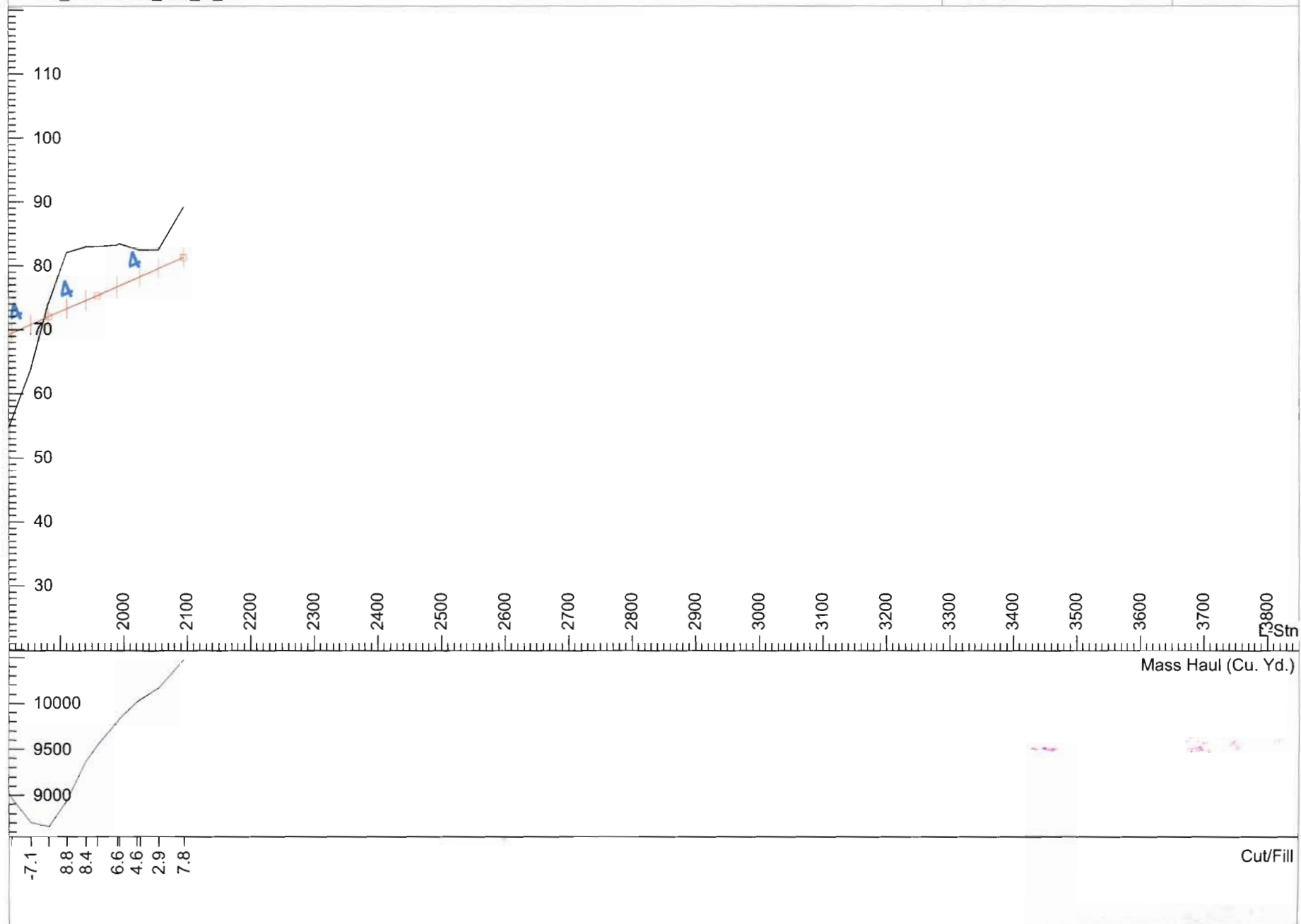
Horz Scale 1:2400

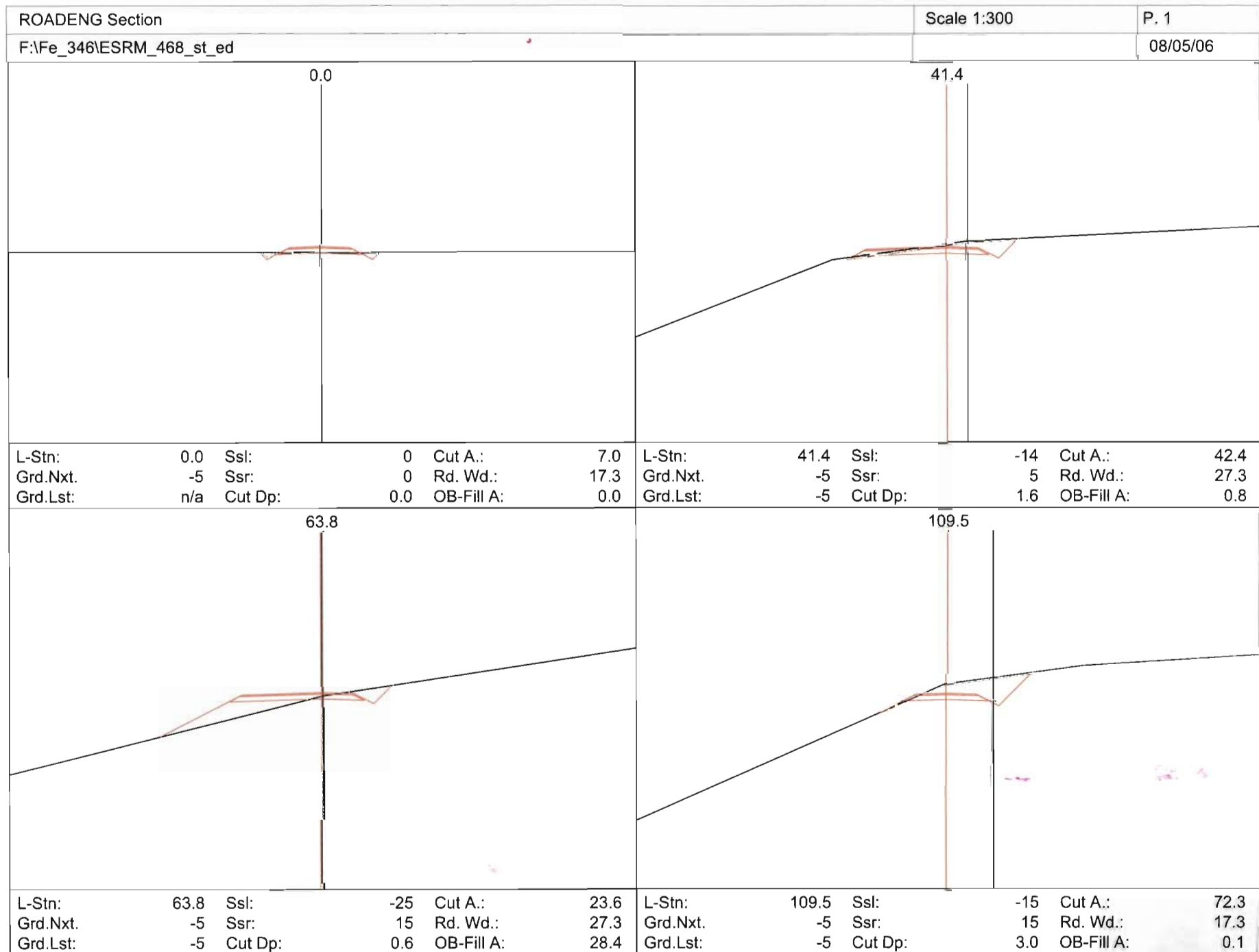
P. 2

F:\Fe_346\ESRM_468_st_ed

Vert Scale 1:240

08/05/06

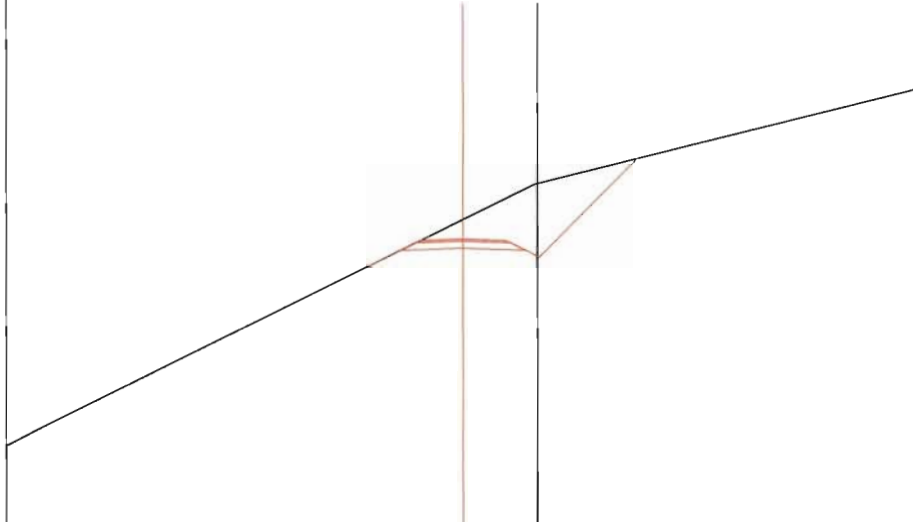




F:\Fe_346\ESRM_468_st_ed

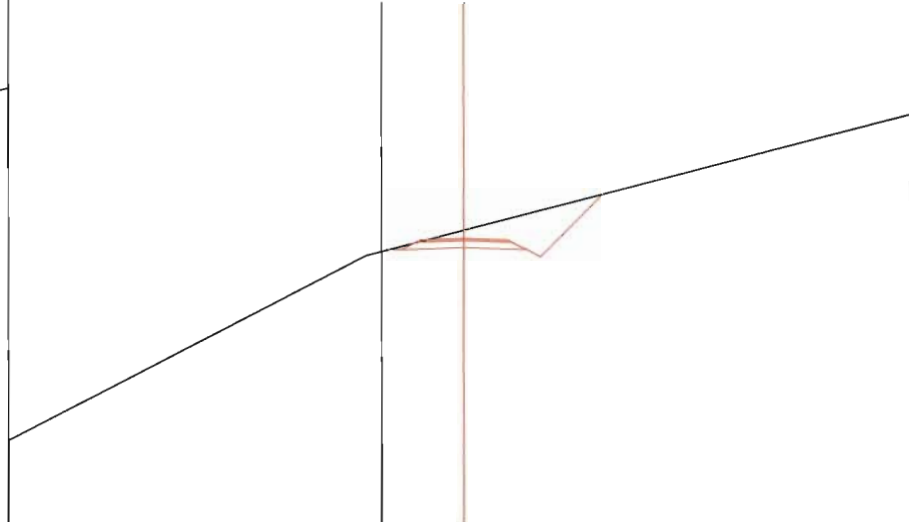
08/05/06

135.1



L-Stn:	135.1	Ssl:	-50	Cut A.:	159.8
Grd.Nxt.	-5	Ssr:	25	Rd. Wd.:	17.3
Grd.Lst:	-5	Cut Dp:	4.0	OB-Fill A:	0.0

