U.S. Department of Agriculture
Forest Service
Rocky Mountain Region
Medicine Bow – Routt National Forests
and Thunder Basin National Grassland

Hahns Peak - Bears Ears District Ranger

ROAD CONSTRUCTION DRAWINGS FOR

CLEARING, EXCAVATION, AND DRAINAGE
FOR
Raghorn Salvage Timber Sale Roads

ROAD NUMBER	ROAD NAME	MILES Reconst.	MILES Const.	SERVICE LEVEL	DESIGN SPEED
508.1	Elk Horn Mtn.	0.19		C	10
508.1B	Elk Horn Mtn. Spur B	0.60		C	10
508.1D	Elk Horn Mtn. Spur D	0.37		C	10
508.1K	Elk Run		0.62	C	10
508.1C	Elk Horn Mtn. Spur C		0.11	C	10
508.1L	Bull Run		1.06	C	10
508.1E	Elk Face	0.15		C	10

Prepared by:

[illegible] 6/26/13
Project Engineer Date

Reviewed by:

Diana R Bardsley 6/26/13
Engineer Date

I certify that these drawings comply with the land and resource management objectives

[illegible] JUNE 26, 2013
District Ranger Date

I certify the technical adequacy of these drawings

Diana R Bardsley 6/26/13
Forest Engineer Date

[illegible] Acting DRS 6/27/13
For Forest Supervisor Date

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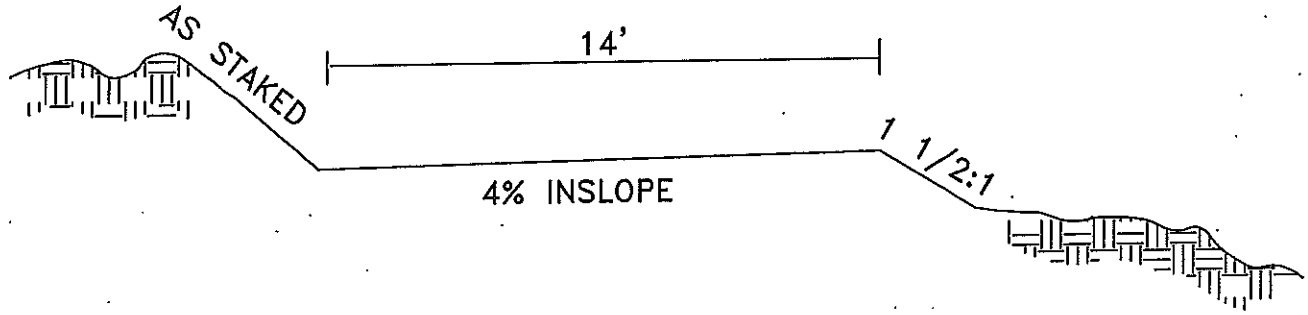
ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	METHOD OF MEASURE	UNIT	REVISION DATE	ROAD NUMBER 508.1 / MILE POST (MILES) 0.19	508.1B / 0.6	508.1D / 0.37	508.1K / 0.62	508.1C / 0.11	508.1L / 1.06	REMARKS
					QUANTITIES						
15101	Mobilization	CQ	Lump Sum	2008						1.00	
15202	Slope, reference, and clearing and grubbing stakes; tolerance C	CQ	Mile	2008				0.62		1.06	
20104	Clearing and grubbing, disposal of tops and limbs f, logs f, stumps f	CQ	Acre	2008				1.90		3.97	
20401	Roadway excavation, compaction method d, finishing method C	CQ	Cubic Yar	2008				3,270.00		7,835.00	
20404	Unclassified borrow, compaction method d, finishing method C	CQ	Cubic Yar	2008		28.00					Mine borrow material at station 23=05 and haul to 22=50 (see Reconsruction Descriptions).
20420	Drainage excavation, type Rolling Dip	CQ	Each	2008	1.00	6.00	6.00				Includes and/or outlet ditches and roadway ditching for 508.1E.
21202	Linear grading	CQ	Lump Sum	2008					1.00		NFSR 508.1C - Begin construction at station 73+92, includes slope staking, clearing and excavation.
30109	Aggregate surface course, grading 11/2" Road Base, compaction method A	CQ	Ton	2008	30.00	60.00					11/2" Roadbase or equal
30329	Road Reconditioning	CQ	Lump Sum	2008		1.00	1.00				Clearing is included. NFSR's 508.1B and 508.1D, includes curve widening and ditching.
60201-18	18 inch corrugated metal pipe, compaction A, 0.064" thickness steel	CQ	Foot	2008						56.00	
60201-24	24 inch corrugated metal pipe, compaction A, 0.064" thickness steel	CQ	Foot	2008					36.00		
62501	Turf establishment dry method (without mulch)	CQ	Acre	2008				1.10		1.92	Seeding includes all disturbed areas.

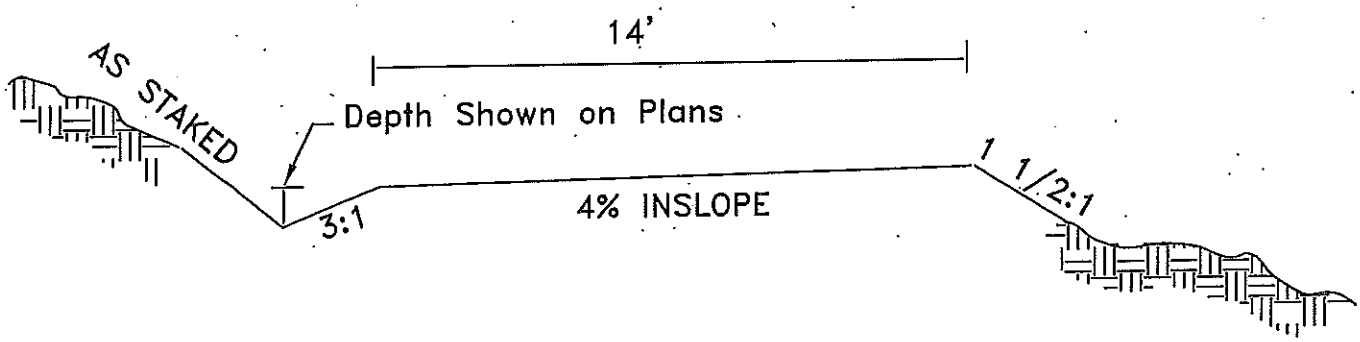
ESTIMATE OF QUANTITIES

				ROAD NUMBER	508.1E	-	-	-	-	-	
				MILE POST (MILES)	0.15	-	-	-	-	-	
ITEM NO.	DESCRIPTION	METHOD OF MEASURE	UNIT	REVISION DATE	QUANTITIES						REMARKS
0	Drainage excavation, type Rolling Dip	CQ	Each	2008	3.00						

NO DITCH SECTION



DITCH SECTION



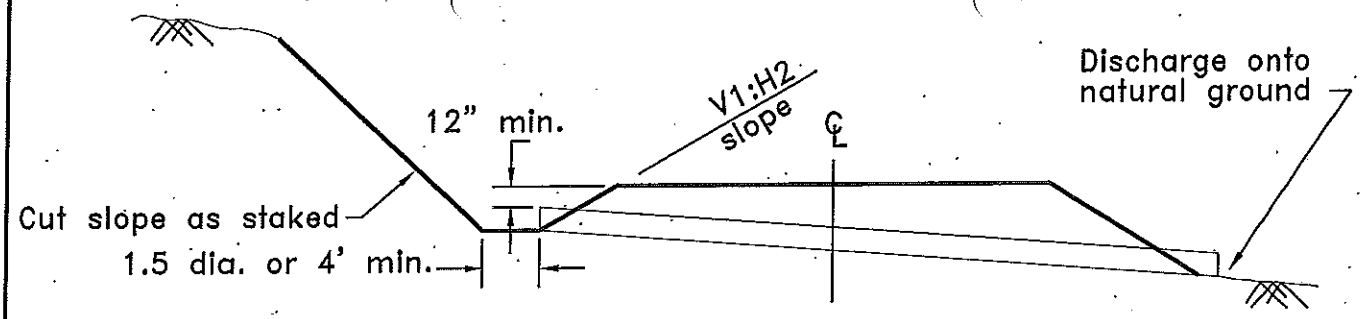
LOCATION SHOWN ON PLAN AND PROFILE SHEETS

ROAD WIDTH MAY VARY FOR CURVE AND FILL WIDENING

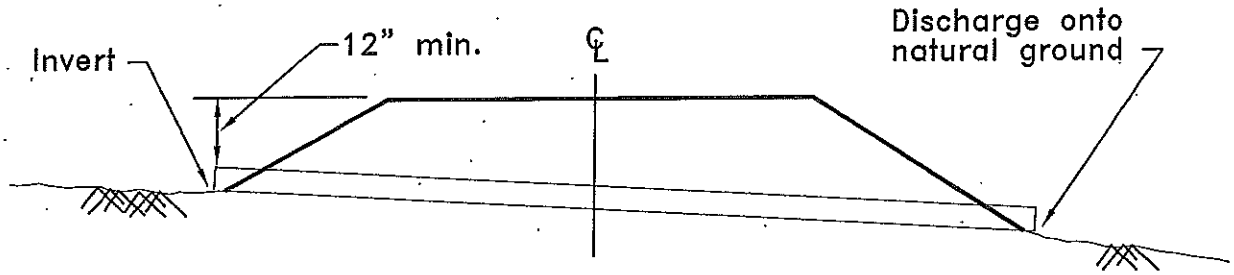
CLEARING LIMITS

CUT SIDE – 2' from top of cut or 4' from shoulder whichever is greater.
FILL SIDE – toe of fill or 4' from shoulder whichever is greater.

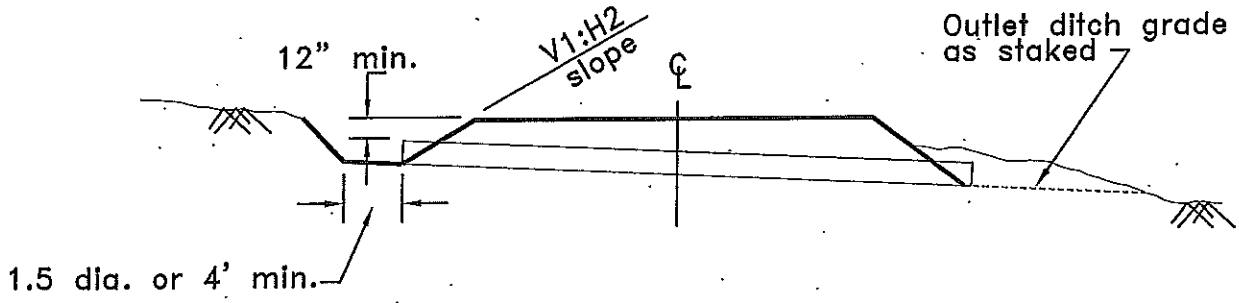
TYPICAL ROADWAY SECTIONS	DEPARTMENT OF AGRICULTURE FOREST SERVICE PROJECT DRAWING	



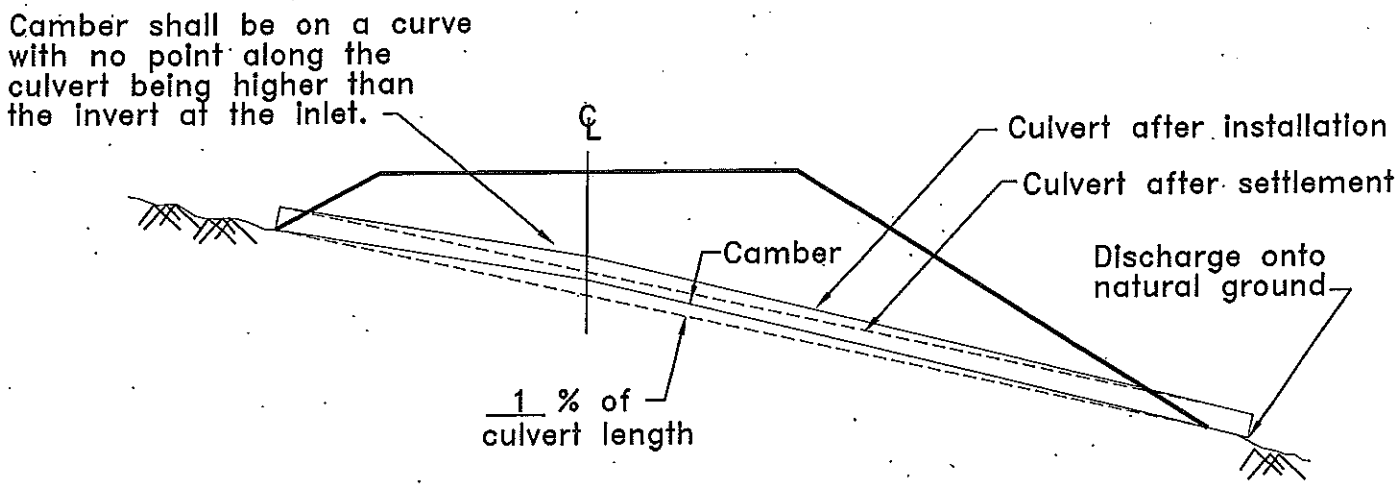
Typical Installation in Sidehill Section



Typical Installation in Fill Section



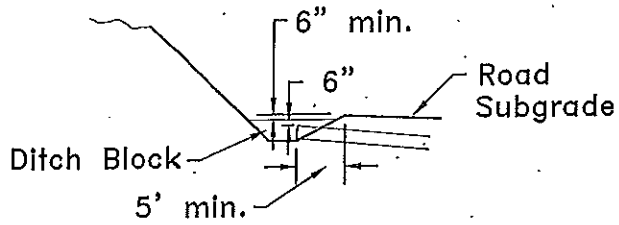
Typical Installation with Outlet Ditch



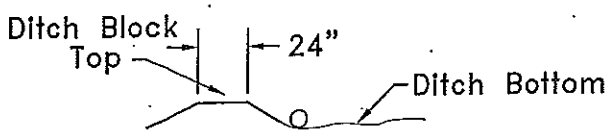
Typical Installation for Camber

Install culverts on 2% minimum grade.

