

**All documents are draft and subject to change without notice.**



## TIMBER NOTICE OF SALE

**SALE NAME:** SYLVAN PEARL

**AGREEMENT NO:** 30-103620

**AUCTION:** June 11, 2024 starting at 10:00 a.m., **COUNTY:** King

South Puget Sound Region Office, Enumclaw, WA

**SALE LOCATION:** Sale located approximately 16 miles east of Cumberland, WA

**PRODUCTS SOLD AND SALE AREA:** All timber, except trees marked with blue paint or bounded out by yellow leave tree area tags, snags and down timber existing more than 5 years from the day of sale, bounded by the following: white timber sale boundary tags, timber type change marked with pink flagging and 5470 road in Unit #1; white timber sale boundary tags, and 5470 road in Unit #2, Unit #3, and Unit #4; white timber sale boundary tags, the 5470, and 5470-5 roads in Unit #5; white timber sale boundary tags, timber type change marked with pink flagging, 5470 alternate Road, 5476 Road, Shoofly, and 5477 Road in Unit #6; white timber sale boundary tags and the 5476 Road in Unit #7;

All timber bounded by orange right of way tags, except that title to timber within the right of way tags is not conveyed to the Purchaser unless the road segment is actually constructed in right of way Unit #8;

All forest products above located on part(s) of Sections 19, 20, 29 and 30 all in Township 21 North, Range 9 East, Sections 25 and 36 all in Township 21 North, Range 8 East, W.M., containing 164 acres, more or less.

**CERTIFICATION:** This sale is certified under the Sustainable Forestry Initiative® program Standard (cert no: BVC-SFIFM-018227) and FSC 100% raw materials under the Forest Stewardship Council® Standard (cert no: BV-FM/COC-080501).

## ESTIMATED SALE VOLUMES AND QUALITY:

Species	Avg DBH	Ring Count	Total MBF	MBF by Grade								
				1P	2P	3P	SM	1S	2S	3S	4S	UT
Douglas fir	18.2	8	3,164						1,514	1,335	288	26
Hemlock	14.4		1,651						298	992	332	30
Silver fir	14.8		790						273	394	113	10
Noble fir	19		517						302	179	35	
Redcedar	18.3		92							78	13	
Red alder	14.4		29							6	20	3
Maple	18		5								5	
Birch	30		3							3		
Sale Total			6,251									

**MINIMUM BID:** \$0.00

**BID METHOD:** Sealed Bids

**PERFORMANCE SECURITY:** \$0.00

**SALE TYPE:** Lump Sum

**EXPIRATION DATE:** October 31, 2026

**ALLOCATION:** Export Restricted

**BID DEPOSIT:** \$0.00 or Bid Bond. Said deposit shall constitute an opening bid at the appraised price.



WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

## TIMBER NOTICE OF SALE

**HARVEST METHOD:** Harvest activities are estimated to be 100 percent ground based harvest. Ground based equipment, with cable-tethered equipment limited to sustained slopes of 75 percent or less, self-leveling equipment limited to sustained slopes 65 percent or less, and all other ground based equipment limited to sustained slopes 45 percent or less. Yarding may be restricted during wet weather if rutting becomes excessive, per clause H-017.

**ROADS:** 44.64 stations of optional construction. 664.85 stations of required prehaul maintenance. 51.30 stations of optional prehaul maintenance. 33.58 stations of abandonment, if constructed. Purchaser maintenance on the 5470, 5470-5, 5477, 5470 alternate, 5476, 5477-3, 5477-4, 5477 ext., 5476-1, 5476-2, and Shoofly roads, and, Unit #1 Spur, and Unit #7 Spur. Designated maintenance on the 5500/Northside Mainline Road.

Rock for this proposal can be obtained from the State owned Load N Go Pit and the Fir Sure Pit at no cost to the Purchaser or any commercial rock source at the Purchaser's expense. Rock source development plan is to be completed per Section 6 of the Road Plan and according to the Rock Source Development if rock is obtained from the Load N Go Pit or the Fir Sure Pit.

## ACREAGE DETERMINATION

**CRUISE METHOD:** Acreage for Units #1, #2, #3, #4, #5, #6, #7 and #8 were determined by traversing boundaries by GPS. Acreage for Units #5 and #6 were determined by traversing boundaries by GPS and by multiplying length times width. GPS data files are available at DNR's website for timber sale packets. See cruise narrative for cruise method.

**FEES:** \$106,267.00 is due on day of sale. \$9.00 per MBF is due upon removal. These are in addition to the bid price.

**SPECIAL REMARKS:** The sale area is typically inaccessible from late November to early May due to snow conditions. Contact Nick Chicano for current conditions at 360-509-1079.

This sale contains high quality Douglas-fir sawlogs and Douglas-fir poles. See cruise.

Purchaser shall stockpile 3000 cu yds of 2 inch minus at the Load n Go Pit, as shown on the Load N Go Pit Development Plan, which is included in the Road Plan.

Note to cruisers and appraisers: Please refrain from leaving pink, orange, or blue flagging from your cruises in or around the sale area to avoid confusion with DNR's marking. Additionally, for the safety of the public, please remove from roads and trails all string from string boxes used during appraising or cruising this sale.

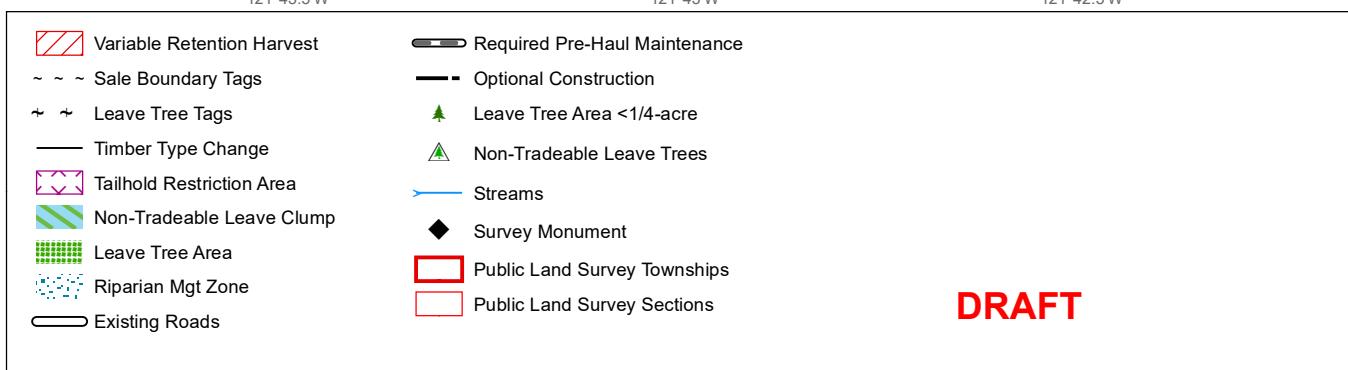
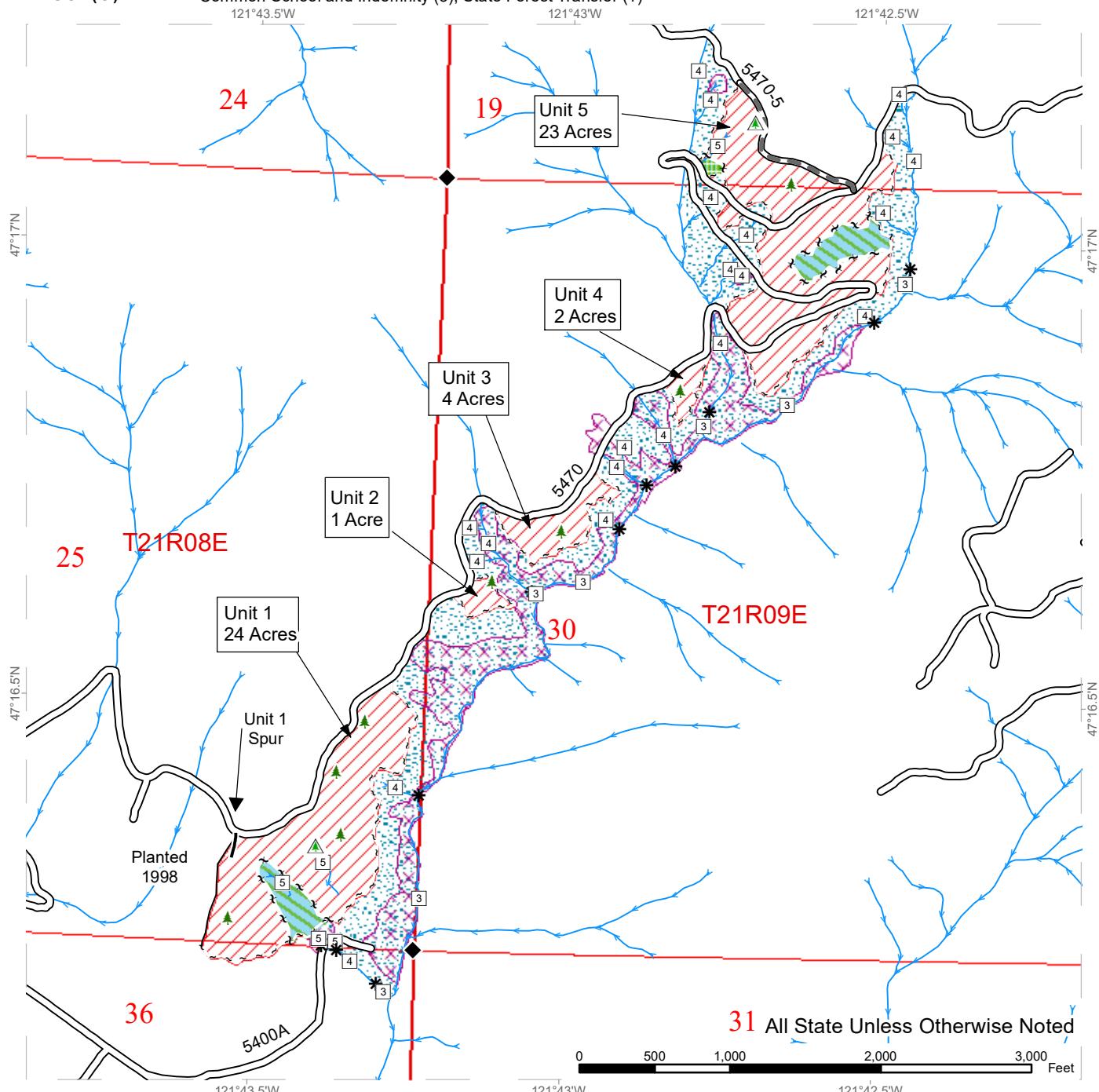
See map for gate locations. Gate keys may be obtained by contacting the South Puget Sound Region Office at 360-825-1631 or by contacting Nick Chicano at 360-509-1079.

# TIMBER SALE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280

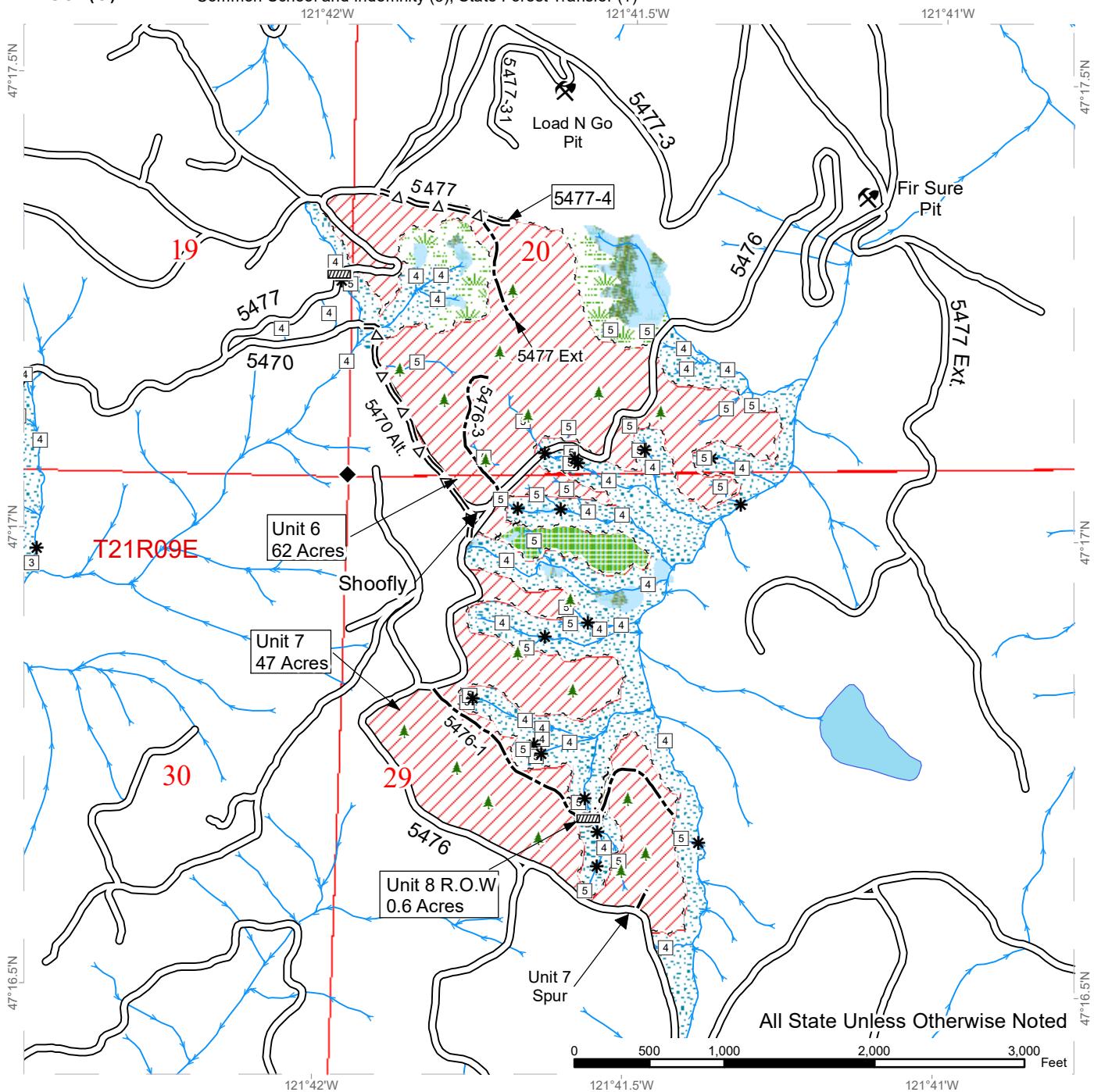


# TIMBER SALE MAP

**DRAFT**

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

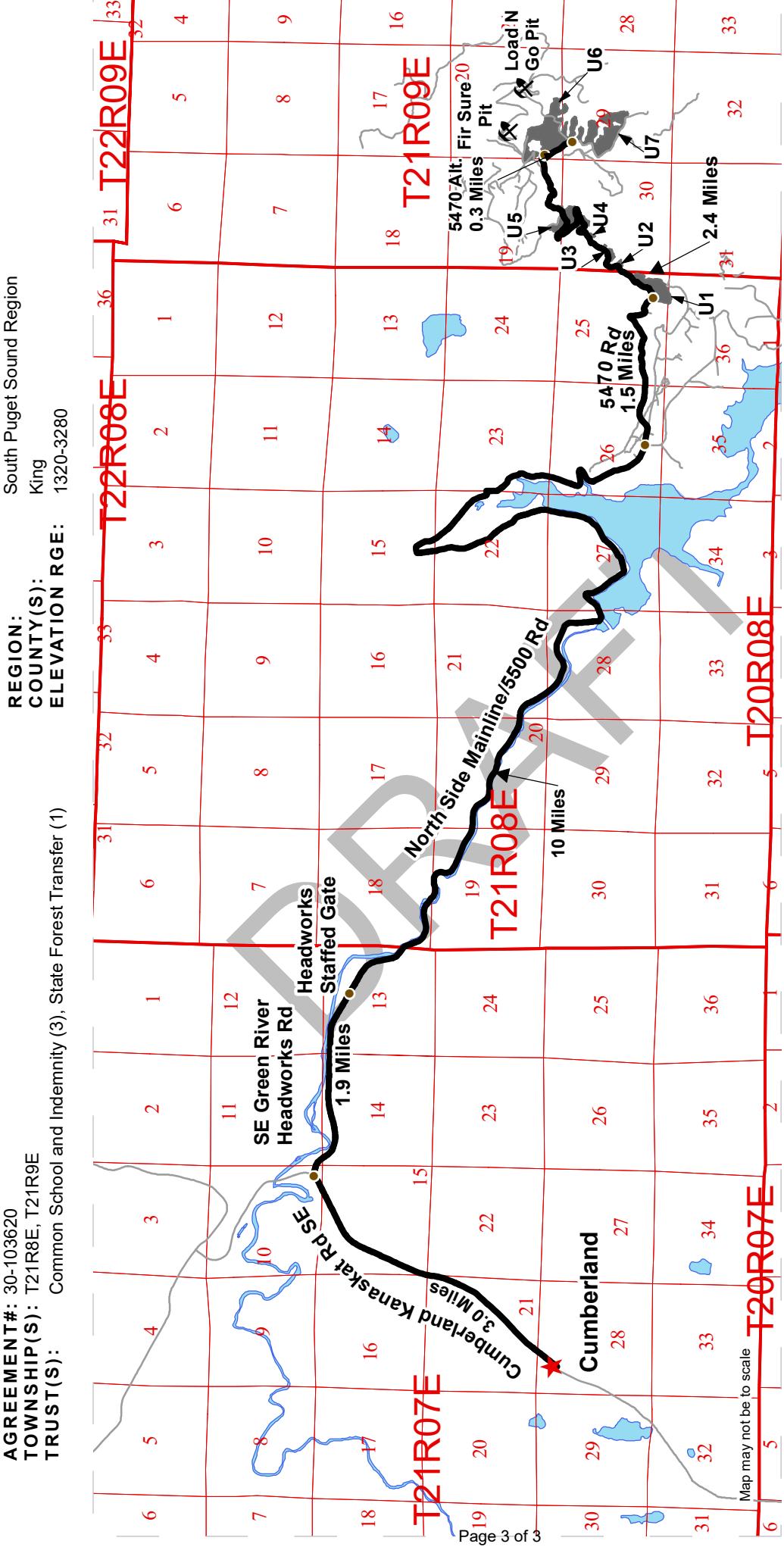
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



## DRIVING MAP

**DRAFT**

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)



**Town**

- ★ Distance Indicator
- Rock Pit
- Haul Route
- - - County Road
- Timber Sale Unit
- Public Land Survey Township Sections

From Cumberland, go north approximately 3 miles then turn right on the South East Green River Headworks Road for 1.9 miles. After passing through the staffed Headworks gate, continue on the North Side Mainline/5500 Road for 10 miles. Veer left onto the 5470 Road for 1.5 miles to reach Unit 1. Continue another 2.4 miles down the 5470 road to reach Units 2, 3, 4, 5, and 6. Continue on the 5470 Alternate Road for 0.3 miles to reach Unit 7.



# PRE-CRUISE NARRATIVE

Sale Name: <b>Sylvan Pearl</b>	Region: <b>South Puget Sound</b>
Agreement #: <b>30-103620</b>	District: <b>Rainier</b>
Contact Forester: <b>Nick Chicano</b>	Phone/ Location: <b>(360)-509-1079 Ext: /</b>
Alternate Contact: <b>Nicole Vonberckefeldt</b>	Phone/ Location: <b>(360)-628-3035 Ext: /</b>

Type of Sale (lump sum, mbf scale, tonnage scale or contract harvest): lump sum

Required or Optional removal of utility as pulp (*for scale sales only*):

Evaluated for RFRS Implementation?: yes

Percentage cable-uphill: 27%

Percentage cable-downhill:

Percentage ground based: 73%

Species Onsite:  RC,  DF,  WH,  RA,  BC,  BLM,  NF,  SF,  SS,  Other:(Please List)

## UNIT ACREAGES\* AND METHOD OF DETERMINATION:

Unit #	Legal Description Sec/Twp/Rng	Grant	Gross Traversed Acres	Deductions from Gross Acres (No harvest acres)				Net Harvest Acres	Acreage Determination (List method, dimensions and error of closure if applicable)
				RMZ/ WMZ Acres	Leave Tree Acres	Existing Road Acres	Other Acres (describe)		
1 VRH	Sec 25,36 / T21N/ R 08E	01, 03	26.3		2.0			24.3	GPS Garmin 64S Boundary and leave tree area
2 VRH	Sec 30/ T 21N/ R 09 E	01, 03	1.3					1.3	GPS Garmin 64S Boundary and leave tree area
3 VRH	Sec 30/ T 21N/ R 09 E	01, 03	4.2					4.2	GPS Garmin 64S Boundary and leave tree area
4 VRH	Sec 30/ T 21N/ R 09 E	01, 03	1.5					1.5	GPS Garmin 64S Boundary and leave tree area
5 VRH	Sec 19, 30 / T 21N/ R 09 E	01, 03	28.5		3.3	2.2		23.0	GPS Garmin 64S Boundary and leave tree area, 2450' x 40' L x W Existing Roads
6 VRH	Sec 19, 20,29/ T 21N/ R 09 E	01, 03	68.9		4.4	2.1		62.4	GPS Garmin 64S Boundary and leave tree area, 2340' x 40' L x W Existing Roads
7 VRH	Sec 29/ T 21N/ R 09 E	01, 03	47.1					47.1	GPS Garmin 64S Boundary and leave tree area
8 ROW	Sec 29/ T 21N/ R 09 E	01, 03	0.6					0.6	GPS Garmin 64S Boundary and leave tree area
<b>TOTAL ACRES</b>			<b>178.4</b>		<b>9.7</b>	<b>4.3</b>		<b>164.4</b>	

## HARVEST PLAN AND SPECIAL CONDITIONS:

Unit #	Harvest Prescription: (Mark leave, take, paint color, tags, flagging etc.)	Special Management areas:	Other conditions (# leave trees, etc.) *For all marked thinnings, include a tree count by species.
1	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Clumped 207 Individual 6
2	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Individual 10
3	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Clumped 34
4	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Individual 12
5	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Clumped 322 Individual 5 11.6 TPA
6	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Clumped 820 Individual 73 12.9 TPA
7	Pink flagging and yellow "leave tree area" tags. Blue banded individual leave trees		Clumped 383
8	Orange "Right of Way" tags and orange ribbon		

#### OTHER PRE-CRUISE INFORMATION:

Unit #	Estimated Volume	Access information (Gates, locks, etc.)	Photos, traverse maps required
1	See Cruise	North Side Mainline Gate Shack	
2			
3			
4			
5			
6			
7			

#### REMARKS:

--

Prepared By: Nick Chicano Date: 7/22/2022	Title: Black Diamond Unit Manager	CC:
--	-----------------------------------	-----

Revised 2/23/2007 (PSLD), Revised 1/22/20 (SPS)

## Timber Sale Cruise Report Sylvan Pearl

**Sale Name:** SYLVAN PEARL

**Sale Type:** LUMP SUM

**Region:** SO PUGET

**District:** RAINIER

**Lead Cruiser:** Aaron Coleman

**Other Cruisers:**n/a

**Cruise Narrative:**

This sale consists of 7 variable retention harvest (VRH) units and 1 right-of-way (R/W) unit located off the 5470 road in the Green River Watershed. No keys were needed for access, though you must check-in at the northside mainline gate. All roads are in good condition.

The primary species for this sale are:

Douglas-fir (50%) with an average diameter of 18 inches.

Western Hemlock (26%) with an average diameter of 14 inches.

Pacific Silver Fir (13%) with an average diameter of 14 inches.

Noble Fir (8%) with an average diameter of 19 inches.

The DF in the higher elevation units (5 thru 7) is rough with many broken/forked tops and spike knots. The lower units (1 thru 4) contain more HQ DF with less overall defect, but root rot pockets, especially in unit 1, affect stocking levels and log quality. Pole-quality DF present in the lower units, but were not cruised as such due to the steepness of the units. The WH, SF, and NF are a mixed bag. Some portions of each unit contain clean boles while others show a lot of frost check.

Most commonly observed defect was broken/forked tops, spike knots, frost check in the white wood.

### Timber Sale Notice Volume (MBF)

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
DF	18.2	7.7		3,165	1,515	1,335	288	26
WH	14.4			1,651	298	992	332	30
SF	14.8			790	273	394	113	10
NF	19.0			517	302	179	35	
RC	18.3			92		78	13	
RA	14.4			29		6	20	3
MA	18.0			5		5		
BC	30.0			3	3			
ALL	16.1	7.7		6,251	2,391	2,989	802	68

### Timber Sale Notice Weight (tons)

Sp	Tons by Grade				
	All	2 Saw	3 Saw	4 Saw	Utility
DF	24,025	10,289	10,840	2,733	163
WH	15,920	2,710	9,523	3,472	216
SF	6,851	2,132	3,534	1,105	80
NF	4,324	2,202	1,751	371	
RC	941		821	120	
RA	260		60	178	22
MA	37		37		
BC	19	19			
ALL	52,377	17,351	26,565	7,979	482

### Timber Sale Overall Cruise Statistics

BA (sq ft/acre)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR SE (%)	Net Vol (bf/acre)	Vol SE (%)
287.0	2.9	135.2	1.8	38,021	3.6

### Timber Sale Unit Cruise Design

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
SYLVAN PEARL U1	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	24.3	26.3	16	8	0
SYLVAN PEARL U2	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	1.3	1.3	2	2	0
SYLVAN PEARL U3	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	4.2	4.3	4	2	0
SYLVAN PEARL U4	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	1.5	1.5	2	2	0
SYLVAN PEARL U5	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	23.0	28.5	17	11	0
SYLVAN PEARL U6	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	62.4	68.9	43	23	0
SYLVAN PEARL U7	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	47.1	47.1	31	15	0
SYLVAN PEARL U8 ROW	B1: VR, 1 BAF (40) Measure All, Sighting Ht = 4.5 ft	0.6	0.6	1	1	0
All		164.4	178.4	116	64	0

**Timber Sale Log Grade x Sort Summary**

Sp	Status	Grade	Sort	Dia	Len	BF Gross	BF Net	Defect %	Tons	MBF Net
BC	LIVE	2 SAW	Domestic	19.7	40	18	18	0.0	18.9	2.9
DF	LIVE	2 SAW	Domestic	14.7	38	6,723	6,575	2.2	7,267.9	1,080.9
DF	LIVE	2 SAW	HQ-B	14.6	39	2,797	2,642	5.5	3,020.8	434.4
DF	LIVE	3 SAW	Domestic	9.5	37	7,039	6,873	2.4	9,348.7	1,129.9
DF	LIVE	3 SAW	HQ-B	10.1	38	1,257	1,250	0.5	1,491.3	205.6
DF	LIVE	4 SAW	Domestic	5.7	29	1,842	1,754	4.8	2,733.3	288.4
DF	LIVE	CULL	Cull	11.1	5	85	0	100.0	0.0	0.0
DF	LIVE	UTILITY	Pulp	8.5	13	155	155	0.0	163.5	25.5
MA	LIVE	3 SAW	Domestic	13.3	20	34	31	9.9	37.2	5.1
NF	LIVE	2 SAW	Domestic	14.8	40	2,005	1,838	8.4	2,201.7	302.1
NF	LIVE	3 SAW	Domestic	9.1	40	1,224	1,091	10.9	1,751.0	179.3
NF	LIVE	4 SAW	Domestic	5.6	30	229	214	6.4	370.9	35.2
RA	LIVE	3 SAW	Domestic	10.8	36	35	35	0.0	59.6	5.7
RA	LIVE	4 SAW	Domestic	8.3	29	124	121	2.5	177.9	19.8
RA	LIVE	UTILITY	Pulp	11.0	12	20	20	0.0	22.4	3.3
RC	LIVE	3 SAW	Domestic	10.1	32	507	477	5.9	820.8	78.4
RC	LIVE	4 SAW	Domestic	5.8	26	90	81	9.8	119.7	13.4
RC	LIVE	CULL	Cull	10.4	6	5	0	100.0	0.0	0.0
SF	LIVE	2 SAW	Domestic	13.4	37	1,778	1,663	6.5	2,132.0	273.4
SF	LIVE	3 SAW	Domestic	9.2	40	2,549	2,394	6.1	3,534.1	393.6
SF	LIVE	4 SAW	Domestic	5.3	27	707	688	2.8	1,105.4	113.0
SF	LIVE	UTILITY	Pulp	6.5	30	59	59	0.0	79.7	9.7
WH	LIVE	2 SAW	Domestic	13.1	40	1,925	1,811	5.9	2,709.8	297.7
WH	LIVE	3 SAW	Domestic	9.0	39	6,254	6,032	3.5	9,522.5	991.7
WH	LIVE	4 SAW	Domestic	5.5	30	2,067	2,018	2.4	3,472.0	331.8
WH	LIVE	CULL	Cull	9.1	2	5	0	100.0	0.0	0.0
WH	LIVE	UTILITY	Pulp	7.3	15	181	181	0.0	216.2	29.7

**Timber Sale Log Sort x Diameter Bin Summary**

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
BC	16 - 19	LIVE	Domestic	19.7	40	18	0.0	18.9	2.9
DF	5 - 7	LIVE	Cull	5.2	19	0	100.0	0.0	0.0
DF	5 - 7	LIVE	Pulp	5.3	14	45	0.0	50.7	7.5
DF	5 - 7	LIVE	Domestic	5.9	31	2,803	2.6	4,319.5	460.9
DF	8 - 11	LIVE	Pulp	8.0	14	9	0.0	14.0	1.4
DF	8 - 11	LIVE	Domestic	9.9	37	5,580	3.0	7,482.3	917.3