178.5



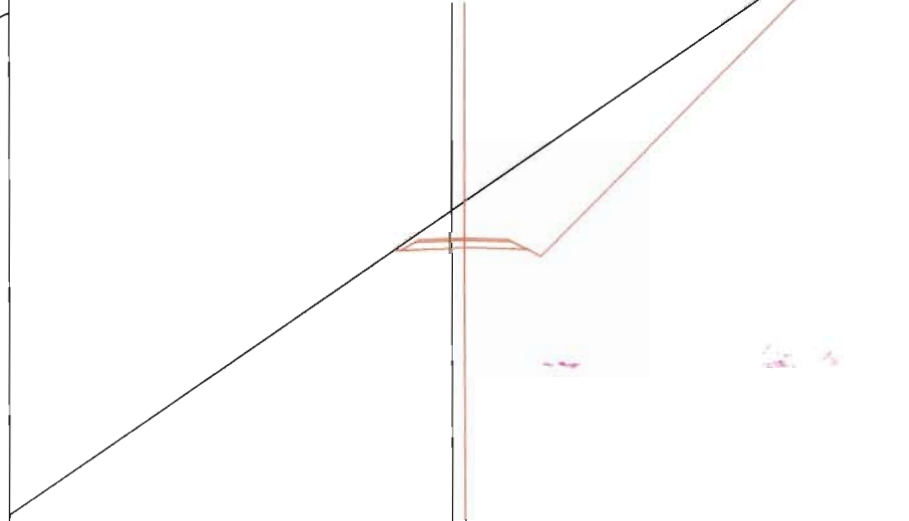
L-Stn:	178.5	Ssl:	-60	Cut A.:	83.7
Grd.Nxt.	-5	Ssr:	30	Rd. Wd.:	17.3
Grd.Lst:	-5	Cut Dp:	2.4	OB-Fill A:	0.0

198.8



L-Stn:	198.8	Ssl:	-75	Cut A.:	171.2
Grd.Nxt.	-5	Ssr:	50	Rd. Wd.:	17.3
Grd.Lst:	-5	Cut Dp:	3.7	OB-Fill A:	0.0

239.4



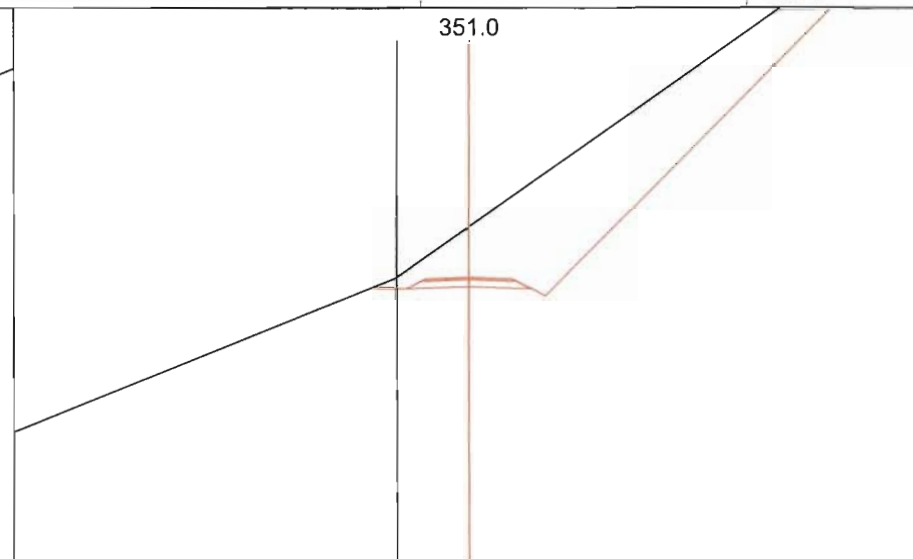
L-Stn:	239.4	Ssl:	-70	Cut A.:	488.2
Grd.Nxt.	-12	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	6.4	OB-Fill A:	0.0

F:\Fe_346\ESRM_468_st_ed

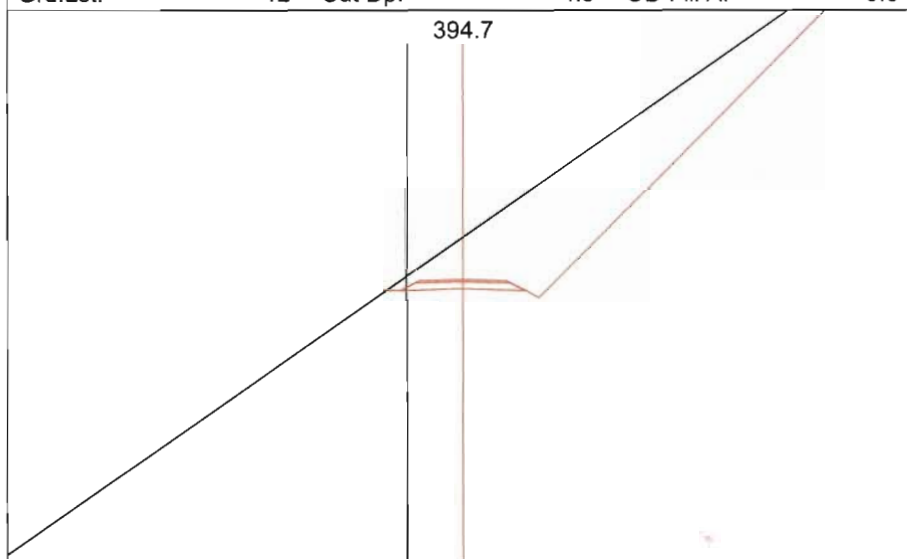
08/05/06



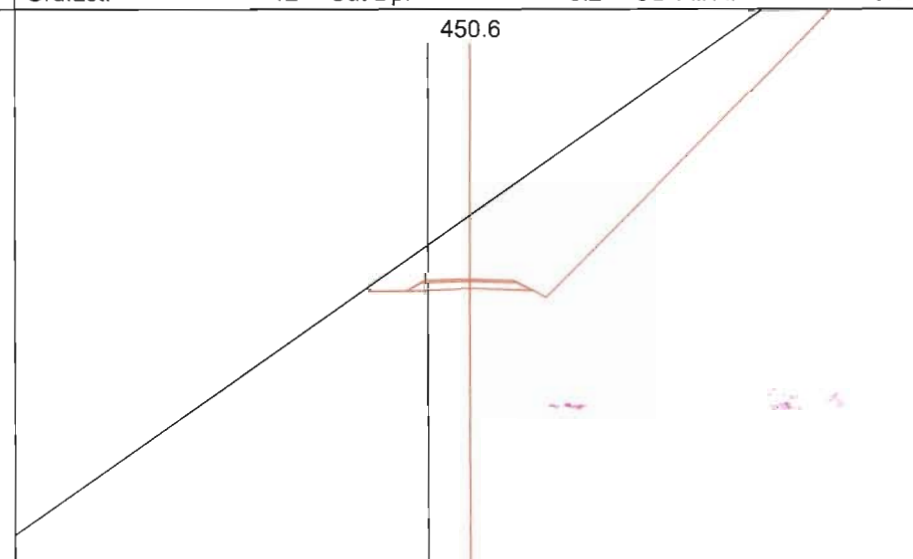
L-Stn:	297.1	Ssl:	-65	Cut A.:	194.2
Grd.Nxt.	-12	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	4.9	OB-Fill A:	0.0



L-Stn:	351.0	Ssl:	-40	Cut A.:	649.4
Grd.Nxt.	-12	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	8.2	OB-Fill A:	0.0



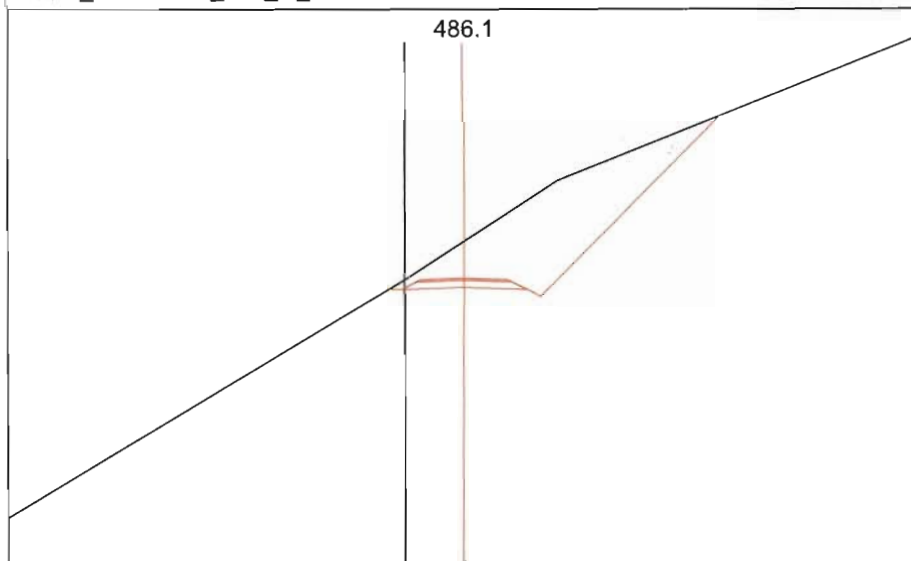
L-Stn:	394.7	Ssl:	-70	Cut A.:	560.6
Grd.Nxt.	-12	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	7.1	OB-Fill A:	0.0



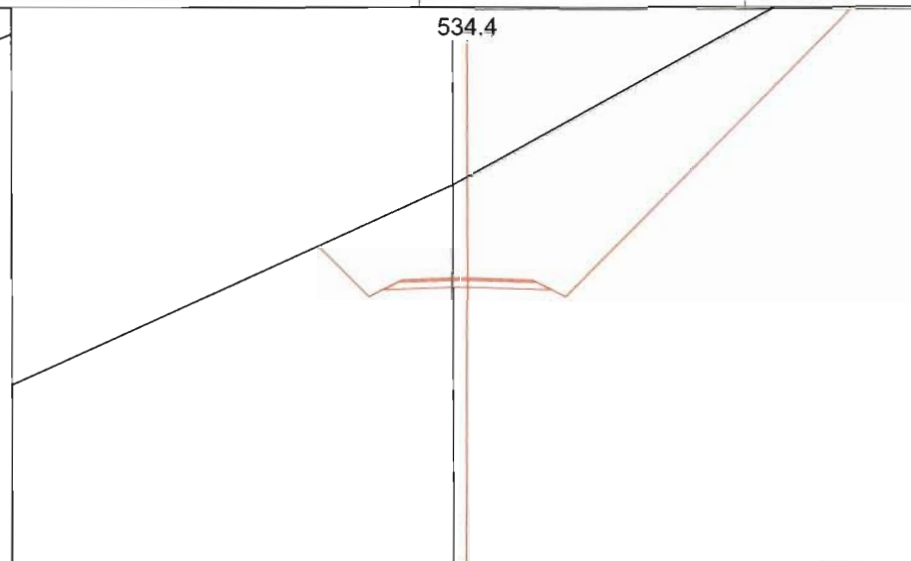
L-Stn:	450.6	Ssl:	-70	Cut A.:	805.6
Grd.Nxt.	-12	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	10.1	OB-Fill A:	0.0