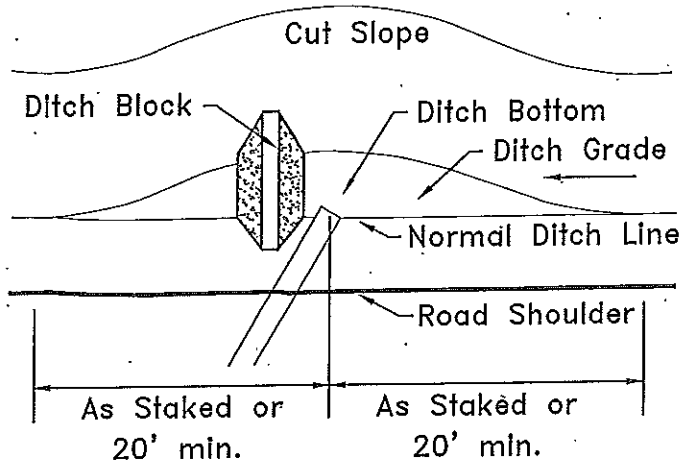
TYPICAL CULVERT INSTALLATION	STANDARD DRAWING	602



Cross Section



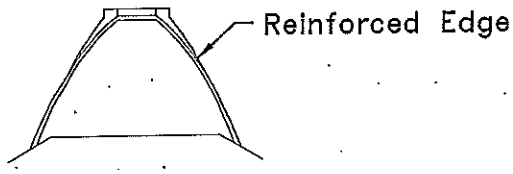
Profile along Ditch

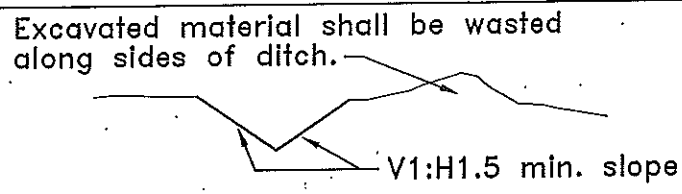


Plan

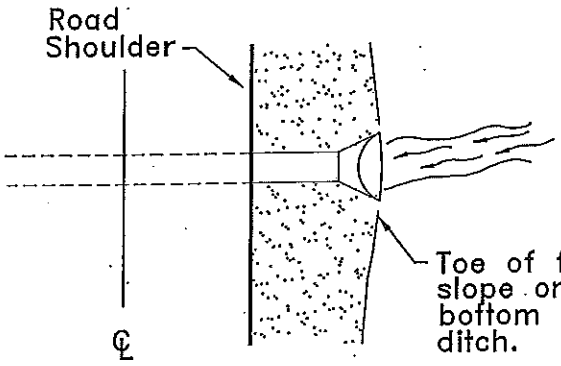
Ditch blocks shall be constructed to divert flow from ditch lines into culverts.

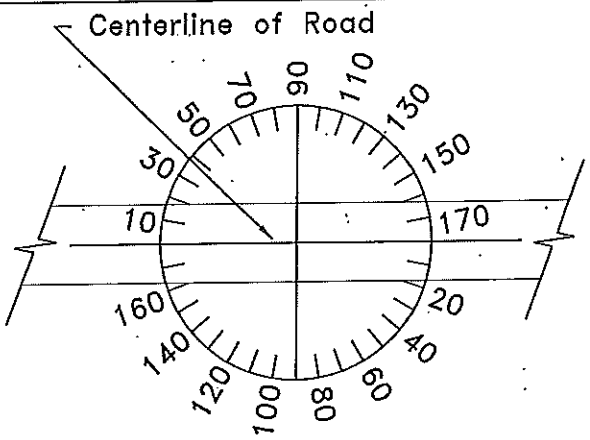
Typical Catch Basin Details



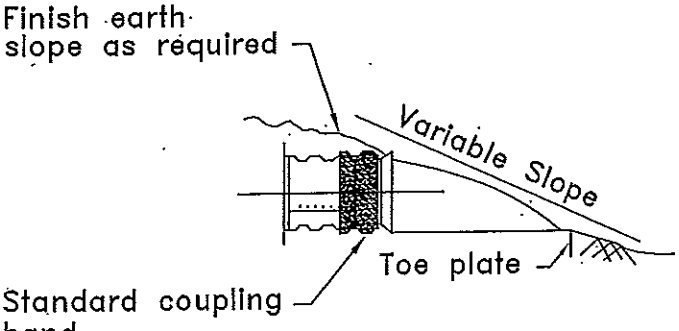


Outlet Ditch and Lead-Off Ditch Detail

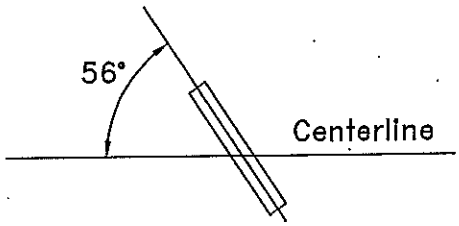




Skew Number



Typical Metal End Section
(When required in the contract)

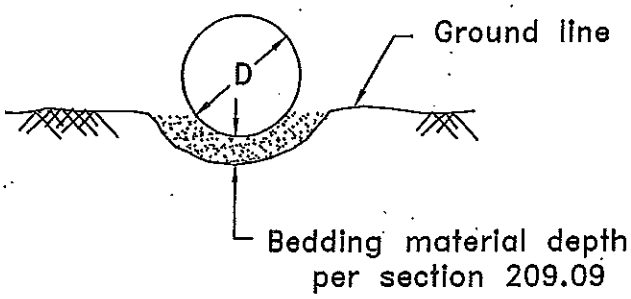


Skew is always from right of ℄

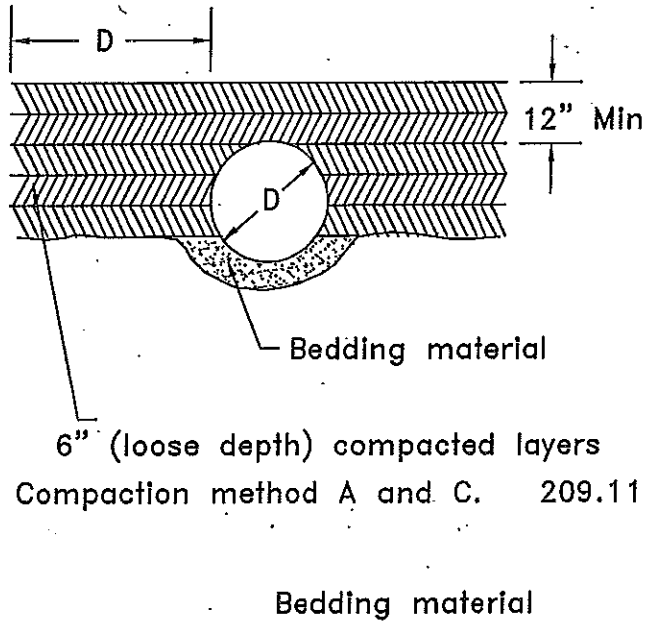
Example

Pipe Skew Diagram

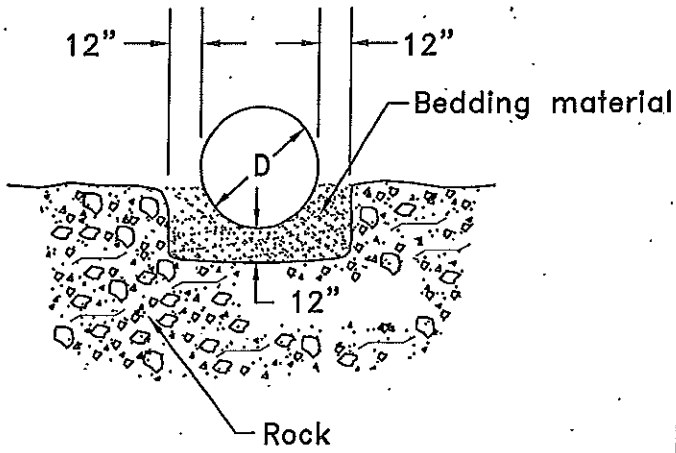
TYPICAL CULVERT INSTALLATION	STANDARD DRAWING	602	



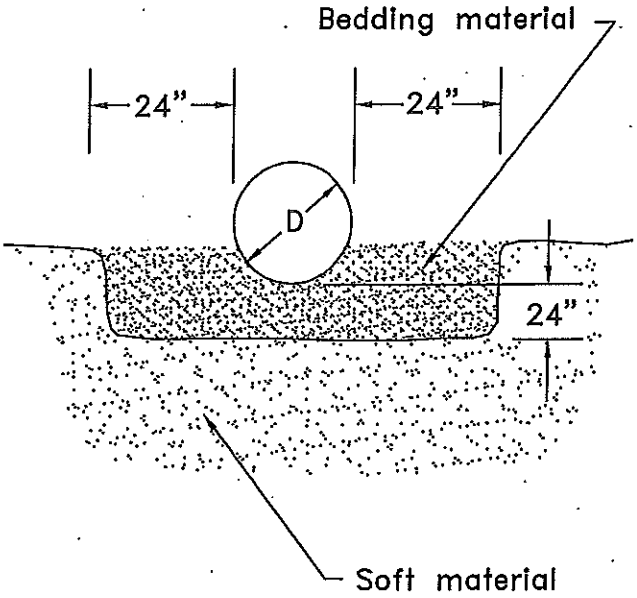
Typical Bedding Detail



Typical Backfill Detail



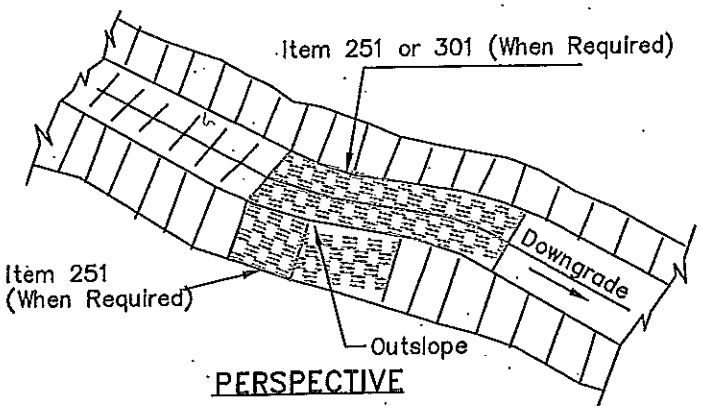
Rock Foundation



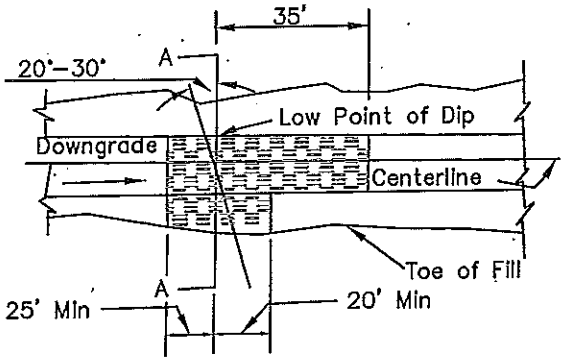
Yielding Foundation

CULVERT BEDDING DETAILS	STANDARD DRAWING	602	

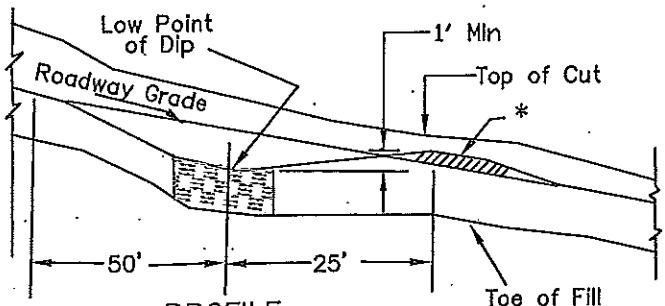
ROLLING DIP
Item No. 20420



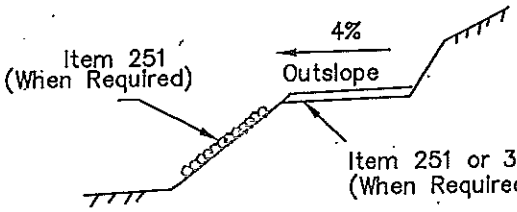
PERSPECTIVE



PLAN



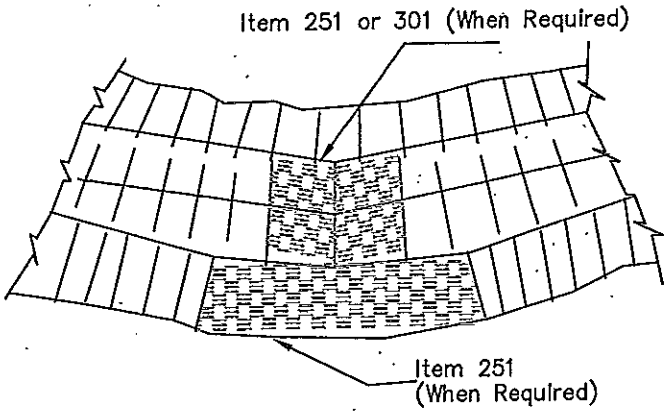
PROFILE



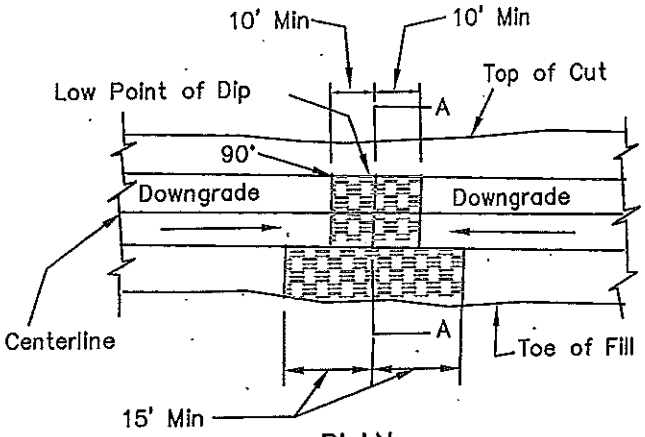
SECTION A–A

* Scarify road surface prior to placing fill material per Section 204.11 Method d. Excess material shall be placed evenly along fill slopes.