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
DF	8 - 11	LIVE	HQ-B	10.1	39	1,250	0.5	1,491.3	205.6
DF	8 - 11	LIVE	Cull	10.7	3	0	100.0	0.0	0.0
DF	12 - 15	LIVE	Pulp	12.3	12	58	0.0	55.5	9.6
DF	12 - 15	LIVE	Cull	13.0	5	0	100.0	0.0	0.0
DF	12 - 15	LIVE	Domestic	13.6	36	3,640	1.3	4,264.5	598.4
DF	12 - 15	LIVE	HQ-B	13.7	39	1,848	4.4	2,148.0	303.7
DF	16 - 19	LIVE	Pulp	16.9	14	43	0.0	43.2	7.1
DF	16 - 19	LIVE	Domestic	17.0	39	2,544	4.1	2,692.1	418.2
DF	16 - 19	LIVE	HQ-B	17.4	40	795	8.1	872.7	130.7
DF	20+	LIVE	Domestic	21.8	40	635	0.0	591.4	104.4
MA	12 - 15	LIVE	Domestic	13.3	20	31	9.9	37.2	5.1
NF	5 - 7	LIVE	Domestic	5.9	32	382	5.2	660.4	62.8
NF	8 - 11	LIVE	Domestic	9.9	40	923	12.1	1,461.5	151.7
NF	12 - 15	LIVE	Domestic	13.8	40	1,140	8.4	1,402.5	187.5
NF	16 - 19	LIVE	Domestic	17.3	40	697	8.3	799.2	114.6
RA	5 - 7	LIVE	Domestic	5.0	21	12	0.0	14.8	2.0
RA	8 - 11	LIVE	Domestic	9.2	31	143	2.1	222.7	23.6
RA	8 - 11	LIVE	Pulp	11.0	12	20	0.0	22.4	3.3
RC	5 - 7	LIVE	Domestic	6.1	28	132	6.3	241.0	21.6
RC	8 - 11	LIVE	Domestic	10.3	31	345	3.8	557.6	56.8
RC	8 - 11	LIVE	Cull	10.4	6	0	100.0	0.0	0.0
RC	12 - 15	LIVE	Domestic	13.6	29	81	16.9	142.0	13.4
SF	5 - 7	LIVE	Pulp	5.0	19	11	0.0	12.9	1.8
SF	5 - 7	LIVE	Domestic	5.6	30	1,051	6.1	1,790.2	172.8
SF	8 - 11	LIVE	Pulp	8.0	40	48	0.0	66.8	7.9
SF	8 - 11	LIVE	Domestic	10.2	40	2,031	5.0	2,849.3	333.8
SF	12 - 15	LIVE	Domestic	13.3	37	1,510	7.1	1,982.1	248.2
SF	16 - 19	LIVE	Domestic	17.2	40	153	0.0	149.9	25.1
WH	5 - 7	LIVE	Pulp	5.0	15	41	0.0	40.8	6.8
WH	5 - 7	LIVE	Domestic	5.7	33	2,941	2.0	5,005.8	483.4
WH	8 - 11	LIVE	Cull	9.1	2	0	100.0	0.0	0.0
WH	8 - 11	LIVE	Pulp	9.7	15	139	0.0	175.4	22.9
WH	8 - 11	LIVE	Domestic	9.8	38	5,110	4.0	7,988.7	840.1
WH	12 - 15	LIVE	Domestic	13.1	40	1,698	4.3	2,514.7	279.1
WH	16 - 19	LIVE	Domestic	16.0	40	114	25.0	195.1	18.7

## Cruise Unit Report SYLVAN PEARL U1

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U1

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
DF	21.4			826	595	199	32
WH	10.4			51		24	26
NF	16.0			25		21	4
RA	13.0			10			10
MA	18.0			5		5	
ALL	16.6			916	595	249	72

### Unit Cruise Design: SYLVAN PEARL U1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	24.3	26.3	16	8	0

### Unit Cruise Summary: SYLVAN PEARL U1

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	24	49	3.1	0
WH	6	6	0.4	0
NF	1	3	0.2	0
RA	1	1	0.1	0
MA	1	1	0.1	0
ALL	33	60	3.8	0

### Unit Cruise Statistics: SYLVAN PEARL U1

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	166.7	59.0	14.7	203.8	26.8	5.5	33,973	64.8	15.7
WH	20.4	191.7	47.9	102.2	19.2	7.9	2,087	192.6	48.6
NF	10.2	400.0	100.0	100.3	0.0	0.0	1,023	400.0	100.0
RA	3.4	400.0	100.0	119.3	0.0	0.0	406	400.0	100.0
MA	3.4	400.0	100.0	61.7	0.0	0.0	210	400.0	100.0
ALL	204.2	54.7	13.7	184.7	36.3	6.3	37,700	65.6	15.1

**Unit Summary: SYLVAN PEARL U1**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	24	ALL	21.4	102	130	35,410	33,973	4.1	66.8	166.7	36.0	825.5
MA	LIVE	CUT	1	ALL	18.0	72	87	233	210	9.9	1.9	3.4	0.8	5.1
NF	LIVE	CUT	1	ALL	16.0	64	80	1,023	1,023	0.0	7.3	10.2	2.6	24.9
RA	LIVE	CUT	1	ALL	13.0	63	82	406	406	0.0	3.7	3.4	0.9	9.9
WH	LIVE	CUT	6	ALL	10.4	55	68	2,087	2,087	0.0	34.6	20.4	6.3	50.7
ALL	LIVE	CUT	33	ALL	18.1	84	106	39,160	37,700	3.7	114.3	204.2	46.7	916.1
ALL	ALL	ALL	33	ALL	18.1	84	106	39,160	37,700	3.7	114.3	204.2	46.7	916.1

DRAFT

## Cruise Unit Report SYLVAN PEARL U2

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U2

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
DF	16.8			55	24	26	5	0
WH	9.0			3			3	
ALL	15.3			58	24	26	8	0

### Unit Cruise Design: SYLVAN PEARL U2

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	1.3	1.3	2	2	0

### Unit Cruise Summary: SYLVAN PEARL U2

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	11	11	5.5	0
WH	1	1	0.5	0
ALL	12	12	6.0	0

### Unit Cruise Statistics: SYLVAN PEARL U2

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	299.4	64.3	45.5	142.5	18.8	5.7	42,653	67.0	45.8
WH	27.2	141.4	100.0	83.8	0.0	0.0	2,280	141.4	100.0
ALL	326.6	47.1	33.3	137.6	22.3	6.4	44,932	52.2	33.9

### Unit Summary: SYLVAN PEARL U2

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net	
DF	LIVE	CUT	11	ALL	16.8	85	103	43,163	42,653	1.2	194.5	299.4	73.1	55.4	
WH	LIVE	CUT	1	ALL	9.0	50	61	2,280	2,280	0.0	61.6	27.2	9.1	3.0	
ALL	LIVE	CUT	12	ALL	15.3	77	93	45,443	44,932	1.1	256.1	326.6	82.1	58.4	
ALL	ALL	ALL	12	ALL	15.3	77	93	45,443	44,932	1.1	256.1	326.6	82.1	58.4	

## Cruise Unit Report SYLVAN PEARL U3

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U3

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
DF	14.9			141	42	77	22
ALL	14.9			141	42	77	22

### Unit Cruise Design: SYLVAN PEARL U3

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	4.2	4.3	4	2	0

### Unit Cruise Summary: SYLVAN PEARL U3

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	10	17	4.3	0
ALL	10	17	4.3	0

### Unit Cruise Statistics: SYLVAN PEARL U3

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	231.4	52.2	26.1	144.7	30.7	9.7	33,468	60.5	27.8
ALL	231.4	52.2	26.1	144.7	30.7	9.7	33,468	60.5	27.8

### Unit Summary: SYLVAN PEARL U3

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	10	ALL	14.9	76	96	33,468	33,468	0.0	191.1	231.4	59.9	140.6
ALL	LIVE	CUT	10	ALL	14.9	76	96	33,468	33,468	0.0	191.1	231.4	59.9	140.6
ALL	ALL	ALL	10	ALL	14.9	76	96	33,468	33,468	0.0	191.1	231.4	59.9	140.6

## Cruise Unit Report SYLVAN PEARL U4

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U4

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
DF	16.3			69	30	35	5
NF	16.0			4		4	0
ALL	16.3			73	30	38	5

### Unit Cruise Design: SYLVAN PEARL U4

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	1.5	1.4	2	2	0

### Unit Cruise Summary: SYLVAN PEARL U4

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	10	10	5.0	0
NF	1	1	0.5	0
ALL	11	11	5.5	0

### Unit Cruise Statistics: SYLVAN PEARL U4

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	272.2	0.0	0.0	169.3	27.6	8.7	46,082	27.6	8.7
NF	27.2	141.4	100.0	96.7	0.0	0.0	2,632	141.4	100.0
ALL	299.4	12.9	9.1	162.7	30.4	9.2	48,714	33.0	12.9

### Unit Summary: SYLVAN PEARL U4

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA		BA	RD	MBF Net
											TPA	BA	RD	MBF Net	
DF	LIVE	CUT	10	ALL	16.3	98	109	46,965	46,082	1.9	187.8	272.2	67.4	69.1	
NF	LIVE	CUT	1	ALL	16.0	127	127	5,244	2,632	49.8	19.5	27.2	6.8	3.9	
ALL	LIVE	CUT	11	ALL	16.3	100	110	52,209	48,714	6.7	207.3	299.4	74.2	73.1	
ALL	ALL	ALL	11	ALL	16.3	100	110	52,209	48,714	6.7	207.3	299.4	74.2	73.1	

## Cruise Unit Report SYLVAN PEARL U5

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U5

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
DF	18.6			678	391	244	37	6
WH	13.6			130	56	32	34	9
SF	17.8			59	33	23	3	
RC	18.4			45		40	6	
RA	18.0			6		6		
ALL	17.6			918	480	345	79	14

### Unit Cruise Design: SYLVAN PEARL U5

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	23.0	28.5	17	11	0

### Unit Cruise Summary: SYLVAN PEARL U5

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	35	57	3.4	0
WH	7	16	0.9	0
SF	3	6	0.4	0
RC	8	9	0.5	0
RA	1	1	0.1	0
ALL	54	89	5.2	0

### Unit Cruise Statistics: SYLVAN PEARL U5

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	182.5	52.7	12.8	161.5	26.0	4.4	29,474	58.7	13.5
WH	51.2	115.6	28.0	110.3	21.8	8.3	5,652	117.6	29.2
SF	19.2	198.9	48.2	133.7	10.7	6.2	2,568	199.2	48.6
RC	28.8	135.5	32.9	68.5	24.5	8.7	1,973	137.7	34.0
RA	3.2	412.3	100.0	77.5	0.0	0.0	248	412.3	100.0
ALL	285.0	36.7	8.9	140.1	35.7	4.9	39,916	51.2	10.1

**Unit Summary: SYLVAN PEARL U5**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	35	ALL	18.6	92	112	30,062	29,474	2.0	96.7	182.5	42.3	677.9
RA	LIVE	CUT	1	ALL	18.0	75	93	248	248	0.0	1.8	3.2	0.8	5.7
RC	LIVE	CUT	8	ALL	18.4	69	77	2,110	1,973	6.5	15.6	28.8	6.7	45.4
SF	LIVE	CUT	3	ALL	17.8	83	97	2,568	2,568	0.0	11.1	19.2	4.6	59.1
WH	LIVE	CUT	7	ALL	13.6	64	77	5,789	5,652	2.4	50.8	51.2	13.9	130.0
ALL	LIVE	CUT	54	ALL	17.2	81	98	40,778	39,916	2.1	176.0	285.0	68.2	918.1
ALL	ALL	ALL	54	ALL	17.2	81	98	40,778	39,916	2.1	176.0	285.0	68.2	918.1

DRAFT

## Cruise Unit Report SYLVAN PEARL U6

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U6

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
DF	17.4	7.7		827	285	433	102	7
SF	14.6			721	241	371	110	
WH	15.8			429	142	206	70	12
NF	19.2			425	266	135	24	
RC	17.0			15		14	1	
RA	14.0			12			9	3
ALL	16.5	7.7		2,430	933	1,159	315	22

### Unit Cruise Design: SYLVAN PEARL U6

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	62.4	68.9	43	23	0

### Unit Cruise Summary: SYLVAN PEARL U6

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	48	81	1.9	3
SF	36	78	1.8	0
WH	19	47	1.1	0
NF	29	39	0.9	0
RC	3	3	0.1	0
RA	2	2	0.0	0
ALL	137	250	5.8	3

### Unit Cruise Statistics: SYLVAN PEARL U6

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	102.5	94.3	14.4	129.3	21.9	3.2	13,261	96.8	14.7
SF	98.8	109.8	16.7	117.0	31.1	5.2	11,553	114.1	17.5
WH	59.5	130.6	19.9	115.6	21.2	4.9	6,880	132.3	20.5
NF	49.4	182.9	27.9	137.8	26.0	4.8	6,803	184.8	28.3
RC	3.8	369.5	56.3	64.4	22.4	13.0	245	370.2	57.8

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
RA	2.5	458.1	69.9	77.2	2.6	1.8	195	458.1	69.9
ALL	316.5	25.0	3.8	123.0	27.5	2.4	38,937	37.2	4.5

**Unit Summary: SYLVAN PEARL U6**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	48	ALL	17.4	81	98	13,823	13,261	4.1	62.1	102.5	24.6	827.5
NF	LIVE	CUT	29	ALL	19.2	83	102	7,498	6,803	9.3	24.6	49.4	11.3	424.5
RA	LIVE	CUT	2	ALL	14.0	69	85	204	195	4.1	2.4	2.5	0.7	12.2
RC	LIVE	CUT	3	ALL	17.0	69	73	245	245	0.0	2.4	3.8	0.9	15.3
SF	LIVE	CUT	36	ALL	14.6	66	77	12,318	11,553	6.2	84.9	98.8	25.8	720.9
WH	LIVE	CUT	19	ALL	15.8	76	87	7,410	6,880	7.1	43.7	59.5	15.0	429.3
ALL	LIVE	CUT	137	ALL	16.2	74	88	41,497	38,937	6.2	220.1	316.5	78.3	2,429.7
ALL	ALL	ALL	137	ALL	16.2	74	88	41,497	38,937	6.2	220.1	316.5	78.3	2,429.7

## Cruise Unit Report SYLVAN PEARL U7

### Unit Sale Notice Volume (MBF): SYLVAN PEARL U7

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
WH	14.1			1,032	98	727	198	9
DF	15.3			569	149	320	87	13
NF	19.1			63	36	20	7	
RC	18.9			31		24	7	
SF	13.0			10				10
ALL	14.7			1,704	283	1,091	299	31

### Unit Cruise Design: SYLVAN PEARL U7

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	47.1	47.1	31	15	0

### Unit Cruise Summary: SYLVAN PEARL U7

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	57	105	3.4	0
DF	22	53	1.7	0
NF	4	5	0.2	0
RC	5	5	0.2	0
SF	1	1	0.0	0
ALL	89	169	5.5	0

### Unit Cruise Statistics: SYLVAN PEARL U7

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
WH	184.4	48.6	8.7	118.8	17.2	2.3	21,901	51.6	9.0
DF	93.1	60.8	10.9	129.7	24.9	5.3	12,074	65.7	12.1
NF	8.8	324.0	58.2	153.1	20.1	10.0	1,344	324.6	59.1
RC	8.8	231.8	41.6	75.2	20.1	9.0	660	232.7	42.6
SF	1.8	556.8	100.0	117.2	0.0	0.0	206	556.8	100.0
ALL	296.8	26.7	4.8	121.9	22.4	2.4	36,185	34.9	5.4

**Unit Summary: SYLVAN PEARL U7**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	22	ALL	15.3	84	94	12,521	12,074	3.6	72.9	93.1	23.8	568.7
NF	LIVE	CUT	4	ALL	19.1	98	107	1,442	1,344	6.8	4.4	8.8	2.0	63.3
RC	LIVE	CUT	5	ALL	18.9	80	84	748	660	11.7	4.5	8.8	2.0	31.1
SF	LIVE	CUT	1	ALL	13.0	82	82	206	206	0.0	1.9	1.8	0.5	9.7
WH	LIVE	CUT	57	ALL	14.1	76	85	22,470	21,901	2.5	170.1	184.4	49.1	1,031.6
ALL	LIVE	CUT	89	ALL	14.6	79	88	37,387	36,185	3.2	253.8	296.8	77.4	1,704.3
ALL	ALL	ALL	89	ALL	14.6	79	88	37,387	36,185	3.2	253.8	296.8	77.4	1,704.3

DRAFT

**Cruise Unit Report  
SYLVAN PEARL U8 ROW**

**Unit Sale Notice Volume (MBF): SYLVAN PEARL U8 ROW**

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
WH	19.0			6	2	4	1
BC	30.0			3	3		
RA	14.0			1		1	
ALL	18.5			10	5	4	2

**Unit Cruise Design: SYLVAN PEARL U8 ROW**

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (40) Measure All, Sighting Ht = 4.5 ft	0.6	0.6	1	1	0

**Unit Cruise Summary: SYLVAN PEARL U8 ROW**

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	2	2	2.0	0
BC	1	1	1.0	0
RA	1	1	1.0	0
ALL	4	4	4.0	0

**Unit Cruise Statistics: SYLVAN PEARL U8 ROW**

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
WH	80.0	0.0	0.0	133.4	7.6	5.4	10,671	7.6	5.4
BC	40.0	0.0	0.0	122.3	0.0	0.0	4,890	0.0	0.0
RA	40.0	0.0	0.0	44.9	0.0	0.0	1,796	0.0	0.0
ALL	160.0	0.0	0.0	108.5	39.7	19.9	17,357	39.7	19.9

**Unit Summary: SYLVAN PEARL U8 ROW**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
BC	LIVE	CUT	1	ALL	30.0	110	138	4,890	4,890	0.0	8.1	40.0	7.3	2.9
RA	LIVE	CUT	1	ALL	14.0	69	85	1,796	1,796	0.0	37.4	40.0	10.7	1.1
WH	LIVE	CUT	2	ALL	19.0	83	105	12,128	10,671	12.0	40.6	80.0	18.4	6.4

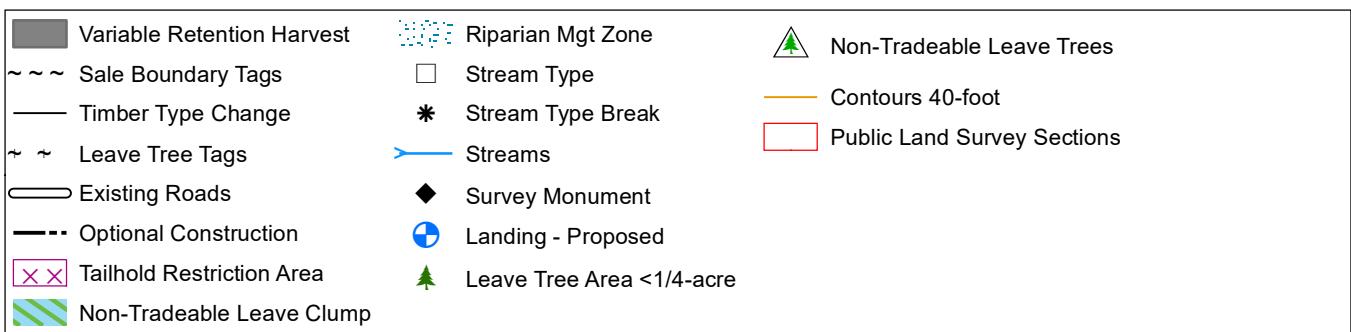
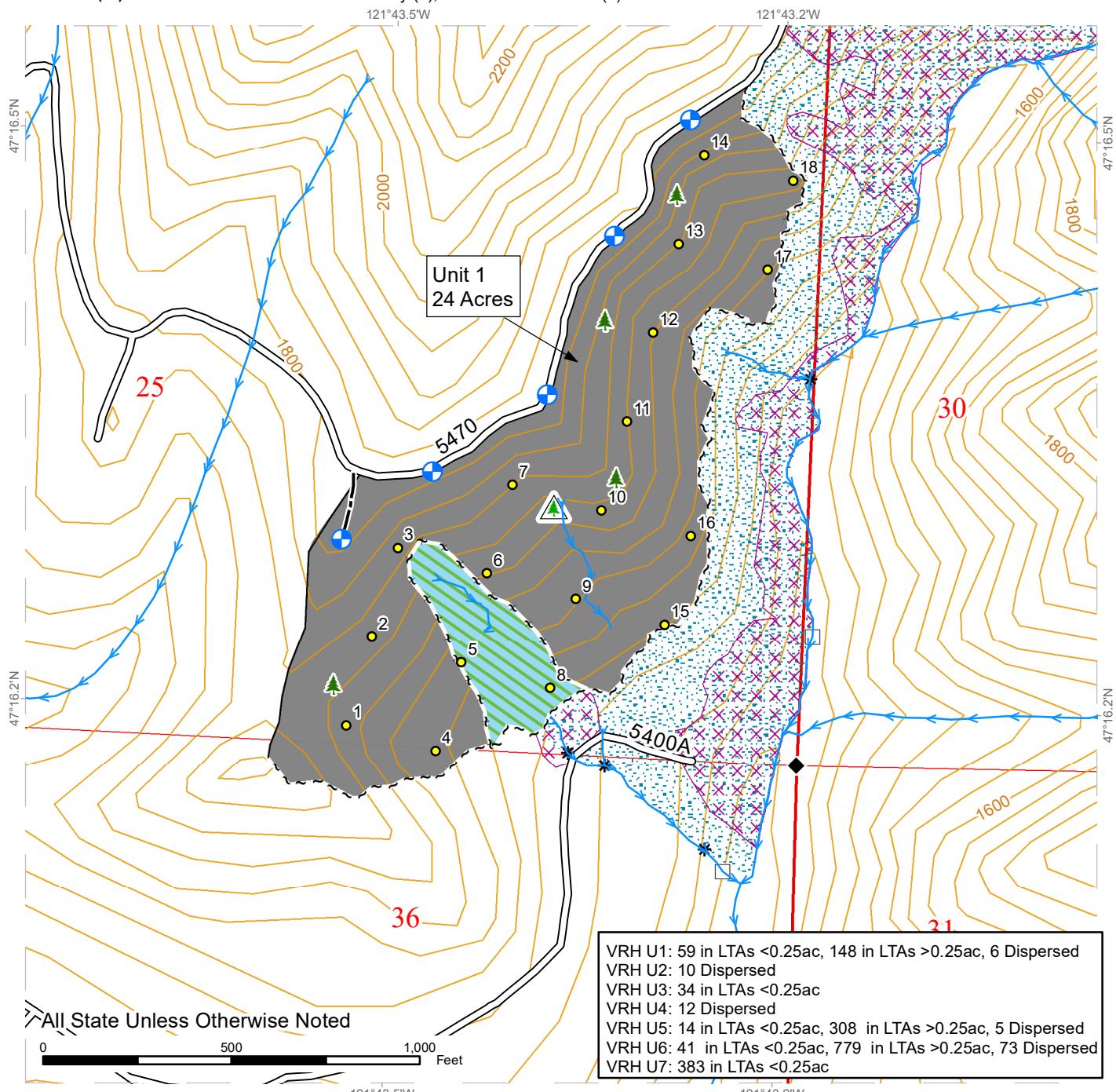
Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
ALL	LIVE	CUT	4	ALL	18.4	80	99	18,814	17,357	7.7	86.1	160.0	36.3	10.4
ALL	ALL	ALL	4	ALL	18.4	80	99	18,814	17,357	7.7	86.1	160.0	36.3	10.4

DRAFT

# CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

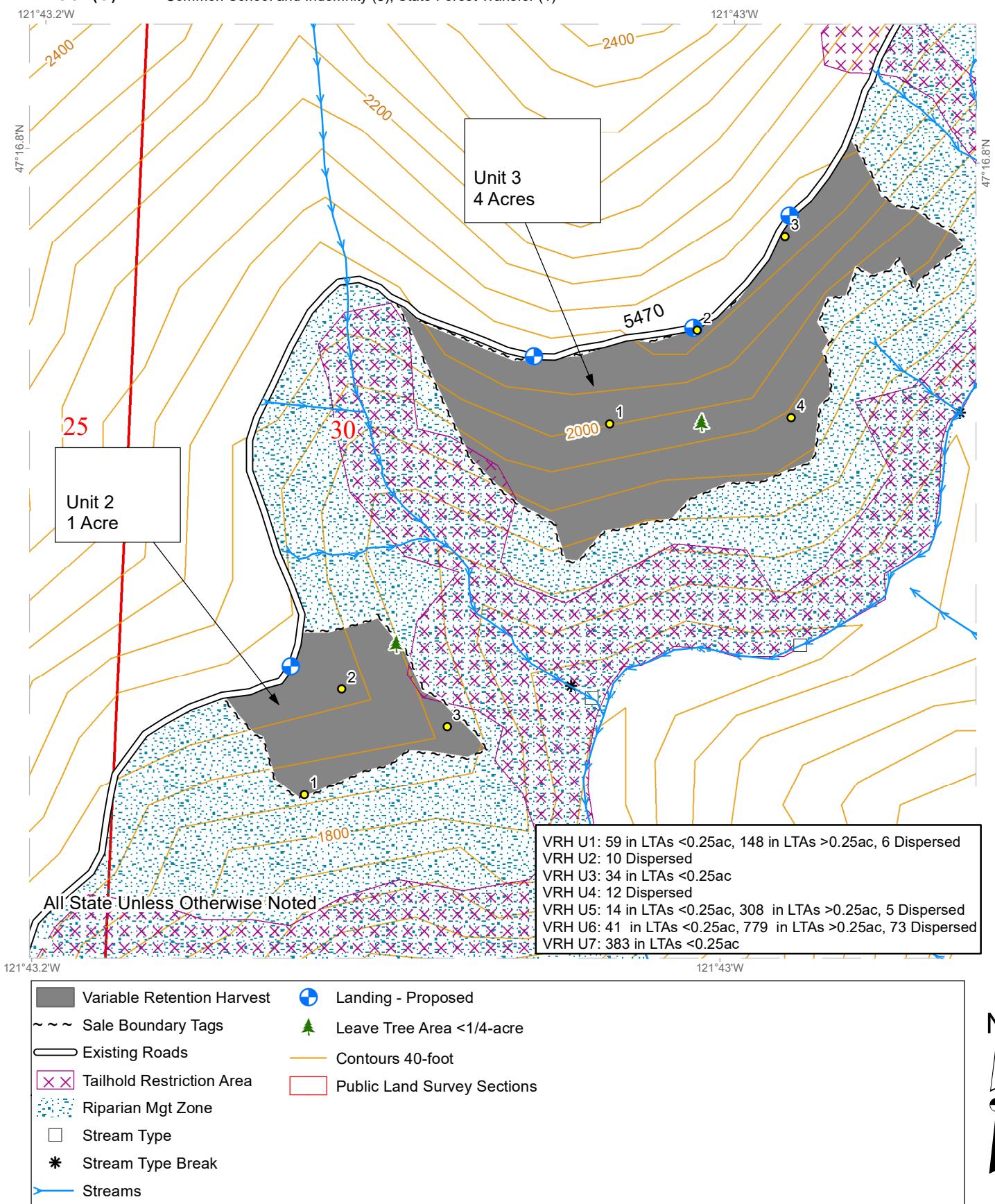
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



# CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

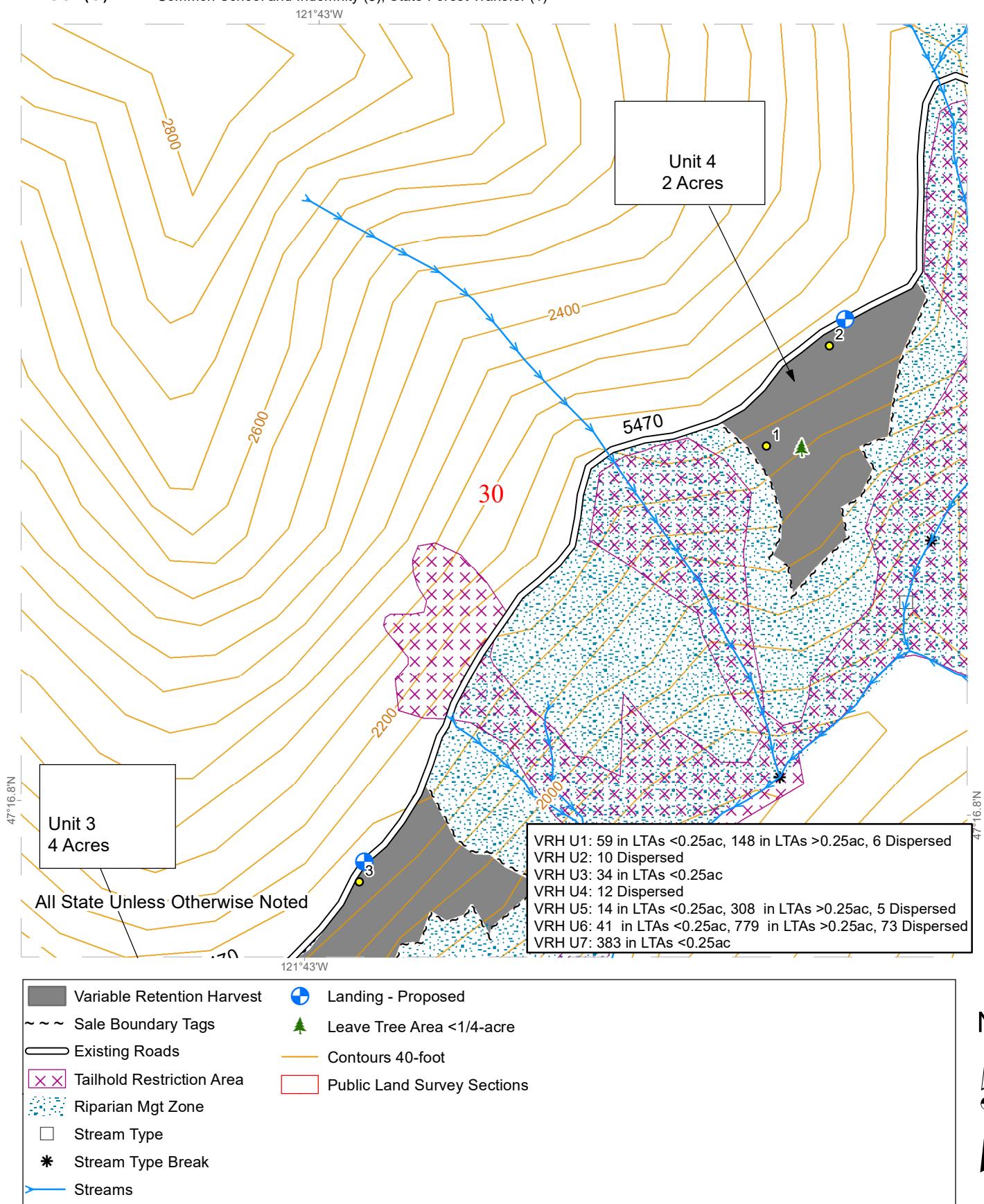
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



# CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

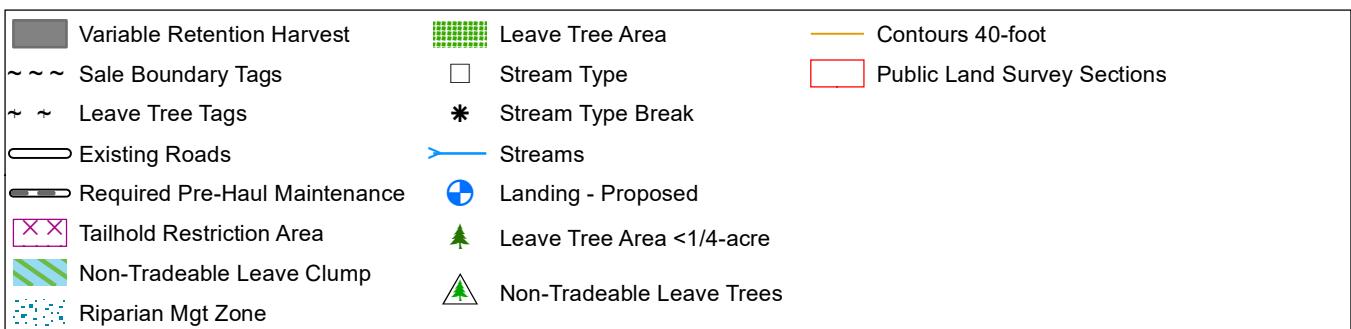
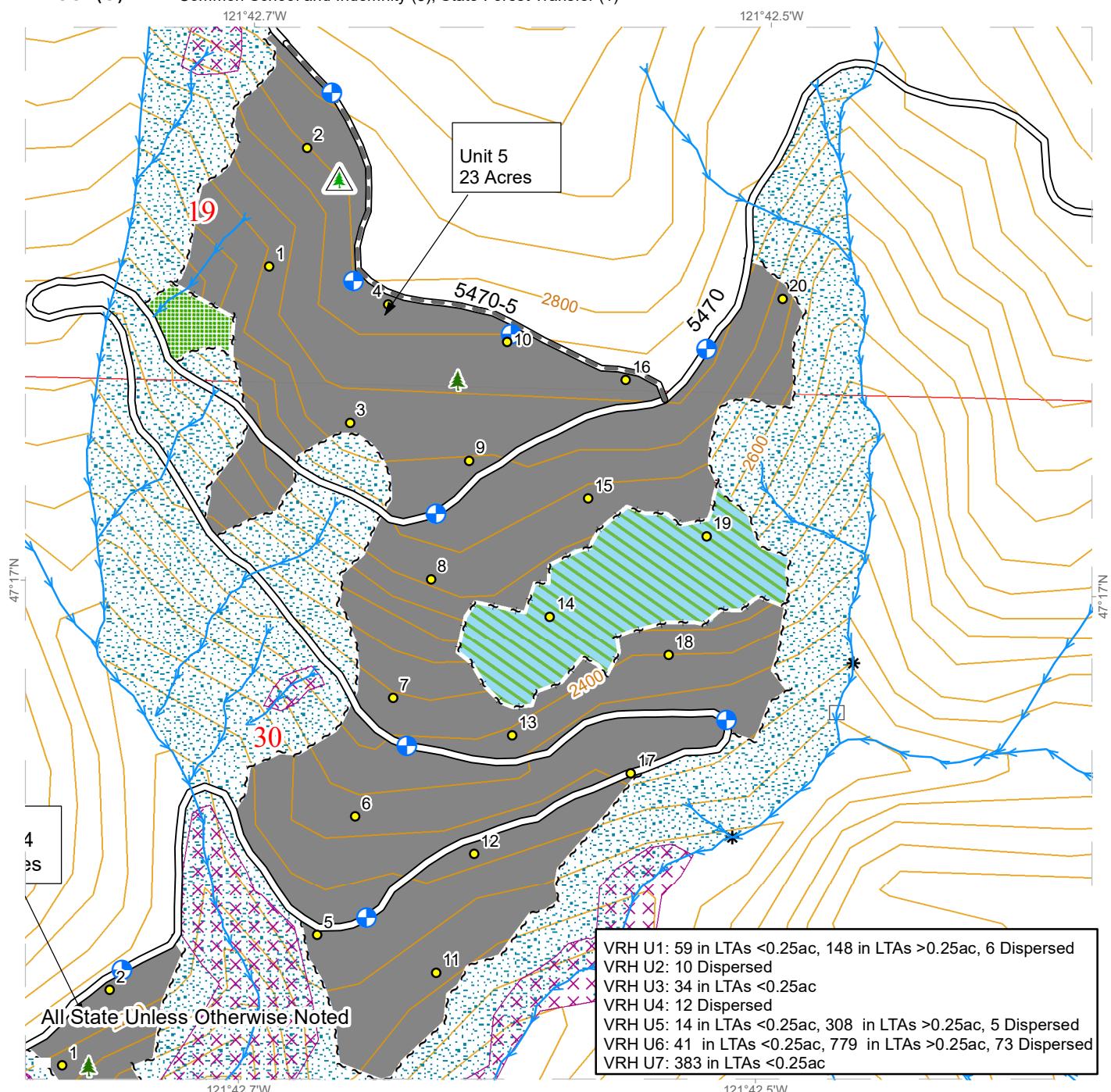
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



# CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

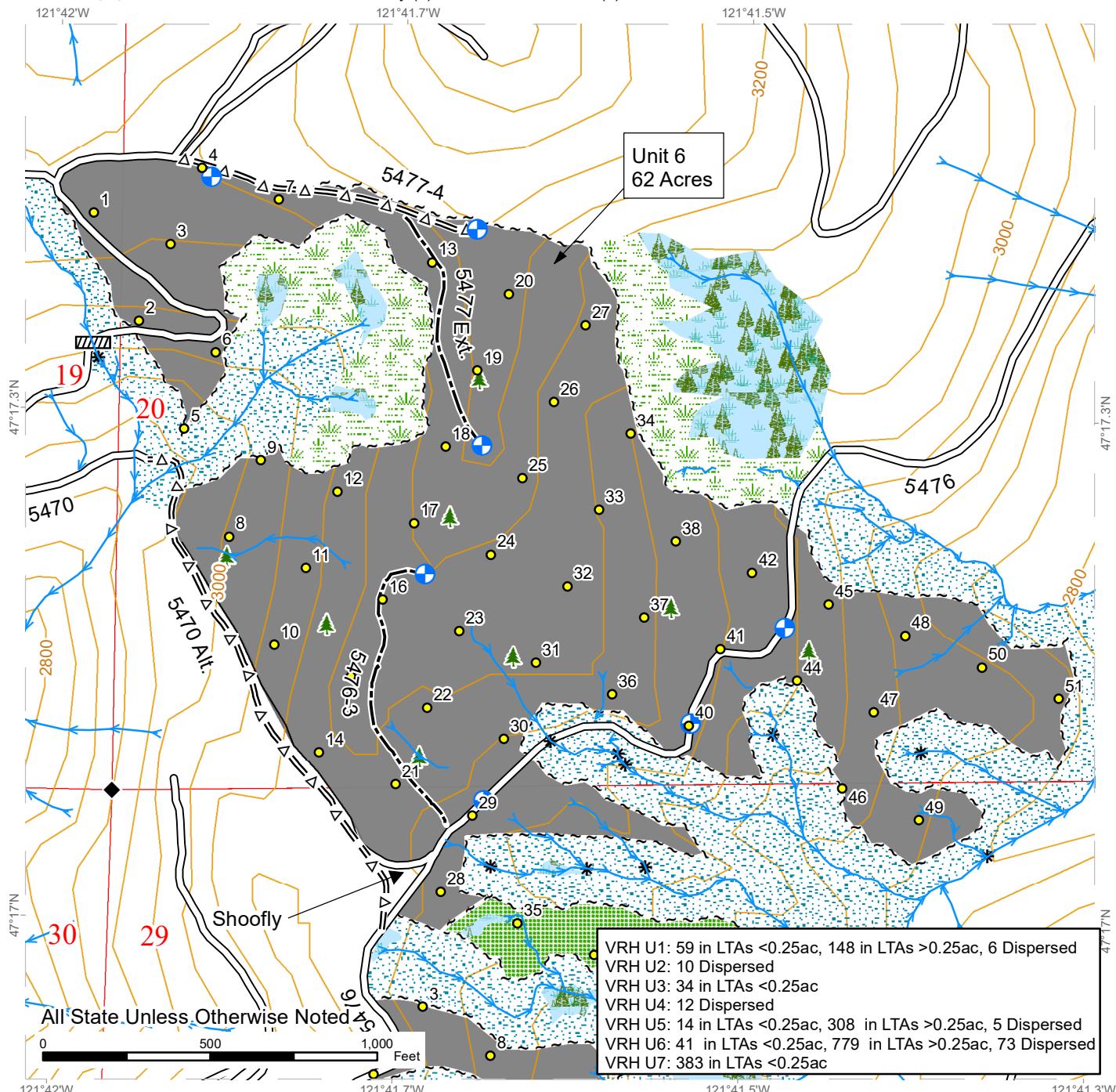
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



## CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

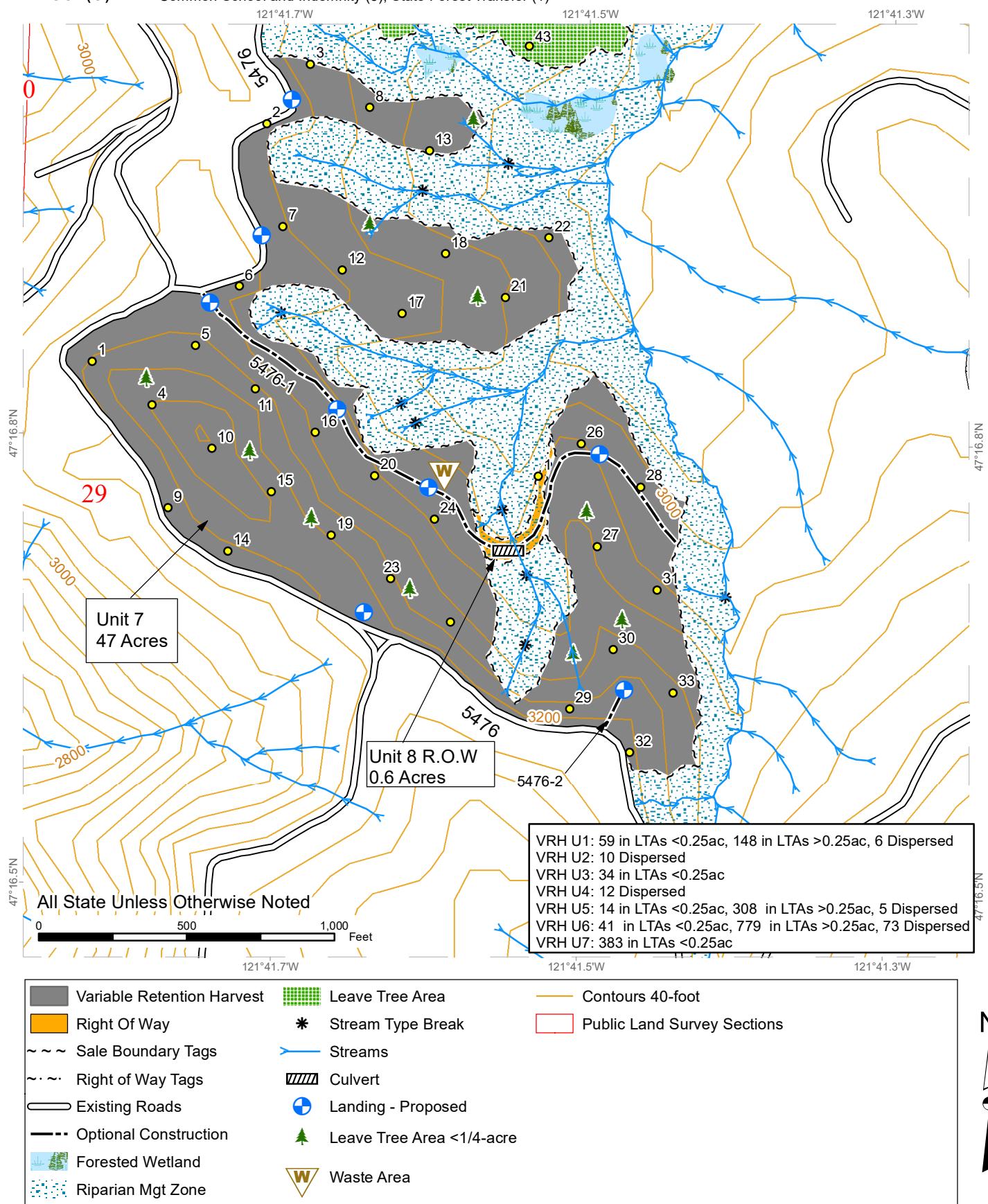
**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



## CRUISE MAP

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT#:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280

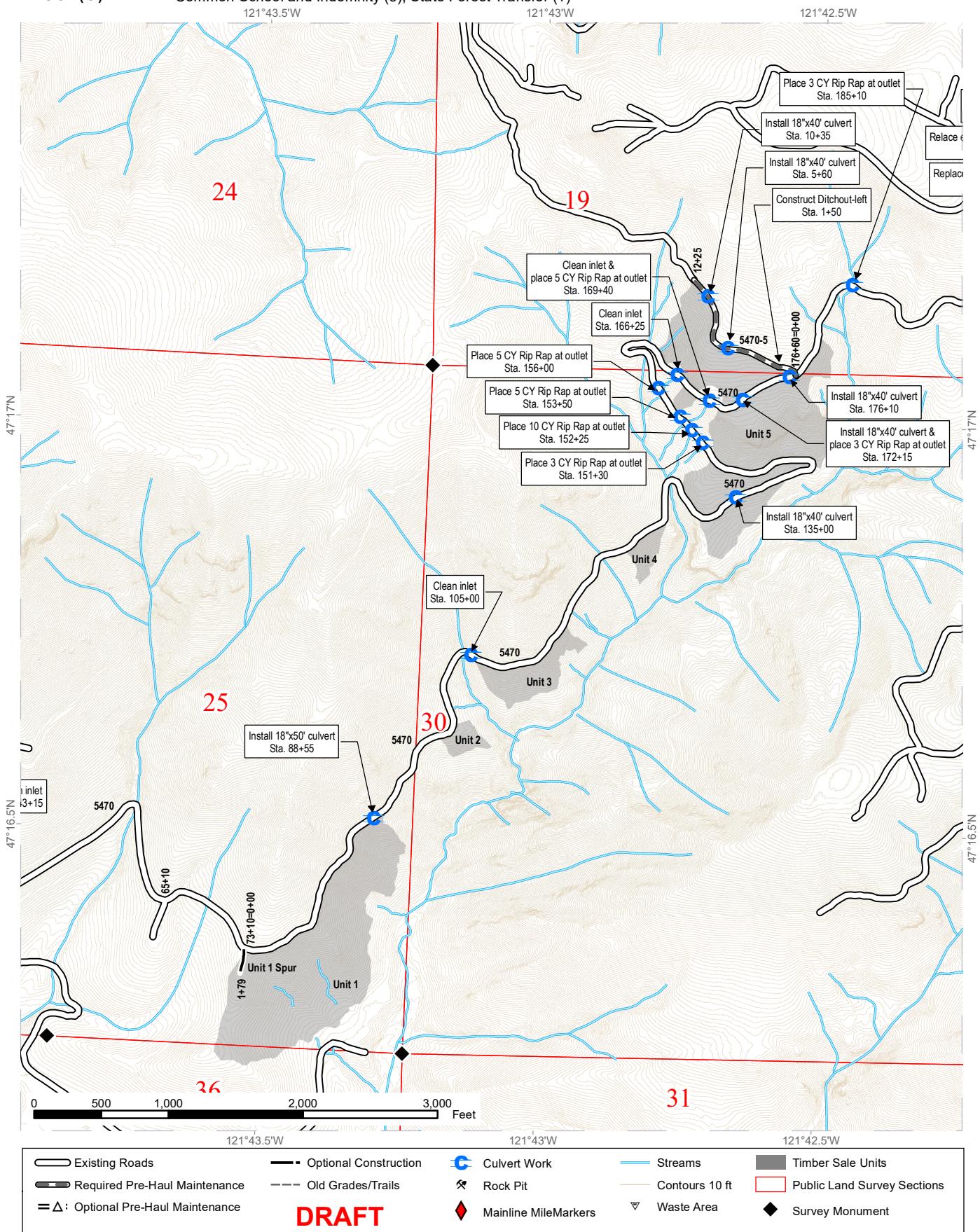


# ROAD WORK MAP 1 of 5

**DRAFT**

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



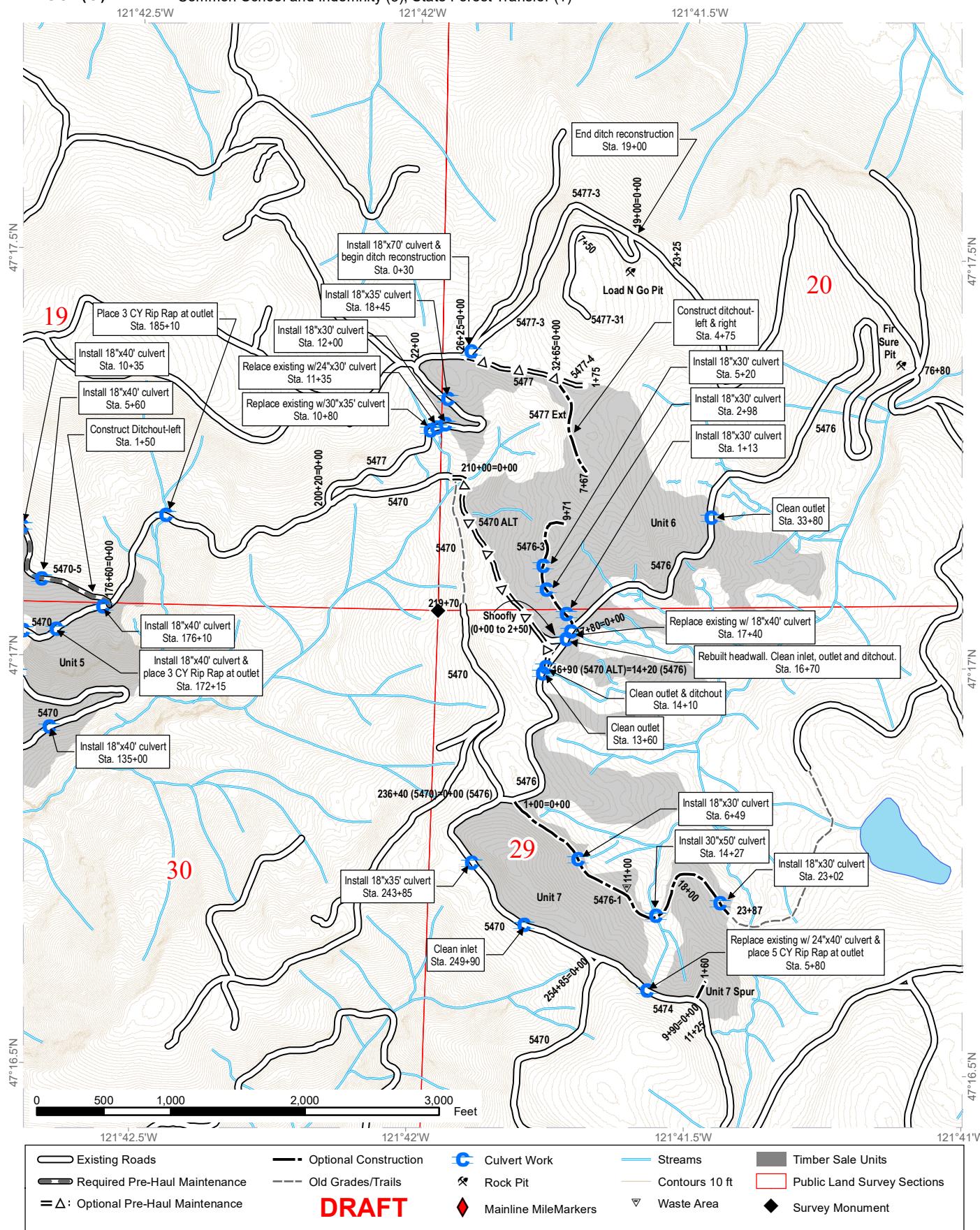
**DRAFT**

# ROAD WORK MAP 2 of 5

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280

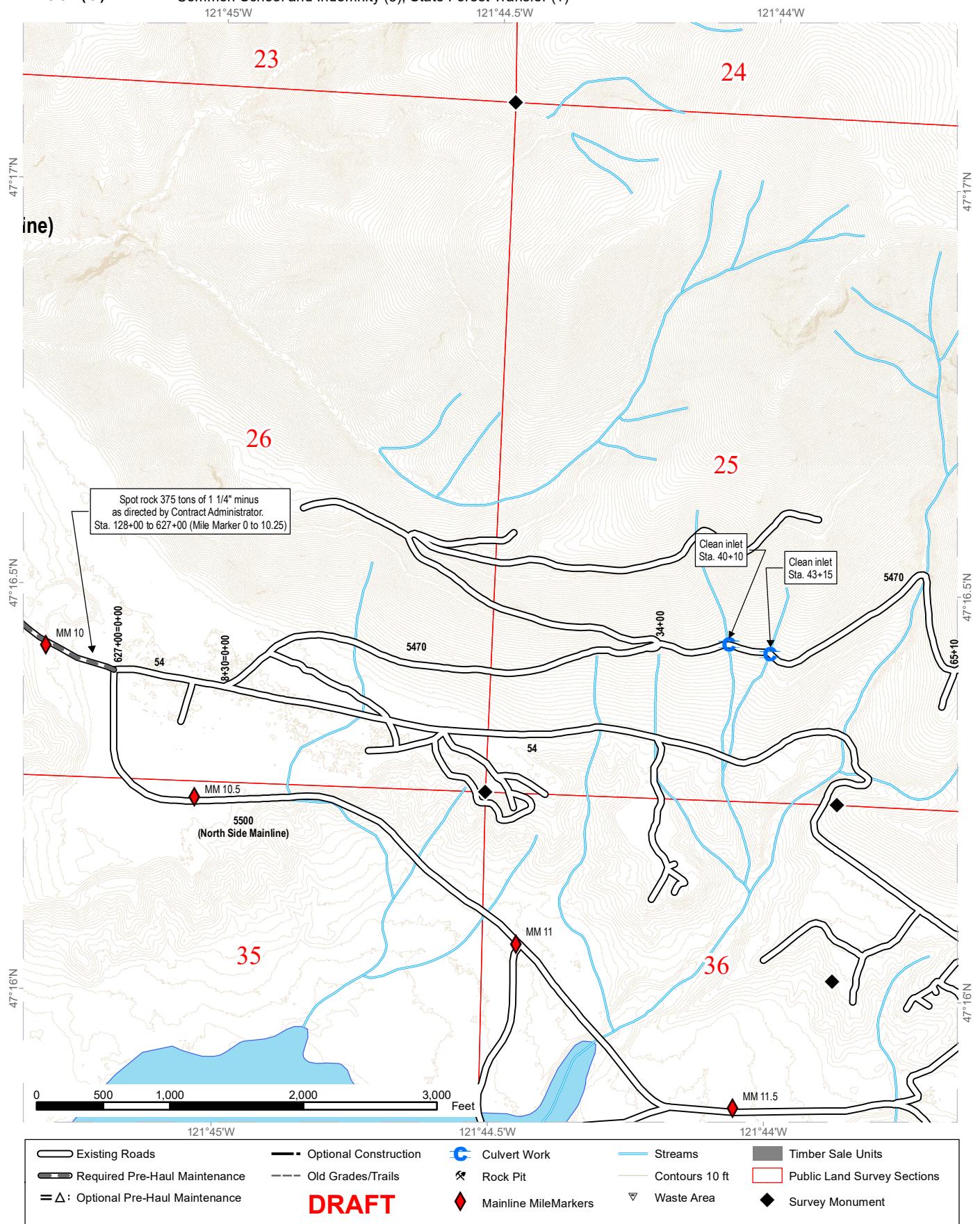


**ROAD WORK MAP 3 of 5**

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



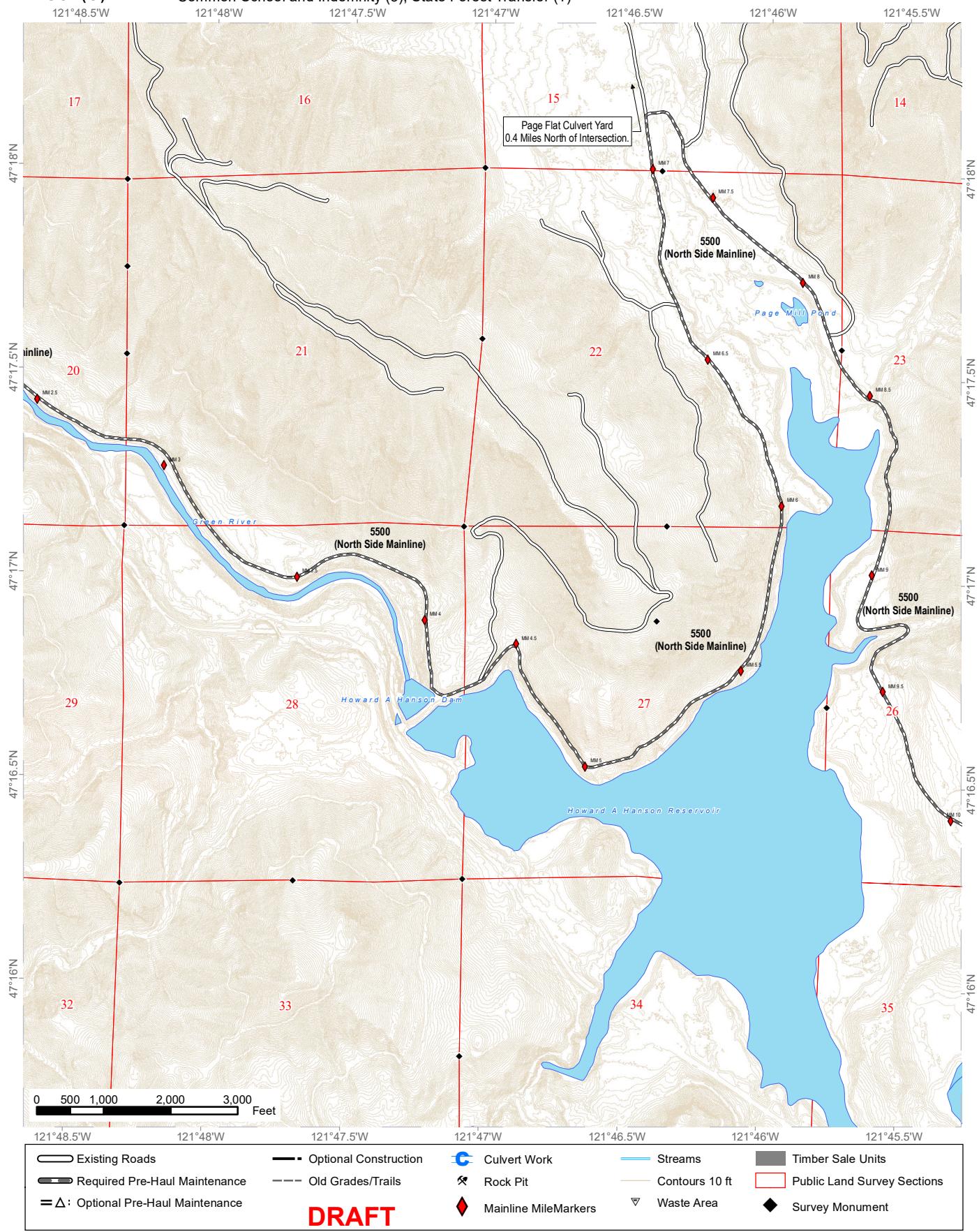
**DRAFT**

# ROAD WORK MAP 4 of 5

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280

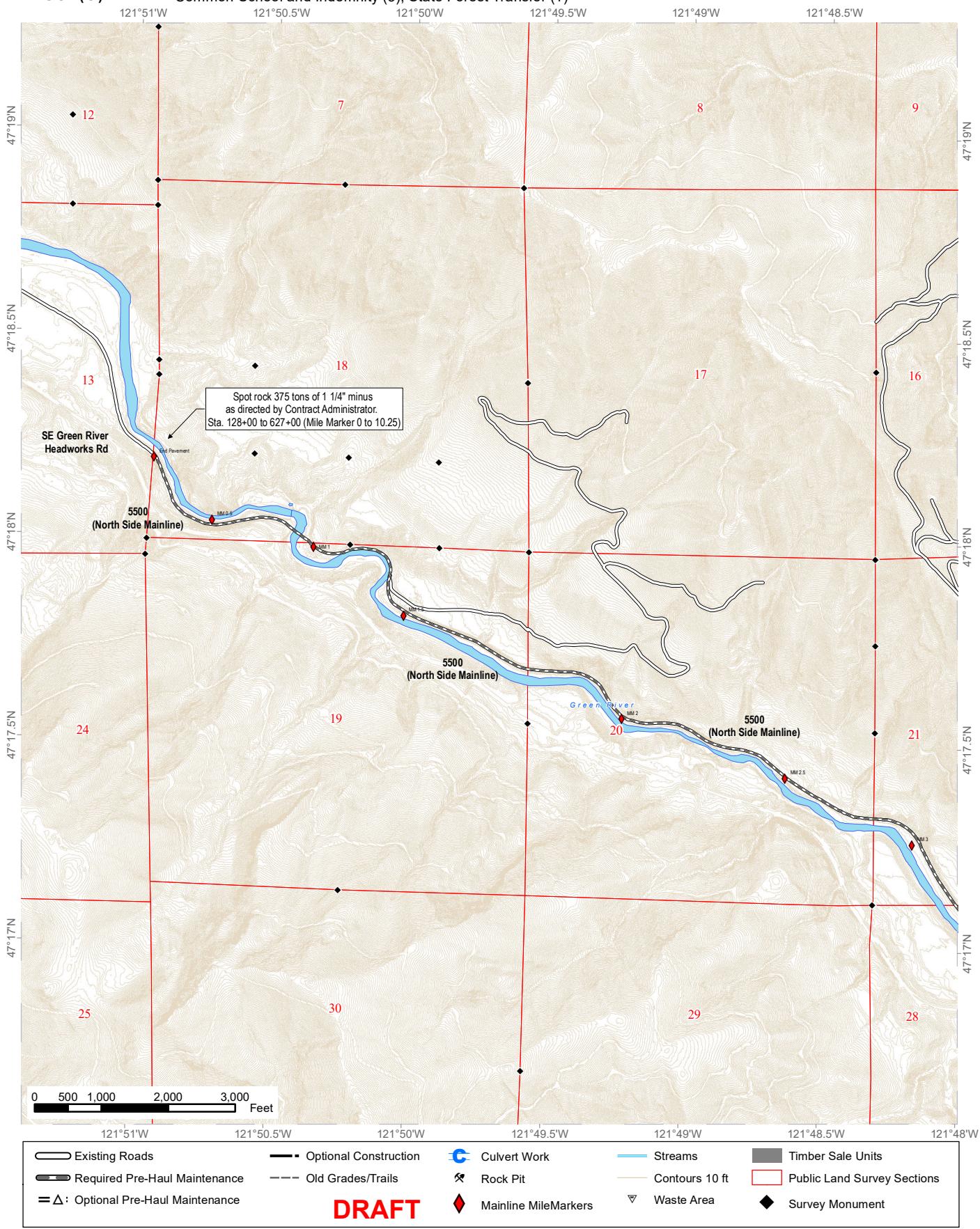


# ROAD WORK MAP 5 of 5

**SALE NAME:** SYLVAN PEARL  
**AGREEMENT #:** 30-103620  
**TOWNSHIP(S):** T21R8E, T21R9E  
**TRUST(S):** Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

**REGION:** South Puget Sound Region  
**COUNTY(S):** King  
**ELEVATION RGE:** 1320-3280



STATE OF WASHINGTON  
DEPARTMENT OF NATURAL RESOURCES

SYLVAN PEARL TIMBER SALE ROAD PLAN  
KING COUNTY  
BLACK DIAMOND UNIT  
SOUTH PUGET SOUND REGION

AGREEMENT NO.: 30-103620

DATE: 01 SEPTEMBER 2023

DRAWN & COMPILED BY: J. GARDNER

SECTION 0 – SCOPE OF PROJECT

**0-1 ROAD PLAN SCOPE**

Clauses in this road plan apply to all road related work, including landings and rock source development, unless otherwise noted.