F:\Fe_346\ESRM_468_st_ed

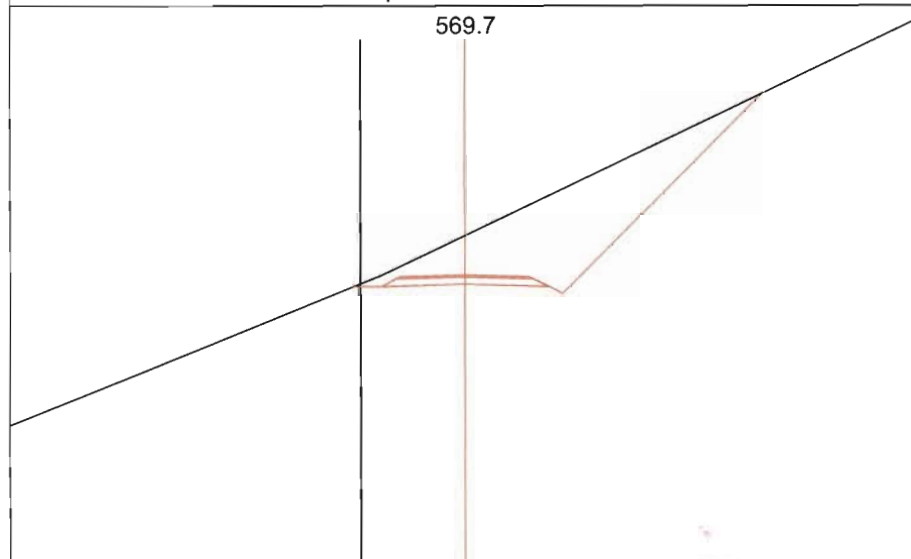
08/05/06



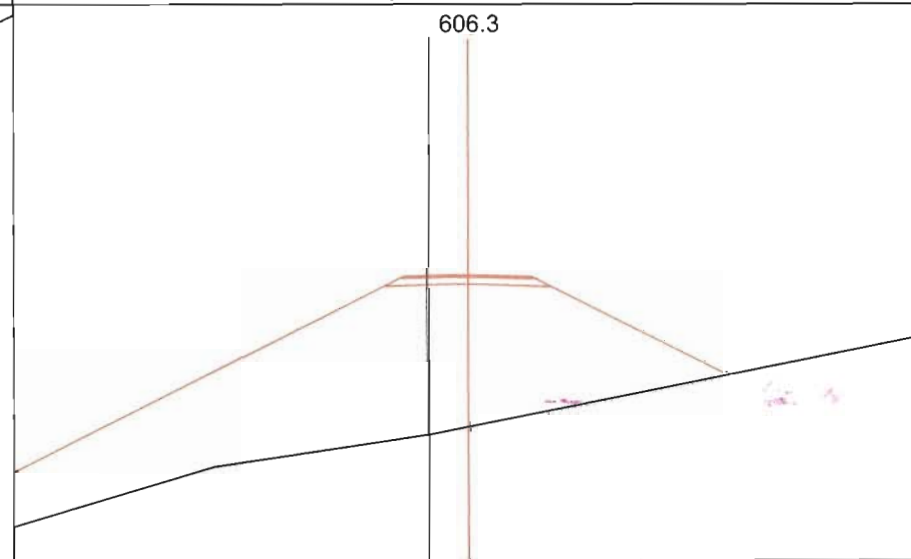
L-Stn:	486.1	Ssl:	-60	Cut A.:	327.0
Grd.Nxt:	-12	Ssr:	65	Rd. Wd.:	17.3
Grd.Lst:	-12	Cut Dp:	6.4	OB-Fill A:	0.0



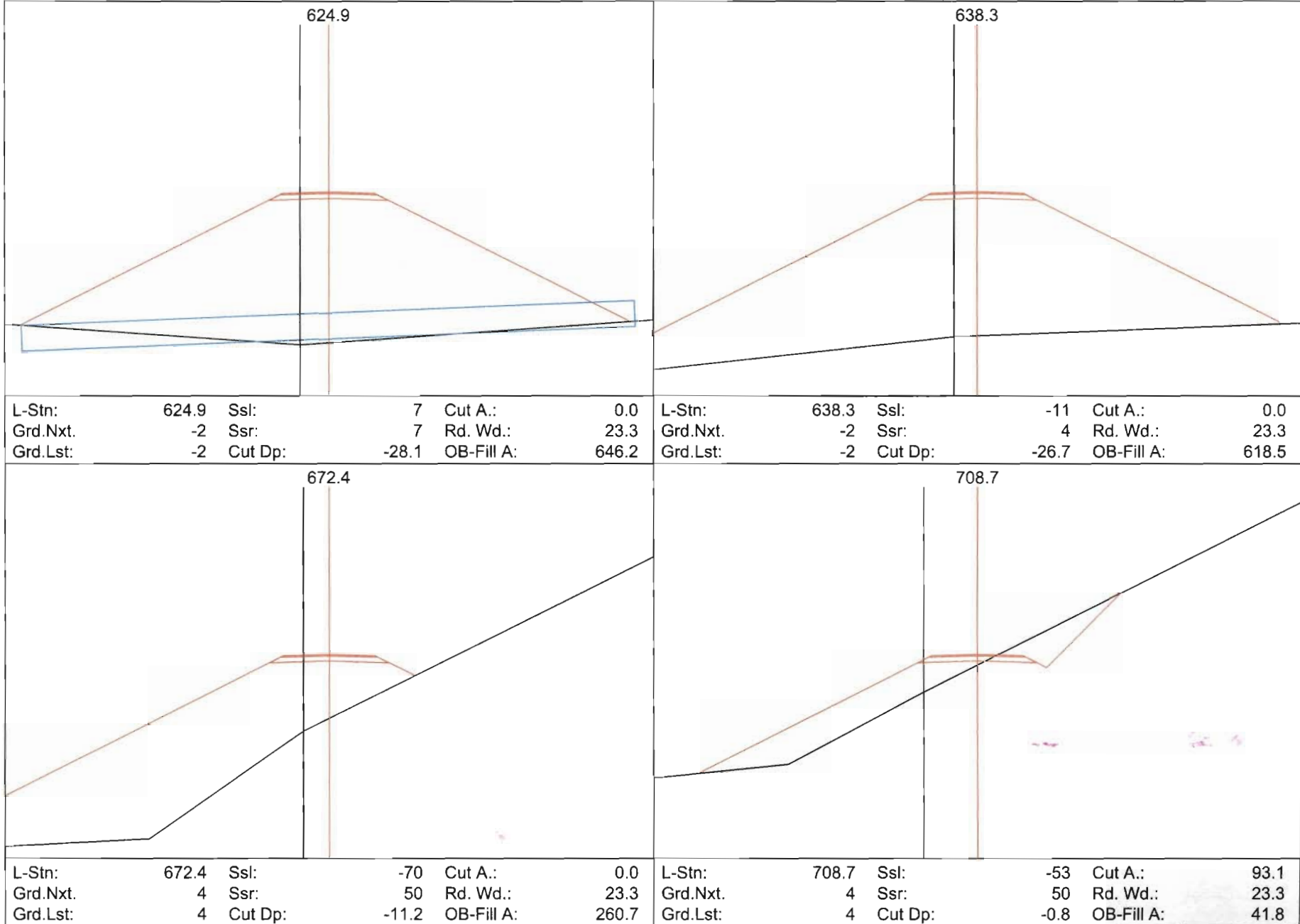
L-Stn:	534.4	Ssl:	-45	Cut A.:	1081.9
Grd.Nxt:	-12	Ssr:	55	Rd. Wd.:	23.3
Grd.Lst:	-12	Cut Dp:	15.0	OB-Fill A:	0.0