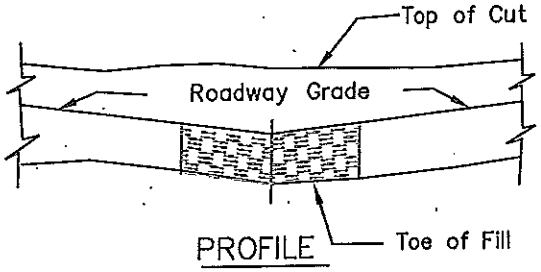
GRADE DIP
Not a Pay Item



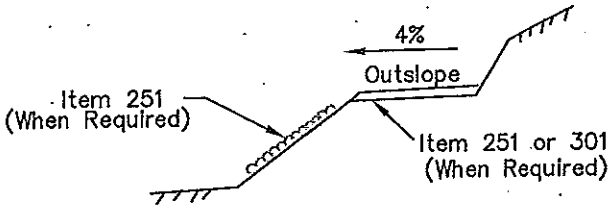
PERSPECTIVE



PLAN



PROFILE



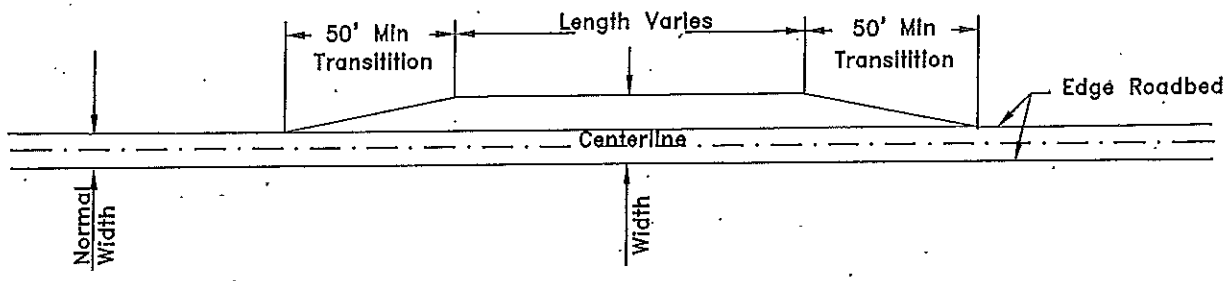
SECTION A–A

LEGEND: RIP–RAP

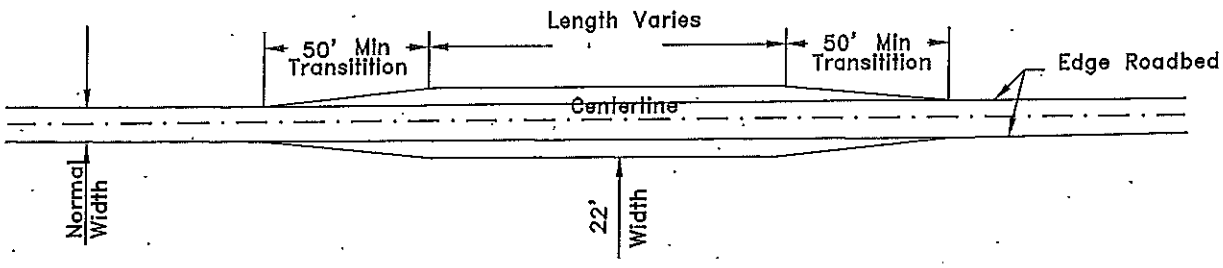
ROLLING DIP and GRADE DIP DETAIL

DEPARTMENT OF AGRICULTURE
FOREST SERVICE

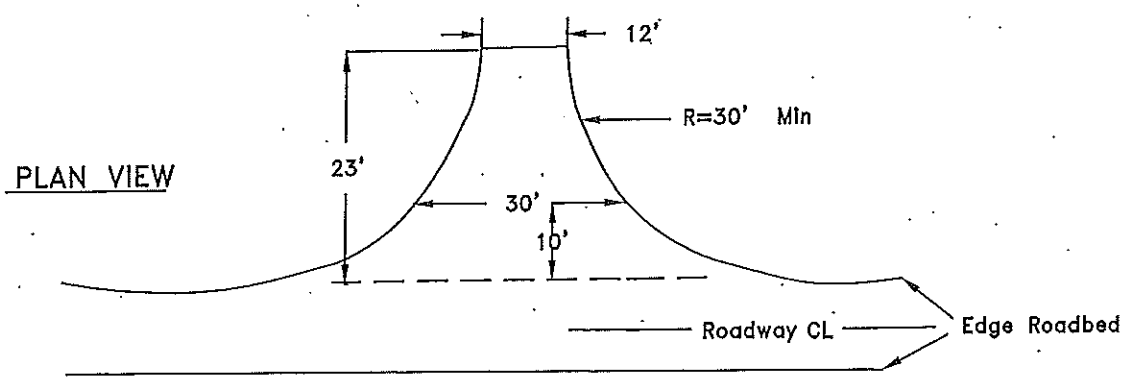
PROJECT DRAWINGS

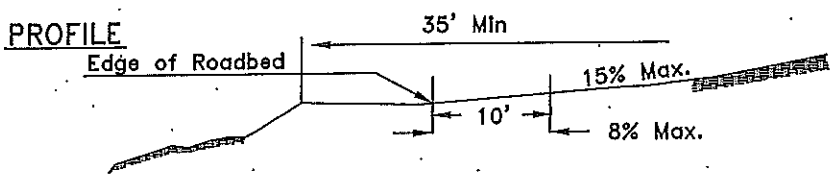


PLAN VIEW
TURNOUT–WIDENING ON ONE SIDE



PLAN VIEW
TURNOUT–WIDENING ON BOTH SIDES





NOTE: Turnarounds have been designed so that they may be used as Turnouts for empty log trucks and service vehicles. (Turnaround grade as staked in field)

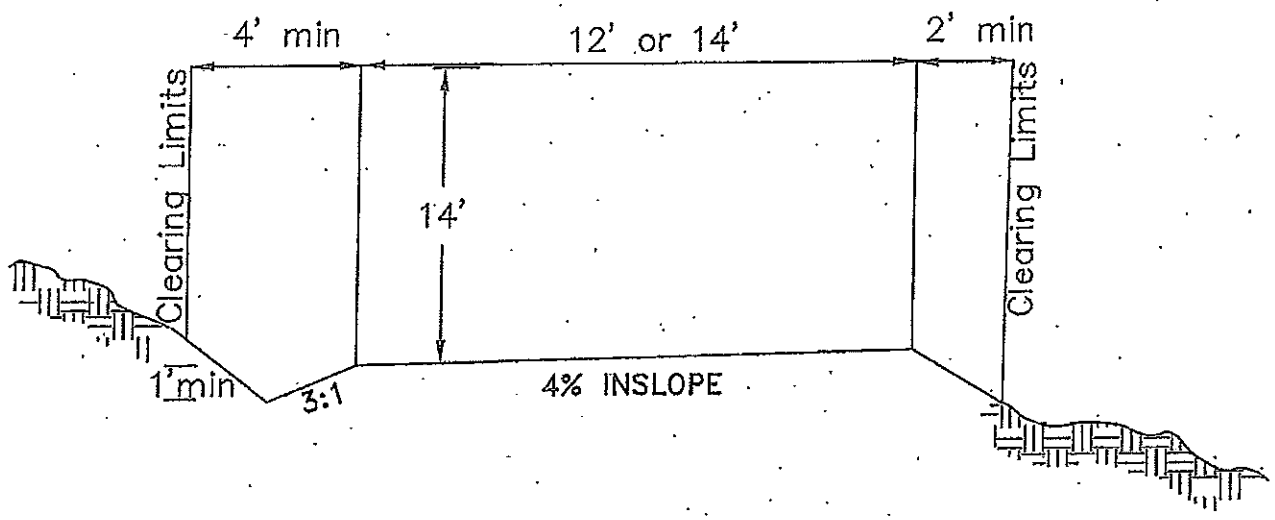
TURNAROUND

T–TURNAROUND and TURNOUT TYPICAL

DEPARTMENT OF AGRICULTURE
FOREST SERVICE

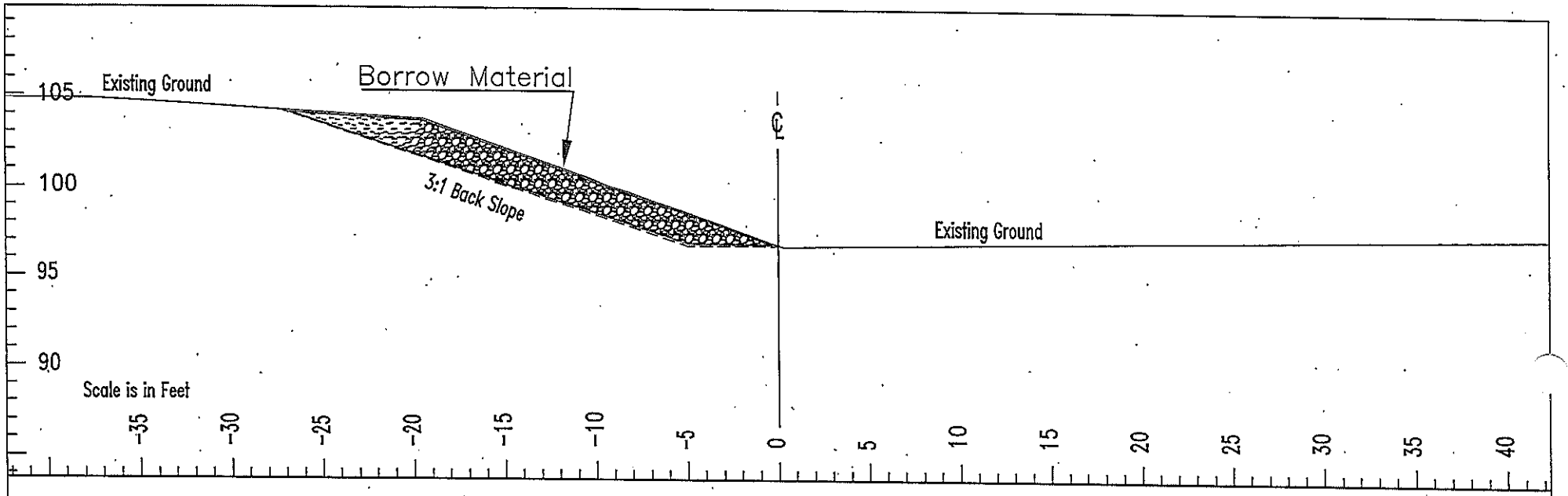
PROJECT DRAWINGS

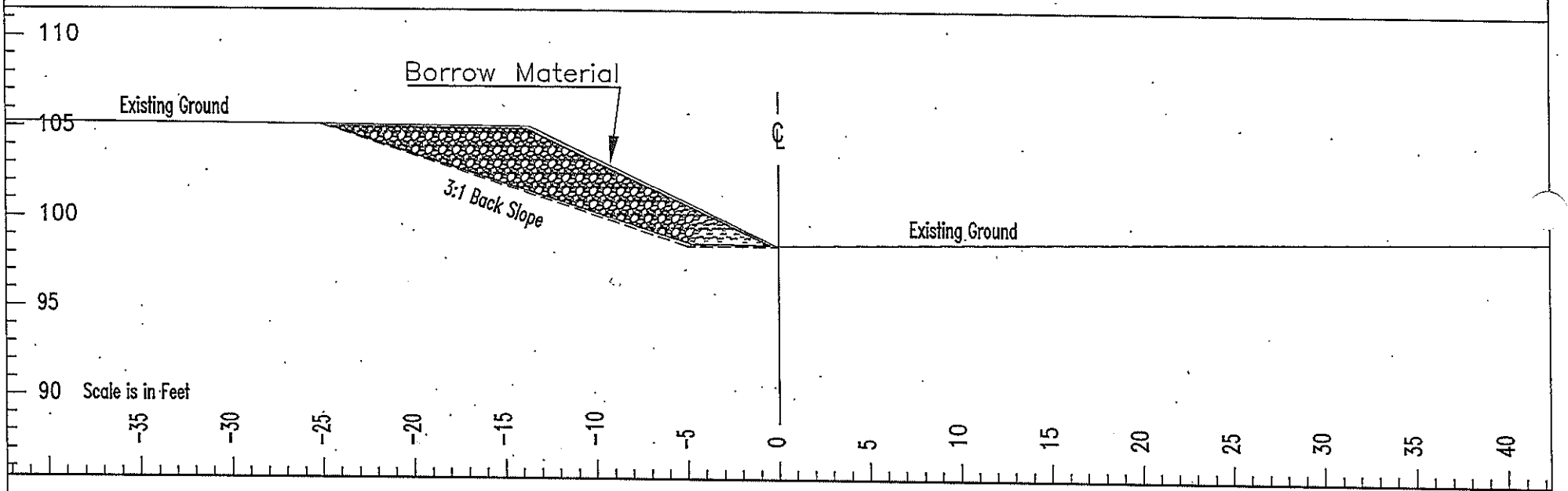
Clearing Limits for Reconstruction and Prehaul Maintenance



20' Minimum clearing limit, plus curve widening, sight distance and 14' clearance height.