**0-2 REQUIRED ROADS**

The specified work on the following roads is required.

Road	Stations	Type
5500	0+00 to 627+00	Pre-haul maintenance
5470	40+05 to 40+15	Pre-haul maintenance
5470	43+10 to 43+20	Pre-haul maintenance
5470	88+30 to 88+80	Pre-haul maintenance
5470	104+95 to 105+05	Pre-haul maintenance
5470	134+75 to 135+25	Pre-haul maintenance
5470	151+25 to 151+35	Pre-haul maintenance
5470	152+20 to 152+30	Pre-haul maintenance
5470	153+45 to 153+55	Pre-haul maintenance
5470	155+95 to 156+05	Pre-haul maintenance
5470	166+20 to 166+30	Pre-haul maintenance
5470	169+35 to 169+45	Pre-haul maintenance
5470	171+90 to 172+40	Pre-haul maintenance
5470	175+85 to 176+35	Pre-haul maintenance
5470	185+05 to 185+15	Pre-haul maintenance
5470	243+60 to 244+10	Pre-haul maintenance
5470	249+85 to 249+95	Pre-haul maintenance
5470-5	0+00 to 12+25	Pre-haul maintenance
5474	5+55 to 6+05	Pre-haul maintenance
5476	13+55 to 13+65	Pre-haul maintenance
5476	14+05 to 14+15	Pre-haul maintenance

5476	16+65 to 16+75	Pre-haul maintenance
5476	17+15 to 17+65	Pre-haul maintenance
5476	33+75 to 33+85	Pre-haul maintenance
5476-1	0+00 to 23+87	Abandonment – if constructed
5476-3	0+00 to 9+71	Abandonment – if constructed
5477	10+55 to 12+25	Pre-haul maintenance
5477-3	0+00 to 19+00	Pre-haul maintenance

### 0-3 OPTIONAL ROADS

The specified work on the following roads is not required. Any optional roads built by the Purchaser must meet all the specifications in the road plan.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
5470 Alt	0+00 to 16+90	Pre-haul maintenance
5476-1	0+00 to 23+87	Construction
5476-3	0+00 to 9+71	Construction
5477	0+00 to 32+65	Pre-haul maintenance
5477 Ext	0+00 to 7+67	Construction
5477-4	0+00 to 1+75	Pre-haul maintenance
Unit 1 Spur	0+00 to 1+79	Construction
Unit 7 Spur	0+00 to 1+60	Construction

### 0-4 CONSTRUCTION

Construction includes, but is not limited to.

- Clearing;
- Grubbing;
- Right-of-way debris disposal;
- Excavation and/or embankment to subgrade;
- Acquisition and installation of drainage structures;
- Acquisition, manufacture, and application of rock.

### 0-6 PRE-HAUL MAINTENANCE

Pre-haul maintenance includes, but is not limited to.

- Clearing roads of brush and sub-mature trees;
- Ditch construction/reconstruction;
- Rip Rap energy dissipator placement;
- Culvert maintenance;
- Acquisition and installation of drainage structures;
- Acquisition, manufacture, and application of rock.

### 0-7 POST-HAUL MAINTENANCE

This project includes post-haul road maintenance listed in Clause 9-5 POST-HAUL MAINTENANCE9-5 .

**0-10 ABANDONMENT**

This project includes abandonment listed in Clause 9-21 ROAD ABANDONMENT.

**0-12 DEVELOP ROCK SOURCE**

Purchaser may develop existing rock sources. Work for developing rock sources is listed in Section 6 ROCK AND SURFACING.

**SECTION 1 – GENERAL****1-1 ROAD PLAN CHANGES**

If the Purchaser desires a change from this road plan including, but not limited to, relocation, extension, change in design, or adding roads; a revised road plan must be submitted in writing to the Contract Administrator for consideration. Before work begins, Purchaser shall obtain approval from the State for the submitted plan.

**1-2 UNFORESEEN CONDITIONS**

Quantities established in this road plan are minimum acceptable values. Additional quantities required by the state due to unforeseen conditions, or Purchaser's choice of construction season or techniques will be at the Purchaser's expense. Unforeseen conditions include, but are not limited to, solid subsurface rock, subsurface springs, saturated ground, and unstable soils.

**1-3 ROAD DIMENSIONS**

Purchaser shall perform road work in accordance with the dimensions shown on the TYPICAL SECTION SHEET and the specifications within this road plan, unless controlled by design data (plan, profile, and cross-sections).

**1-4 ROAD TOLERANCES**

Purchaser shall perform road work within the tolerances listed below. The tolerance class for each road is listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road and Subgrade Width (feet)	+1.5	+1.5	+2.0
Subgrade Elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

**1-6 ORDER OF PRECEDENCE**

Any conflict or inconsistency in the road plan will be resolved by giving the documents precedence in the following order:

1. Addenda.
2. Designs or Plans. On designs and plans, figured dimensions shall take precedence over scaled dimensions.
3. Road Plan Clauses.

4. Typical Section Sheet.
5. Standard Lists.
6. Standard Details.
7. Road Work maps.

In case of any ambiguity or dispute over interpreting the road plan, the Contract Administrator's or designee's decision will be final.

#### **1-8 REPAIR OR REPLACEMENT OF DAMAGED MATERIALS**

Purchaser shall repair or replace all materials, roadway infrastructure, and road components damaged during road work or operation activities. The Contract Administrator will direct repairs and replacements. Repairs to structural materials must be made in accordance with the manufacturer's recommendation.

#### **1-9 DAMAGED METALLIC COATING**

Any cut ends, or damaged galvanized or aluminized coating on existing or new bridge components, culverts, downspouts, and flumes must be cleaned and treated with a minimum of two coats of zinc rich paint or cold galvanizing compound.

#### **1-15 ROAD MARKING**

Purchaser shall perform road work in accordance with the state's marked location. All road work is marked as follows:

- Construction: Orange ribbon tied at eye-height along centerline, with orange pin flags marking centerline.

#### **1-21 HAUL APPROVAL**

Purchaser shall not use roads under this road plan for timber hauling other than timber cut on the right-of-way, without written approval from the Contract Administrator.

#### **1-22 WORK NOTIFICATIONS**

On the following road(s), Purchaser shall notify the Contract Administrator a minimum of 7 calendar days before work begins.

<u>Road</u>	<u>Stations</u>
5500	0+00 to 627+00

#### **1-23 ROAD WORK PHASE APPROVAL**

Purchaser shall obtain written approval from the Contract Administrator upon completion of each of the following phases of road work:

- Subgrade construction
- Haul approval

#### **1-29 SEDIMENT RESTRICTION**

Purchaser shall not allow silt-bearing runoff to enter any streams.

### **1-30 CLOSURE TO PREVENT DAMAGE**

In accordance with Contract Clause G-220 STATE SUSPENDS OPERATION, the Contract Administrator will suspend road work or hauling right-of-way timber, forest products, or rock under the following conditions:

- Surface or base stability problems persist.
- Weather is such that satisfactory results cannot be obtained in an area of operations.

Operations must stop unless authority to continue working or hauling is granted in writing by the Contract Administrator. In the event that surface or base stability problems persist, Purchaser shall cease operations, or perform corrective maintenance or repairs, subject to specifications within this road plan. Before and during any suspension, Purchaser shall protect the work from damage or deterioration.

### **1-31 SPEED LIMITS**

On the following road, speeds are limited to 35 mph.

<u>Road</u>	<u>Stations</u>
5500	0+00 to 627+00

### **1-32 BRIDGE AND ASPHALT SURFACE RESTRICTION**

The use of metal tracked equipment is not allowed on bridge or asphalt surfaces at any time. If Purchaser must run equipment on bridge or asphalt surfaces, then rubber tired equipment or other methods, approved in writing by Contract Administrator, must be used.

If tracked equipment is used on bridge or asphalt surfaces, Purchaser shall immediately cease all road construction and hauling operations. Purchaser shall remove any dirt, rock, or other material tracked or spilled on the bridge or asphalt surface(s) and have surface(s) evaluated by the Unit Engineer or their designee for any damage caused by transporting equipment. Any damage to the surface(s) will be repaired, at the Purchaser's expense, as directed by the Contract Administrator.

### **1-33 SNOW PLOWING RESTRICTION**

On all except the following road(s), snowplowing will be allowed after the execution of a SNOW PLOWING AGREEMENT, which is available from the Contact Administrator upon request. If damage occurs while plowing, further permission to plow may be revoked by the Contract Administrator.

<u>Road</u>	<u>Stations</u>
5500	0+00 to 627+00

## **SECTION 2 – MAINTENANCE**

**2-1 GENERAL ROAD MAINTENANCE**

Purchaser shall maintain all roads used under this contract in accordance with the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS for the entire term of this contract. Maintenance is required even during periods of inactivity.

**2-2 ROAD MAINTENANCE – PURCHASER MAINTENANCE**

Purchaser shall perform maintenance on roads listed in Contract Clause C-050 PURCHASER ROAD MAINTENANCE AND REPAIR in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

**2-4 PASSAGE OF LIGHT VEHICLES**

Purchaser shall maintain the following road(s) in a condition that will allow the passage of light administrative vehicles.

<u>Road</u>	<u>Stations</u>
5500	0+00 to 627+00
54	0+00 to 8+30

**2-5 MAINTENANCE GRADING – EXISTING ROAD**

On the following road(s), Purchaser shall use a grader to shape the existing surface before the application of rock. Purchaser shall accomplish all grading using a motor grader with a minimum of 175 horsepower.

<u>Road</u>	<u>Stations</u>	<u>Requirements</u>
5470-5	0+00 to 12+25	Grade existing road prior to the application of rock.

**2-6 CLEANING CULVERTS**

On the following road(s), Purchaser shall clean the inlets and/or outlets of the listed culverts before timber haul.

<u>Road</u>	<u>Stations</u>
5470	40+10, 43+15, 105+00, 166+25, 169+40, & 249+90
5476	13+60, 14+10, 16+70, & 33+80

**2-8 MAINTAINING EROSION CONTROL STRUCTURES**

On the following road(s), Purchaser shall clean and maintain all erosion control structures. Work must be completed before timber haul. Excavated material must be scattered outside the grubbing limits.

<u>Road</u>	<u>Stations</u>	<u>Comments</u>
5470	151+30	Place 3 CY of Rip Rap at outlet

5470	152+25	Place 10 CY of Rip Rap at outlet
5470	153+50	Place 5 CY of Rip Rap at outlet
5470	156+00	Place 5 CY of Rip Rap at outlet
5470	169+40	Place 5 CY of Rip Rap at outlet
5470	172+15	Place 3 CY of Rip Rap at outlet
5470	185+10	Place 3 CY of Rip Rap at outlet
5470-5	1+50	Construct ditchout-left
5474	5+80	Place 5 CY of Rip Rap at outlet
5476	14+10	Steepen and extend ditchout-right to provide for positive drainage
5476	16+70	Steepen and extend ditchout-right to provide for positive drainage. Rebuild headwall.

### SECTION 3 – CLEARING, GRUBBING, AND DISPOSAL

#### 3-3 BRUSHING ALTERNATIVE

On the following road(s), Purchaser may remove vegetative material up to 4 inches in diameter, including limbs, as shown on the BRUSHING DETAIL. Cutting, pulling, digging, pushing over, and other non-cutting methods of vegetation removal may be used for brushing. Excavator buckets, log loaders, dozers and similar equipment may be used. Purchaser shall remove brushing debris from the road surface, ditchlines, and culvert inlets and outlets.

<u>Road</u>	<u>Stations</u>
5470 Alt	0+00 to 16+90
5477	26+25 to 32+65
5477-4	0+00 to 1+75

#### 3-5 CLEARING

Purchaser shall fall all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries and within waste and debris areas, or if not marked in the field, between the clearing limits specified on the TYPICAL SECTION SHEET. Clearing must be completed before starting excavation and embankment.

#### 3-8 PROHIBITED DECKING AREAS

Purchaser shall not deck right-of-way timber in the following areas:

- Within the grubbing limits.
- Within 50 feet of any stream.
- In locations that interfere with the construction of the road prism.
- In locations that impede drainage.
- Against standing trees.

**3-10 GRUBBING**

Purchaser shall remove all stumps between the grubbing limits specified on the TYPICAL SECTION SHEET and within waste and debris areas. Purchaser shall also remove stumps with undercut roots outside the grubbing limits. Grubbing must be completed before starting excavation and embankment.

**3-20 ORGANIC DEBRIS DEFINITION**

Organic debris is defined as all vegetative material not eligible for removal by Contract Clause G-010 PRODUCTS SOLD AND SALE AREA or G-011 RIGHT TO REMOVE FOREST PRODUCTS AND CONTRACT AREA, that is larger than one cubic foot in volume within the grubbing limits as shown on the TYPICAL SECTION SHEET.

**3-21 DISPOSAL COMPLETION**

Purchaser shall remove organic debris from the road surface, ditchlines, and culvert inlets and outlets. Purchaser shall complete all disposal of organic debris, before timber haul.

**3-23 PROHIBITED DISPOSAL AREAS**

Purchaser shall not place organic debris in the following areas:

- Within 50 feet of a cross drain culvert.
- Within 50 feet of a live stream, or wetland.
- On road subgrades, or excavation and embankment slopes.
- On slopes greater than 40%.
- Within the operational area for cable landings where debris may shift or roll.
- On locations where brush can fall into the ditch or onto the road surface.
- Against standing timber.

**3-24 BURYING ORGANIC DEBRIS RESTRICTED**

Purchaser shall not bury organic debris unless otherwise stated in this plan.

**3-25 SCATTERING ORGANIC DEBRIS**

Purchaser shall scatter organic debris outside of the clearing limits in natural openings. Where natural openings are unavailable or restrictive, alternate debris disposal methods are subject to the written approval of the Contract Administrator.

## SECTION 4 – EXCAVATION

**4-2 PIONEERING**

Pioneering may not extend past construction that will be completed during the current construction season. In addition, the following actions must be taken as pioneering progresses:

- Drainage must be provided on all uncompleted construction.

- Road pioneering operations may not undercut the final cut slope or restrict drainage.
- Culverts at live stream crossings must be installed during pioneering operations prior to embankment.

#### **4-3 ROAD GRADE AND ALIGNMENT STANDARDS**

Purchaser shall follow these standards for road grade and alignment except as designed:

- Grade and alignment must have smooth continuity, without abrupt changes in direction.
- Maximum grades may not exceed 18 percent favorable and 12 percent adverse.
- Minimum curve radius is 60 feet at centerline.
- Maximum grade change for sag vertical curves is 5% in 100 feet.
- Maximum grade change for crest vertical curves is 4% in 100 feet.

#### **4-5 CUT SLOPE RATIO**

Purchaser shall construct excavation slopes no steeper than shown on the following table, unless construction staked or designed:

<u>Material Type</u>	<u>Excavation Slope Ratio</u>	<u>Excavation Slope Percent</u>
Common Earth (on side slopes up to 55%)	1:1	100
Common Earth (56% to 70% side slopes)	¾:1	133
Common Earth (on slopes over 70%)	½:1	200
Fractured or loose rock	½:1	200
Hardpan or solid rock	¼:1	400

#### **4-6 EMBANKMENT SLOPE RATIO**

Purchaser shall construct embankment slopes no steeper than shown on the following table, unless construction staked or designed:

<u>Material Type</u>	<u>Embankment Slope Ratio</u>	<u>Embankment Slope Percent</u>
Sandy Soils	2:1	50
Common Earth and Rounded Gravel	1½:1	67
Angular Rock	1¼:1	80

#### **4-7 SHAPING CUT AND FILL SLOPE**

Purchaser shall construct excavation and embankment slopes to a uniform line and left rough for easier revegetation.

#### **4-8 CURVE WIDENING**

The minimum widening placed on the inside of curves is:

- 6 feet for curves of 50 to 79 feet radius.
- 4 feet for curves of 80 to 100 feet radius.

#### **4-9 EMBANKMENT WIDENING**

The minimum embankment widening is:

- 2 feet for embankment heights at centerline of 2 to 6 feet.
- 4 feet for embankment heights at centerline of greater than 6 feet.

Purchaser shall apply embankment widening equally to both sides of the road to achieve the required width.

#### **4-22 TURNAROUNDS**

Turnarounds must be no larger than 30 feet long and 30 feet wide.

#### **4-25 DITCH CONSTRUCTION AND RECONSTRUCTION**

On the following road(s), Purchaser shall construct or reconstruct ditches into the subgrade as specified on the TYPICAL SECTION SHEET. Ditches must be constructed concurrently with construction of the subgrade.

<u>Road</u>	<u>Stations</u>
5476-1	18+00 to 23+87
5476-3	0+00 to 9+71
5477 Ext	0+00 to 7+67
5477-3	0+30 to 19+00
Unit 7 Spur	0+00 to 1+60

#### **4-27 DITCH WORK – MATERIAL USE PROHIBITED**

Purchaser shall not pull ditch material across the road or mix in with the road surface. Excavated material must be scattered outside the grubbing limits.

#### **4-28 DITCH DRAINAGE**

Ditches must drain to cross-drain culverts or ditchouts.

#### **4-29 DITCHOUTS**

Purchaser shall construct ditchouts as identified in the table below and as needed. Ditchouts must be constructed in a manner that diverts ditch water onto the forest floor and must have excavation backslopes no steeper than a 1:1 ratio. L or R denotes ditchout left or ditchout right oriented as if facing in the direction of stationing increasing.

<u>Road</u>	<u>Stations</u>	<u>L or R</u>
5470-5	1+50	L
5476-3	1+13	R
5476-3	5+20	R
5477 Ext	4+75	L & R

**4-35 WASTE MATERIAL DEFINITION**

Waste material is defined as all dirt, rock, mud, or related material that is extraneous or unsuitable for construction material. Waste material, as used in Section 4 EXCAVATION, is not organic debris.

**4-36 DISPOSAL OF WASTE MATERIAL**

Purchaser may sidecast waste material on side slopes up to 45% if the waste material is compacted and free of organic debris. On side slopes greater than 45%, all waste material must be end hauled or pushed to the designated embankment sites and waste areas identified in Clause 4-37        WASTE AREA LOCATION.

**4-37 WASTE AREA LOCATION**

Purchaser shall deposit waste material in areas identified or approved by the Contract Administrator. Additional waste areas may also be identified or approved by the Contract Administrator.

<u>Road</u>	<u>Waste Area Location</u>	<u>Comments</u>
5476-1	11+00	On downhill (north) side of road

**4-38 PROHIBITED WASTE DISPOSAL AREAS**

Purchaser shall not deposit waste material in the following areas, except as otherwise specified in this plan:

- Within 50 feet of a cross drain culvert.
- Within 100 feet of a live stream or wetland.
- Within a riparian management zone.
- Within a wetland management zone.
- On side slopes steeper than 45%.
- In locations that interfere with the construction of the road prism.
- On road prisms or turn-arounds
- In locations that impede drainage.
- Within the operational area for cable landings.
- Against standing timber.

**4-48 NATIVE MATERIAL**

Native material consists of naturally occurring material that is free of organic debris, trash, and rocks greater than 4 inches in any dimension.

**4-55 ROAD SHAPING**

Purchaser shall shape the subgrade and surface as shown on the TYPICAL SECTION SHEET. The subgrade and surface shape must ensure runoff in an even, un-concentrated manner, and must be uniform, firm, and rut-free.

**4-60 FILL COMPACTION**

Purchaser shall compact all embankment and waste material in accordance with the COMPACTION LIST by routing equipment over the entire width of each lift. A plate compactor must be used for embankment segments too narrow to accommodate equipment. Waste material may be placed by end-dumping or sidecasting until sufficiently wide enough to support the equipment.

**4-61 SUBGRADE COMPACTION**

Purchaser shall compact constructed subgrades in accordance with the COMPACTION LIST by routing equipment over the entire width except ditch. Purchaser shall obtain written approval from the Contract Administrator for subgrade compaction before application of rock.

**SECTION 5 – DRAINAGE****5-1 REMOVAL OF SHOULDER BERMS**

Purchaser shall remove berms from road shoulders. The construction of ditchouts is required where ponding could result from the effects of sidecast debris.

**5-5 CULVERTS**

Purchaser shall install culverts as part of this contract. Culverts must be installed concurrently with subgrade work and must be installed before subgrade compaction and rock application. Culvert locations and the minimum requirements for culvert length and diameter are designated on the CULVERT AND DRAINAGE LIST. Culvert, downspout, and flume lengths may be adjusted to fit as-built conditions and may not terminate directly on unprotected soil. Culverts must be new material and meet the specifications in Clauses 10-15 through 10-24.

**5-6 CULVERT TYPE**

Purchaser shall install culverts made of plastic in accordance with Clauses 10-15 through 10-24.

**5-12 UNUSED MATERIALS STATE PROPERTY**

On required roads, any materials listed on the CULVERT AND DRAINAGE LIST that are not installed will become the property of the state. Purchaser shall stockpile materials at the Page Flats Culvert Yard Pit (SE $\frac{1}{4}$  NW $\frac{1}{4}$  Section 05 T21R08E).

**5-13 CONTINGENCY CULVERTS**

The following culverts will be supplied by the Purchaser and are available for installation as directed by the Contract Administrator.

<u>Road</u>	<u>Size</u>
On any portion of road used for timber or rock haul.	18" x 30' culvert
	18" x 30' culvert
	18" culvert band

## **5-15 CULVERT INSTALLATION**

Culvert installation must be in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL. Corrugated Polyethylene pipe must be installed in a manner consistent with the manufacturer's recommendations. Culverts shall be banded using lengths of no less than 10 feet, and no more than one length less than 16 feet. Shorter section of banded culvert shall be installed at the inlet end.

## **5-17 CROSS DRAIN SKEW AND SLOPE**

Cross drains, on road grades in excess of 3%, must be skewed at least 30 degrees from perpendicular to the road centerline, except where the cross drain is at the low point in the road culverts will not be skewed. Cross drain culverts must be installed at a slope steeper than the incoming ditch grade, but not less than 3% or more than 10%.

## **5-18 CULVERT DEPTH OF COVER**

All culverts must be installed with a depth of cover of not less than 1 foot of compacted subgrade over the top of the culvert at the shallowest point.

## **5-20 ENERGY DISSIPATERS**

Purchaser shall install energy dissipaters in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL at all culverts on the CULVERT AND DRAINAGE LIST that specify the placement of rock.

The type of energy dissipater and the amount of material must be consistent with the specifications listed on the CULVERT AND DRAINAGE LIST. Energy dissipaters must extend a minimum of 1 foot to each side of the culvert at the outlet and a minimum of 2 feet beyond the outlet.

## **5-25 CATCH BASINS**

Purchaser shall construct catch basins in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions of catch basins are 2 feet wide and 4 feet long.

## **5-26 HEADWALLS FOR CULVERTS**

Purchaser shall construct headwalls in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL at all culverts on the CULVERT AND DRAINAGE LIST. Rock must be placed on shoulders, slopes, and around culvert inlets and outlets. Minimum specifications require that rock be placed at a width of one culvert diameter on each side of the culvert opening, and to a height of one culvert diameter above the top of the culvert. Rock may not restrict the flow of water into culvert inlets or catch basins.

### **5-33 NATIVE SURFACE ROADS**

If overwintered, native surface roads must be waterbarred by November 1. Purchaser shall construct waterbars according to the attached DRIVABLE WATERBAR DETAIL at a maximum spacing that will produce a vertical distance of no more than 15 feet between waterbars or between natural drainage paths, and with a maximum spacing of 300 feet.

## **SECTION 6 – ROCK AND SURFACING**

### **6-2 ROCK SOURCE ON STATE LAND**

Rock used in accordance with the quantities on the ROCK LIST may be obtained from the following source(s) on state land at no charge to the Purchaser. Purchaser shall obtain written approval from the Contract Administrator for the use of material from any other source. If other operators are using, or desire to use the rock source(s), a joint operating plan must be developed. All parties shall follow this plan. Purchaser shall notify the Contract Administrator a minimum of 5 calendar days before starting any operations in the listed locations.

<u>Source</u>	<u>Location</u>	<u>Rock Type</u>
Load N Go Pit	SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 20 T21R09E	2-Inch Minus, 4-Inch In Place
Fir Sure Pit	NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 20 T21R09E	Quarry Spalls, Light Loose Rip Rap

### **6-5 ROCK FROM COMMERCIAL SOURCE**

Rock used in accordance with the quantities on the ROCK LIST may be obtained from commercial sources at the Purchaser's expense. Rock sources are subject to written approval by the Contract Administrator before their use.

### **6-10 ROCK SOURCE DEVELOPMENT PLAN BY STATE**

Purchaser shall conduct rock source development and use at the following sources, in accordance with the written PIT DEVELOPMENT PLAN(s) prepared by the state and included in this road plan. Upon completion of operations, the rock source must be left in the condition specified in the PIT DEVELOPMENT PLAN(s), and approved in writing by the Contract Administrator.

<u>Source</u>	<u>Location</u>
Load N Go Pit	SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 20 T21R09E
Fir Sure Pit	NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 20 T21R09E

### **6-12 ROCK SOURCE SPECIFICATIONS**

Rock sources must be in accordance with the following specifications, unless otherwise specified in the ROCK SOURCE DEVELOPMENT PLAN:

- Pit walls may not be undermined or over steepened.
- Pit walls must be maintained in a condition to minimize the possibility of the walls sliding or failing.
- All vehicle access to the top of the pit faces must be blocked.

#### **6-14 DRILL AND SHOOT**

Rock drilling and shooting must meet the following specifications:

- Purchaser shall notify the Contract Administrator a minimum of 5 calendar days before blasting operations.
- Purchaser shall submit an informational drilling and shooting plan to the Contract Administrator 5 calendar days before any drilling.
- All operations must be carried out in compliance with the Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration and the Safety Standards for Construction Work (296-155 WAC), Washington Department of Labor and Industries.
- Purchaser shall block access roads before blasting operations.

#### **6-20 ROCK CRUSHING OPERATIONS**

Rock crushing operations must conform to the following specifications:

Rock crushing operations must conform to the following specifications:

- Operations and placement of oversize material must be conducted in or near the rock source site.
- Purchaser shall produce sieve analysis for crushing operations every 500 yards for 2-INCH MINUS.
- Purchaser may use a commercial testing lab to produce sieve analyses.

#### **6-21 IN-PLACE PROCESSING**

Purchaser may use in-place processing, such as a grid roller or other method, if suitable crushing can be demonstrated to meet the surfacing size-specified in Clause 6-38 4-INCH IN-PLACE ROCK. Purchaser shall remove any existing organic debris before the start of in-place crushing operations.

#### **6-22 FRACTURE REQUIREMENT FOR ROCK**

A minimum of 75% by visual inspection of coarse aggregate must have at least one fractured face. Coarse aggregate is the material greater than 1/4-inch in size.

#### **6-23 ROCK GRADATION TYPES**

Purchaser shall provide or manufacture rock in accordance with the types and amounts listed in the ROCK LIST. Rock must meet the following specifications for gradation and uniform quality when prior to haul approval being issued.

#### **6-28 1 ¼-INCH MINUS CRUSHED ROCK**

% Passing 1 ¼" square sieve	100%
-----------------------------	------

% Passing 5/8" square sieve	50 - 80%
% Passing U.S. #4 sieve	25 - 45%
% Passing U.S. #40 sieve	3 - 18%
% Passing U.S. #200 sieve	7.5% max.