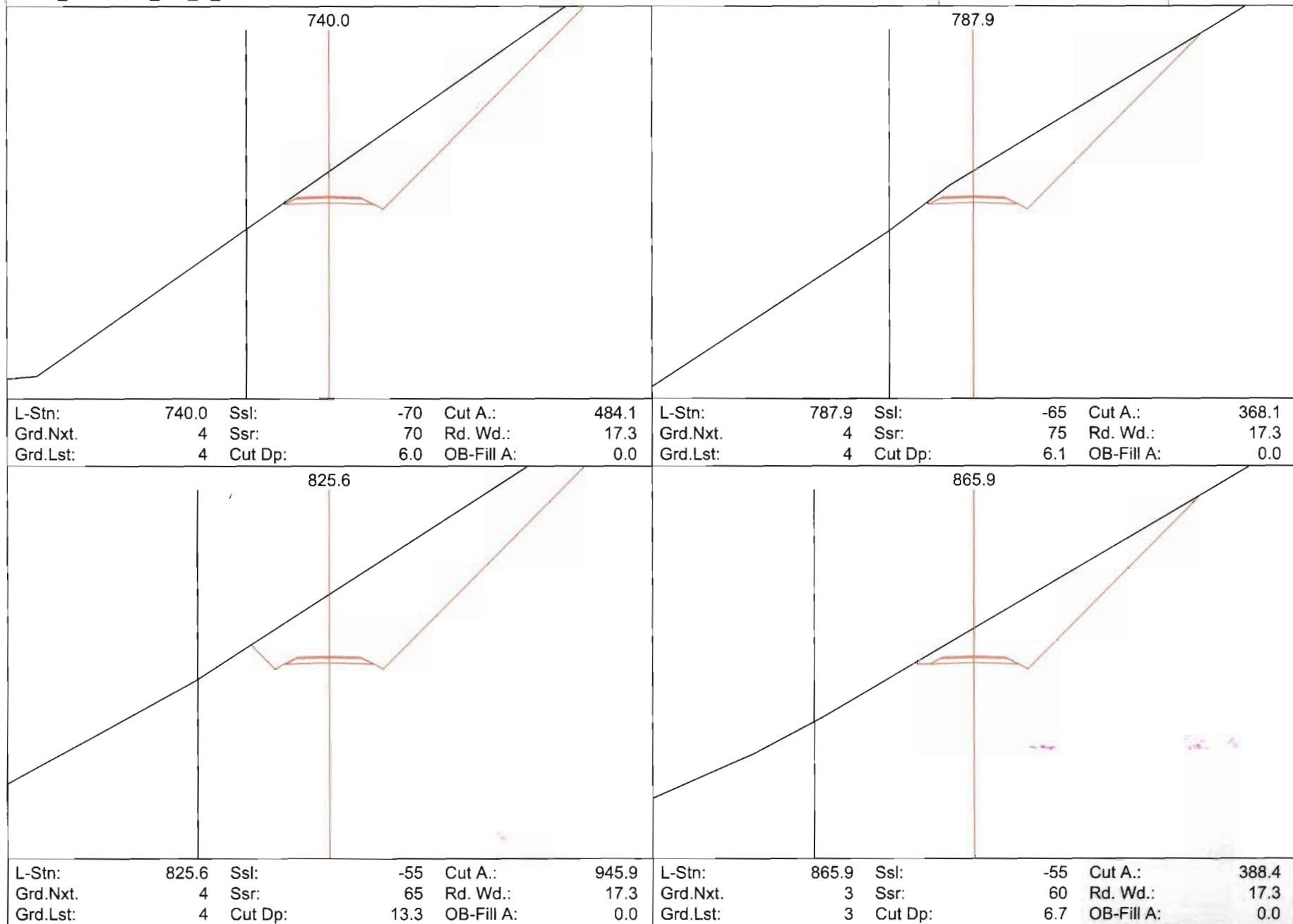


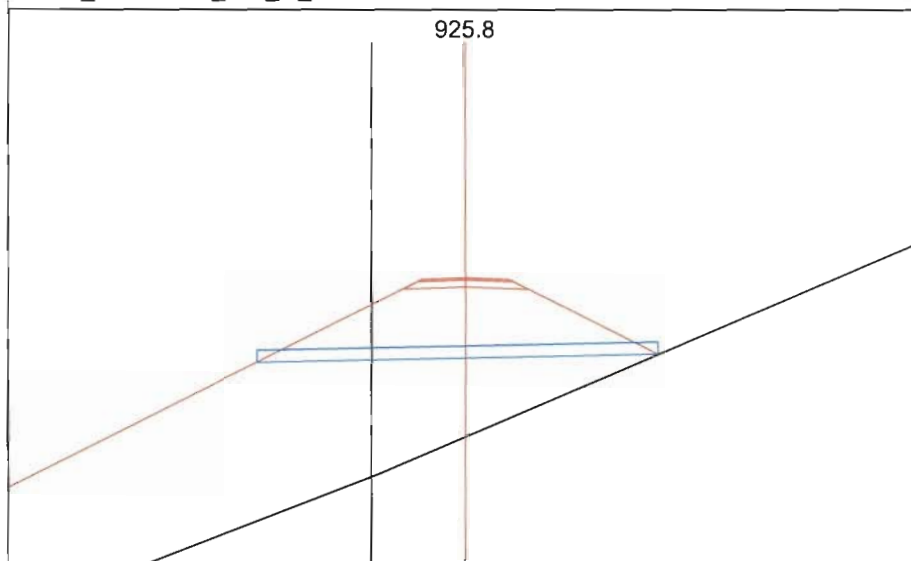
L-Stn:	569.7	Ssl:	-55	Cut A.:	396.9
Grd.Nxt:	-2	Ssr:	65	Rd. Wd.:	23.3
Grd.Lst:	-2	Cut Dp:	6.8	OB-Fill A:	0.0



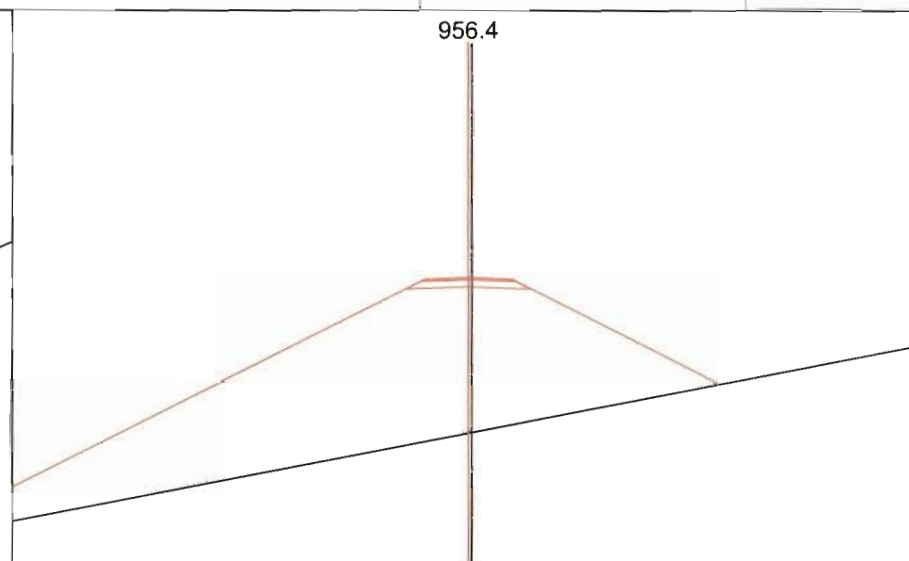
L-Stn:	606.3	Ssl:	-15	Cut A.:	0.0
Grd.Nxt:	-2	Ssr:	20	Rd. Wd.:	23.3
Grd.Lst:	-2	Cut Dp:	-19.8	OB-Fill A:	456.4



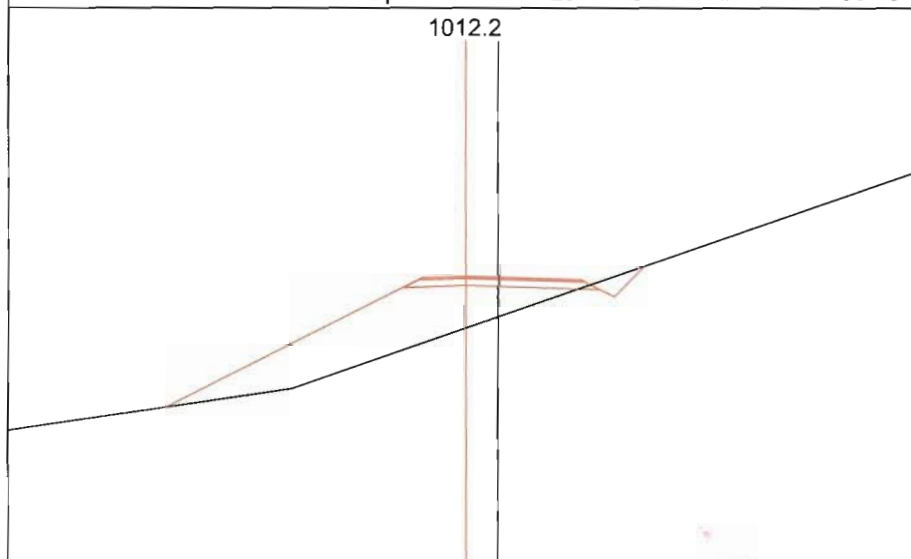




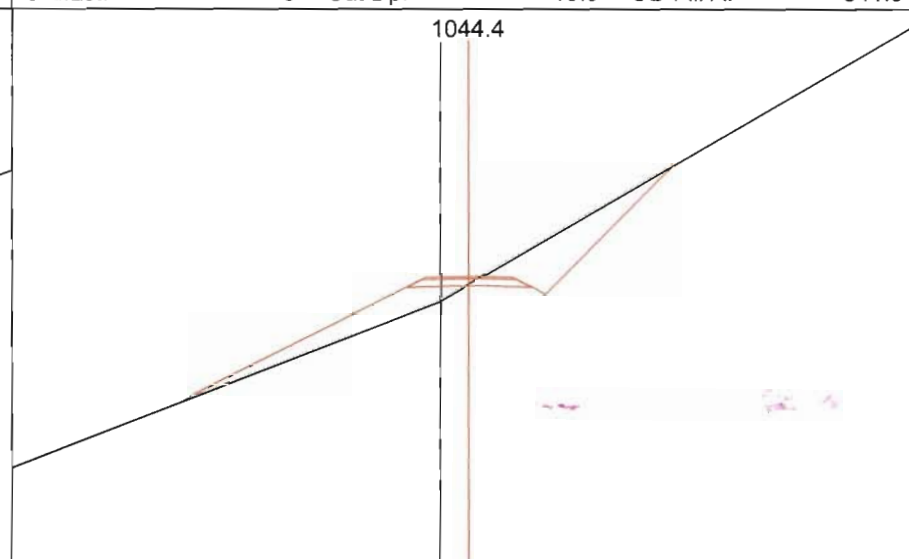
L-Stn:	925.8	Ssl:	-45	Cut A.:	0.0
Grd.Nxt.	3	Ssr:	50	Rd. Wd.:	17.3
Grd.Lst:	3	Cut Dp:	-20.7	OB-Fill A:	354.8



L-Stn:	956.4	Ssl:	-20	Cut A.:	0.0
Grd.Nxt.	3	Ssr:	20	Rd. Wd.:	17.3
Grd.Lst:	3	Cut Dp:	-19.9	OB-Fill A:	341.9



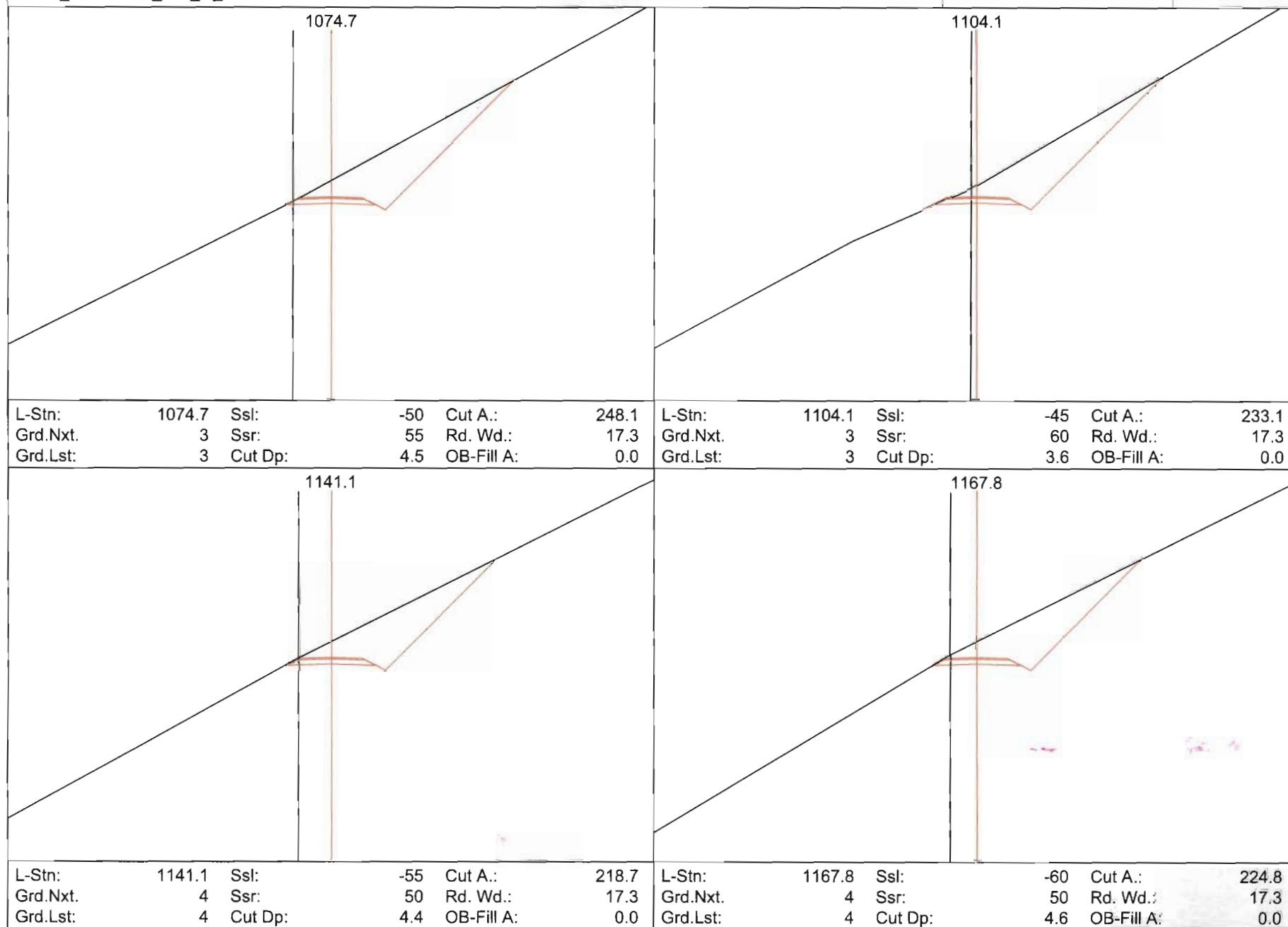
L-Stn:	1012.2	Ssl:	-35	Cut A.:	11.6
Grd.Nxt.	3	Ssr:	35	Rd. Wd.:	27.3
Grd.Lst:	3	Cut Dp:	-5.9	OB-Fill A:	107.9