CLEARING LIMITS DETAIL	DEPARTMENT OF AGRICULTURE FOREST SERVICE PROJECT DRAWING	

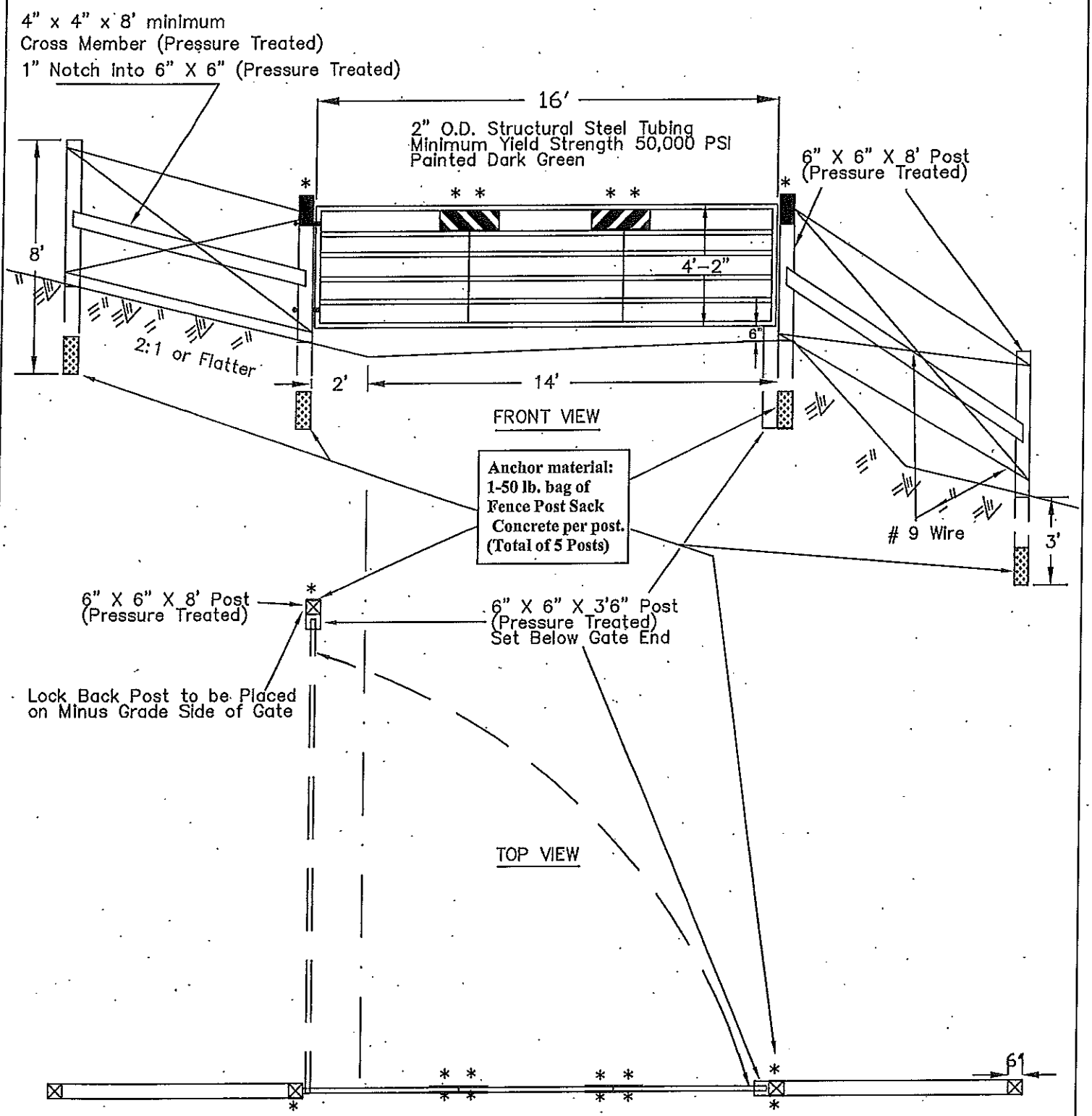




Typical Borrow Site Cross Sections

SIOUX 6 RAIL STOCK GATE

(or Approved Equal)



(4 ea.) * Type 2 Object Marker, Yellow, 6" X 12"
(4 ea.) * * Barricade Marker, Red and White, 24" X 8"

Signs will be in accordance with section 718 – FP-03
Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects
When posts are anchored in concrete, specification 601.01 is required.

GATE DETAIL 16 FT.	DEPARTMENT OF AGRICULTURE FOREST SERVICE	
	PROJECT DRAWING	

GENERAL NOTES AND REQUIREMENT

GENERAL

Unsuitable or excess materials encountered in Items 204, 303, and 602 shall be disposed of by sidecasting adjacent to the roadway as approved by the CO or as shown on the drawing.

SECTION 156 – PUBLIC TRAFFIC

Submit a traffic control plan prior to construction in accordance with MUTCD standards.
All required signs will be in place and approved prior to beginning work in the sale area.
MUTCD signing is included in the overhead cost.

SECTION 201 – CLEARING AND GRUBBING

The Contractor shall exercise care during clearing and grubbing to ensure
that clearing limit flagging and construction stakes remain in-place.
Decking areas are incidental to clearing and grubbing and will be approved by the CO.

Clearing and maintenance on existing roads are included in C5.31# - Road Maintenance Requirements, see Typical Roadway Section and Clearing Limit Detail or approved by the CO in the field.
Clearing for sight distance and curve widening is included.

SECTION 203 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

All used culverts, gates, posts and other used material are designated under 203.05 (Disposing of Material) (a).
Timber disposal methods are identified within this section.

SECTION 204 - EXCAVATION AND EMBANKMENT

Construction Tolerance Class is "K"
Finish the roadbed to method "C"
All low points that can trap water shall be constructed to drain freely away from the road
All ditches shall be constructed to drain in the same direction as the road grade.
Lead-off Ditch is a ditch that leads water from the ditch line away from the roadway to natural ground.
The typical drawing is the same as the outlet ditch detail in 602.
Drainage structure locations are subject to adjustment by the CO in the field.
Curve widening, fill widening, and slope ratio will be noted in the construction staking notes.
Turnaround locations will be located appoximately 1000' feet apart and at the end of the roads, costs are included in the excavation.

SECTION 209 – STRUCTURE EXCAVATION AND BACKFILL

All pipe installations are Compacting Method A.

SECTION 301 – AGGREGATE COURSES

The closest commercial gravel pit to the project is located approximately one mile west of the Clark Store, in Clark, Colorado.
Compaction of aggregate is Method "A".

SECTION 602 – CULVERTS AND DRAINS

Verify culvert lengths in the field before ordering.

SECTION 635 – TEMPORARY TRAFFIC CONTROL

Cost for signing is incidental to the contract.

Raghorn Stewardship

RECONSTRUCTION DESCRIPTIONS

NFSR 508.1

Station (MP)	
80+78 (1.53)	Remove any ruts and add 20CY of 11/2" road base to station 81+84
81+84 (1.55)	Construct Rolling Dip
90+82 (1.72)	**End Reconstruction**

NFSR 508.1B

Station (MP)	
0+00 (0.00)	Minimum road with 12'
2+00 (0.04)	Begin 11/2" Road Base – 60 Tons
2+35 (0.045)	Clean 18" CMP
2+50 (0.05)	Begin Reconstructing ditch on right for 280'
5+30 (0.10)	End 11/2" Road Base
6+85 (0.13)	Gate, Replace Barricade Markers (Prehaul Maintenance)
8+70 (0.165)	Construct Rolling Dip,
9+35 (0.18)	Construct Rolling Dip
11+30 (0.21)	Construct Rolling Dip
12+55 (0.24)	Construct Rolling Dip, Begin curve widening 4'
13+55 (0.26)	End curve widening
14+55 (0.275)	Construct Rolling Dip
14+80 (0.28)	Minimum Width through curve 22'
18+75 (0.355)	Grade Dip
19+00 (0.36)	Intersection NFSR 508.1D
22+50 (0.425)	Construct Rolling Dip and begin constructing ditch to log culvert. Add 28 CY's of borrow for 55' from borrow site ahead.
23+05 (0.44)	Begin Borrow Site, Log culvert, Fix failure to right (3 CY fill)
24+15 (0.46)	End Borrow Site
30+00 (0.57)	Grade Dip
31+70 (0.60)	**End Reconstruction**

RECONSTRUCTION DESCRIPTIONS

NFSR 508.1D

Station (MP)	
0+00 (0.00)	
1+25 (0.02)	Construct Rolling Dip, Begin curve widening 6' on left for 100'
2+25 (0.04)	End curve widening
3+05 (0.06)	Construct Rolling Dip
6+05 (0.115)	Grade Dip
7+40 (0.14)	Construct Rolling Dip
8+40 (0.16)	Construct Rolling Dip
9+65 (0.18)	Curve widening, clear 8' and curve widening 6' on left for 100'
10+65 (0.20)	End curve widening
12+90 (0.245)	Grade Dip
14+95 (0.285)	Curve widening, clearing both sides, 14' road width, +15% grade
16+00 (0.30)	Construct Rolling Dip
18+05 (0.34)	Construct Rolling Dip
19+20 (0.365)	**End Reconstruction,** Construct Turn-Around, Unit boundary,

NFSR 508.1E

Station (MP)		
5+02	(0.095)	Construct Rolling Dip with 15' Outlet Ditch
30+10	(0.57)	Construct Rolling Dip
34+85	(0.66)	Construct Rolling Dip, Construct ditch ahead 75' to next rolling dip and ditch back 50'

Raghorn Stewardship

New Construction Drainage Summary

NFSR # 501.1K

Station	Drainage Type
6+95	GD
17+18	GD
20+37	GD
23+96	GD
27+05	GD
30+00	GD
31+14	GD

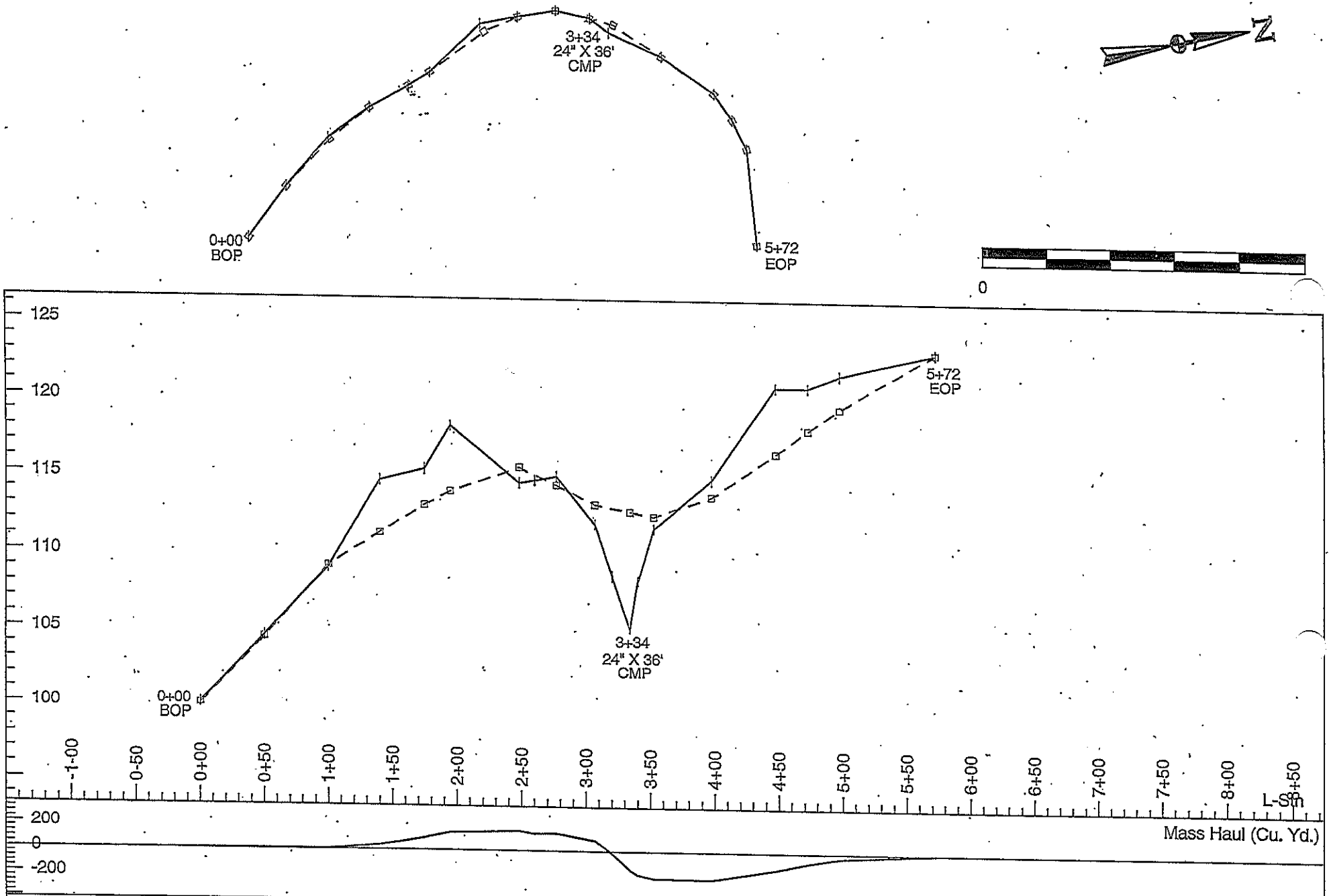
NFSR # 508.1L

Station	Drainage Type
10+39	GD
19+15	GD
23+91	18" x 26' CMP
37+70	18" x 30' CMP
50+58	GD