The portion of aggregate retained on the No. 4 sieve may not contain more than 0.2 percent organic debris and trash. All percentages are by weight.

#### **6-30 2-INCH MINUS CRUSHED ROCK**

% Passing 2" square sieve	100%
% Passing 1" square sieve	65 - 85%
% Passing U.S. #4 sieve	26 - 39%
% Passing U.S. #40 sieve	16% maximum
% Passing U.S. #200 sieve	5% maximum

The portion of aggregate retained on the No. 4 sieve may not contain more than 0.2 percent organic debris and trash. All percentages are by weight.

#### **6-38 4-INCH IN-PLACE ROCK**

4-inch in-place rock must have a minimum of 90 percent of the top 4 inches of the running surface pass a 4-inch square opening.

In-place rock may not contain more than 5 percent by weight of organic debris and trash. No more than 50 percent of rock may be larger than 8 inches in any dimension and no rock may be larger than 12 inches in any dimension.

#### **6-43 QUARRY SPALLS**

% Passing 8" square sieve	100%
% Passing 3" square sieve	40% maximum
% Passing 3/4" square sieve	10% maximum

Rock may not contain more than 5 percent vegetative debris or trash. All percentages are by weight.

#### **6-50 LIGHT LOOSE RIP RAP**

Light loose rip rap must consist of angular, hard, sound, and durable stone. It must be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather. Light loose rip rap must be free of rock fines, soil, organic debris or other extraneous material, and must meet the following requirements:

<u>Quantity</u>	<u>Approximate Size Range</u>
20% to 90%	500 lbs. to 1 ton (18"- 28")
15% to 50%	50 lbs. to 500 lbs. (8"- 18")
10% to 20%	3 inch to 50 lbs. (3"- 8")

**6-55 ROCK APPLICATION MEASURED BY COMPACTED DEPTH**

Measurement of specified rock depths, are defined as the compacted depth(s) using the compaction methods required in this road plan. Estimated quantities specified in the ROCK LIST are compacted yards. Purchaser shall apply adequate amounts of rock to meet the specified rock depths. Specified rock depths are minimum requirements and are not subject to reduction, unless otherwise stated in Clause 6-75 OPTIONAL ROCK EXCEPTION. Rock specified in Clause 6-76 MAINLINE REPLACEMENT ROCK will be complied by load ticket.

**6-65 ROCK STOCKPILE LOCATION**

Purchaser shall stockpile rock as listed below. Rock stockpiles must be in accordance with Clause 6-67 ROCK STOCKPILE SPECIFICATIONS.

<u>Rock Source</u>	<u>Rock Type</u>	<u>Quantity (c.y.)</u>	<u>Stockpile Location</u>
Load N Go	2-Inch Minus	3000	As shown on Load N Go Development Plan

**6-67 ROCK STOCKPILE SPECIFICATIONS**

Rock stockpiles listed in Clause 6-65 ROCK STOCKPILE LOCATION must meet the following specifications:

Before placing aggregates upon the stockpile site, the site must be cleared of vegetation, trees, stumps, brush, rocks, or other debris and the ground leveled to a smooth, firm, uniform surface. When completed, the stockpile must be neat and regular in shape.

**6-70 APPROVAL BEFORE ROCK APPLICATION**

Purchaser shall obtain written approval from the Contract Administrator for subgrade compaction on new roads and road grading on existing roads before rock application.

**6-71 ROCK APPLICATION**

Purchaser shall apply rock in accordance with the specifications and quantities shown on the ROCK LIST. Rock must be spread, shaped, and compacted full width concurrent with rock hauling operations. Road surfaces must be compacted in accordance with the COMPACTION LIST by routing equipment over the entire width.

**6-73 ROCK FOR WIDENED PORTIONS**

Purchaser shall apply rock to turnarounds, turnouts, and areas with curve widening to the same depth and specifications as the traveled.

**6-75 OPTIONAL ROCK EXCEPTION**

On the following roads, Purchaser may provide and place less rock than shown on the ROCK LIST.

<u>Road</u>	<u>Stations</u>
5476-1	0+00 to 13+27 & 15+27 to 23+87
5476-3	0+00 to 9+71
5477 Ext	0+00 to 7+67
Unit 1 Spur	0+00 to 1+79
Unit 7 Spur	0+00 to 1+60

## **6-76 MAINLINE ROCK REPLACEMENT**

On the following road(s), Purchaser shall apply 1-1/4 Inch Minus spot rock in accordance with the quantities shown on the ROCK LIST as directed by Contract Administrator. Purchaser shall provide load tickets to the Contract Administrator.

<u>Road</u>	<u>Location</u>	<u>Rock Type</u>
5500 (North Side Mainline)	0+00 (MM 0) to 627+00 (MM 10½)	1-1/4 Inch Minus

## SECTION 7 – STRUCTURES

### **7-5 STRUCTURE DEBRIS**

Purchaser shall not allow debris from the installation or removal of structures to enter any stream. Components removed from existing structures(s) must be removed from state land. Purchaser shall maintain a clean jobsite, with all materials stored away from the high water mark or other area presenting a risk of the materials entering a stream. Debris entering any stream must be removed immediately, and placed in the site(s) designated for stockpiling or disposal. Purchaser shall retrieve all material carried downstream from the jobsite.

### **7-57 CULVERT SHAPE CONTROL**

Purchaser shall monitor the culvert shape during backfill and compaction. Special attention must be paid to maintaining the structure's rise dimensions, concentricity, and smooth uniform curvature. If compaction methods are resulting in peaking or deflection of the culvert, Purchaser shall modify the compaction method to achieve the appropriate end result.

## SECTION 8 – EROSION CONTROL

### **8-15 REVEGETATION**

On the following road(s), Purchaser shall spread grass seed and a layer of straw on all exposed soils resulting from road work activities. Purchaser shall revegetate during the first available opportunity after road work is completed.

<u>Road</u>	<u>Location</u>	<u>Quantity</u>	<u>Type</u>
5474	5+55 to 6+05	50 lbs/acre	Pasture Mix
5476-1	13+87 to 14+67	50 lbs/acre	Pasture Mix
5477	10+40 to 12+15	50 lbs/acre	Pasture Mix

## **8-16 REVEGETATION SUPPLY**

The Purchaser shall provide the Pasture Mix grass seed and straw.

## SECTION 9 – POST-HAUL ROAD WORK

### **9-1 EARTHEN BARRICADES**

Purchaser shall construct barricades in accordance with the EARTHEN BARRICADE DETAIL.

<u>Road</u>	<u>Stations</u>
5476-1	0+00
5476-3	0+00

### **9-2 CULVERT REMOVAL FROM LIVE STREAM**

If constructed, on the following road(s), Purchaser shall remove culvert from live streams and leave the resulting channel open with excavation slope and excavated channel width as specified. End haul excavated material to waste area designated in Clause 4-37 WASTE AREA LOCATION.

<u>Road</u>	<u>Stations</u>	<u>Excavated Channel Width</u>	<u>Slope Ratio</u>
5476-1	14+27	16 feet	2H:1V

### **9-3 CULVERT MATERIAL REMOVED FROM STATE LAND**

Culverts removed from roads become the property of the Purchaser and must be removed from state land.

### **9-5 POST-HAUL MAINTENANCE**

Purchaser shall perform post-haul maintenance in accordance with the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS and as specified below.

<u>Road</u>	<u>Stations</u>	<u>Additional Requirements</u>
5470	73+10 to 89+25, 96+75 to 98+45, 105+00 to 113+50, 121+25 to 124+90, 129+00 to 150+00, 154+00 to 154+70, 163+60 to 180+00, 236+40 to 254+85	Purchaser shall clean/reshape ditches, headwalls, and catchbasins.
5470 Alt	1+60 to 16+90	

5470-5	0+00 to 12+25	Work must be completed after timber haul is finished and must be done in accordance with the dimensions on the TYPICAL SECTION SHEET. All logging debris shall be removed. Pulling ditch material across the road or mixing in with the road surfaces is not allowed.
5051	0+00 to 3+50	
5474	0+00 to 11+25	
5476	0+00 to 35+00	
5477	12+10 to 32+65	
5477 Ext	0+00 to 7+67	
5477-4	0+00 to 1+75	
Shoofly	0+00 to 2+50	
Unit 1 Spur	0+00 to 1+79	
Unit 7 Spur	0+00 to 1+60	

## 9-10 LANDING DRAINAGE

Purchaser shall provide for drainage of the landing surface.

## 9-21 ROAD ABANDONMENT

If built, Purchaser shall abandon the following roads before the termination of this contract.

Road	Stations
5476-1	0+00 to 23+87
5476-3	0+00 to 9+71

## 9-22 ABANDONMENT

- Construct non-drivable waterbars according to the attached NON-DRIVABLE WATERBAR DETAIL at a maximum spacing that will produce a vertical drop of no more than 10 feet between waterbars or between natural drainage paths and with a maximum spacing of 200 feet.
- Skew waterbars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3 percent grade.
- Key waterbars into the cut-slope to intercept the ditch. Waterbars must be outsloped to provide positive drainage. Outlets must be on stable locations.
- Block roads with earthen barricades in accordance with the attached EARTHEN BARRICADE DETAIL.
- Remove stream culverts.
- Remove ditch cross drain culverts and leave the resulting trench open.
- Slope all trench walls and approach embankments no steeper than 1.5:1.
- Apply grass seed concurrently with abandonment and in accordance with Section 8 EROSION CONTROL.

## SECTION 10 MATERIALS

**10-17 CORRUGATED PLASTIC CULVERT**

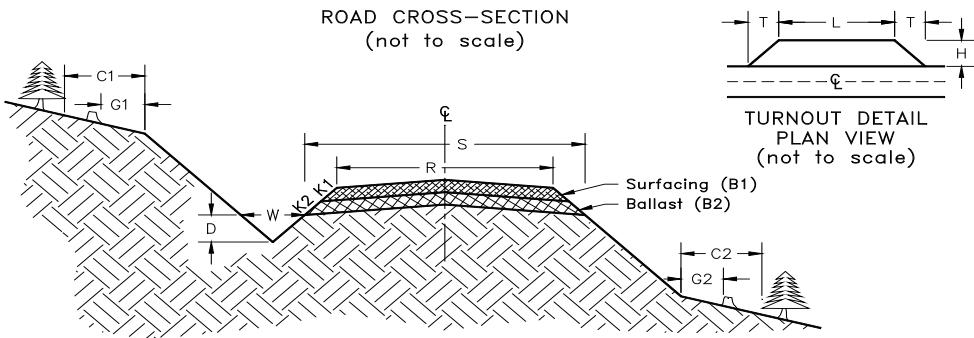
Polyethylene culverts must meet AASHTO M-294 specifications, or ASTM F-2648 specifications for recycled polyethylene. Culverts must be Type S – double walled with a corrugated exterior and smooth interior.

**10-22 PLASTIC BAND**

Plastic coupling and end bands must meet the AASHTO specification designated for the culvert. Only fittings supplied or recommended by the culvert manufacturer may be used. Split coupling bands must have a minimum of four corrugations, two on each side of the pipe joint.

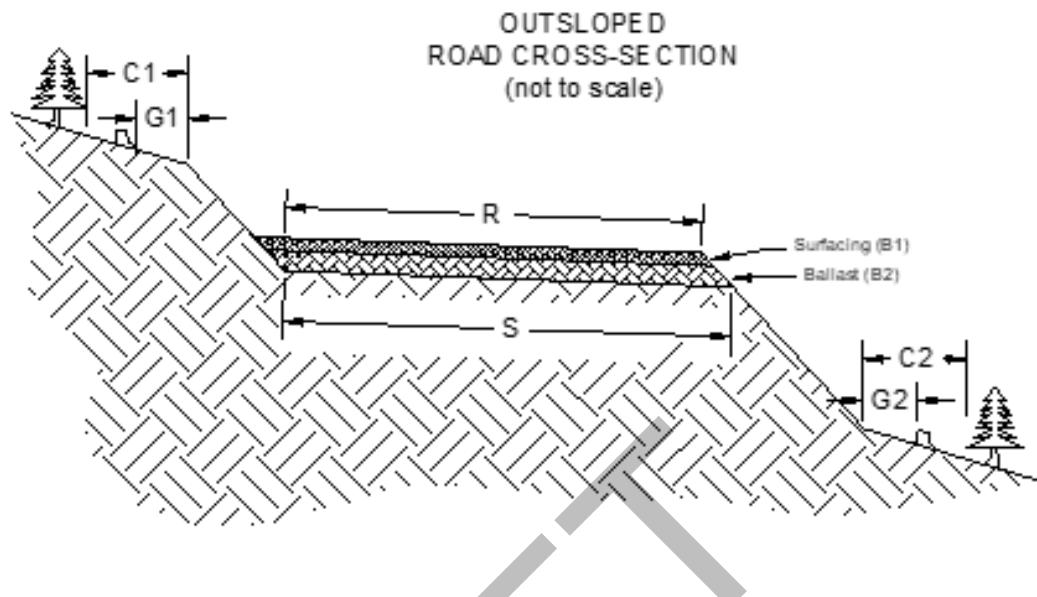
DRAFT

## TYPICAL SECTION SHEET



Road Number	From Station	To Station	Tolerance Class	Subgrade Width (feet)	Road Width (feet)	Ditch Width (feet)	Ditch Depth (feet)	Crown in. @ CL	Grubbing Limits (feet)	Clearing Limits (feet)	Cut Slope Ratio	Fill Slope Ratio	
				S	R	W	D		G1	G2	C1	C2	Clause
5500 (North Side Mainline)	0+00	627+00	A	-	18	3	1	4	-	-	-	-	4-5      4-6
54	0+00	8+30	C	-	16	3	1	4	-	-	-	-	4-5      4-6
5470	0+00	210+00	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5470	236+40	254+85	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5470 Alt	0+00	16+90	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5470-5	0+00	12+25	C	-	14	3	1	4	-	-	-	-	4-5      4-5
5474	0+00	11+25	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5476	0+00	76+80	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5476-1	14+00	14+50	C	17	14	3	1	4	2	2	tags	tags	4-5      4-6
5476-1	18+00	23+87	C	17	14	3	1	4	2	2	5	5	4-5      4-6
5476-3	0+00	9+71	C	17	14	3	1	4	2	2	5	5	4-5      4-6
5477	0+00	32+65	C	-	14	3	1	4	-	-	-	-	4-5      4-6
5477 Ext	0+00	7+67	C	17	14	3	1	4	2	2	5	5	4-5      4-6
5477-3	0+00	23+25	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5477-31	0+00	7+50	A	-	14	3	1	4	-	-	-	-	4-5      4-6
5477-4	0+00	1+75	C	-	14	3	1	4	-	-	-	-	4-5      4-6
Shoofly	0+00	2+50	C	-	14	3	1	4	-	-	-	-	4-5      4-6
Unit 1 Spur	0+00	1+79	C	17	14	3	1	4	-	-	-	-	4-5      4-6
Unit 7 Spur	0+00	1+60	C	17	14	3	1	4	-	-	-	-	4-5      4-6

## TYPICAL SECTION SHEET



## ROCK LIST (page 1 of 2)

### BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2	4-Inch In-Place				L	H	T
5476-1*	0+00	13+27	1 ½:1	12"	62	13.27	823				
5476-1	13+27	15+27	1 ½:1	12"	62	2.00	124				
5476-1*	15+27	23+87	1 ½:1	12"	62	8.60	533				
5476-3*	0+00	9+71	1 ½:1	12"	62	9.71	602				
5477 Ext*	0+00	7+67	1 ½:1	12"	62	7.67	476				
Unit 1 Spur*	0+00	1+79	1 ½:1	12"	62	1.79	111				
Unit 7 Spur*	0+00	1+60	1 ½:1	12"	62	1.60	99				
Landing Rock*							4000				
					Quarry Spalls & Rip Rap						
Culvert Headwalls and Dissipaters							45				
Light Loose Rip Rap							48				

4-Inch In-Place Total\_ 6768\_ Cubic Yards

Quarry Spalls & Rip Rap Total\_ 93\_ Cubic Yards

Ballast Total\_ 6861\_ Cubic Yards

\* Optional Rock: Purchaser is allowed the following rock depths from State owned rock sources, but application of rock is not required.

NOTE: Yardages are estimated on a compacted (In-Place) basis. Compliance of required rock will be based on compacted depth measurement. **Apply appropriate factors to determine loose amounts for estimating purposes.**

## ROCK LIST (page 2 of 2)

### SURFACE

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./Station	# of Stations	CY Subtotal	Rock Source
			K1	B1	1 ¼ INCH MINUS			
5500 (North Side Mainline)	0+00	627+00	1 ½:1	Spot Rock as per Clause 6-76.			375 Tons	Commercial
				2 INCH MINUS				
5470	88+30	88+80	1 ½:1				10	
5470	134+75	135+25	1 ½:1				10	
5470	171+90	172+40	1 ½:1				10	
5470	175+85	176+35	1 ½:1				10	
5470	243+60	244+10	1 ½:1				20	
5470-5	0+00	12+25	1 ½:1	6"	28	12.25	343	
5474	5+55	6+05	1 ½:1				20	
5476	17+15	17+65	1 ½:1				20	
5477	10+55	12+25	1 ½:1	6"	28	1.70	48	
5477-3	0+05	0+55	1 ½:1				30	
Stockpile							3000	Load N Go Pit

1 ¼ Inch Minus 375 Tons  
2-Inch Minus 3521 Cubic Yard

NOTE: Yardages are estimated on a compacted (In-Place) basis. Compliance of required rock will be based on compacted depth measurement. **Apply appropriate factors to determine loose amounts for estimating purposes.**

## CULVERT AND DRAINAGE LIST (page 1 of 3)

Road Number	Location	Culvert Dia. (in)	Type	Culvert	Length (ft)		Riprap (C.Y.)			Backfill Material*	Placement Method*	Const. Staked*	Remarks
5470	40+10	36											Clean Inlet T4 Stream
5470	43+15	36					3	LL					Clean Inlet T4 Stream
5470	88+55	18	PD	50			1	1.5	QS	NT			
5470	105+00	18					1	1.5	QS	NT			Clean Inlet
5470	135+00	18											
5470	151+30	24					3	LL					Place Rip Rap at outlet as Energy Dissipator
5470	152+25	24					10	LL					Place Rip Rap at outlet as Energy Dissipator
5470	153+50	24					5	LL					Place Rip Rap at outlet as Energy Dissipator
5470	156+00	24					5	LL					Place Rip Rap at outlet as Energy Dissipator
5470	166+25	18											Clean Inlet
5470	169+40	18					5	LL					Clean Inlet & Place Rip Rap at outlet as Energy Dissipator
5470	172+15	18	PD	30			1	3	QS-inlet LL-outlet	NT			Place Rip Rap at outlet as Energy Dissipator

PD = Polyethylene Pipe Dual Wall AASHTO No. M294 Type S or ASTM F2648

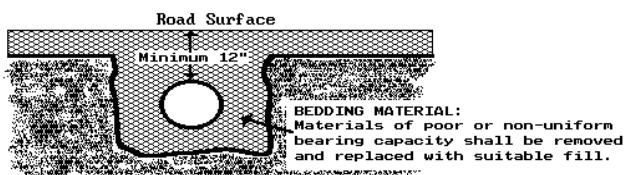
AS10 = Aluminized Steel AASHTO No. M274, 10 Gauge

TEMP = Temporary Culvert

### Key:

- QS - Quarry Spalls
- SR - Shot Rock
- NT - Native (bank run)
- SPR - Select Pit Run
- LL - Light Loose Rip Rap
- HL - Heavy Loose Riprap
- Flume - Half round pipe
- Downspout - Full round pipe

### CULVERT BACKFILL AND BASE PREPARATION (For culverts less than 36")



## CULVERT AND DRAINAGE LIST (page 2 of 3)

Road Number	Location	Culvert Dia. (in)	Culvert Type	Culvert	Length (ft)	Downsp	Flume	Inlet	Outlet	Riprap (C.Y.) Type	Backfill Material*	Placement Method*	Const. Staked*	Remarks
5470	176+10	18	PD	40				1	1.5	QS	NT			
5470	185+10	24							3	LL				Place Rip Rap at outlet as Energy Dissipator
5470	243+85	18	PD	35				1	1.5	QS	NT			
5470	249+90	18												Clean Inlet
5470-5	1+50													Construct Ditchout-left
5470-5	5+60	18	PD	40				1	1.5	QS	NT			
5470-5	10+35	18	PD	40				1	1.5	QS	NT			
5474	5+80	24	PD	40				1	5	QS-inlet LL-outlet	NT			Replace Existing. Place Rip Rap at outlet as Energy Dissipator
5476	13+60	18												Clean Outlet
5476	14+10	18												Clean Outlet & Ditchout
5476	16+70	18												Rebuilt Headwall & Clean: Inlet, Outlet and Ditchout
5476	17+40	18	PD	40				1	1.5	QS	NT			Replace Existing.
5476	33+80	18												Clean Outlet

PD = Polyethylene Pipe Dual Wall AASHTO No. M294 Type S or ASTM F2648

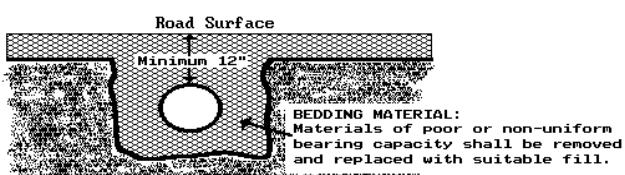
AS10 = Aluminized Steel AASHTO No. M274, 10 Gauge

TEMP = Temporary Culvert

### Key:

- QS - Quarry Spalls
- SR - Shot Rock
- NT - Native (bank run)
- SL - Select Fill
- LL - Light Loose Rip Rap
- HL - Heavy Loose Riprap
- Flume - Half round pipe
- Downspout - Full round pipe

#### CULVERT BACKFILL AND BASE PREPARATION (For culverts less than 36")



## CULVERT AND DRAINAGE LIST (page 3 of 3)

Road Number	Location	Culvert		Length (ft)	Downsp	Flume	Riprap (C.Y.)			Backfill Material*	Placement Method*	Const. Staked*	Remarks
		Dia. (in)	Type	Culvert			Inlet	Outlet	Type				
5476-1	6+49	18	PD	30			1	1.5	QS	NT			
5476-1	14+27	30	PD	50			3	3	LL	NT			T4 Stream
5476-1	23+02	18	PD	30			1	1.5	QS	NT			
5476-3	1+13	18	PD	30			1	1.5	QS	NT			Construct Ditchout
5476-3	2+98	18	PD	30			1	1.5	QS	NT			
5476-3	5+20	18	PD	30			1	1.5	QS	NT			Construct Ditchout
5477	10+80	30	PD	35			1	1.5	QS	NT			Replace Existing T4 Stream
5477	11+35	24	PD	30			1	1.5	QS	NT			Replace Existing
5477	12+00	18	PD	30			1	1.5	QS	NT			
5477	18+45	18	PD	35			1	1.5	QS	NT			
5477-3	0+30	18	PD	70			1	1.5	QS	NT			
As directed by CA		18	PD	30			1	1.5	QS	NT			
		18	PD	30									
		18	Polly	Band									Contingency Culverts & Band

PD = Polyethylene Pipe Dual Wall AASHTO No. M294 Type S or ASTM F2648

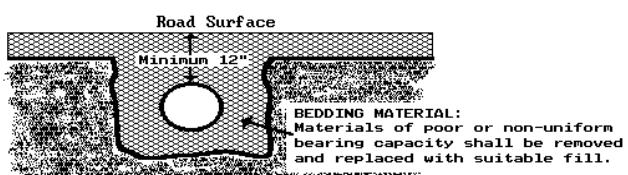
AS10 = Aluminized Steel AASHTO No. M274, 10 Gauge

TEMP = Temporary Culvert

### Key:

- QS - Quarry Spalls
- SR - Shot Rock
- NT - Native (bank run)
- SL - Select Fill
- LL - Light Loose Rip Rap
- HL - Heavy Loose Riprap
- Flume - Half round pipe
- Downspout - Full round pipe

### CULVERT BACKFILL AND BASE PREPARATION (For culverts less than 36")

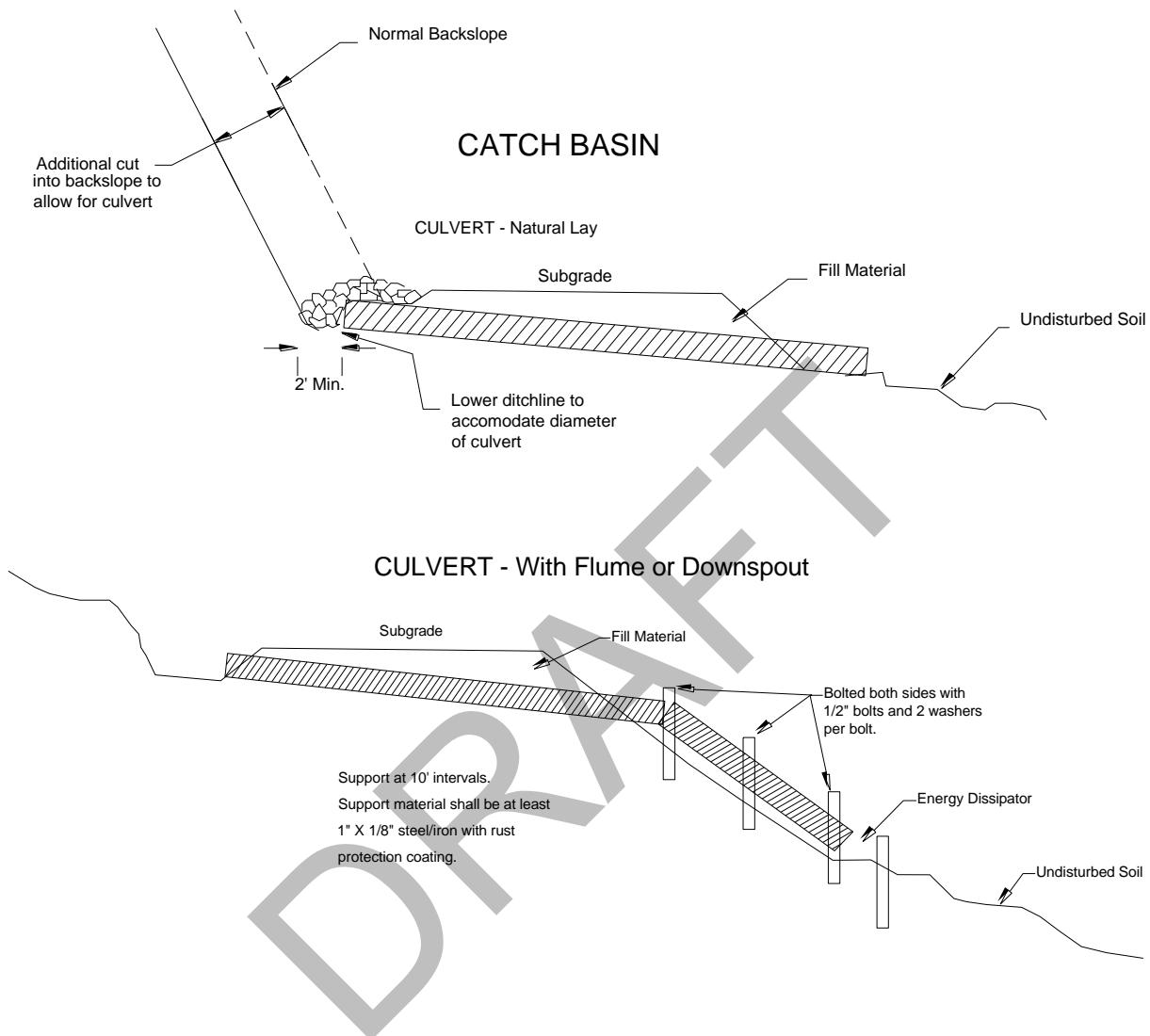


## COMPACTION LIST

Road	From Station	To Station	Type	Max Depth Per Lift (inches)	Equipment Type	Equipment Weight (lbs)	Minimum Number of Passes	Maximum Operating Speed (mph)
5500 (North Side Mainline)	0+00	627+00	Surfacing	4"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5470	0+00	210+00	Surfacing	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5470	236+40	254+85	Surfacing,	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5470-5	0+00	12+25	Subgrade,	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5474	0+00	11+25	Surfacing	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5476	0+00	76+80	Surfacing	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5476-1	0+00	23+87	Subgrade, Surfacing	12"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5476-3	0+00	9+71	Subgrade, Surfacing	12"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5477	0+00	32+65	Subgrade, Surfacing	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5477 Ext	0+00	7+67	Subgrade, Surfacing	12"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5
5477-3	0+00	23+25	Surfacing	6"	Smooth Drum Vibratory Roller	14,000	3 low freq. vibe on	3.5

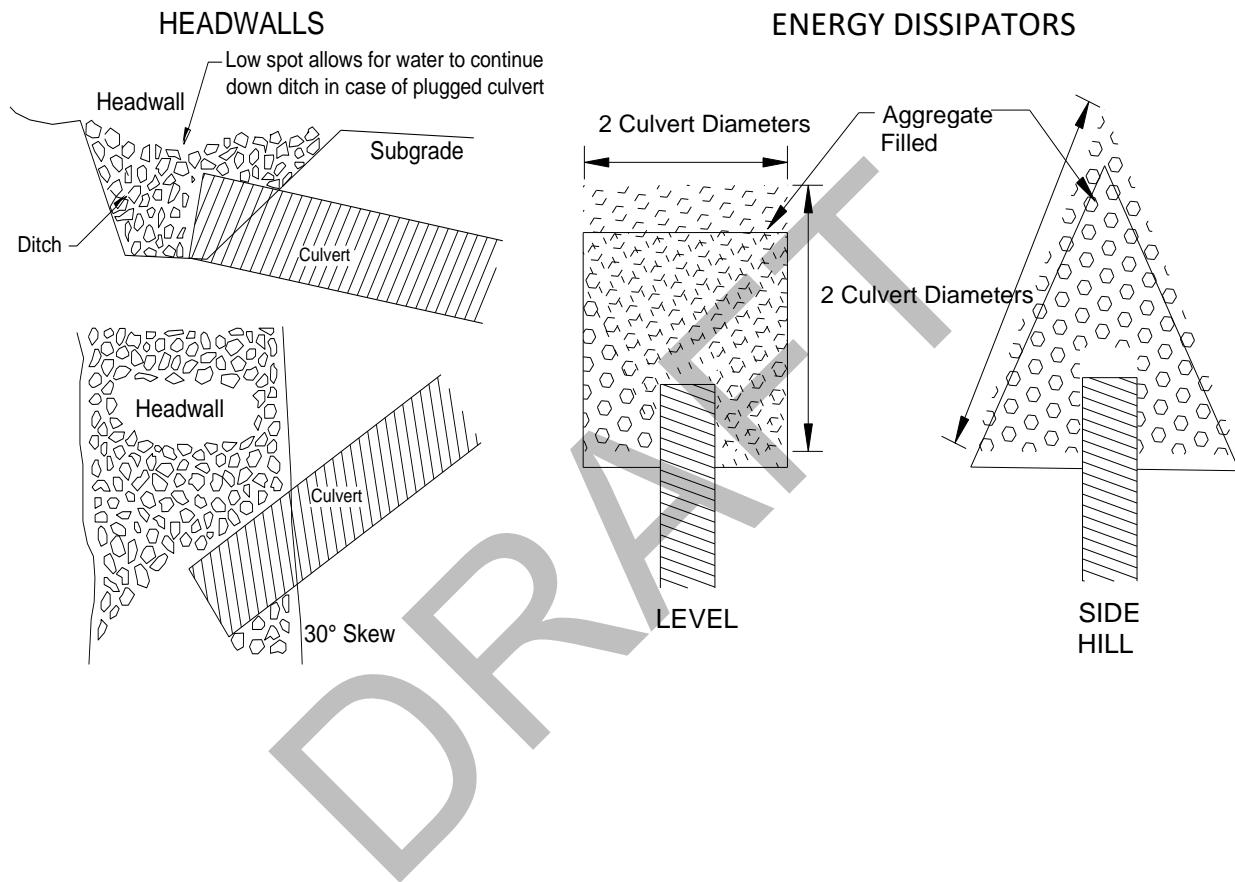
## CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 1 of 3)



**CULVERT AND DRAINAGE SPECIFICATION DETAIL**  
(Page 2 of 3)

Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.