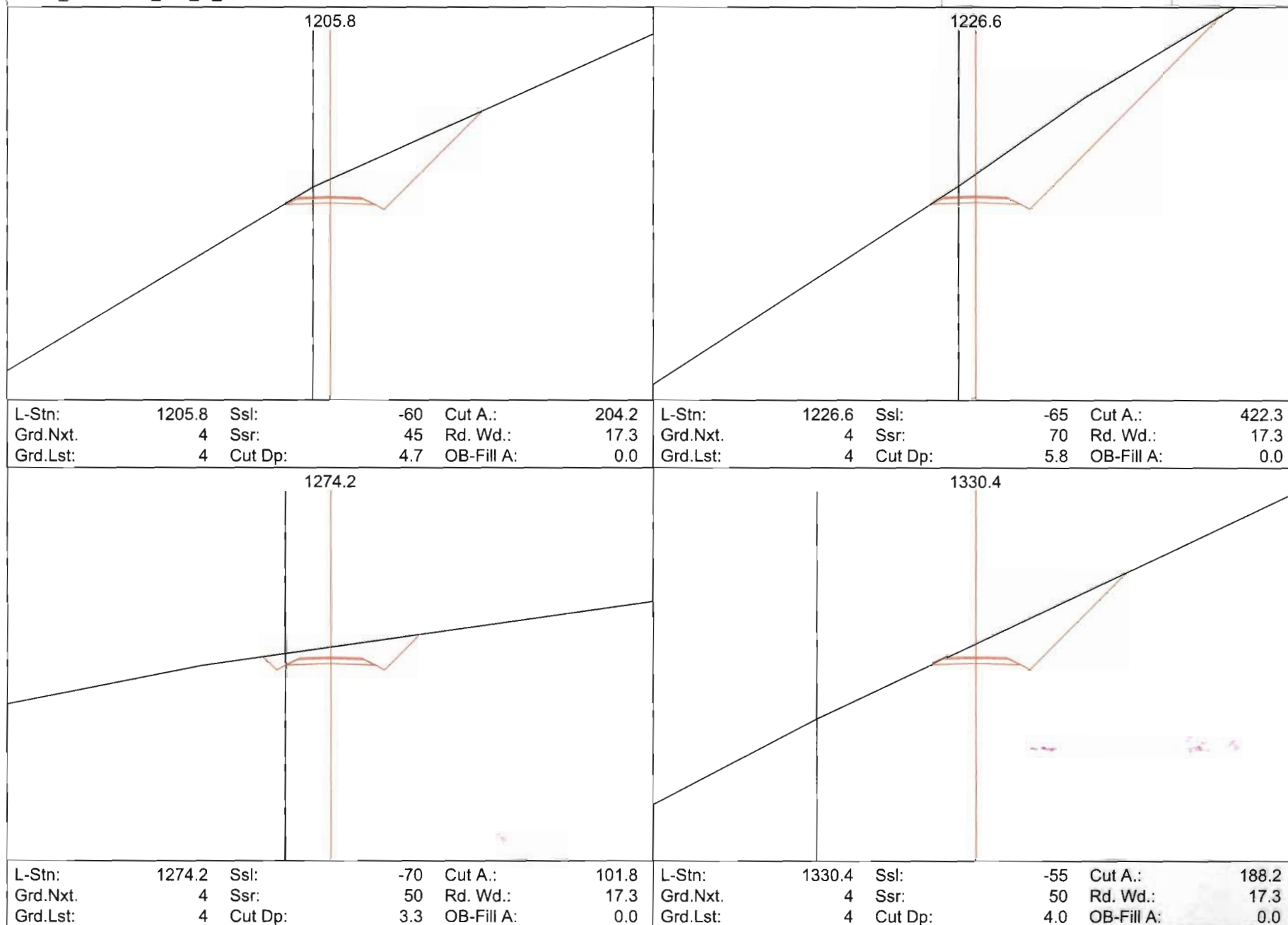


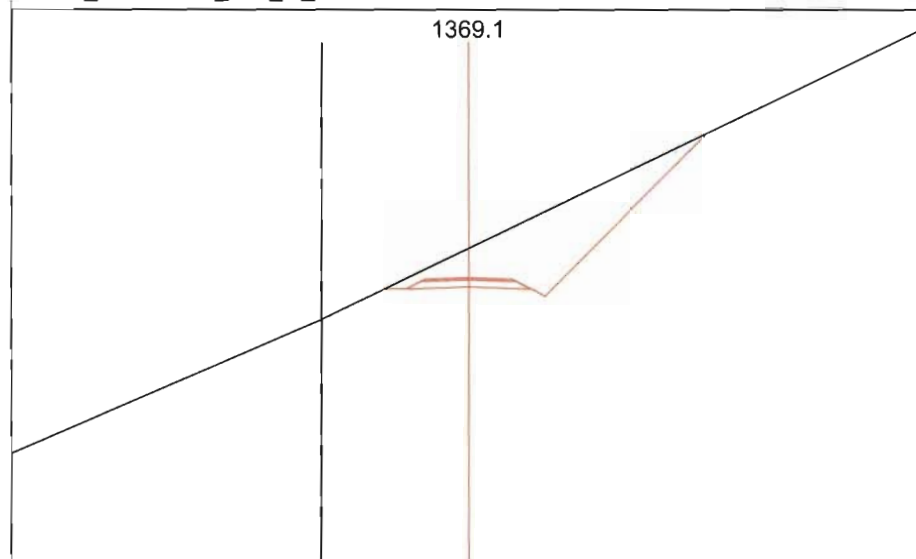
L-Stn:	1044.4	Ssl:	-40	Cut A.:	106.4
Grd.Nxt.	3	Ssr:	60	Rd. Wd.:	17.3
Grd.Lst:	3	Cut Dp:	0.2	OB-Fill A:	16.4

F:\Fe_346\ESRM_468_st_ed

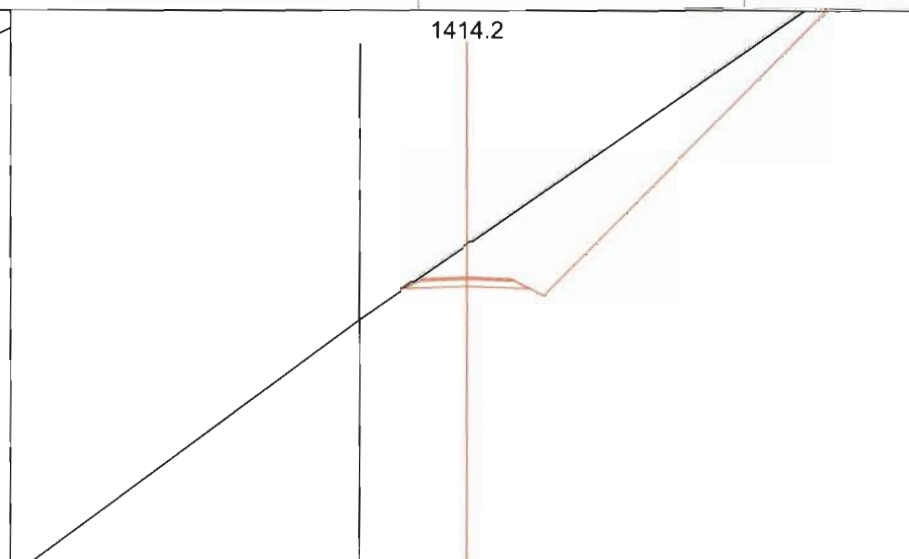
08/05/06



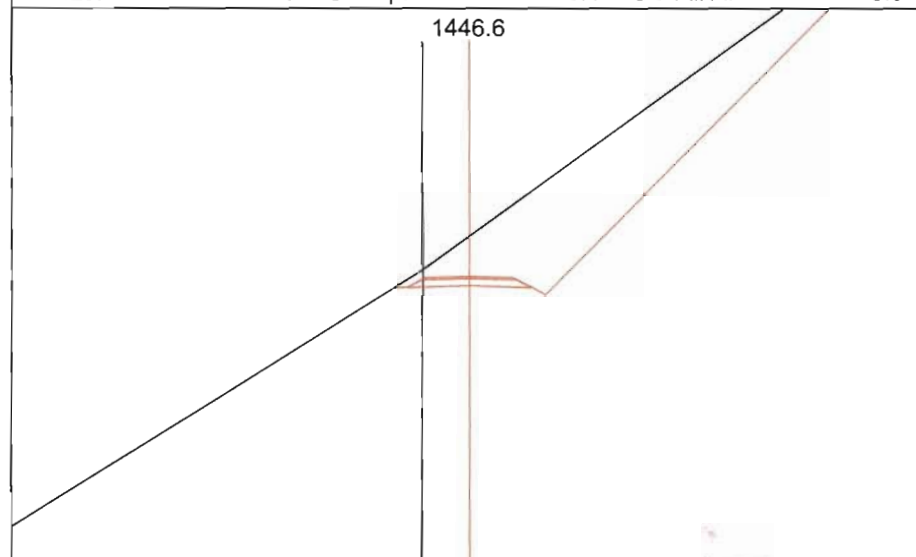




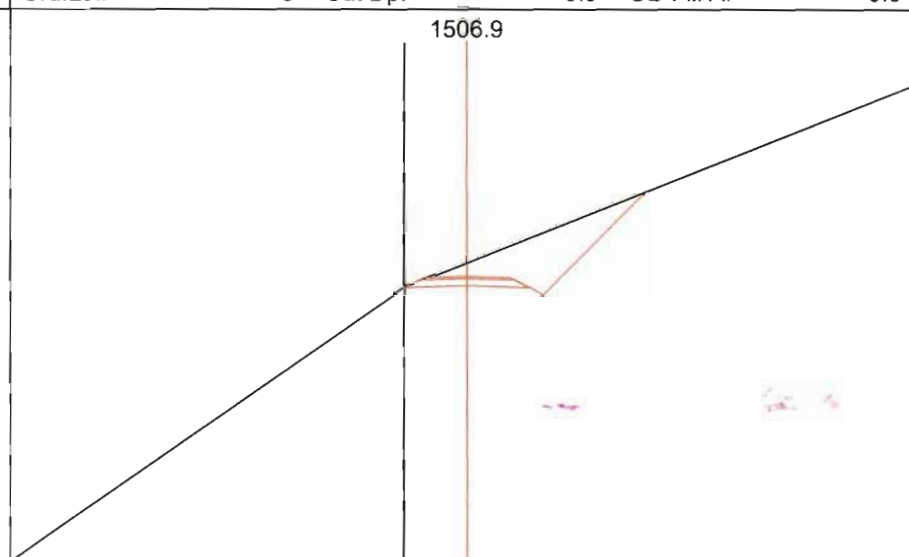
L-Stn:	1369.1	Ssl:	-45	Cut A.:	252.8
Grd.Nxt.	2	Ssr:	50	Rd. Wd.:	17.3
Grd.Lst:	2	Cut Dp:	5.4	OB-Fill A:	0.0