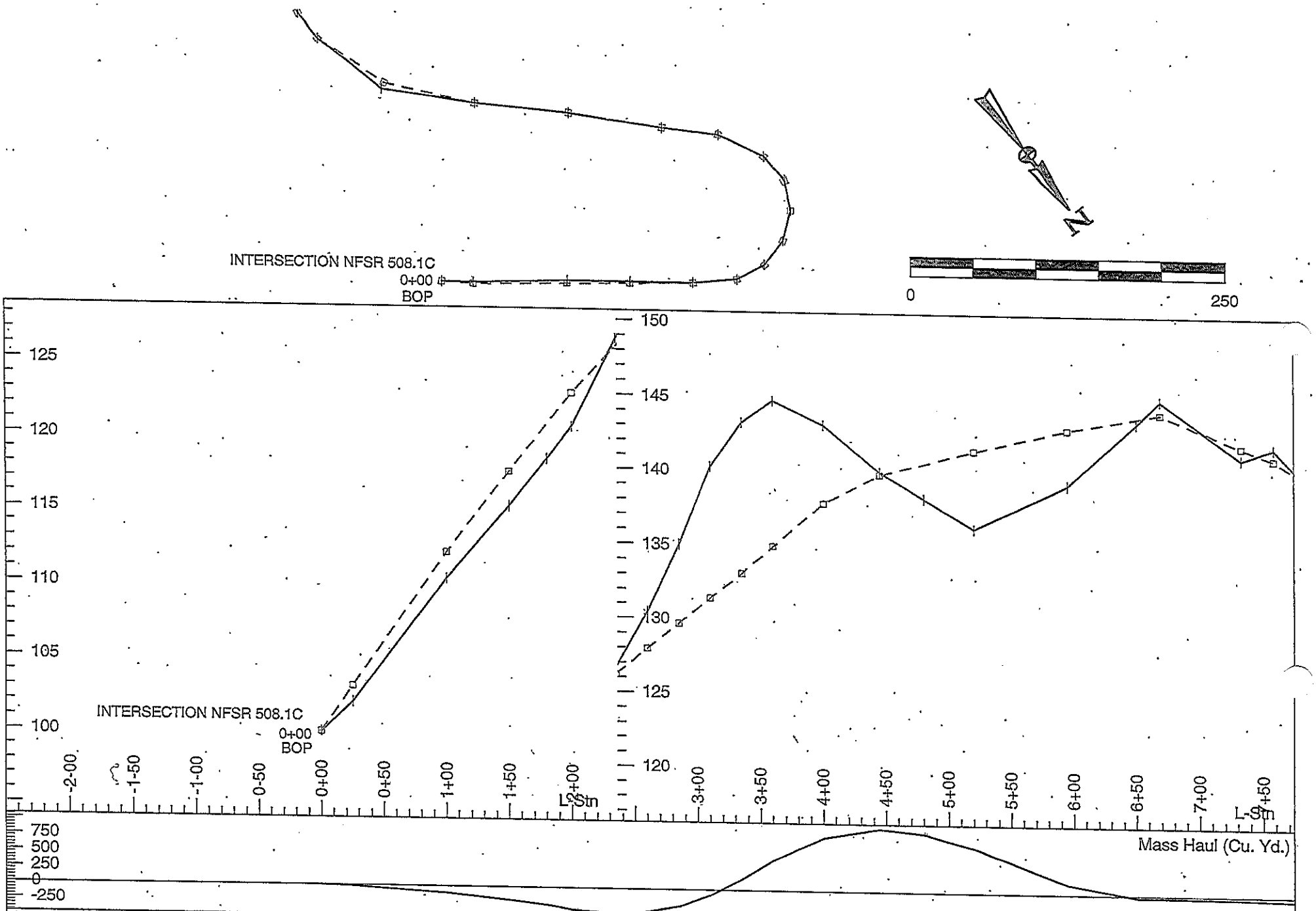
NFSR # 508.1C

Station	Drainage Type
3+34	24" x 36' CMP

GD = Grade Dip
RD = Rolling Dip
CMP = Corrugated Metal Pipe



Page 1 of 1	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1C		Profile Horiz. Scale: 1" = 100'



Page 1 of

Designer : D.Winter

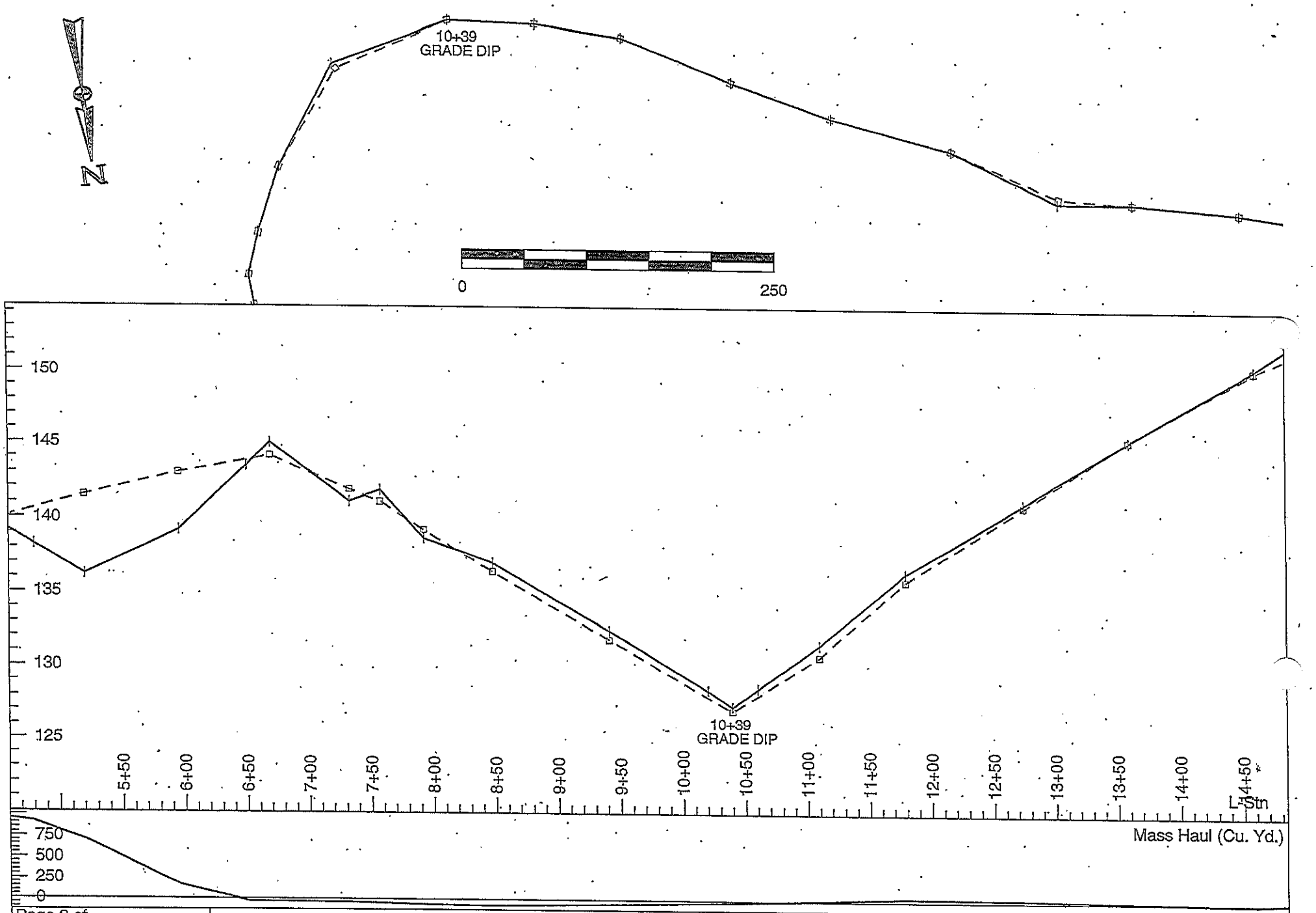
NFSR 508.1L

Raghorn Salvage

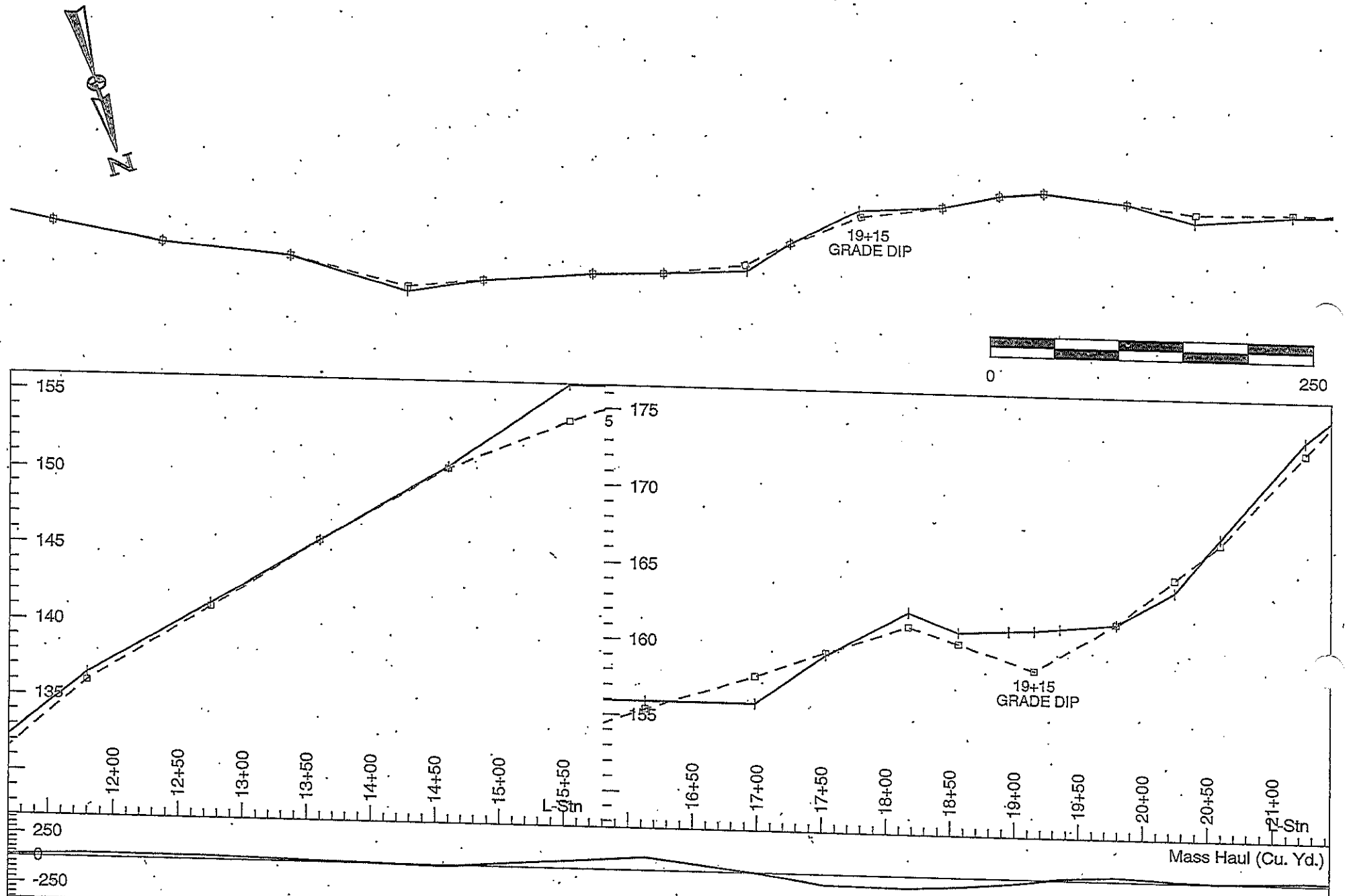
Plan Scale: 1" = 100

Profile Vert. Scale: 1" = 10'

Profile Horiz. Scale: 1" = 100'



Page 2 of	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1L		Profile Horiz. Scale: 1" = 100'