Headwalls to be constructed  
of material that will resist  
erosion.

Dissipator Specifications:  
Depth: 1 culvert diameter  
Aggregate: as specified in the  
CULVERT LIST.

**CULVERT AND DRAINAGE SPECIFICATION DETAIL**  
(Page 3 of 3)  
**POLYETHYLENE PIPE INSTALLATION**

**INSTALLATION REQUIREMENTS:**

1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.
2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.
3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.
4. Site conditions and availability of bedding materials often dictate the type of installation method used.
5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% is required. This minimum compaction can be achieved by either hand or mechanical tamping.

**MINIMUM DIMENSIONS**  
Trench or Open Ditch Installation

Trench Installation		Open Ditch Installation	
Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
6"	6"	12"	54"

**Trench Installation:** Shows a vertical cross-section of a rectangular trench. Inside the trench, there is a circular pipe (D) surrounded by a layer of gravel or compacted soil (B). The distance from the bottom of the pipe to the top of the backfill is labeled C. Below the trench, a horizontal dimension line shows the total width of the trench as W.

**Open Ditch Installation:** Shows a cross-section of a V-shaped ditch. Inside the ditch, there is a circular pipe (D) surrounded by a layer of gravel or compacted soil (B). The distance from the bottom of the pipe to the top of the backfill is labeled C. Below the ditch, a horizontal dimension line shows the total width of the ditch as W.

## FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

Page 1 of 2

### Cuts and Fills

- Maintain slope lines to a stable gradient compatible with the construction materials. Remove slides up to 100 cubic yards in volume from ditches and the roadway. Repair fill-failures with selected material or material approved by the Contract Administrator. Remove overhanging material from the top of cut slopes.
- Waste material from slides or other sources shall be placed and compacted in stable locations identified in the road plan or approved by the Contract Administrator, so that sediment will not deliver to any streams or wetlands.
- Slide material and debris shall not be mixed into the road surface materials, unless approved by the Contract Administrator.

### Surface

- Grade and shape the road surface, turnouts, and shoulders to the original shape on the TYPICAL SECTION SHEET to provide a smooth, rut-free traveled surface and maintain surface water runoff in an even, unconcentrated manner.
- Blading shall not undercut the backslope or cut into geotextile fabric on the road.
- If required by the Contract Administrator, water shall be applied as necessary to control dust and retain fine surface rock.
- Surface material shall not be bladed off the roadway. Replace surface material when lost or worn away, or as directed by the Contract Administrator.
- Remove shoulder berms, created by grading, to facilitate drainage, except as marked or directed by the Contract Administrator.
- For roads with geotextile fabric: spread surface aggregate to fill in soft spots and wheel ruts (barrel spread) to prevent damage to the geotextile fabric.

### Drainage

- Prevent silt bearing road surface and ditch runoff from delivering sediment to any streams or wetlands.
- Maintain rolling dips and drivable waterbars as needed to keep them functioning as intended.
- Maintain headwalls to the road shoulder level with material that will resist erosion.
- Maintain energy dissipaters at culvert outlets with non-erodible material or rock.
- Keep ditches, culverts, and other drainage structures clear of obstructions and functioning as intended.
- Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This shall be done even during periods of inactivity.

**FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS**  
**Page 2 of 2**

**Preventative Maintenance**

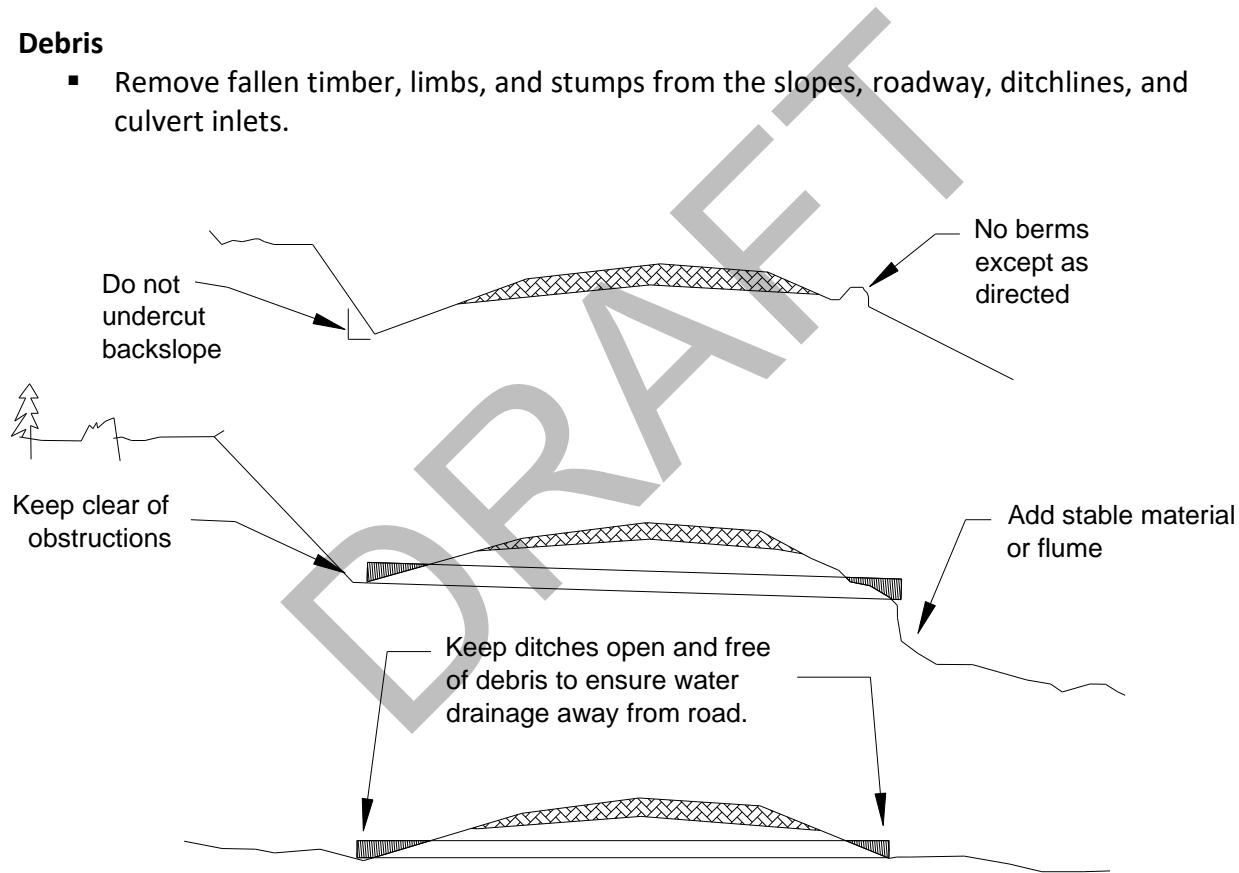
- Perform preventative maintenance work to safeguard against storm damage, such as blading to ensure correct runoff, ditch and culvert cleaning, and waterbar maintenance.

**Termination of Use or End of Season**

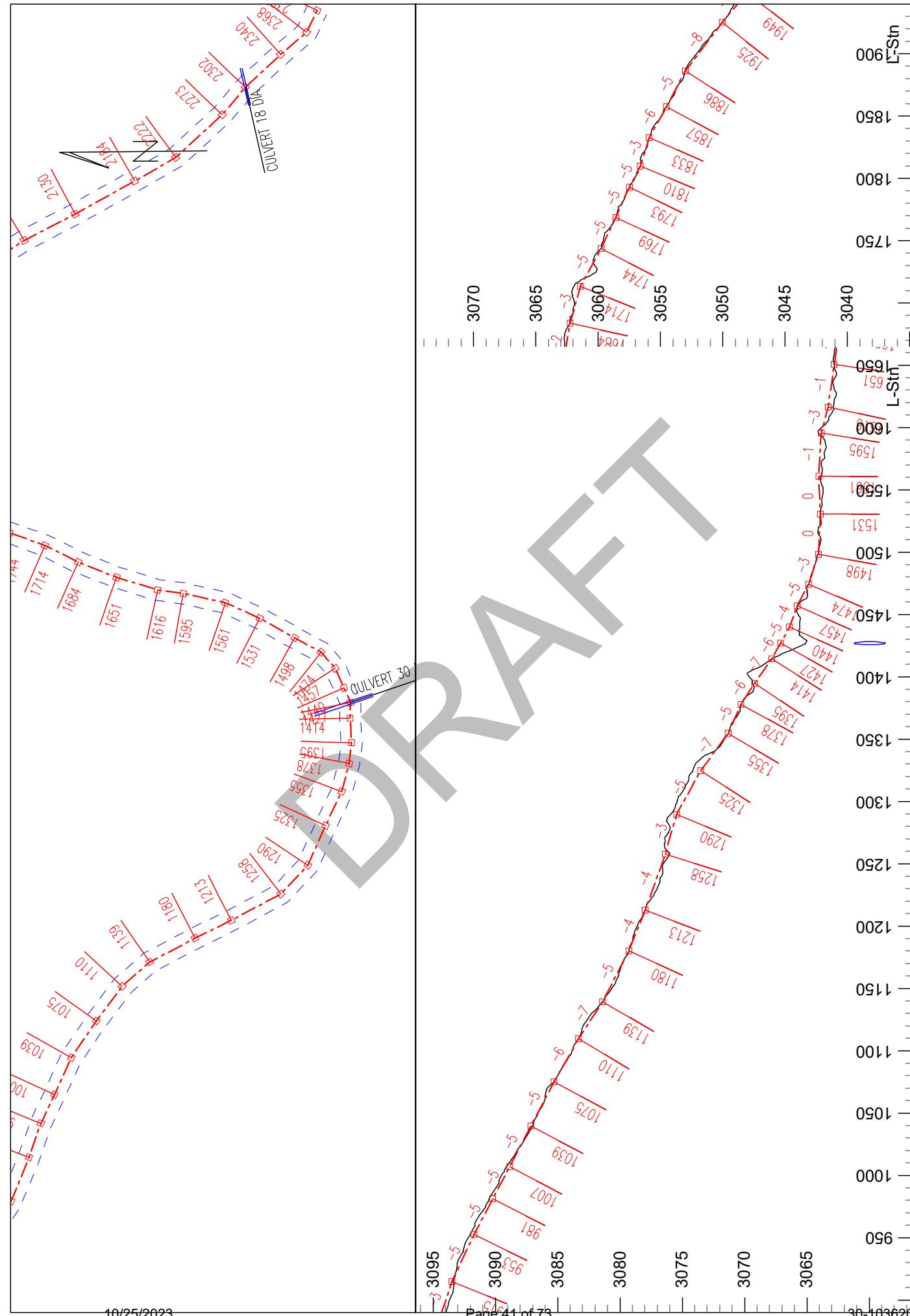
- At the conclusion of logging operations, ensure all conditions of these specifications have been met.

**Debris**

- Remove fallen timber, limbs, and stumps from the slopes, roadway, ditchlines, and culvert inlets.







10/25/2023

Page 41 of 73

Sylvan Pearl Timber Sale  
5476-1  
Contract #: 30-103620  
\*Remote design using LiDAR data\*

30-103620



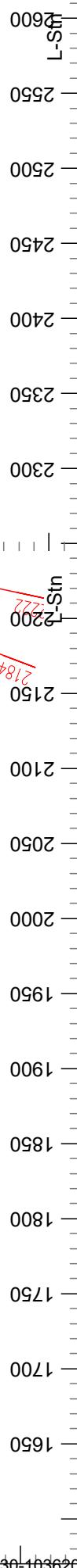
**NATURAL RESOURCES**  
WASHINGTON STATE DEPARTMENT OF

Engineer: J. Gardner  
23/08/18

Plan Scale 1:1200
Profile Vert Scale 1:120
Profile Horz Scale 1:1200

Page 2 of 3

10/25/2023



Sylvan Pearl Timber Sale  
5476-1  
Contract #: 30-103620  
\*Remote design using LiDAR data\*

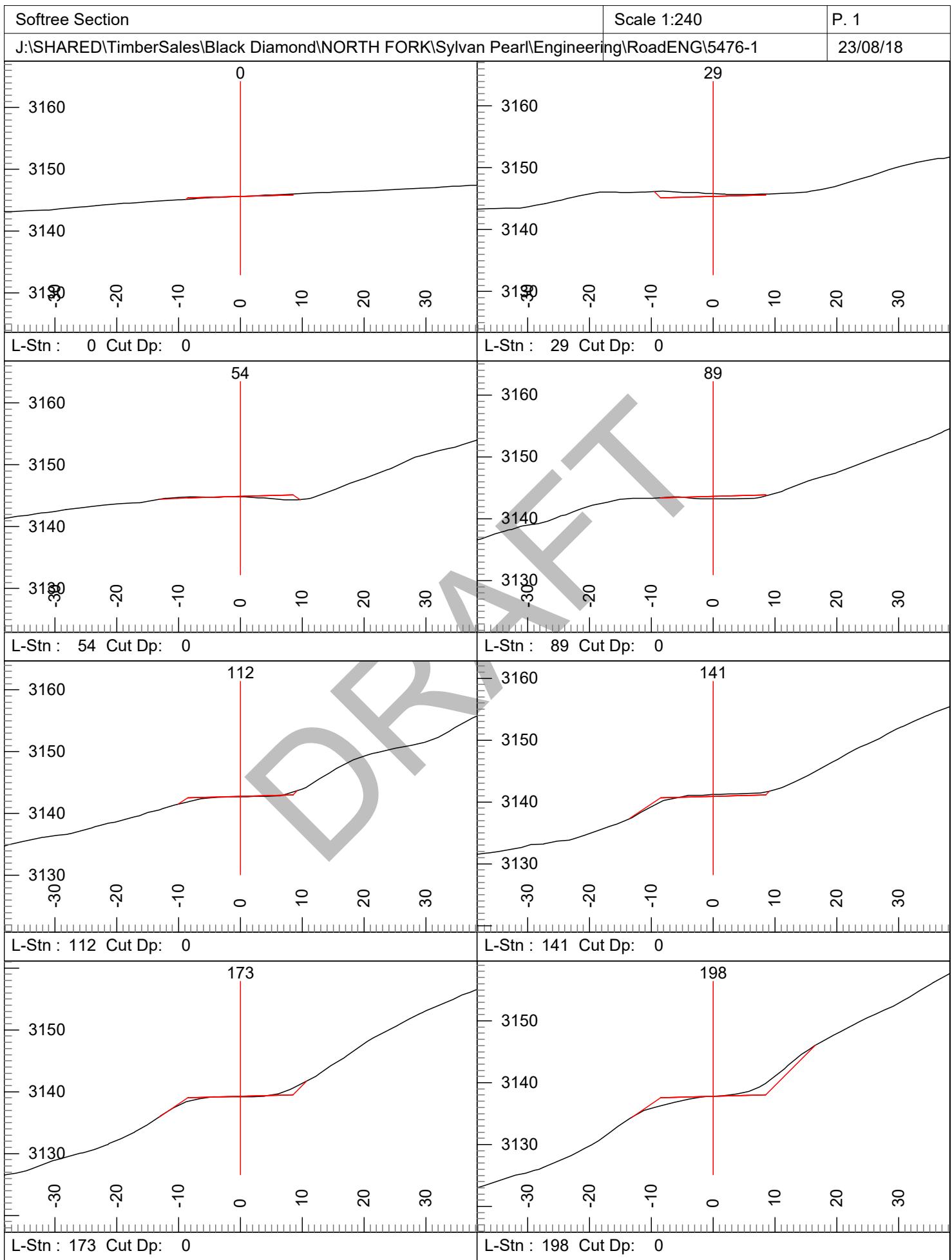


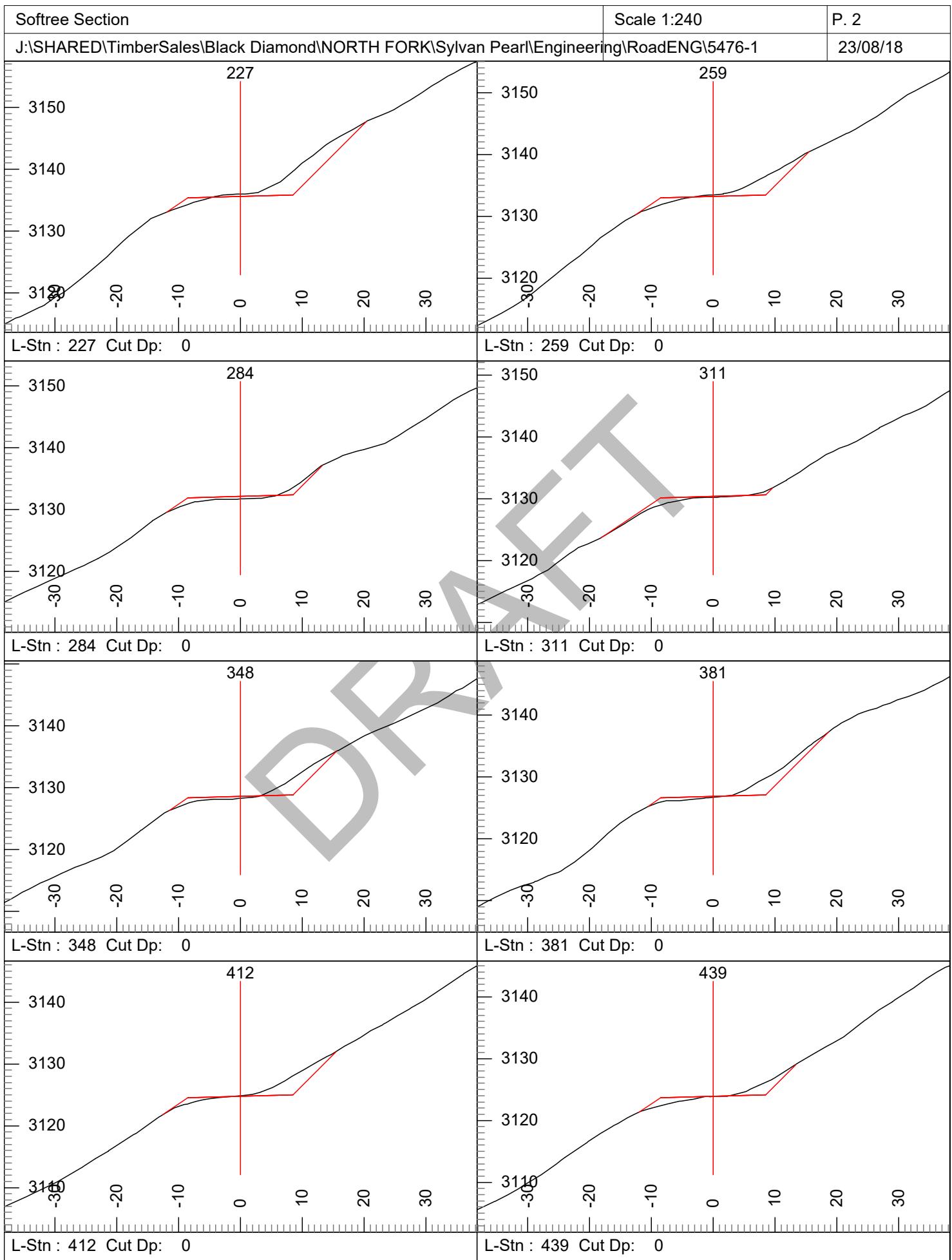
WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

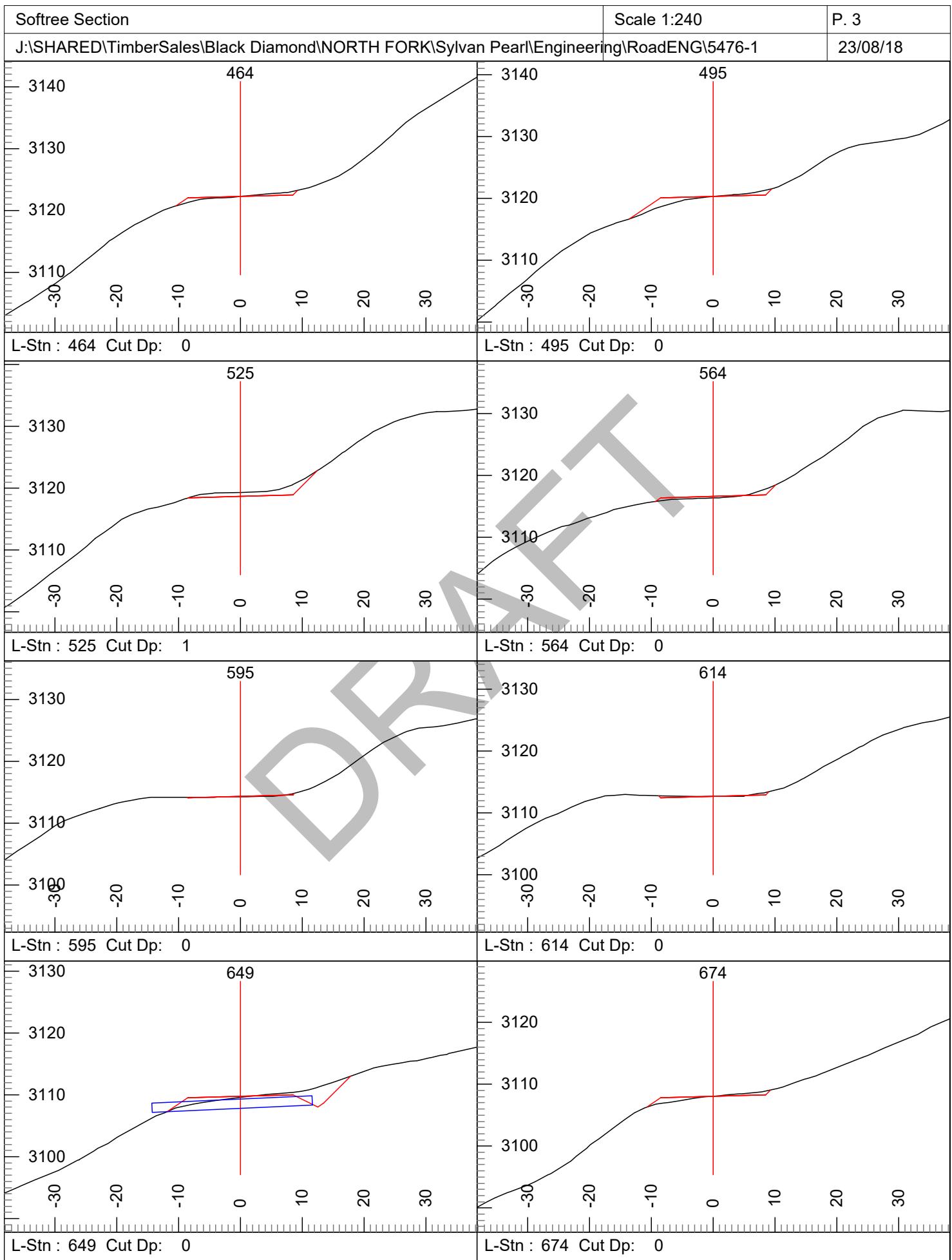
Engineer: J. Gardner  
23/08/18

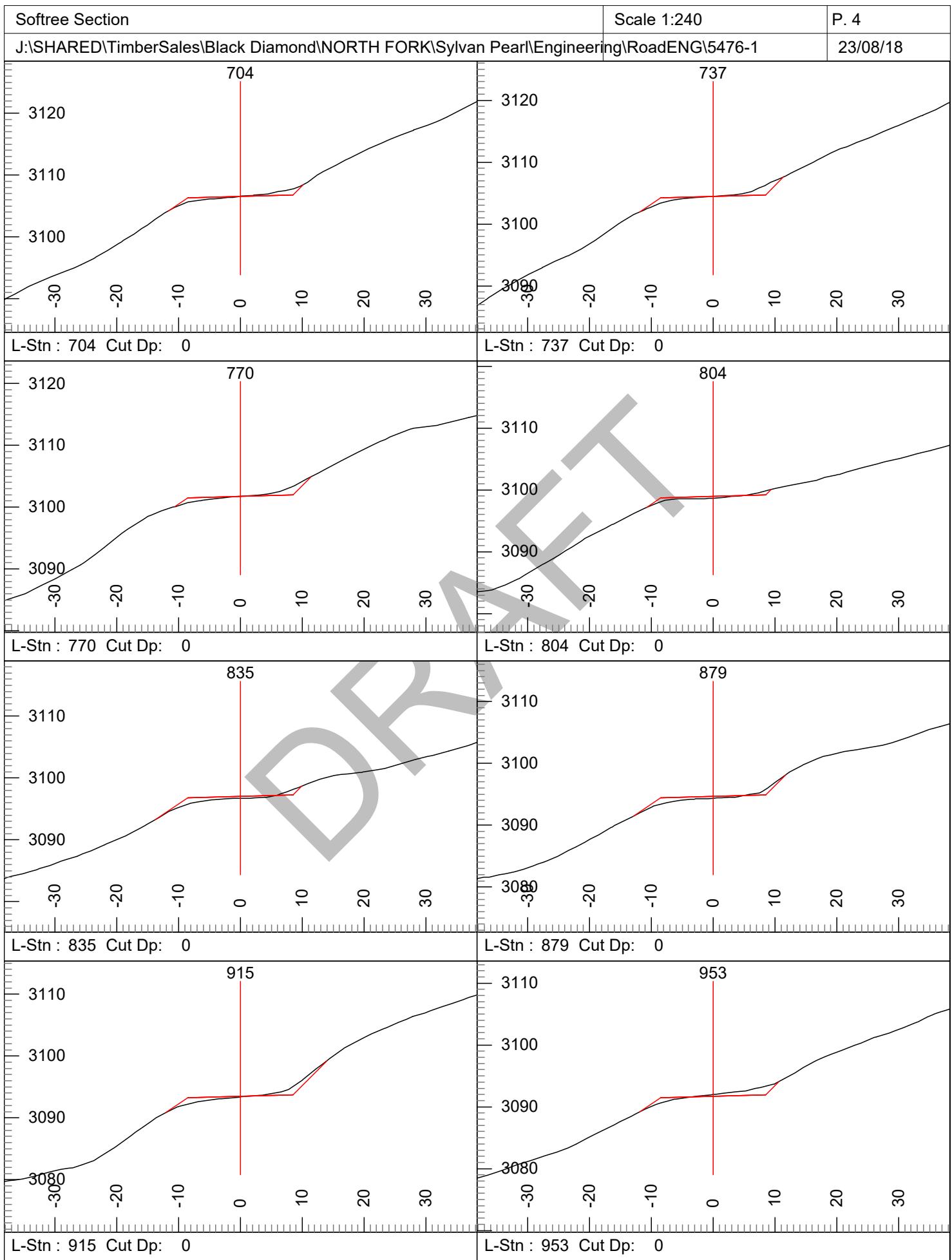
Plan Scale 1:1200  
Profile Vert Scale 1:120  
Profile Horz Scale 1:1200