L-Stn:	1414.2	Ssl:	-74	Cut A.:	471.6
Grd.Nxt.	-3	Ssr:	70	Rd. Wd.:	17.3
Grd.Lst:	-3	Cut Dp:	5.9	OB-Fill A:	0.0



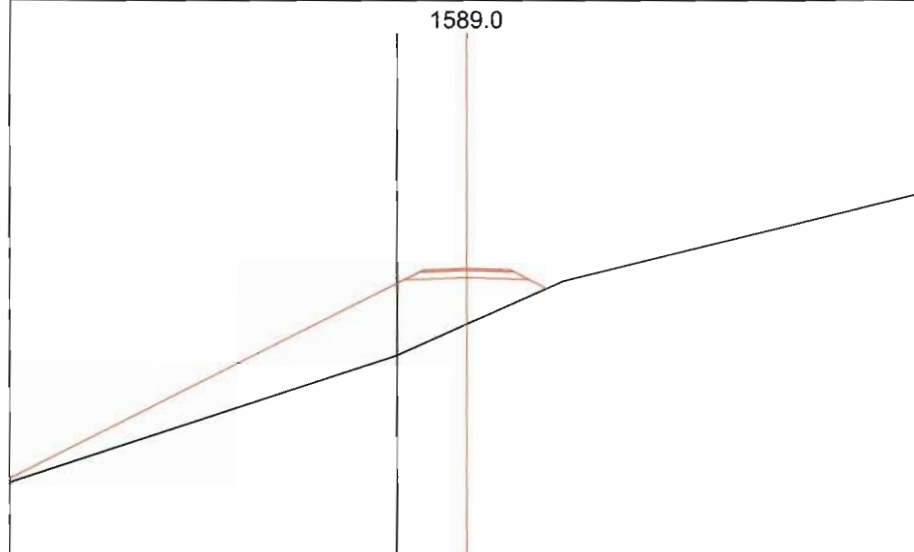
L-Stn:	1446.6	Ssl:	-65	Cut A.:	591.2
Grd.Nxt.	-3	Ssr:	75	Rd. Wd.:	17.3
Grd.Lst:	-3	Cut Dp:	6.9	OB-Fill A:	0.0



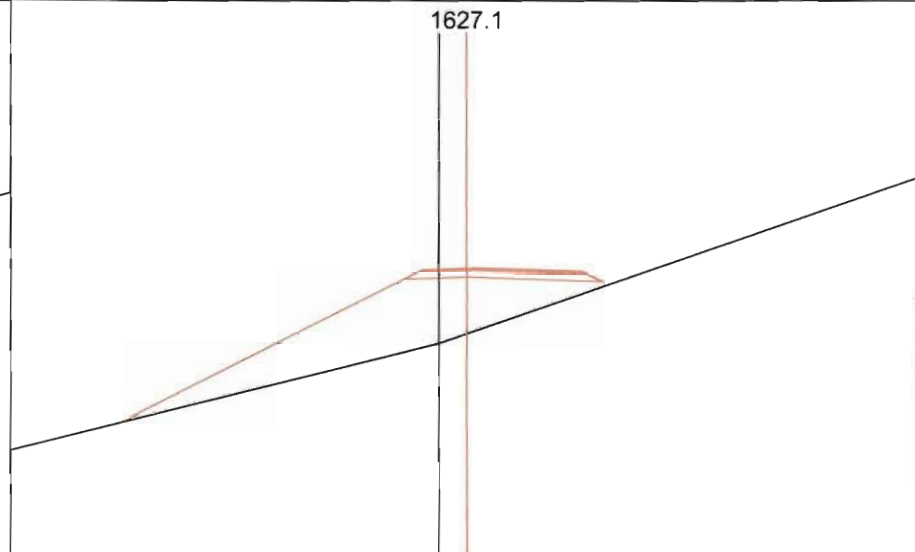
L-Stn:	1506.9	Ssl:	-70	Cut A.:	140.5
Grd.Nxt.	-7	Ssr:	40	Rd. Wd.:	17.3
Grd.Lst:	-7	Cut Dp:	3.4	OB-Fill A:	0.0

F:\Fe_346\ESRM_468_st_ed

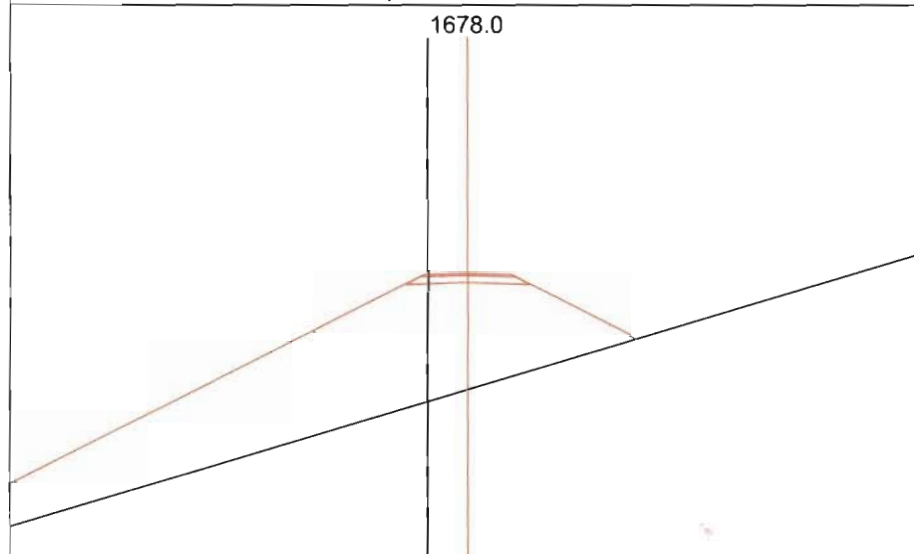
08/05/06



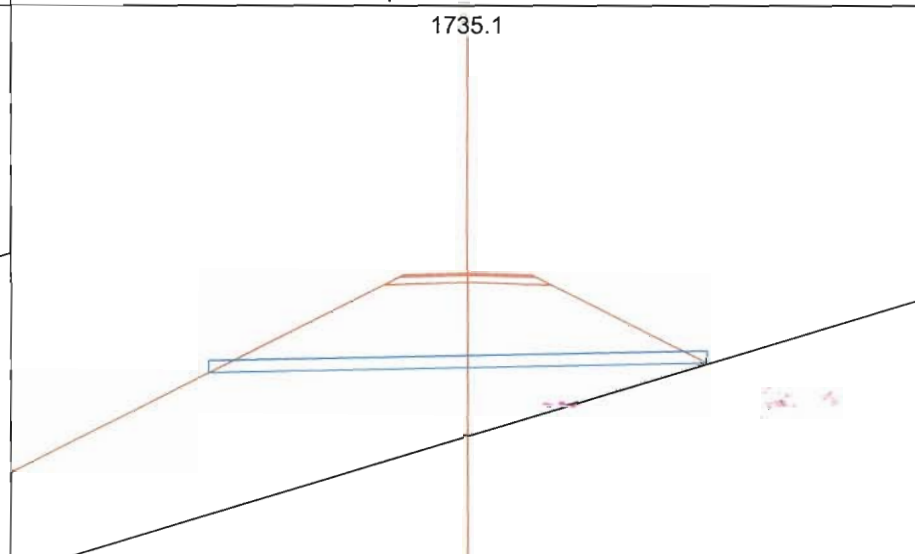
L-Stn:	1589.0	Ssl:	-33	Cut A.:	0.0
Grd.Nxt.	-7	Ssr:	45	Rd. Wd.:	17.3
Grd.Lst:	-7	Cut Dp:	-6.4	OB-Fill A:	107.5