Page 3 of

Designer : D.Winter

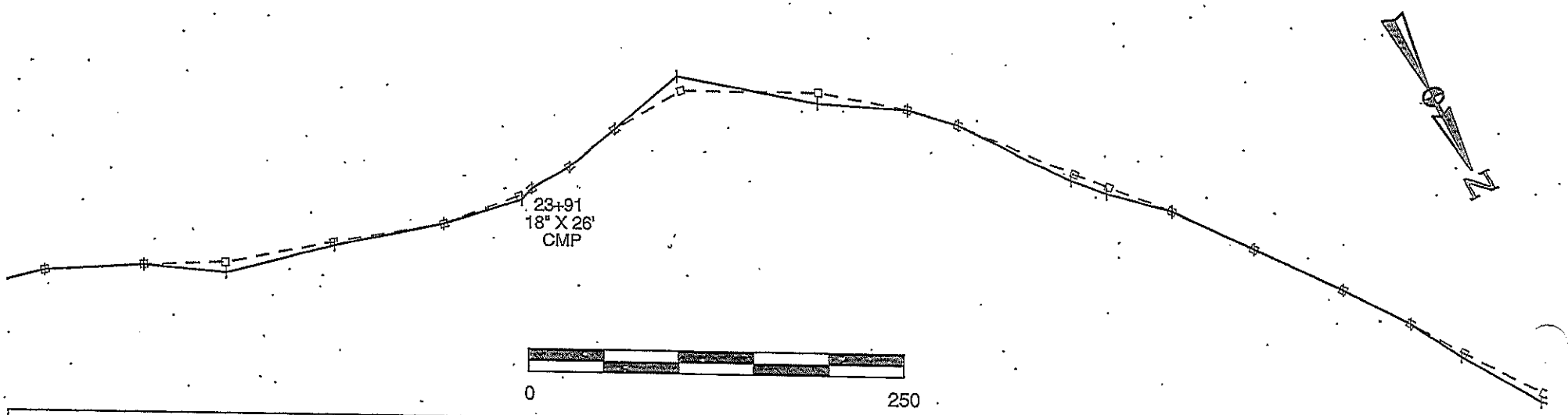
NFSR 508.1L

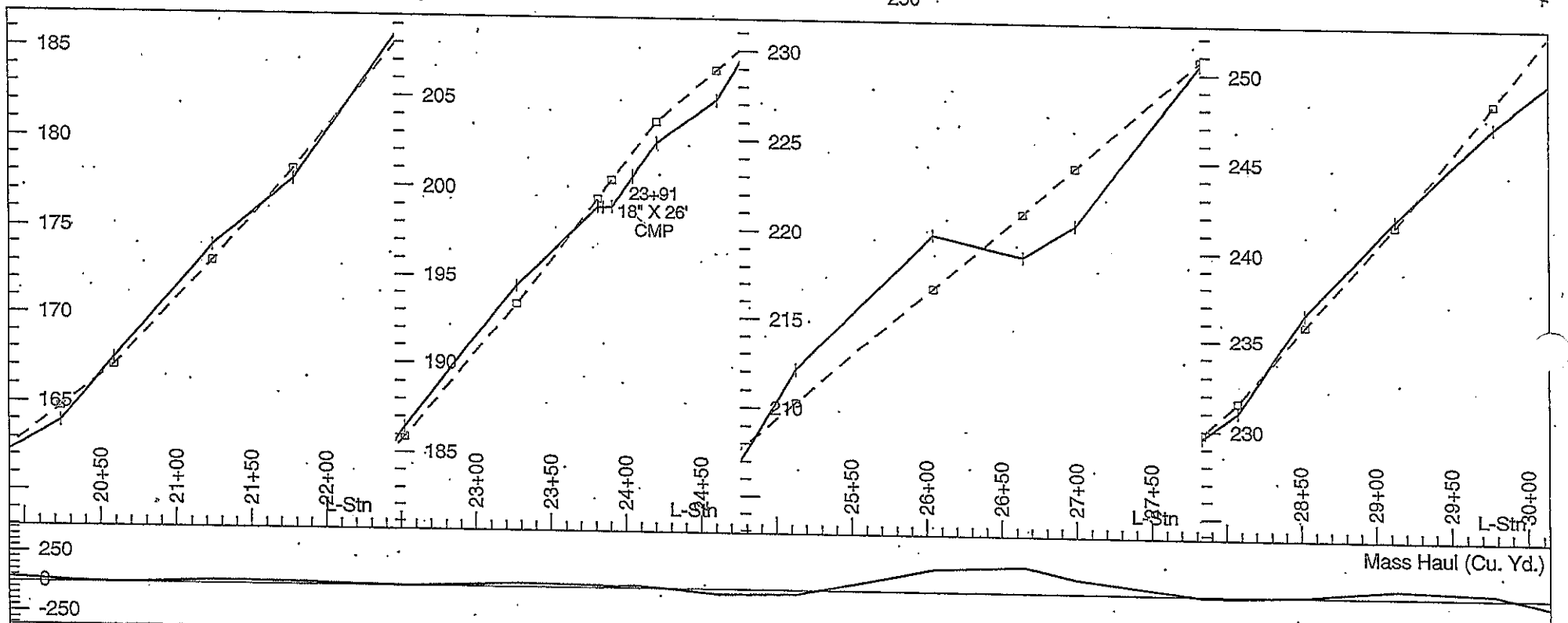
Raghorn Salvage

Plan Scale: 1" = 100

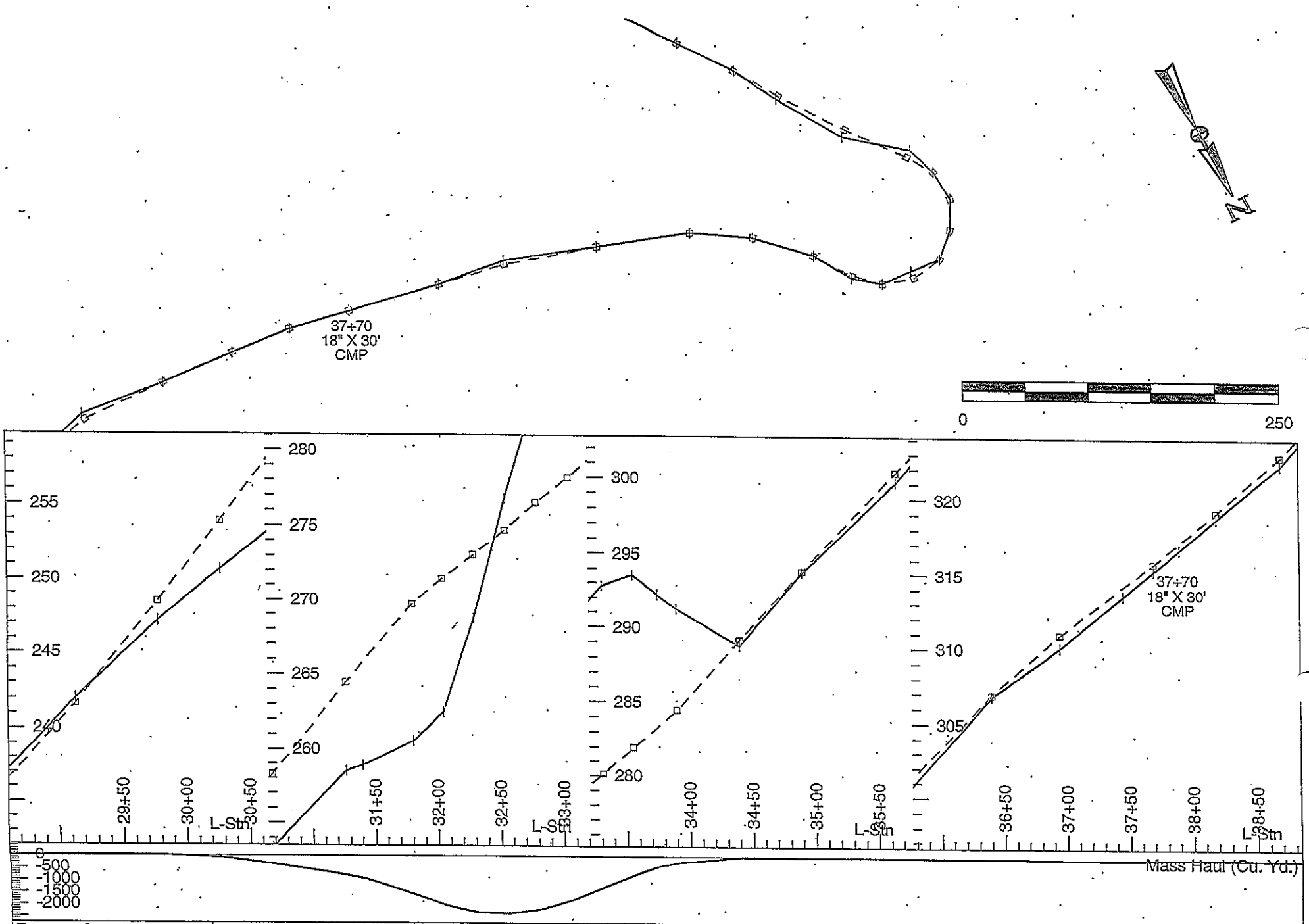
Profile Vert. Scale: 1" = 10'

Profile Horiz. Scale: 1" = 100'

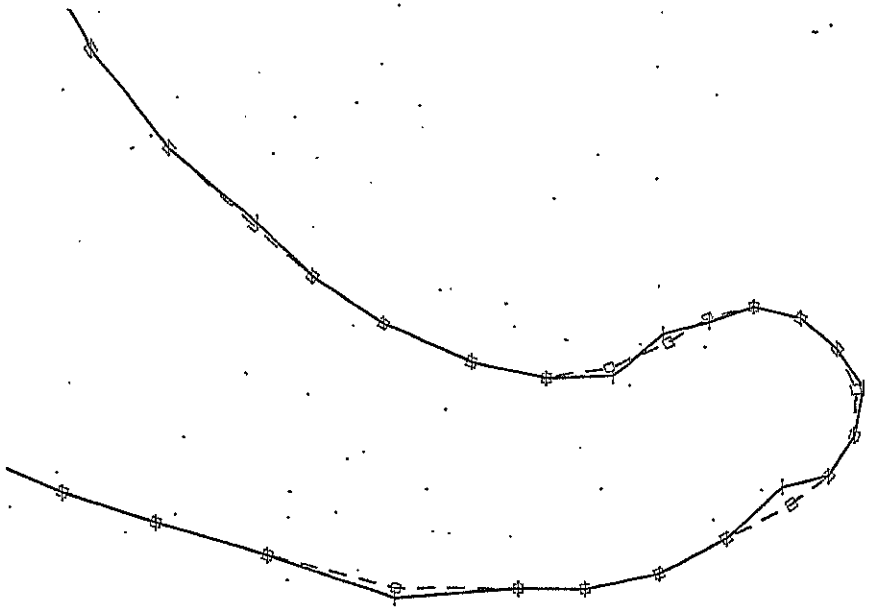


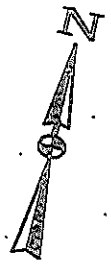


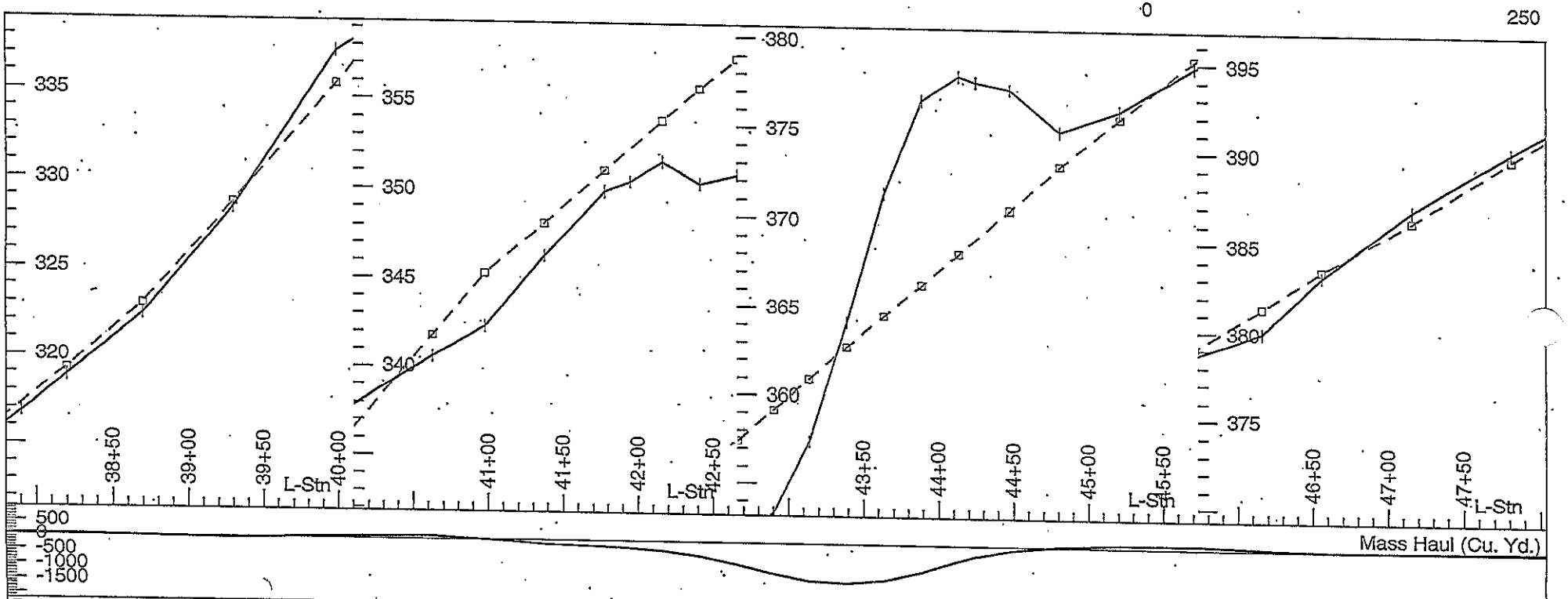
Page 4 of	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1L		Profile Horiz. Scale: 1" = 100'



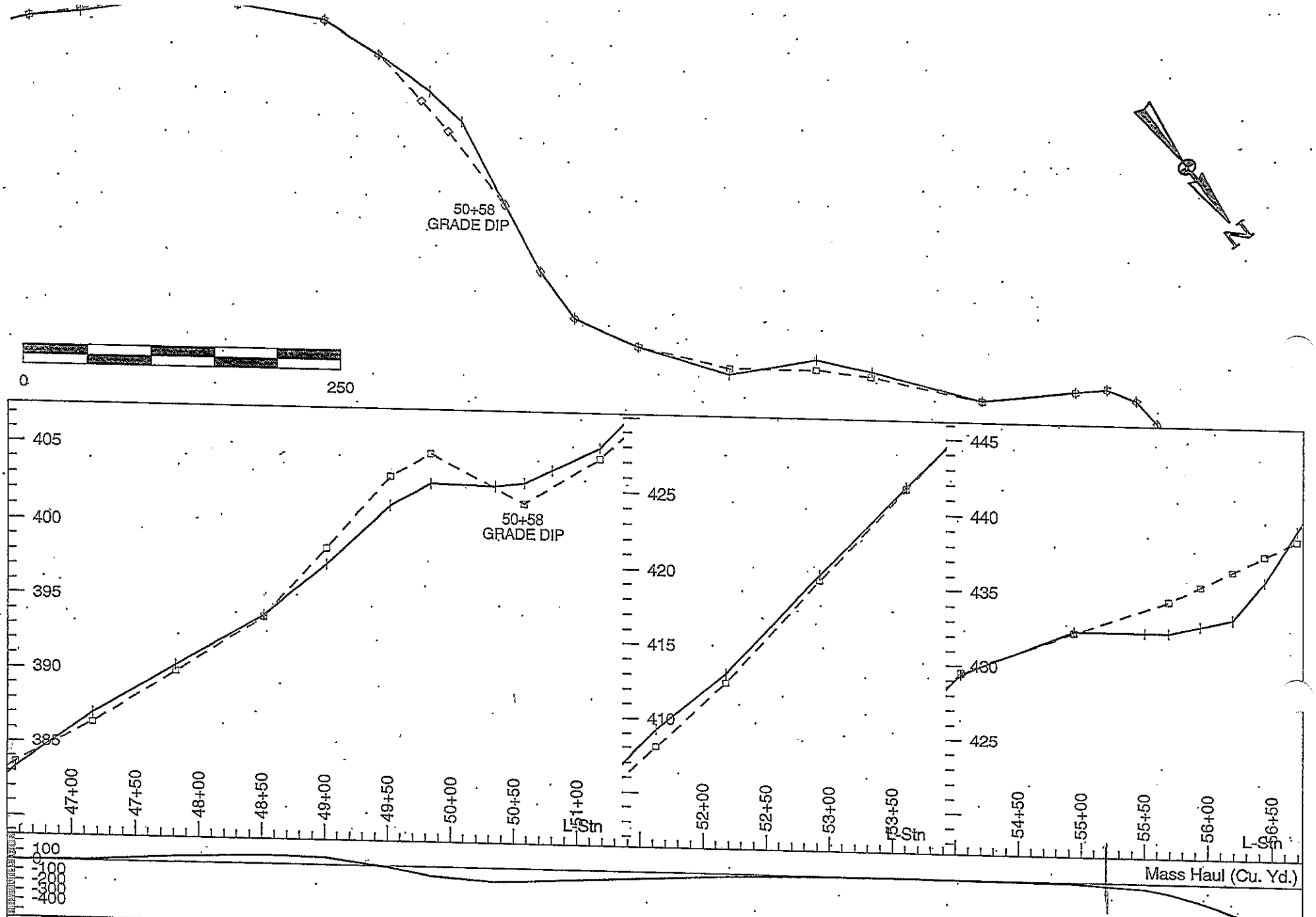
Page 5 of	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1L		Profile Horiz. Scale: 1" = 100'