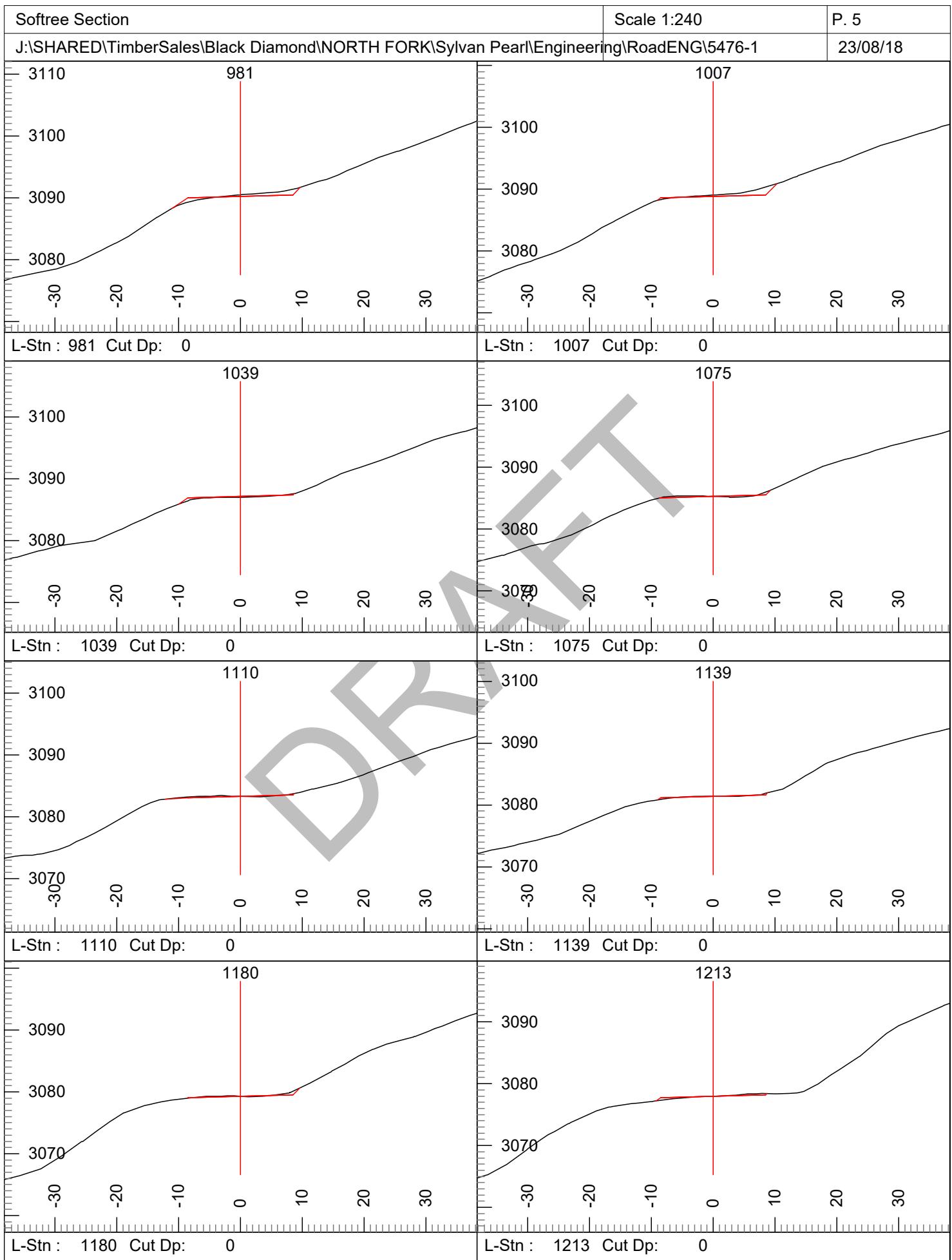
Page 3 of 3

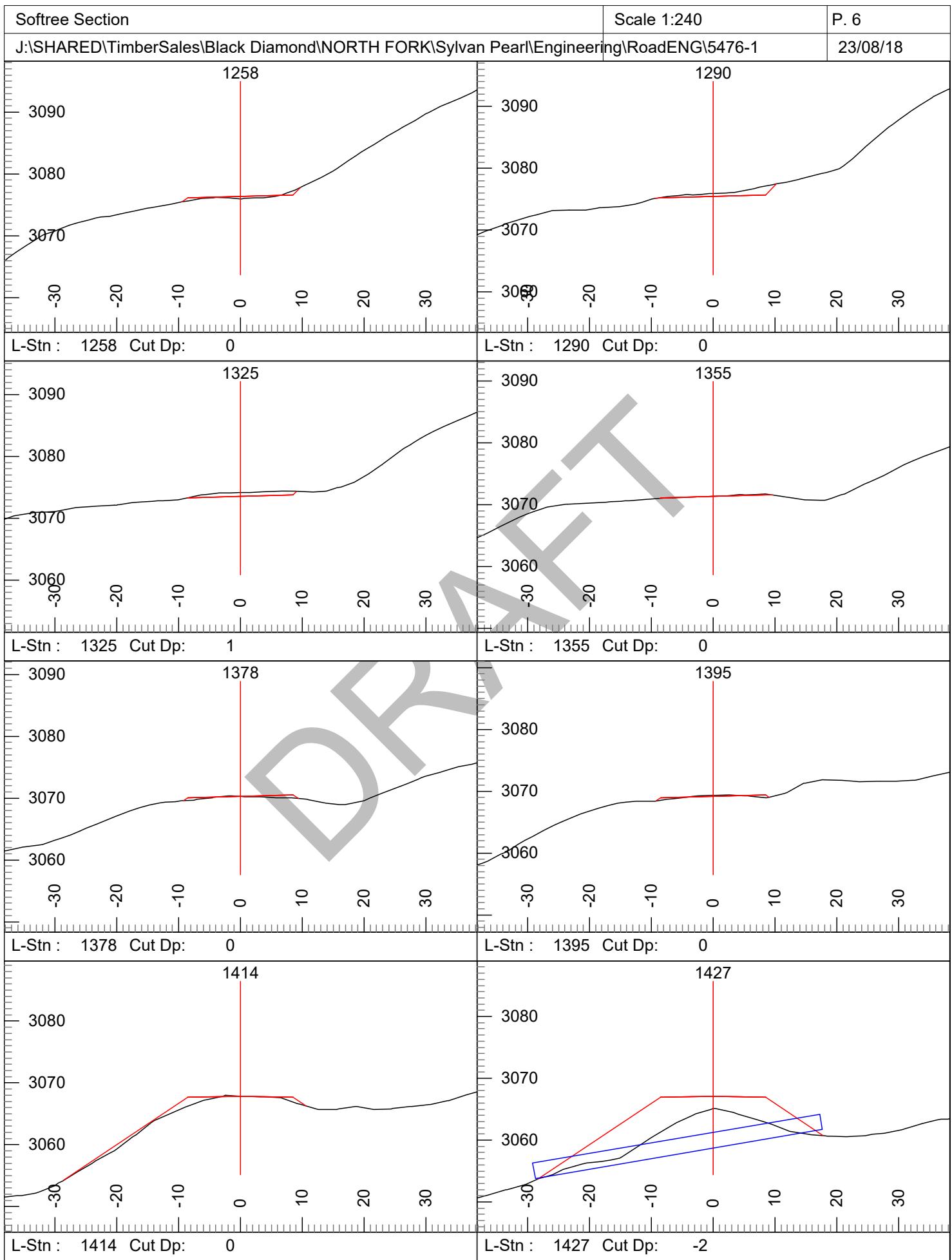


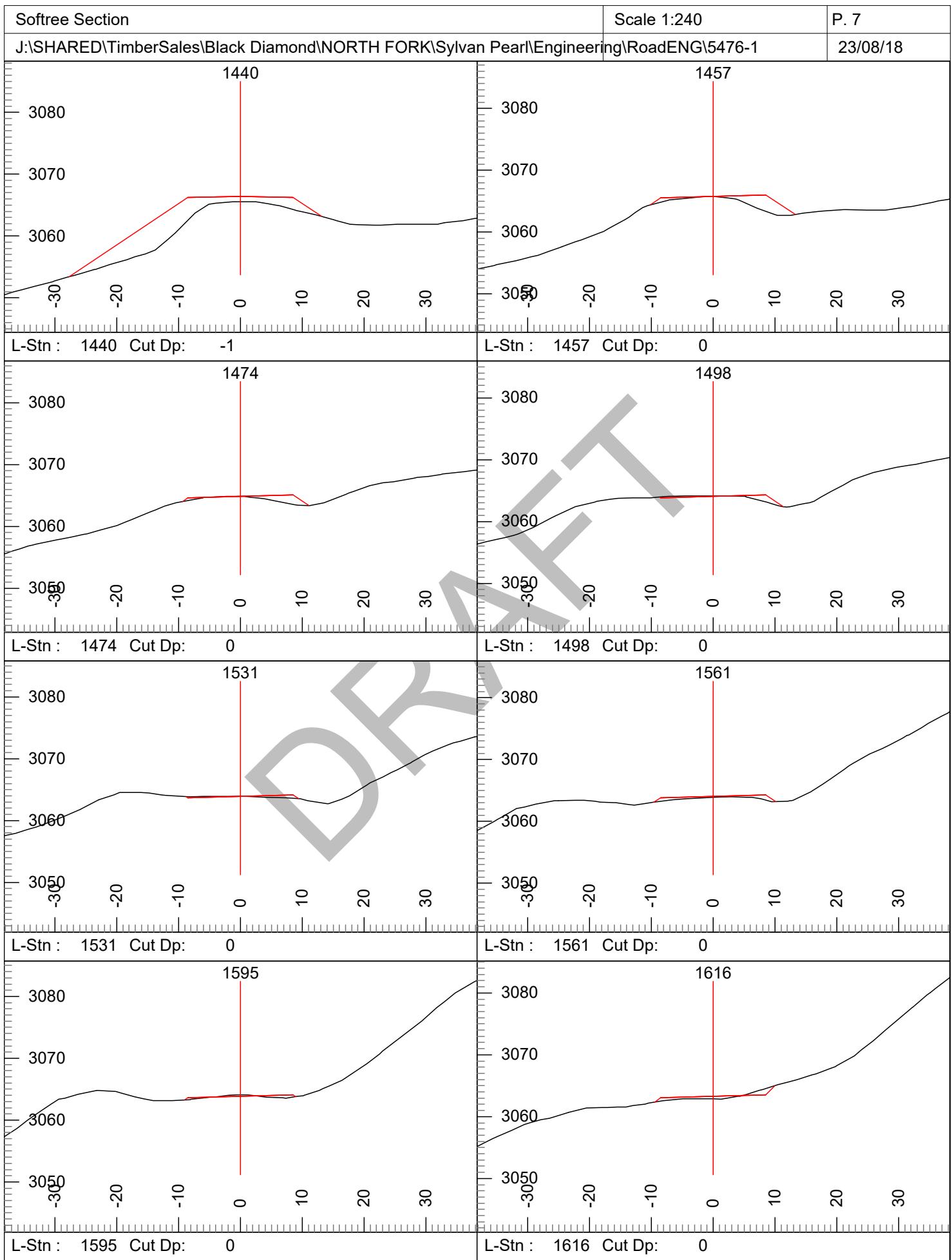


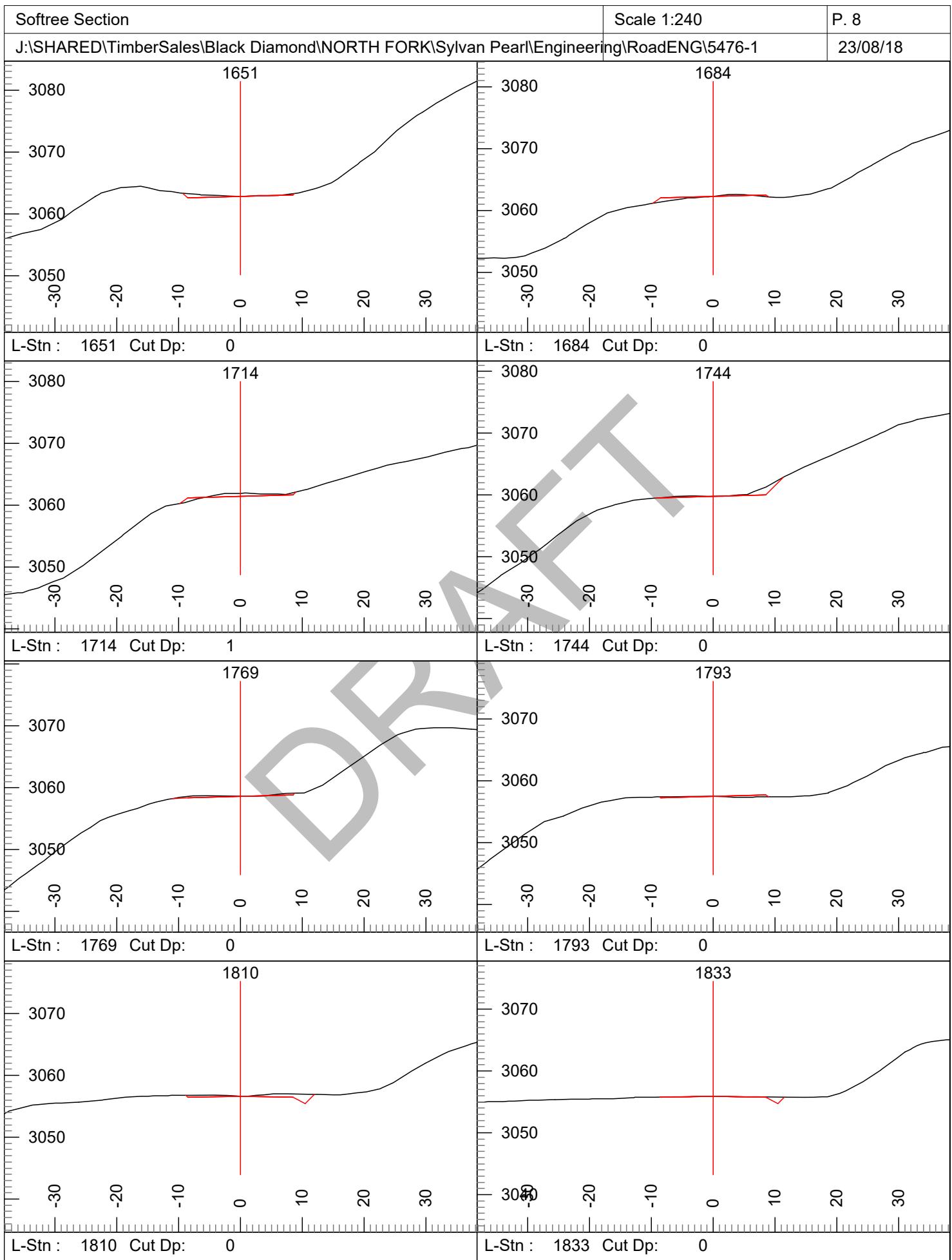


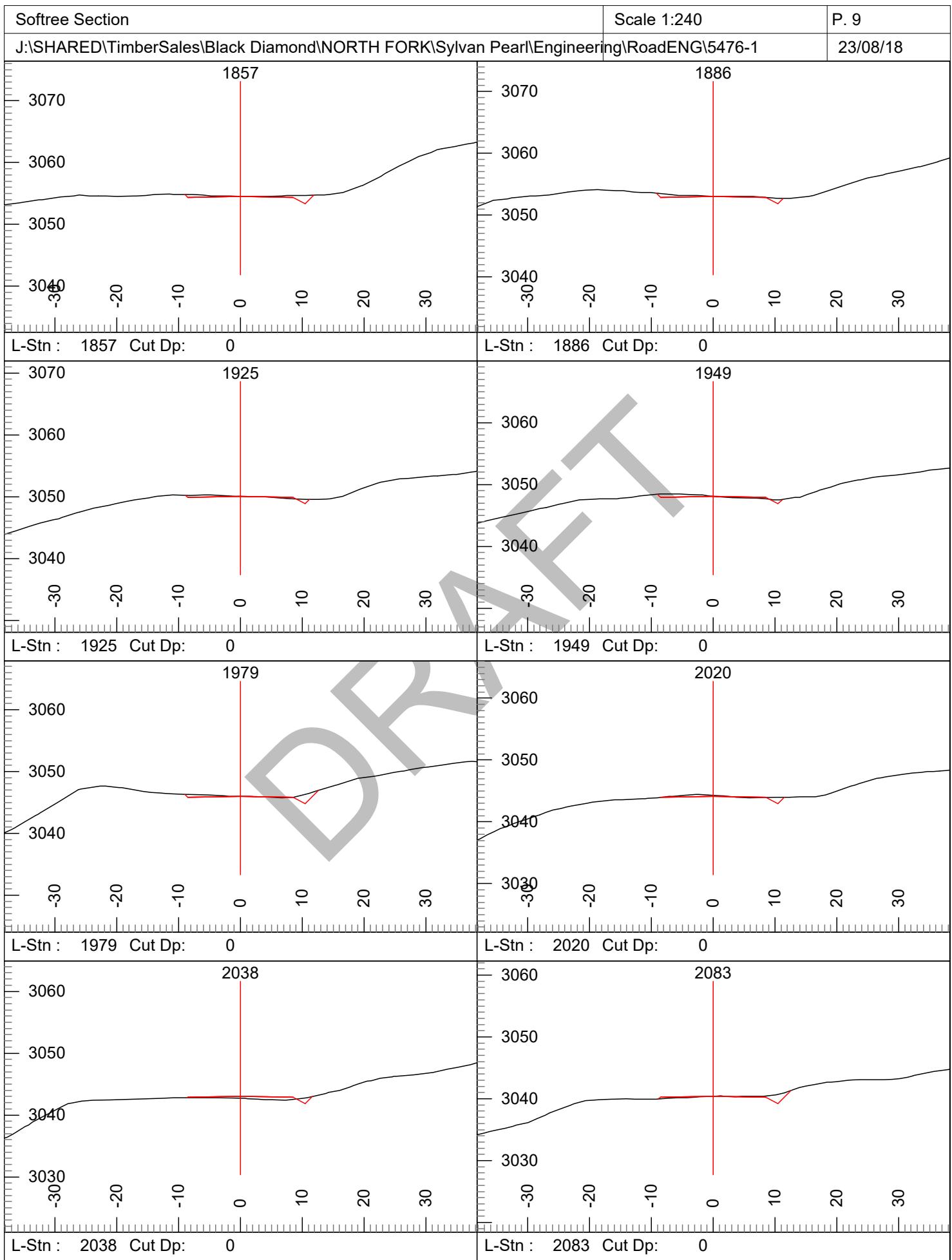


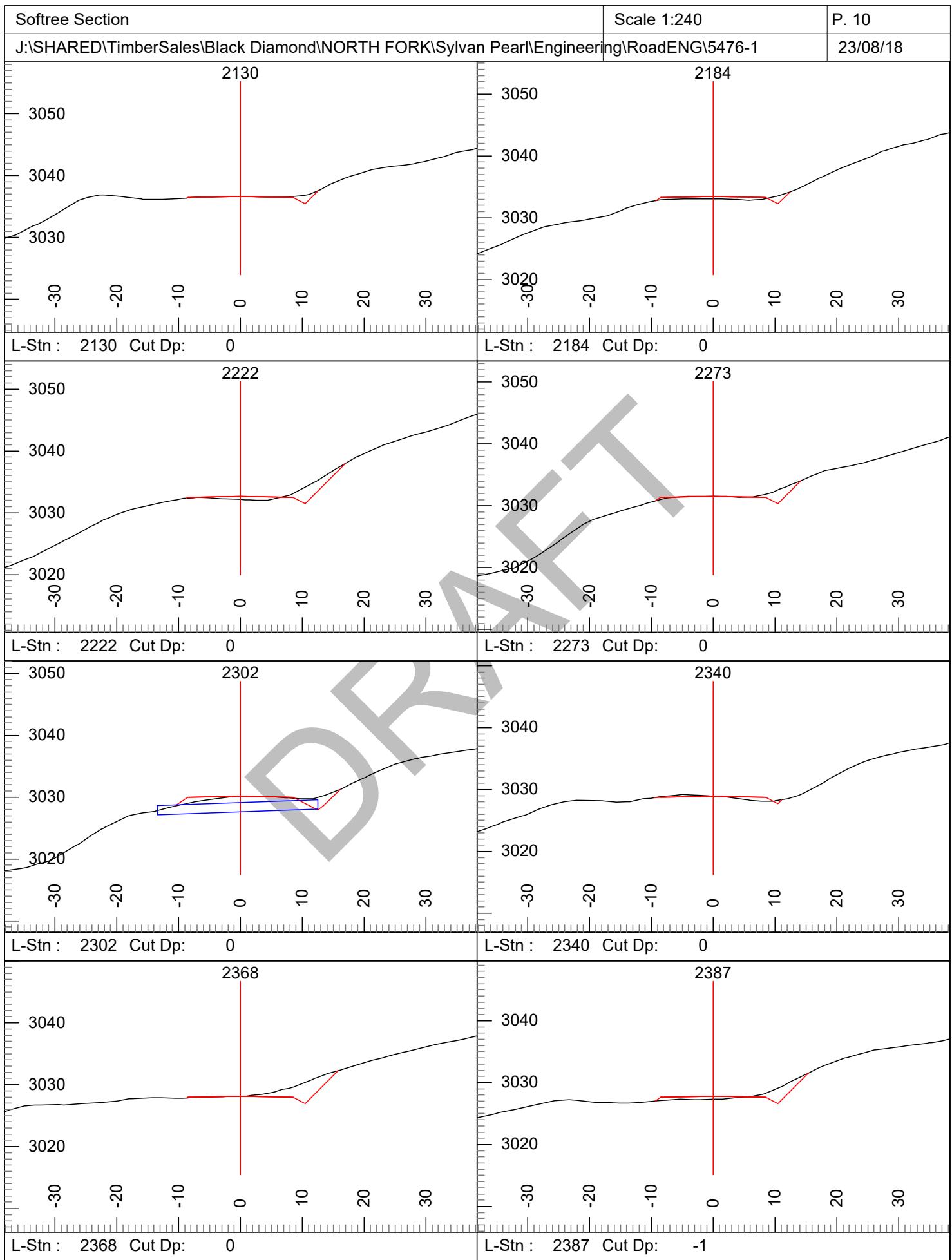


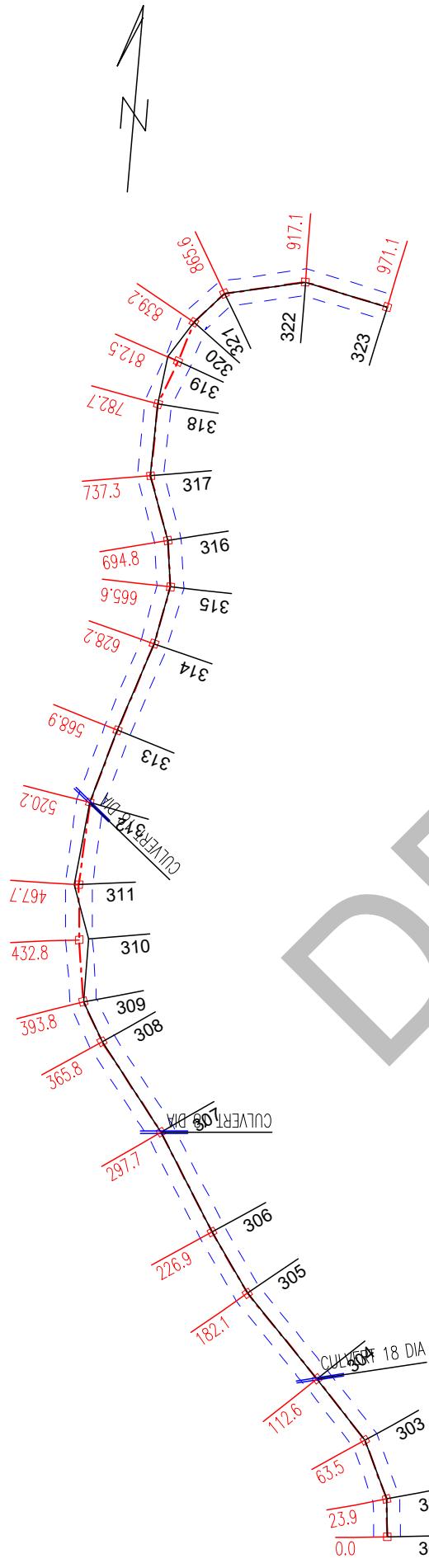




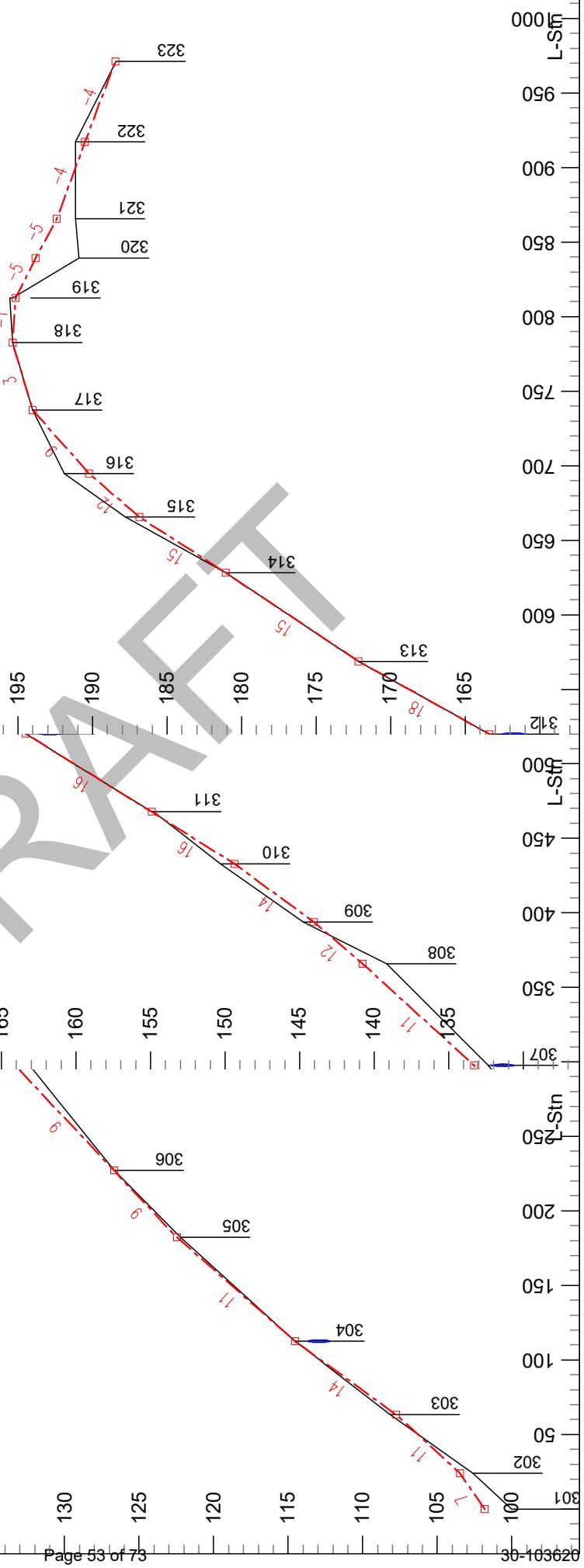








10/25/2023



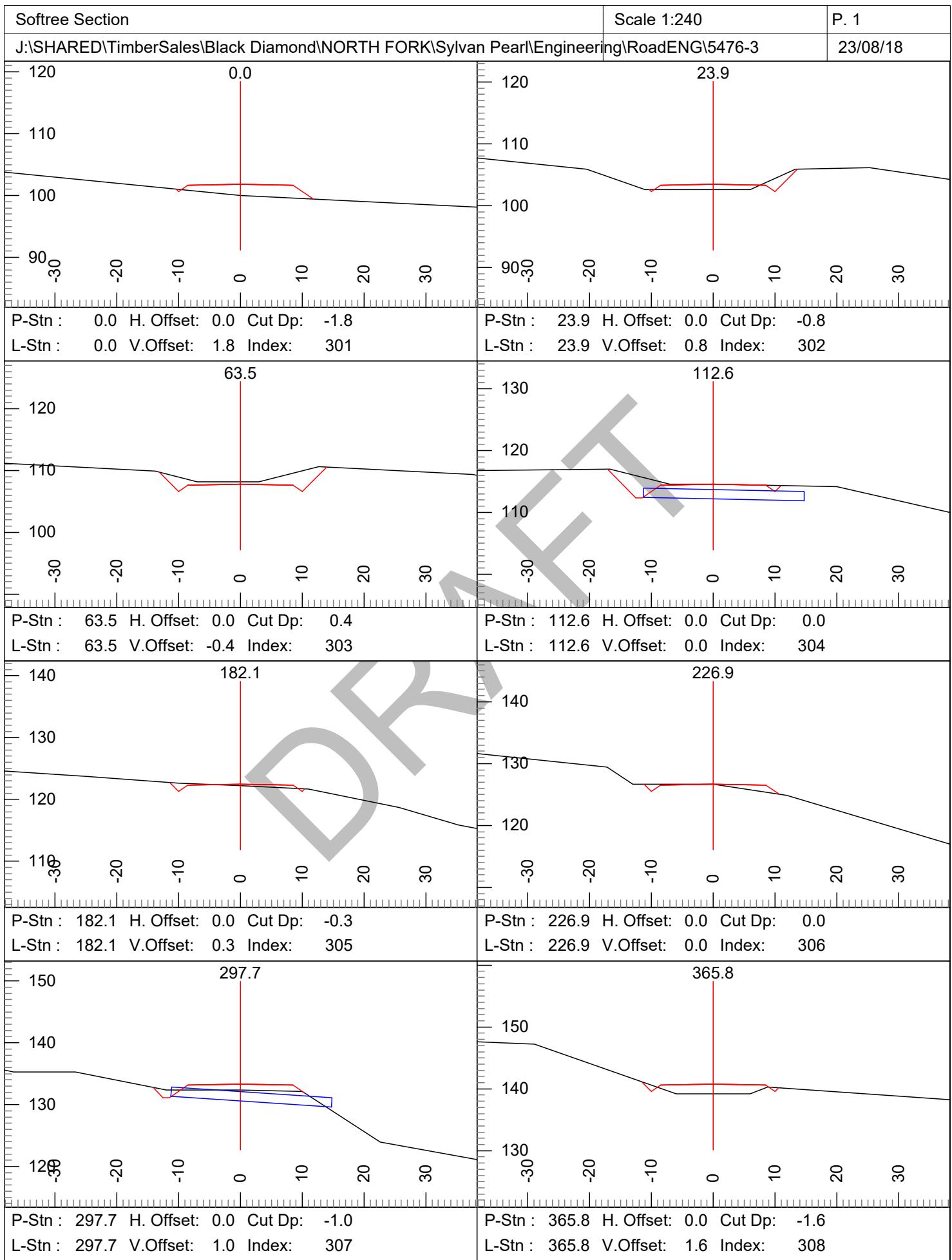
Page 53 of 73

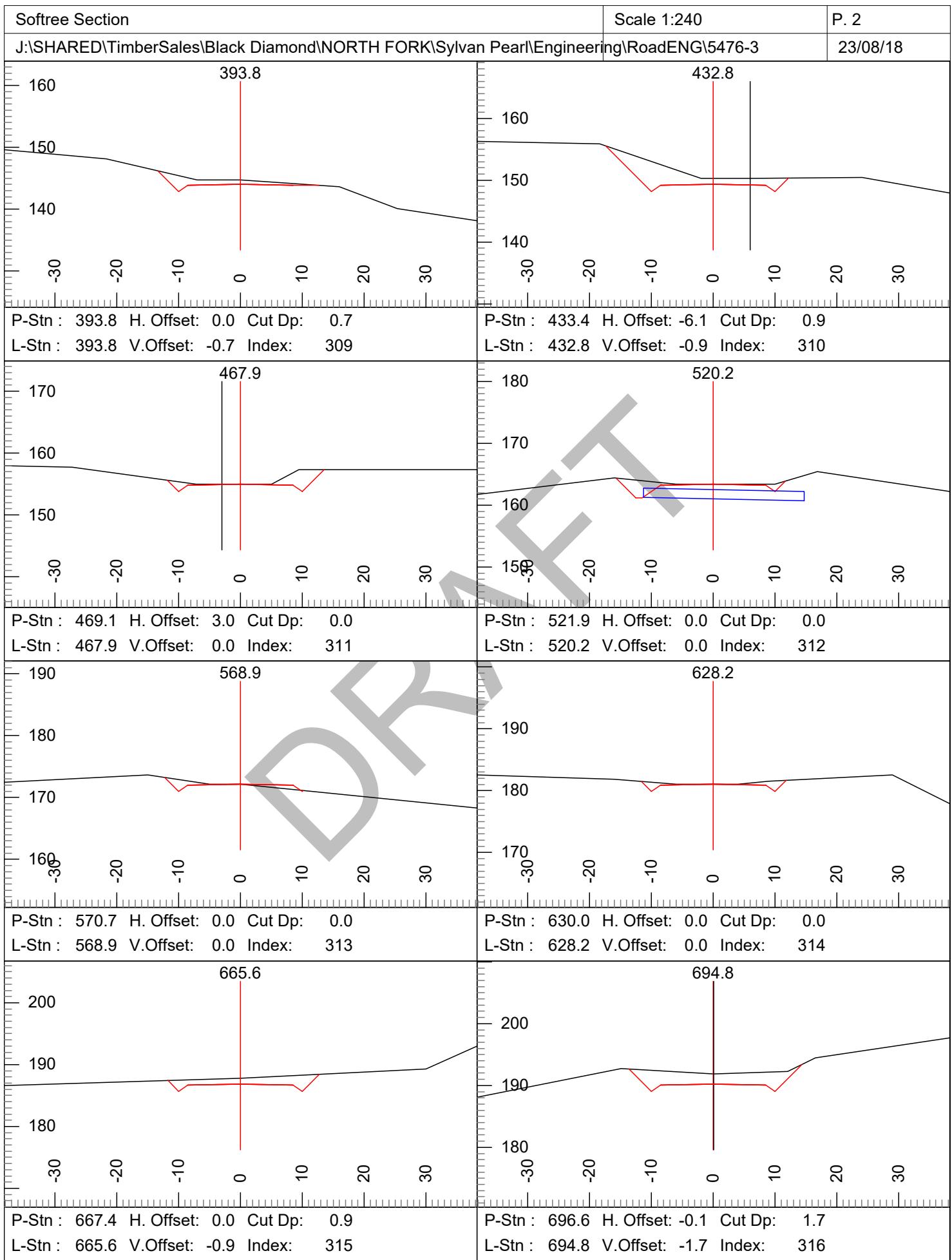
Sylvan Pearl Timber Sale  
5476-3  
Contract #: 30-103620