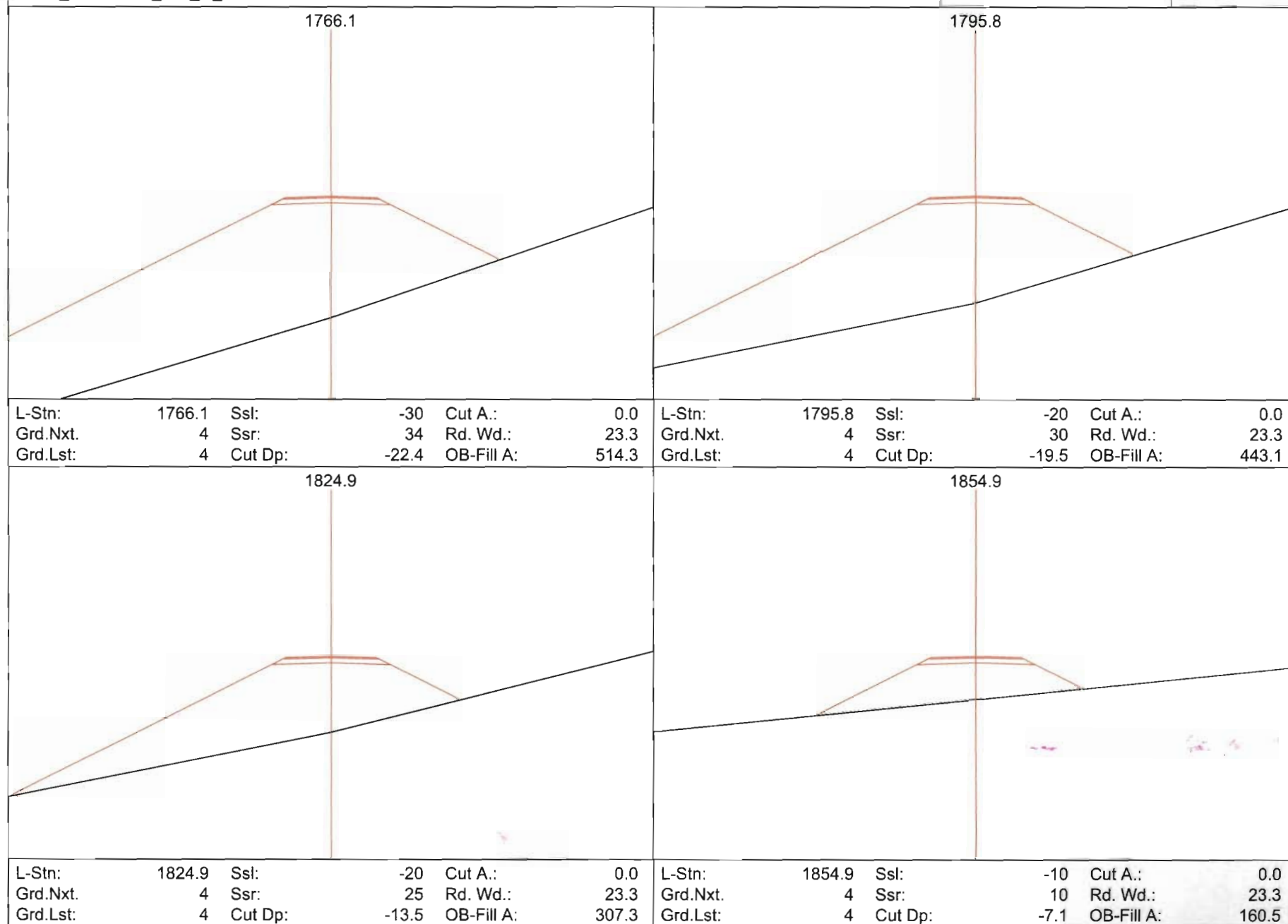
L-Stn:	1627.1	Ssl:	-25	Cut A.:	0.0
Grd.Nxt.	1	Ssr:	35	Rd. Wd.:	27.3
Grd.Lst:	1	Cut Dp:	-7.6	OB-Fill A:	153.0



L-Stn:	1678.0	Ssl:	-30	Cut A.:	0.0
Grd.Nxt.	4	Ssr:	30	Rd. Wd.:	17.3
Grd.Lst:	4	Cut Dp:	-14.7	OB-Fill A:	250.9



L-Stn:	1735.1	Ssl:	-30	Cut A.:	0.0
Grd.Nxt.	4	Ssr:	30	Rd. Wd.:	23.3
Grd.Lst:	4	Cut Dp:	-21.1	OB-Fill A:	486.2



1882.6

1911.5

L-Stn: 1882.6 Ssl: 0 Cut A.: 70.4
 Grd.Nxt. 4 Ssr: 0 Rd. Wd.: 23.3
 Grd.Lst: 4 Cut Dp: 1.9 OB-Fill A: 0.0

L-Stn: 1911.5 Ssl: 35 Cut A.: 464.4
 Grd.Nxt. 4 Ssr: -15 Rd. Wd.: 23.3
 Grd.Lst: 4 Cut Dp: 8.8 OB-Fill A: 0.0

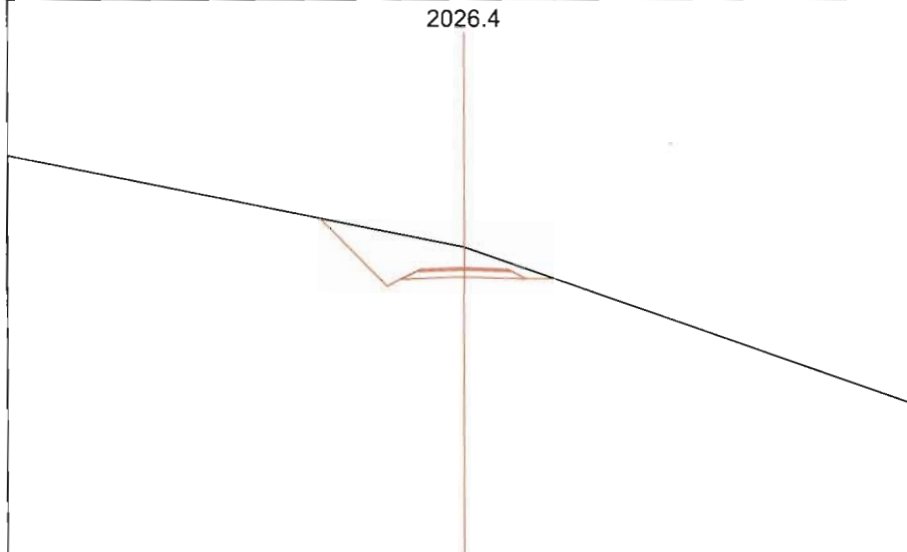
1941.4

1994.1

L-Stn: 1941.4 Ssl: 15 Cut A.: 272.7
 Grd.Nxt. 4 Ssr: -25 Rd. Wd.: 17.3
 Grd.Lst: 4 Cut Dp: 8.4 OB-Fill A: 0.0

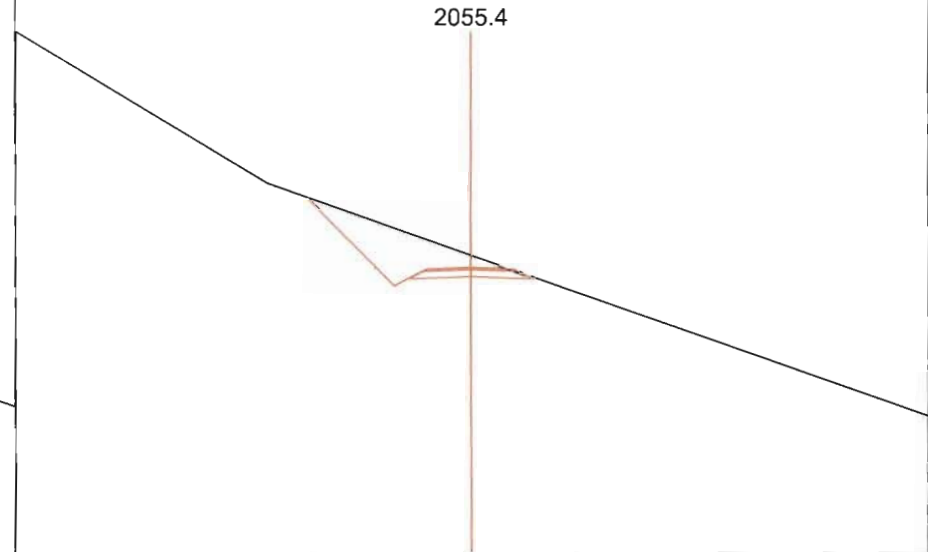
L-Stn: 1994.1 Ssl: 20 Cut A.: 228.1
 Grd.Nxt. 4 Ssr: -35 Rd. Wd.: 27.3
 Grd.Lst: 4 Cut Dp: 6.6 OB-Fill A: 0.0

2026.4



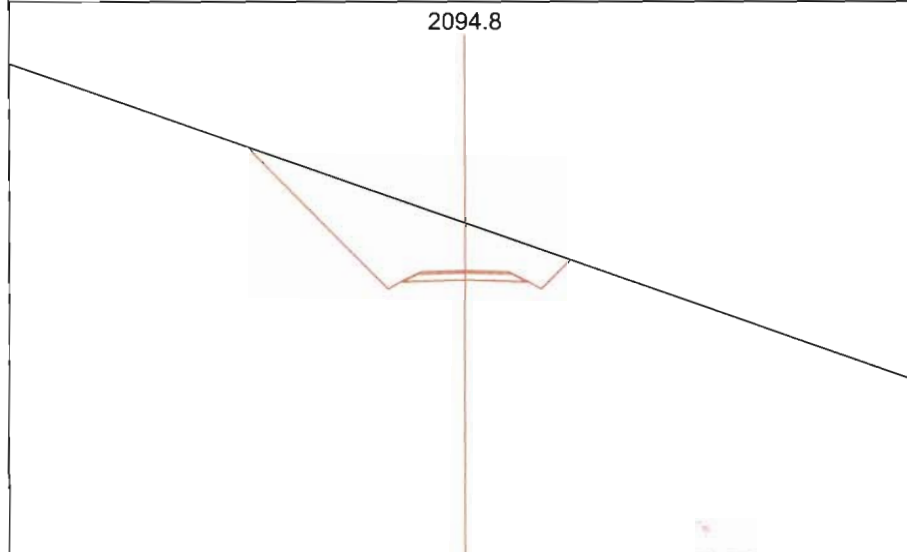
L-Stn:	2026.4	Ssl:	20	Cut A.:	120.3
Grd.Nxt.	4	Ssr:	-35	Rd. Wd.:	17.3
Grd.Lst:	4	Cut Dp:	4.2	OB-Fill A:	0.0

2055.4



L-Stn:	2055.4	Ssl:	35	Cut A.:	113.2
Grd.Nxt.	4	Ssr:	-35	Rd. Wd.:	17.3
Grd.Lst:	4	Cut Dp:	2.9	OB-Fill A:	0.0

2094.8



L-Stn:	2094.8	Ssl:	40	Cut A.:	307.8
Grd.Nxt.	n/a	Ssr:	-40	Rd. Wd.:	17.3
Grd.Lst:	4	Cut Dp:	7.8	OB-Fill A:	0.0

Description: St. Edwards
 Crew: ESRM 468 Class
 Unit:
 Survey Date: 05/5/08
 Length: 2606.9ft.
 Number of Shots: 64

Station	Type	Fore Azim	Back Azim	S.D.	Slp.(%)	SSL Slp.(%)/S.D.	SSR Slp.(%)/S.D.	GND	CRK	Label	H.D.	X	Y	Z
	FS	120.0	296.0	37.0	-25						35.9			
449.1						-70/75.0 T,-70/..	70/75.0 T,70/..	**		12		319.9	245.5	66.0
	FS	92.0	275.0	58.5	-4						58.5			
390.6						-70/75.0 T,-70/..	70/75.0 T,70/..	**		11		261.5	249.0	68.0
	FS	68.0	246.0	47.5	-10						47.3			
343.3						-40/50.0 T,-40/..	70/75.0 T,70/..	**		10		218.0	230.6	73.0
	FS	44.0	225.0	50.5	6						50.4			
292.9						-65/75.0 T,-65/..	70/20.0 T,40/75.0 T,4	**		9		182.7	194.6	70.0
	FS	66.0	245.0	54.0	-41						50.0			
243.0						-70/75.0 T,-70/..	70/50.0 T,70/..	**		8		137.2	173.9	90.0
	FS	84.0	260.0	41.0	14						40.6			
202.4						-75/75.0 T,-70/..	50/50.0 T,50/..	**		7		97.0	168.2	85.0
	FS	60.0	240.0	26.5	-18						26.1			
176.3						-60/75.0 T,-60/..	30/50.0 T,30/..	**		6		74.4	155.2	89.0
	FS	28.0	206.0	41.0	-31						39.2			
137.1						-50/75.0 T,-50/..	25/75.0 T,25/..	**		5		56.7	120.3	102.0
	FS	12.0	186.0	27.0	12						26.8			
110.3						-15/10.0 T,-50/50.0 T	15/15.0 T,7/50.0 T,7/	**		4		52.5	93.8	98.0
	FS	44.0	224.0	47.5	3						47.5			
62.8						-25/50.0,-25/..	15/50.0 T,15/..	**		3		19.5	59.7	97.0
	FS	22.0	202.0	22.0	-12						21.8			
41.0						-14/27.0 T,-40/75.0 T	5/100.0 T,0/..	**		2		11.3	39.4	100.0
	FS	16.0	196.0	41.0	0						41.0			
* 0.0						0/..	0/..	**		Landing Center 1		* 0.0	* 0.0	* 100.0