Page 6 of	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1L		Profile Horiz. Scale: 1" = 100'



Page 7 of

Designer : D.Winter

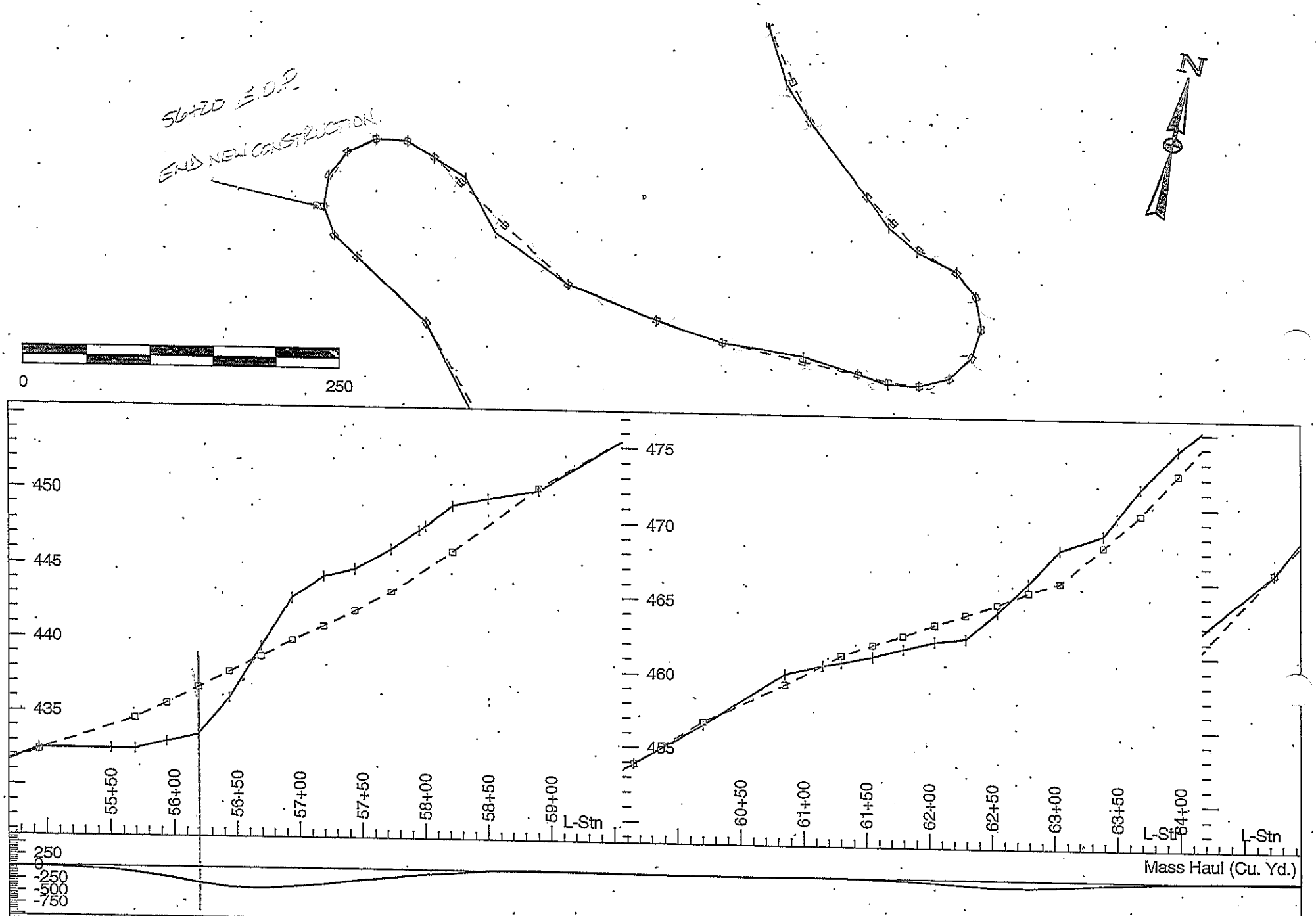
NFSR 508.1L

Raghorn Salvage

Plan Scale: 1" = 100'

Profile Vert. Scale: 1" = 10'

Profile Horiz. Scale: 1" = 100'



Page 8 of

Designer : D.Winter

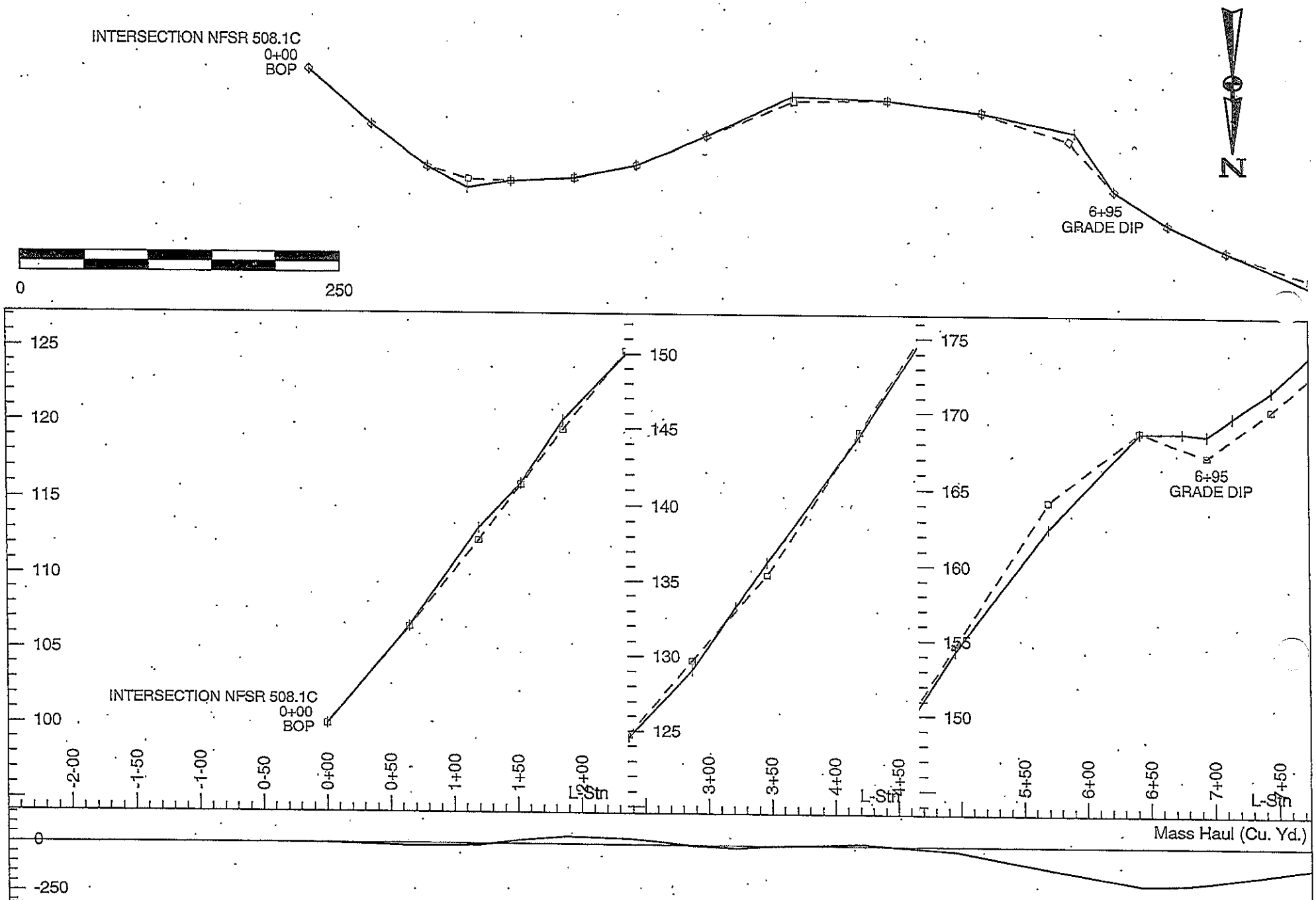
NFSR 508.1L

Raghorn Salvage

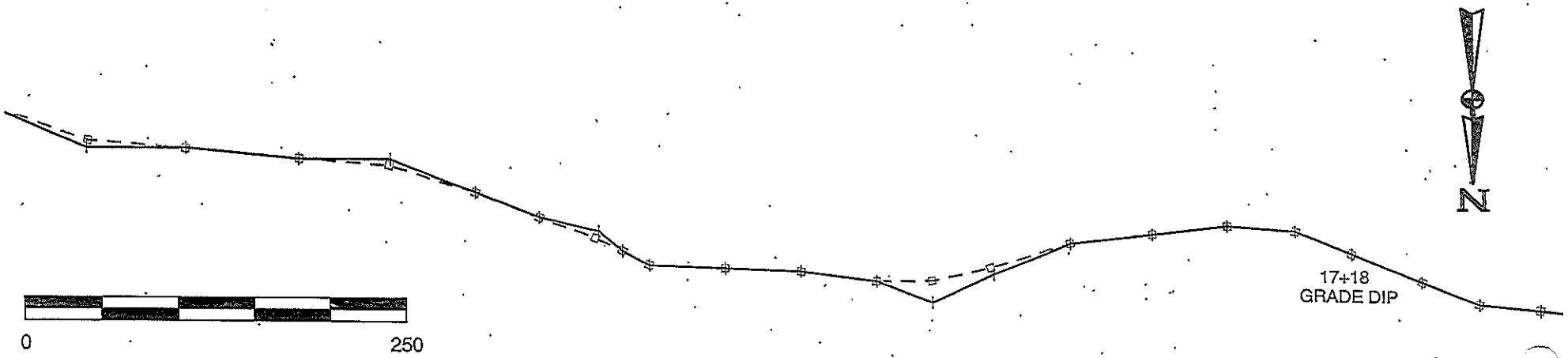
Plan Scale: 1" = 100

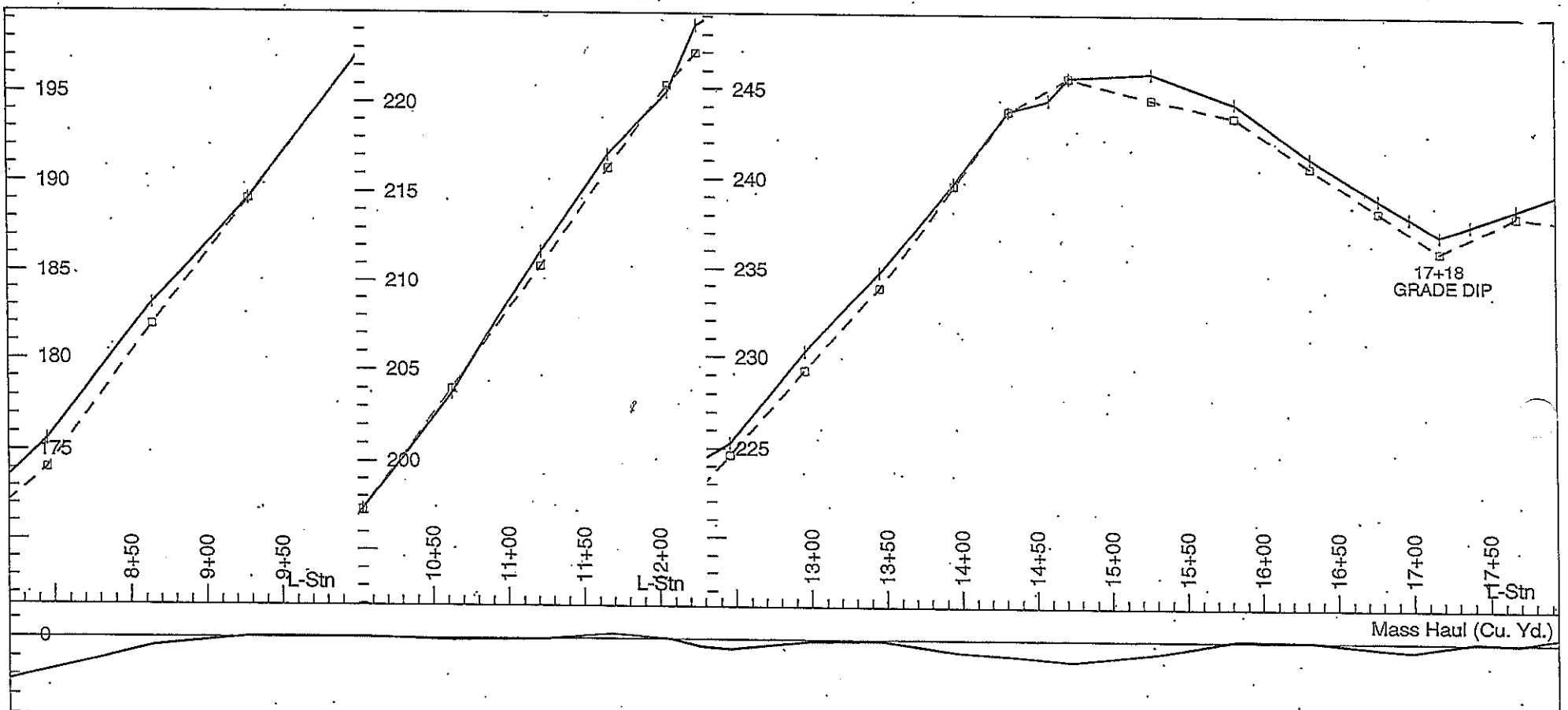
Profile Vert. Scale: 1" = 10'

Profile Horiz. Scale: 1" = 100'