Station	Type	Fore Azim	Back Azim	S.D.	Slp.(%)	SSL Slp.(%)/S.D.	SSR Slp.(%)/S.D.	GND	CRK	Label	H.D.	X	Y	Z
	FS	256.0	78.0	31.5	10						31.3			
971.0						-35/30.0 T,-15/30.0 T	35/75.0 T,35/..	**		27		306.7	513.6	55.0
	FS	268.0	89.0	58.5	31						55.9			
915.1						-20/75.0 T,-20/..	20/75.0 T,20/..	**		26		362.6	515.1	38.0
	FS	302.0	124.0	28.0	25						27.2			
887.9						-45/75.0 T,-45/..	50/75.0 T,50/..	**		25		385.3	500.3	31.0
	FS	320.0	142.0	44.5	-31						42.5			
845.4						-55/15.0 T,-45/50.0 T	60/75.0 T,60/..	**		24		412.1	467.3	44.0
	FS	344.0	166.0	37.0	-16						36.5			
808.9						-55/50.0 T,-55/..	65/75.0 T,65/..	**		23		421.5	432.0	50.0
	FS	334.0	155.0	39.5	9						39.3			
769.5						-65/50.0 T,-65/..	75/15.0 T,60/60.0 T,6	**		22		438.5	396.5	47.0
	FS	332.0	152.0	48.0	3						48.0			
721.6						-70/50.0 T,-10/30.0 T	70/75.0 T,70/..	**		Draw Xing 21		461.0	354.1	45.0
	FS	334.0	154.0	28.5	7						28.4			
693.1						-53/30.0 T,-10/40.0 T	50/50.0 T,50/..	**		20		473.5	328.6	43.0
	FS	354.0	174.0	34.5	27						33.3			
659.8						-70/36.6 T,-5/24.6 T,-	50/50.0 T,50/..	**		19		477.0	295.4	34.0
	FS	10.0	189.0	35.5	45						32.4			
627.5						-11/75.0 T,-11/..	4/50.0 T,4/..	**		Stream Xing 18		471.6	263.5	20.0
	FS	38.0	217.0	12.5	11						12.4			
615.0						7/75.0 T,-5/..	7/75.0 T,7/..	**		17		464.0	253.7	18.0
	FS	34.0	214.0	19.5	-44						17.8			
597.2						-15/30.0 T,-30/75.0 T	20/75.0 T,20/..	**		16		454.1	238.9	26.0
	FS	56.0	233.0	40.5	-68						33.5			
563.7						-55/75.0 T,-55/..	65/75.0 T,65/..	**		15		426.8	219.4	49.0
	FS	78.0	258.0	35.5	-46						32.3			
531.4						-45/50.0 T,-45/..	55/75.0 T,55/..	**		14		395.3	212.7	64.0
	FS	110.0	290.0	47.0	15						46.5			
485.0						-60/75.0 T,-60/..	65/25.0 T,40/50.0 T,4	**		13		351.6	228.6	57.0

Station	Type	Fore Azim	Back Azim	S.D.	Slp.(%)	SSL Slp.(%)/S.D.	SSR Slp.(%)/S.D.	GND	CRK	Label	H.D.	X	Y	Z
	FS	260.0	80.0	52.5	-12						52.1			
1570.6						-25/75.0 T,-25/..	35/75.0 T,35/..	**		42		-283.8	470.9	53.1
	FS	258.0	78.0	37.5	3						37.5			
1533.1						-33/70.0 T,-33/..	45/25.0 T,25/50.0 T,4	**		41		-247.1	478.7	51.1
	FS	260.0	81.0	81.0	-21						79.3			
1453.9						-70/60.0 T,-70/..	40/50.0 T,40/..	**		40		-169.0	491.8	68.1
	FS	272.0	90.0	60.0	-11						59.6			
1394.2						-65/75.0 T,-65/..	75/50.0 T,75/..	**		39		-109.3	490.8	75.1
	FS	262.0	82.0	32.5	18						32.0			
1362.2						-74/75.0 T,-74/..	70/75.0 T,70/..	**		38		-77.7	495.2	69.1
	FS	262.0	78.0	46.0	2						46.0			
1316.2						-45/75.0 T,-45/..	50/75.0 T,50/..	**		37		-32.4	503.2	68.1
	FS	254.0	74.0	39.0	20						38.2			
1278.0						-55/75.0 T,-55/..	50/75.0 T,50/..	**		36		4.4	513.8	60.1
	FS	254.0	75.0	49.5	-17						48.8			
1229.2						-70/75.0 T,-70/..	50/75.0 T,50/..	**		35		51.4	526.8	69.1
	FS	276.0	98.0	46.0	-4						46.0			
1183.2						-65/70.0 T,-65/..	70/30.0 T,60/50.0 T,6	**		34		97.0	521.2	71.1
	FS	262.0	82.0	21.0	5						21.0			
1162.3						-60/75.0 T,-60/..	45/75.0 T,45/..	**		33		117.8	524.1	69.1
	FS	270.0	90.0	37.0	7						36.9			
1125.4						-60/75.0 T,-60/..	50/75.0 T,50/..	**		32		154.7	524.1	67.1
	FS	286.0	106.0	26.5	7						26.4			
1098.9						-55/75.0 T,-55/..	50/75.0 T,50/..	**		31		180.1	516.8	65.1
	FS	278.0	97.0	37.0	-1						37.0			
1061.9						-45/25.0 T,-55/50.0 T	60/75.0 T,60/..	**		30		216.8	512.0	65.1
	FS	276.0	97.0	29.0	12						28.8			
1033.1						-50/75.0 T,-50/..	55/75.0 T,55/..	**		29		245.4	508.7	62.1
	FS	274.0	94.0	31.0	11						30.8			
1002.3						-40/75.0 T,-40/..	60/75.0 T,60/..	**		28		276.2	506.6	59.1

Station	Type	Fore Azim	Back Azim	S.D.	Slp.(%)	SSL Slp.(%)/S.D.	SSR Slp.(%)/S.D.	GND	CRK	Label	H.D.	X	Y	Z
	FS	148.0	328.0	60.0	-65						50.3			
2165.7						0/..	0/..	**		57		-109.3	494.2	65.0
	FS	122.0	302.0	46.0	-16						45.4			
2120.3						0/..	0/..	**		56		-147.8	518.3	72.0
	FS	145.0	318.0	80.0	-21						78.3			
2042.0						40/100.0 T,40/..	-40/100.0 T,-40/..	**		END 55		-196.5	579.6	89.0
	FS	82.0	263.0	40.0	17						39.4			
2002.5						35/30.0 T,60/75.0 T,6	-35/100.0 T,-35/..	**		54		-235.6	574.4	82.0
	FS	88.0	268.0	29.0	0						29.0			
1973.5						20/100.0 T,20/..	-35/100.0 T,-35/..	**		53		-264.6	573.4	82.0
	FS	84.0	265.0	33.0	0						33.0			
1940.5						20/100.0 T,20/..	-35/60.0 T,-35/..	**		52		-297.5	570.2	82.0
	FS	110.0	291.0	53.5	-1						53.5			
1887.1						15/100.0 T,15/..	-25/60.0 T,-25/..	**		51		-347.6	589.0	83.0
	FS	106.0	286.0	30.0	3						30.0			
1857.1						35/100.0 T,35/..	-15/60.0 T,-15/..	**		50		-376.4	597.2	82.0
	FS	76.0	256.0	30.0	28						28.9			
1828.2						0/100.0 T,0/..	0/60.0 T,0/..	**		49		-404.4	590.3	74.0
	FS	52.0	231.0	29.5	37						27.7			
1800.5						-10/100.0 T,-10/..	10/60.0 T,10/..	**		48		-426.1	573.0	63.0
	FS	22.0	199.0	31.0	26						30.0			
1770.5						-20/100.0 T,-20/..	25/60.0 T,25/..	**		47		-436.6	544.9	55.0
	FS	354.0	176.0	30.0	25						29.1			
1741.4						-20/100.0 T,-20/..	30/60.0 T,30/..	**		46		-434.1	515.9	48.0
	FS	328.0	150.0	30.0	14						29.7			
1711.7						-30/100.0 T,-30/..	34/100.0 T,34/..	**		45		-418.7	490.5	44.0
	FS	298.0	118.0	31.0	0						31.0			
1680.7						-30/75.0 T,-30/..	30/75.0 T,30/..	**		44		-391.4	475.9	44.0
	FS	284.0	104.0	58.0	-4						58.0			
1622.7						-30/75.0 T,-30/..	30/75.0 T,30/..	**		43		-335.1	461.9	46.0

[illegible]

ROADENG Data

P. 1

F:\Fe_346\ESRM_468_st_ed

08/05/06

L-Stn ft.	P-Stn ft.	Cut Dp. ft.	Grade %	V.Br %
0.0	0.0	0.0	-5	0
209.1	215.2	4.0	-12	-7
550.0	545.9	12.3	-2	10
638.4	627.5	-26.7	4	6
832.0	817.6	11.9	3	-1
1115.8	1073.6	3.7	4	1
1303.2	2355.1	-18.8	4	0
1366.9	1313.0	5.1	2	-2
1409.7	1357.5	6.1	-3	-5
1446.9	2163.7	-8.4	-7	-5
1599.0	1542.8	-6.0	1	8
1655.1	1598.7	-11.1	4	4
1800.6	1746.2	-18.5	4	0
1883.2	1828.8	2.1	4	0
1959.6	1905.2	7.7	4	0
2094.8	2042.0	7.8		0

Magruder_3823_Operations
Spring 2008

The following closing errors in table 1 were calculated from the reported field data. A possible reason for such error is because of the use of a hand compass and cloth tape, instead of digital readout equipment.

Point	Original:			Difference:			Hyp.	Error:
	Distance	X	Y	Distance	X	Y		
64	2606.9	268.7	526.9	1604.6	-7.5	20.3	21.6412	74.1457
28	1002.3	276.2	506.6					
62	2509.7	172	534.8	1410.8	-8.1	18	19.7385	71.4744
31	1098.9	180.1	516.8					
60	2371.2	43.7	536.9	1142	-7.7	10.1	12.7004	89.9185
35	1229.2	51.4	526.8					

Table 1: Closing Error Data (prepared by J. Doonan and C. Magruder)