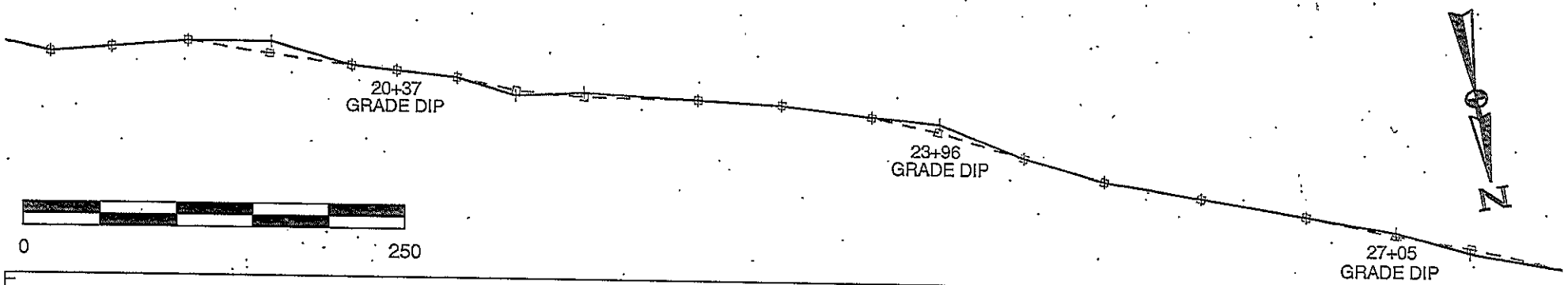


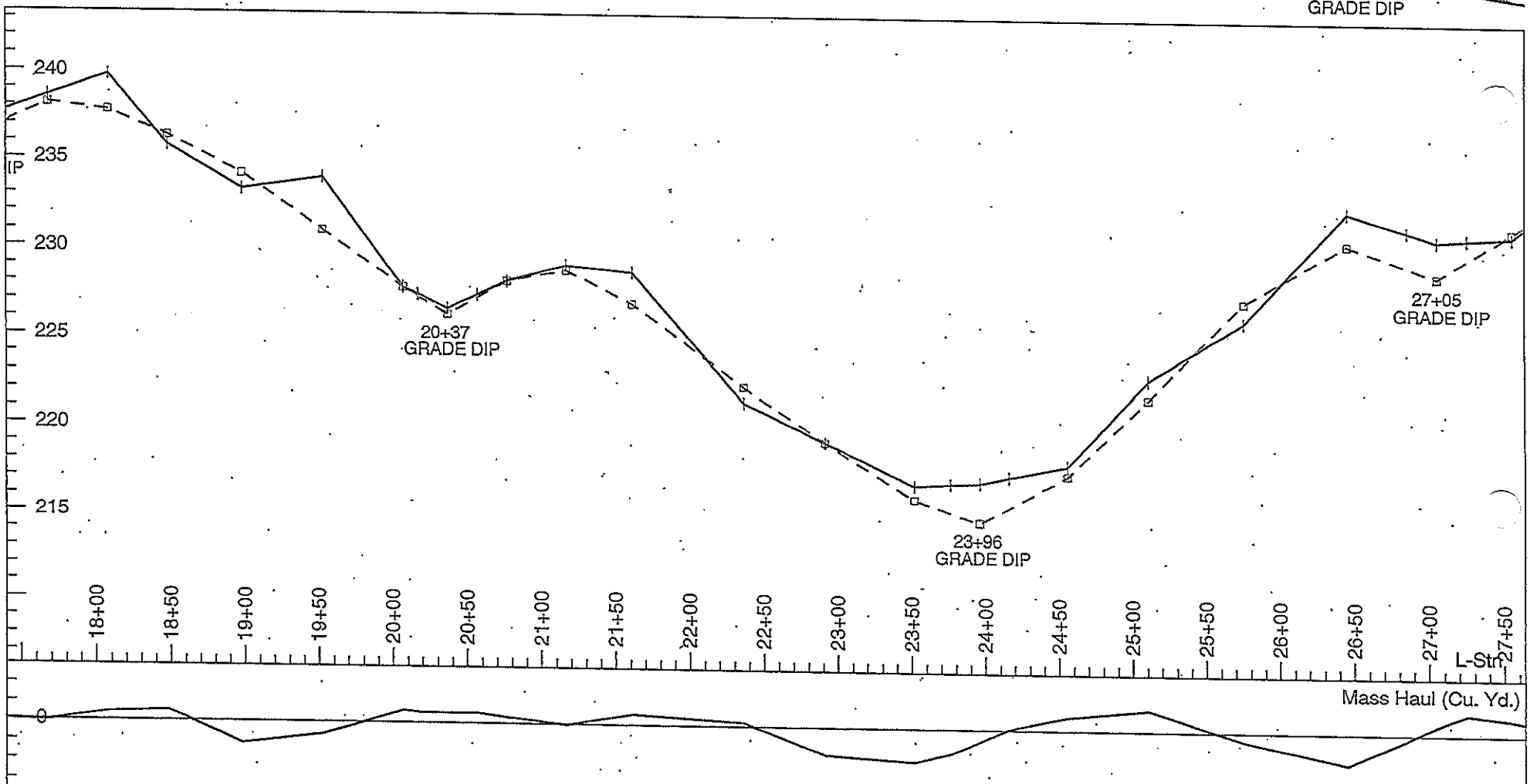
Page 1 of 4	**Raghorn Salvage**	Plan Scale: 1" = 100'
Designer : D.Winter		Profile Vert. Scale: 1" = 10' Profile Horiz. Scale: 1" = 100'
NFSR 508.1K		





Page 2 of 4	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10' Profile Horiz. Scale: 1" = 100'
NFSR 508.1K		

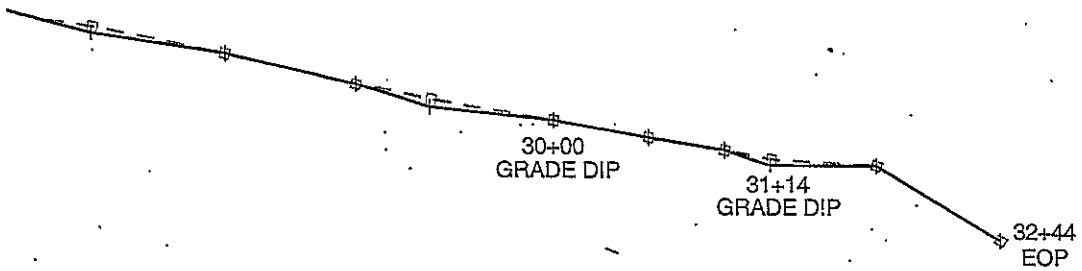


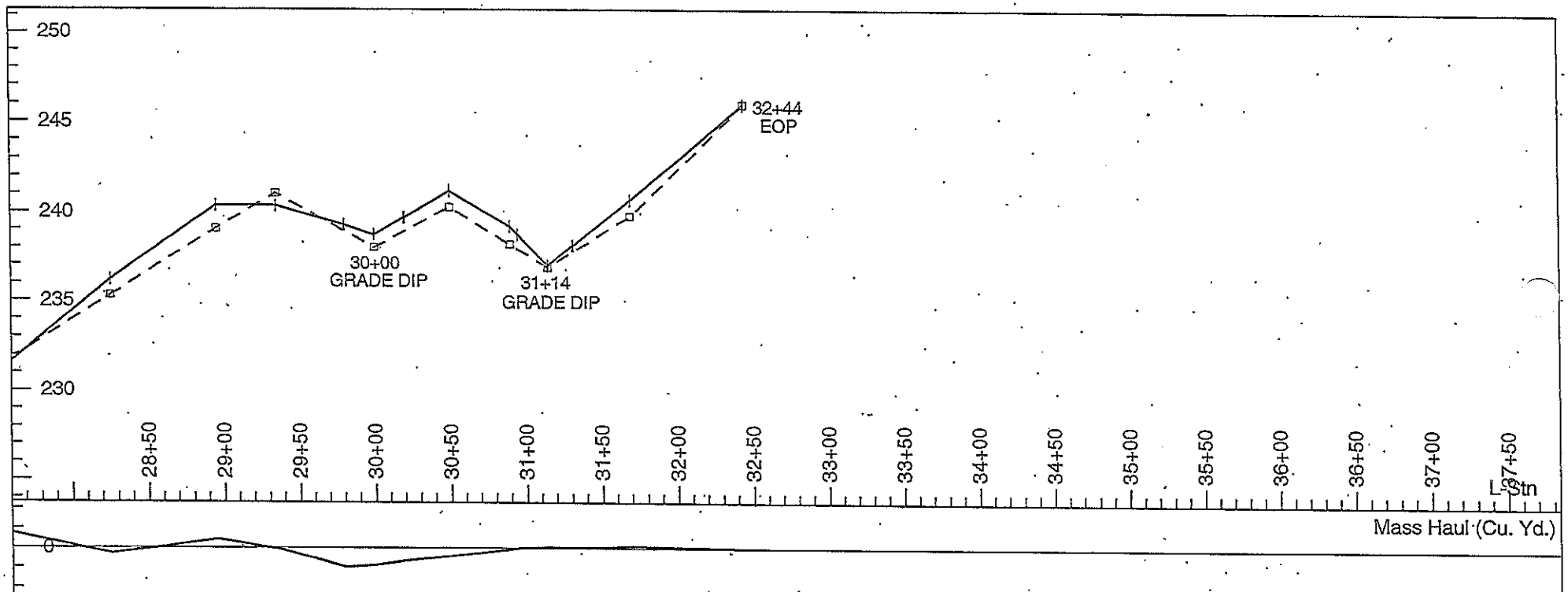


Page 3 of 4	
Designer : D.Winter	
NFSR 508..1K	

Raghorn Salvage

Plan Scale: 1" = 100
Profile Vert. Scale: 1" = 10' Profile Horiz. Scale: 1" = 100'





Page 4 of 4	**Raghorn Salvage**	Plan Scale: 1" = 100
Designer : D.Winter		Profile Vert. Scale: 1" = 10'
NFSR 508.1K		Profile Horiz. Scale: 1" = 100'

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage

Road Name: Elkhorn Mountain

Road No.: 508.1

Length (Miles): 0.19

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
20420	Drainage excavation, type Rolling Dip	CQ	Each	1.00	$ 108.30	20	1.05	$ 103.14	$ 103.14
30109	Aggregate surface course, grading 11/2" Road Base, compaction method A	CQ	Ton	30.00	$ 26.15	15	1.04	$ 25.14	$ 754.20

SUB-TOTAL: $ 857.34

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage

Road Name: Elkhorn Mountain Spur B

Road No.: 508.1B

Length (Miles): 0.6

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
20404	Unclassified borrow, compaction method d, finishing method C	CQ	Cubic Yard	28.00	$ 15.46	20	1.05	$ 14.72	$ 412.16
20420	Drainage excavation, type Rolling Dip	CQ	Each	6.00	$ 108.30	20	1.05	$ 103.14	$ 618.84
30109	Aggregate surface course, grading 11/2" Road Base, compaction method A	CQ	Ton	60.00	$ 26.15	15	1.04	$ 25.14	$ 1,508.40
30329	Road Reconditioning	CQ	Lump Sum	1.00	$ 603.40	40	1.11	$ 543.60	$ 543.60

SUB-TOTAL: $ 3,083.00

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage
Road Name: Elkhorn Mountain Spur D

Road No.: 508.1D
Length (Miles): 0.37

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
20420	Drainage excavation, type Rolling Dip	CQ	Each	6.00	$ 108.30	20	1.05	$ 103.14	$ 618.84
30329	Road Reconditioning	CQ	Lump Sum	1.00	$ 922.04	40	1.11	$ 830.67	$ 830.67

SUB-TOTAL: $ 1,449.51

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage

Road Name: Elk Run

Road No.: 508.1K

Length (Miles): 0.62

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
15202	Slope, reference, and clearing and grubbing stakes; tolerance C	CQ	Mile	0.62	$ 1,626.67	80	1.25	$ 1,301.34	$ 806.83
20104	Clearing and grubbing, disposal of tops and limbs f, logs f, stumps f	CQ	Acre	1.90	$ 3,121.70	40	1.11	$ 2,812.34	$ 5,343.45
20401	Roadway excavation, compaction method d, finishing method C	CQ	Cubic Yard	3,270.00	$ 1.58	25	1.07	$ 1.48	$ 4,839.60
62501	Turf establishment dry method (without mulch)	CQ	Acre	1.10	$ 460.00	30	1.08	$ 425.93	$ 468.52

SUB-TOTAL: $ 11,458.40

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage

Road Name: Elkhorn Mountain Spur C

Road No.: 508.1C

Length (Miles): 0.11

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
21202	Linear grading	CQ	Lump Sum	1.00	$ 2,241.58	40	1.11	$ 2,019.44	$ 2,019.44
60201-24	24 inch corrugated metal pipe, compaction A, 0.064" thickness steel	CQ	Foot	36.00	$ 33.90	20	1.05	$ 32.29	$ 1,162.44

SUB-TOTAL: $ 3,181.88

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Stewardship

Road Name: Bull Run

Road No.: 508.1L

Length (Miles): 1.06

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
15101	Mobilization	CQ	Lump Sum	1.00	$ 3,300.00	30	1.08	$ 3,055.56	$ 3,055.56
15202	Slope, reference, and clearing and grubbing stakes; tolerance C	CQ	Mile	1.06	$ 1,626.67	80	1.25	$ 1,301.34	$ 1,379.42
20104	Clearing and grubbing, disposal of tops and limbs f, logs f, stumps f	CQ	Acre	3.97	$ 2,892.00	40	1.11	$ 2,605.41	$ 10,343.48
20401	Roadway excavation, compaction method d, finishing method C	CQ	Cubic Yard	7,835.00	$ 1.66	25	1.07	$ 1.55	$ 12,144.25
60201-18	18 inch corrugated metal pipe, compaction A, 0.064" thickness steel	CQ	Foot	56.00	$ 28.98	20	1.05	$ 27.60	$ 1,545.60
62501	Turf establishment dry method (without mulch)	CQ	Acre	1.92	$ 460.00	30	1.08	$ 425.93	$ 817.79

SUB-TOTAL: $ 29,286.10

TOTAL ALL ROADS: $ 49,625.65

SCHEDULE OF ITEMS
(Timber Sale)

Timber Sale: Raghorn Salvage

Road No.: 508.1E

Road Name: Elk Run

Length (Miles): 0.15

Item Number	Description	Method of Meas.	Unit	Quantity	Unit Price	Percent Labor (%)	Labor Factor	S.R.C Unit Price	Total
20420	Drainage excavation, type Rolling Dip	CQ	Each	3.00	$ 108.30	20	1.05	$ 103.14	$ 309.42

SUB-TOTAL: $ 309.42

TOTAL ALL ROADS: $ 49,625.65