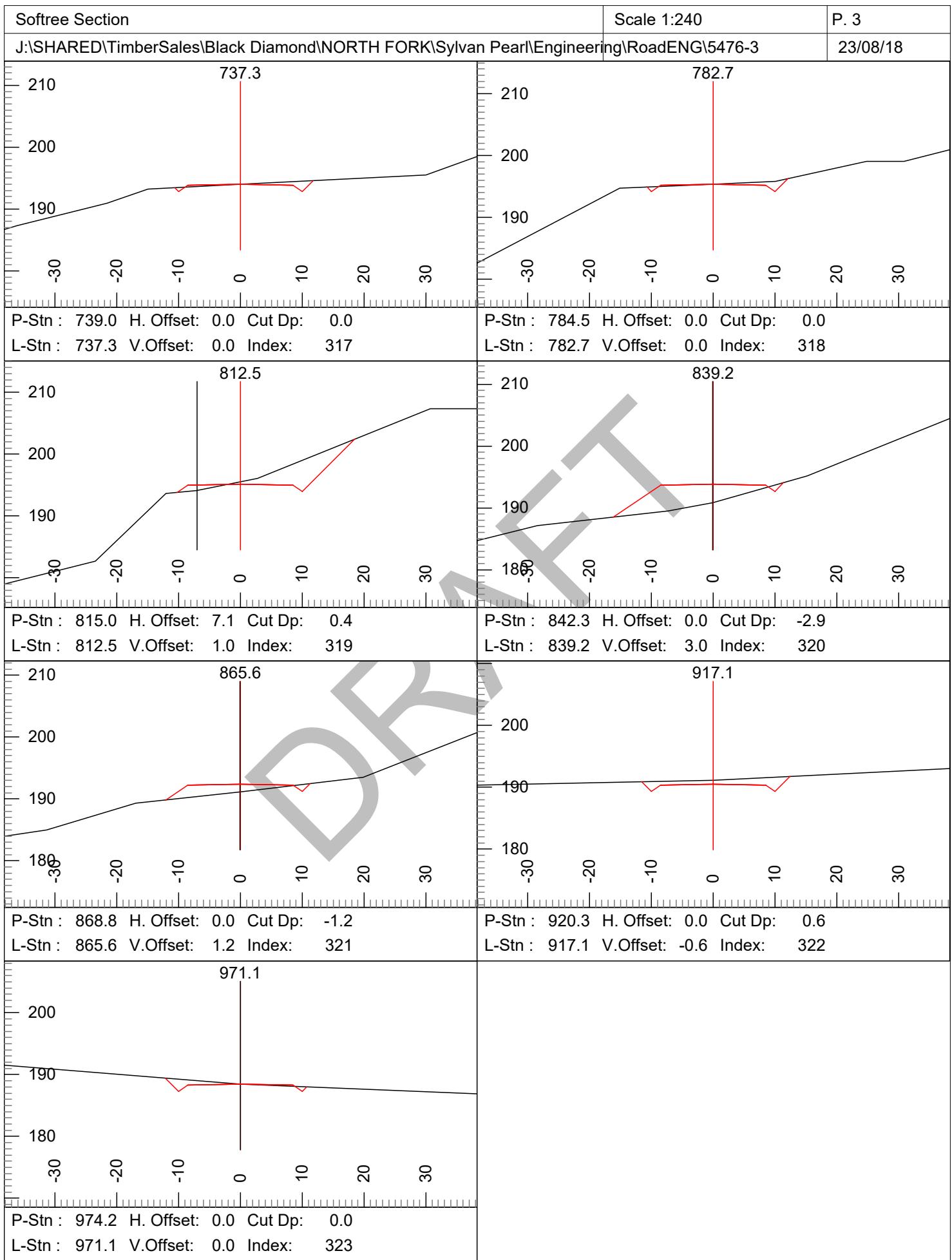


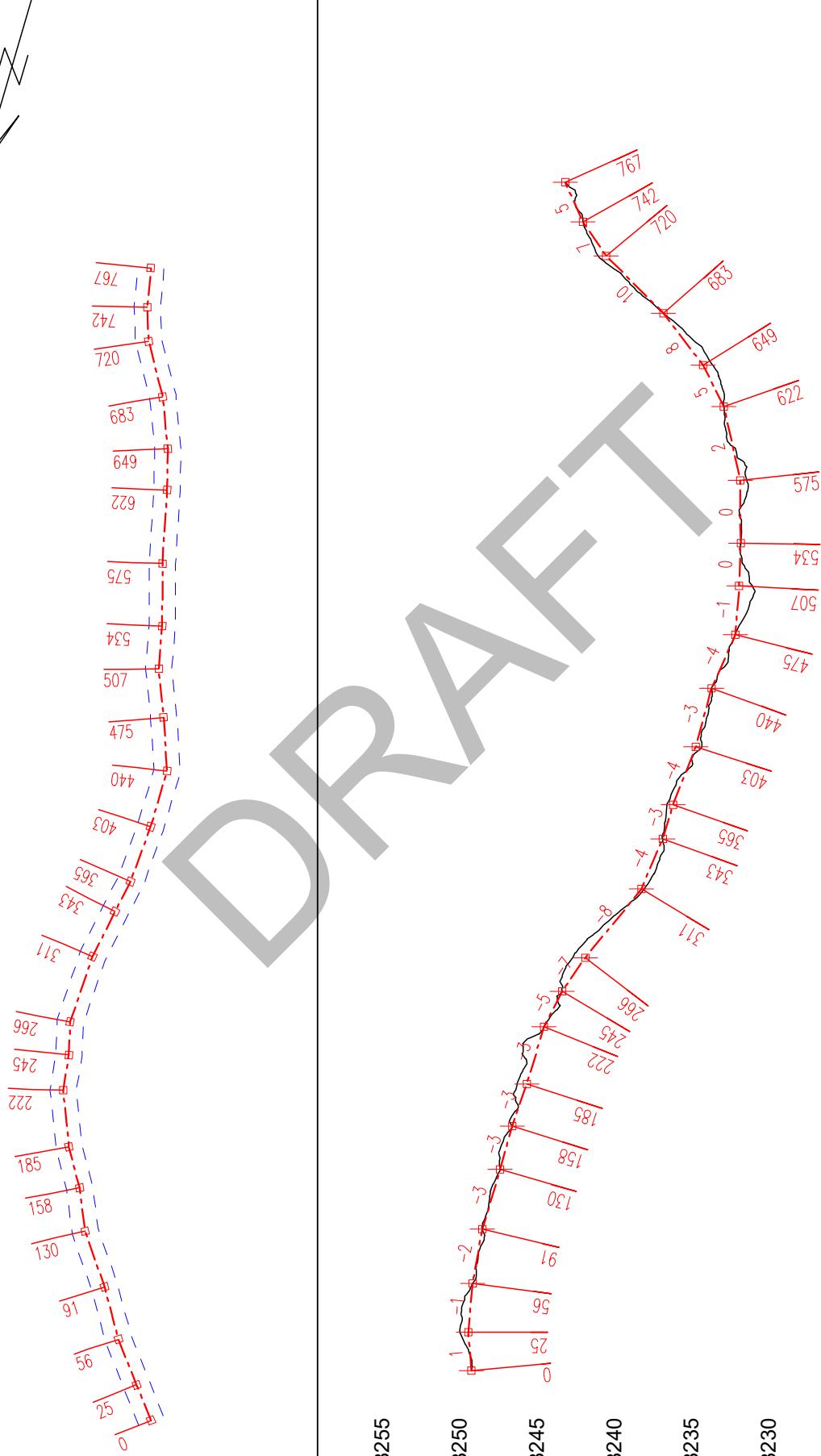
Plan Scale 1:1200  
Profile Vert Scale 1:120  
Profile Horz Scale 1:1200

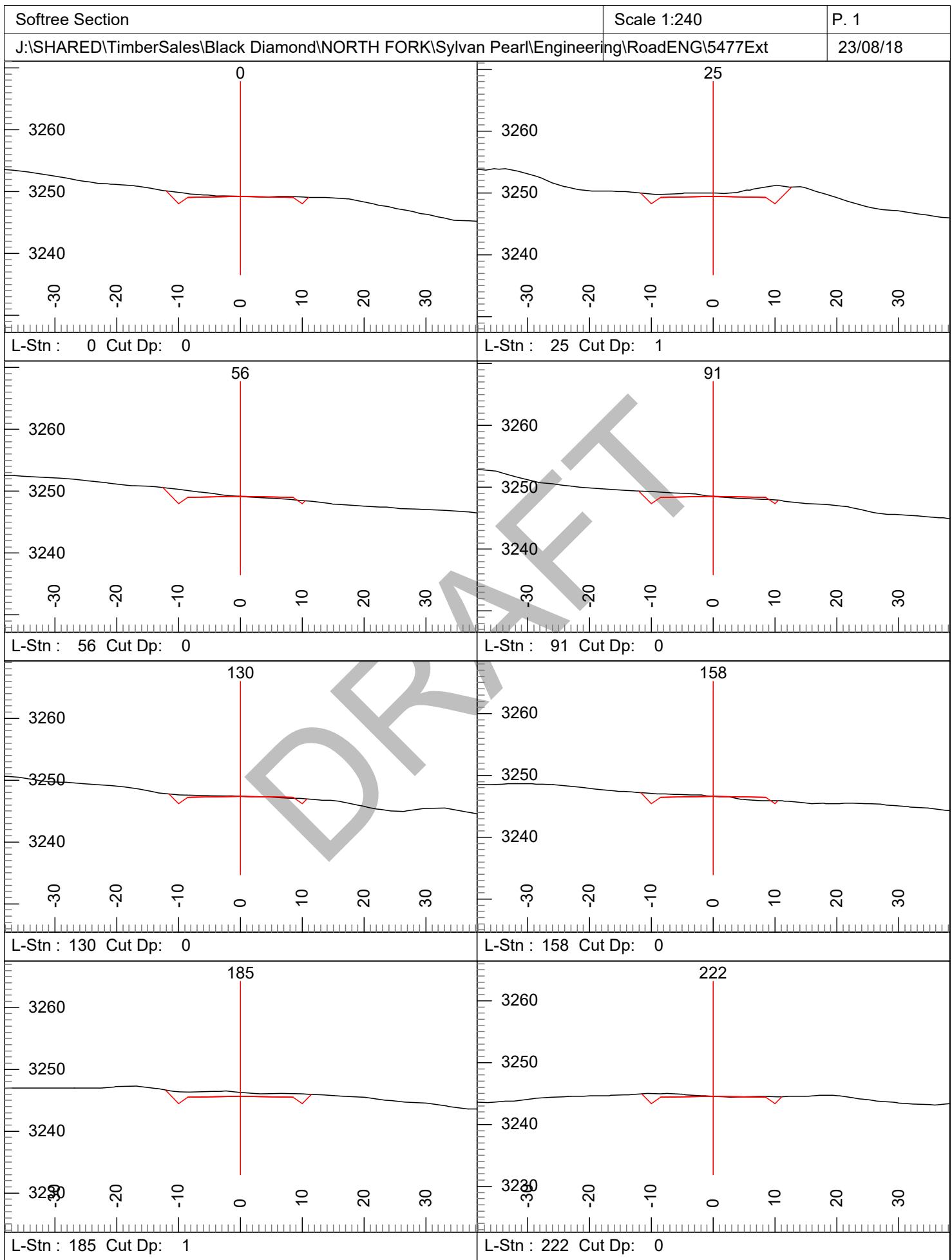
Engineer: J. Gardner  
23/08/18  
Page 1 of 1

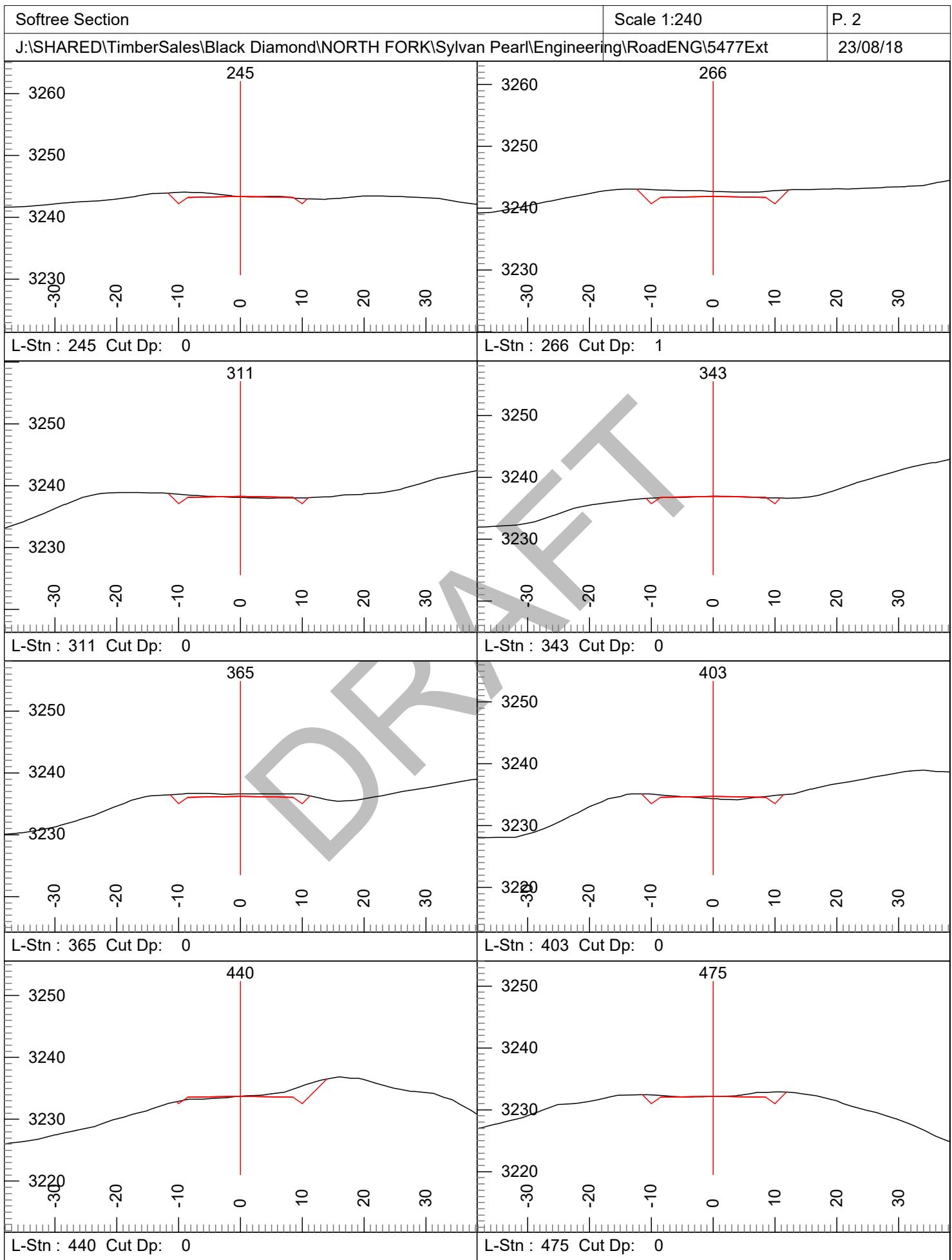


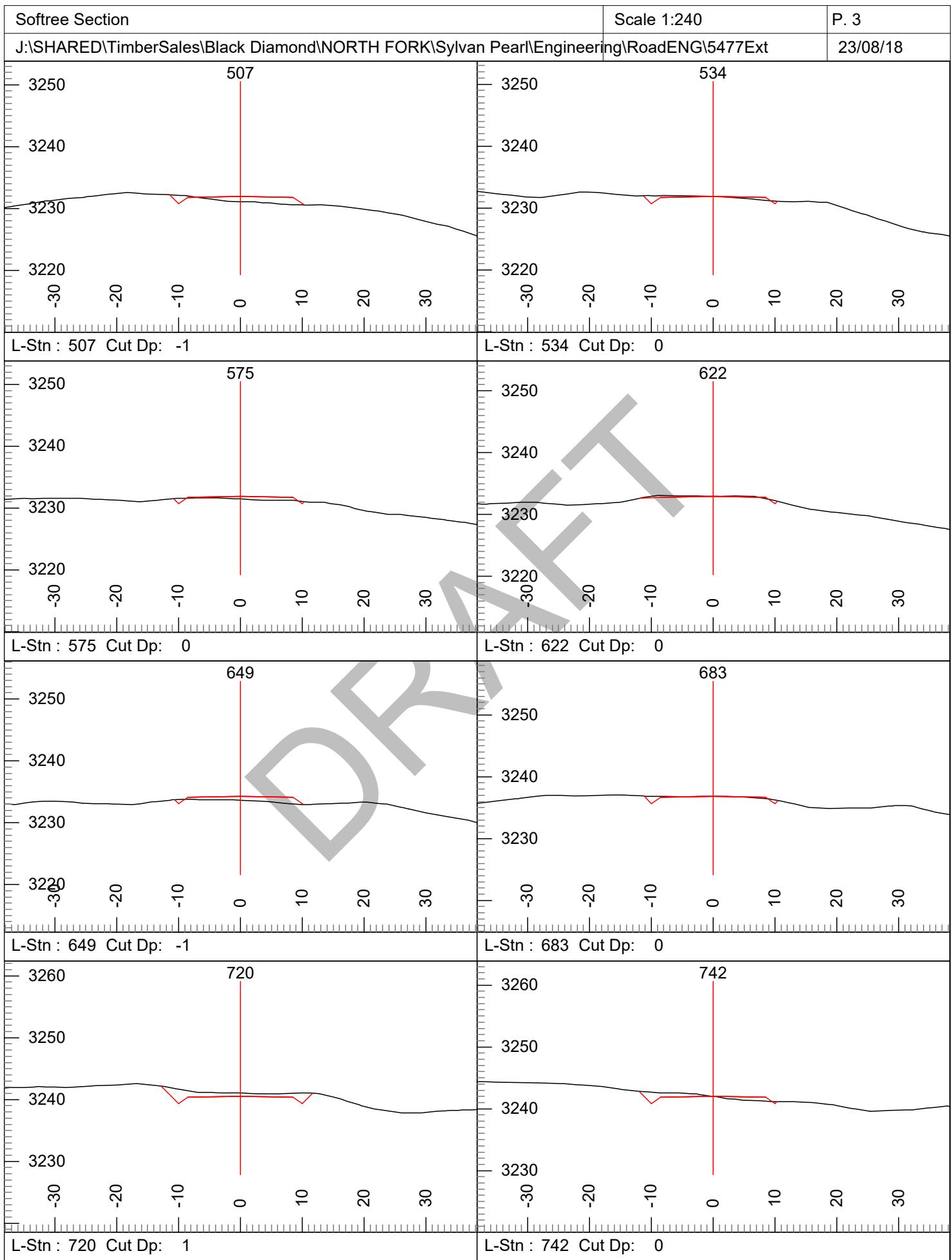


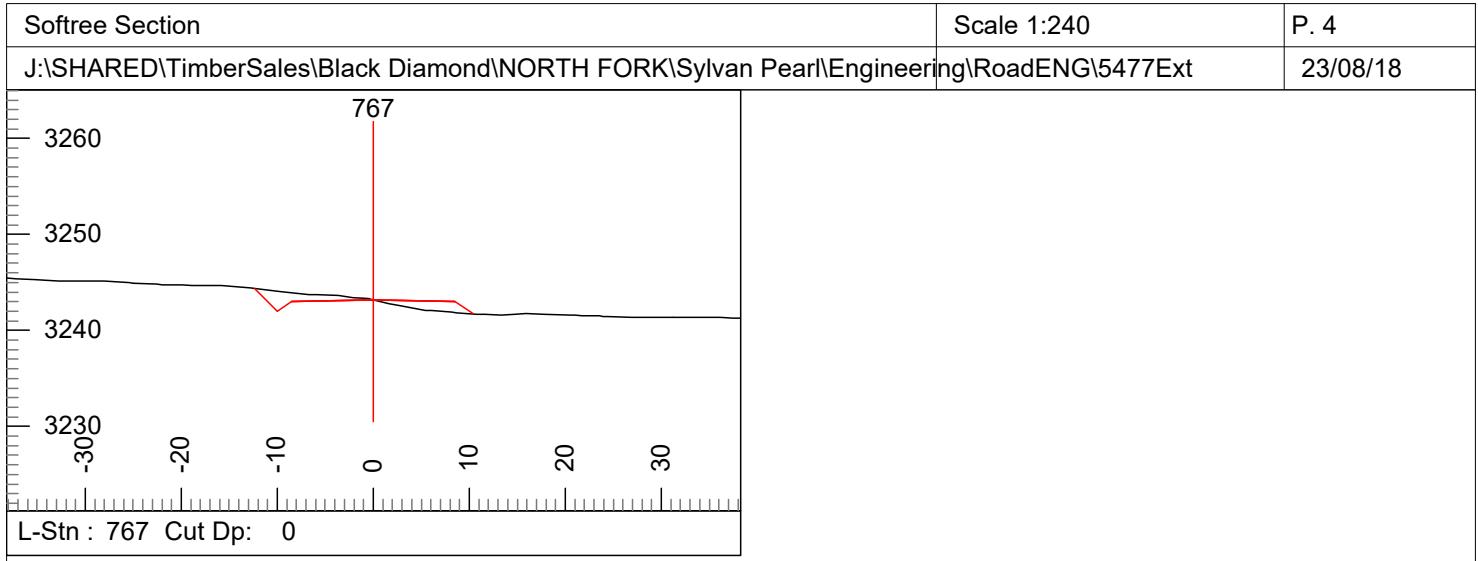












DRAFT

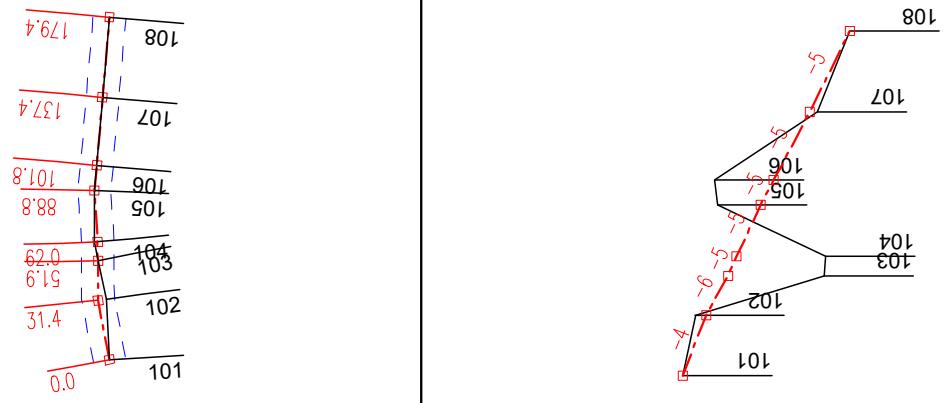
WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

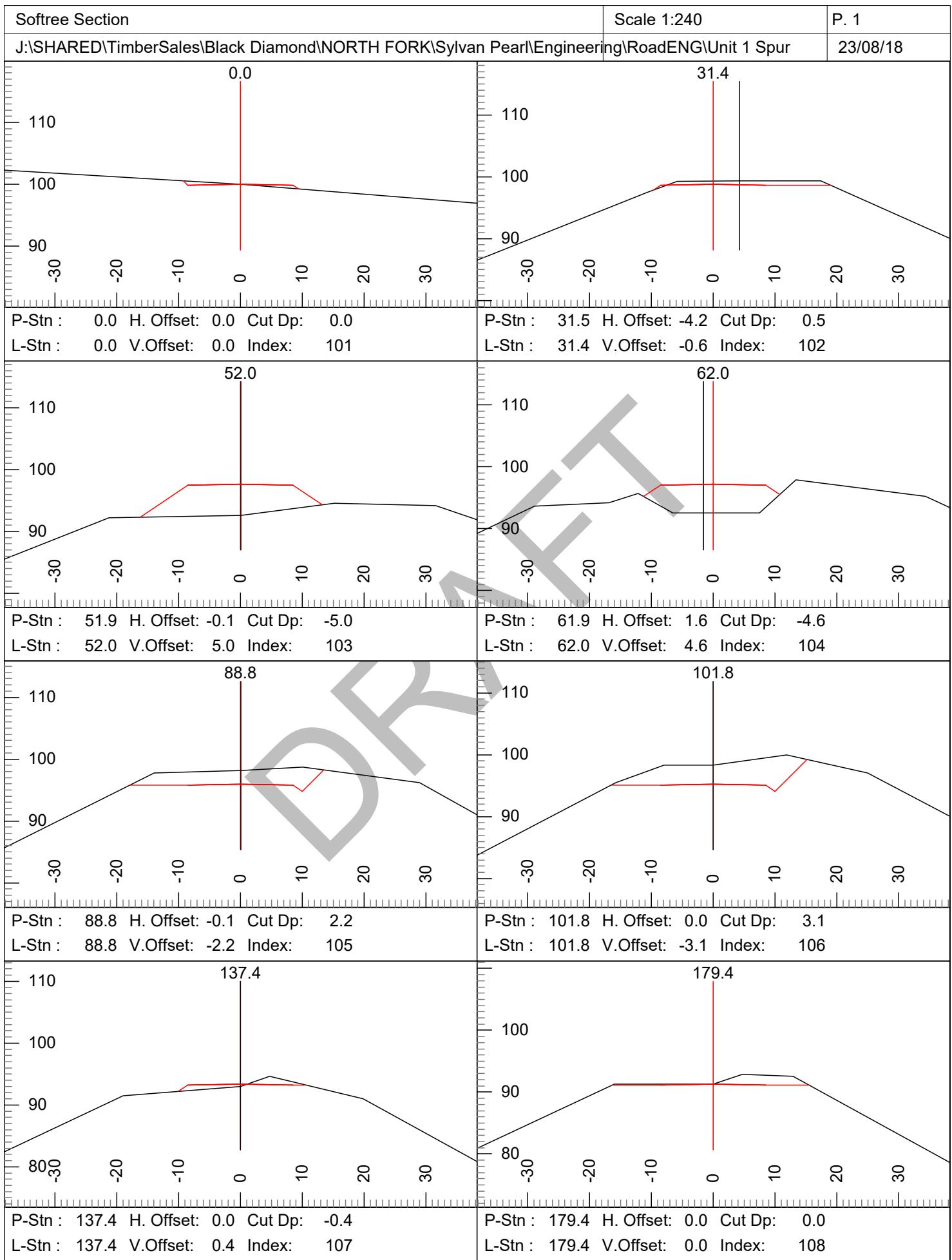


Sylvan Pearl Timber Sale  
Unit 1 Spur  
Contract #: 30-103620

Plan Scale 1:1200  
Profile Vert Scale 1:120  
Profile Horz Scale 1:1200

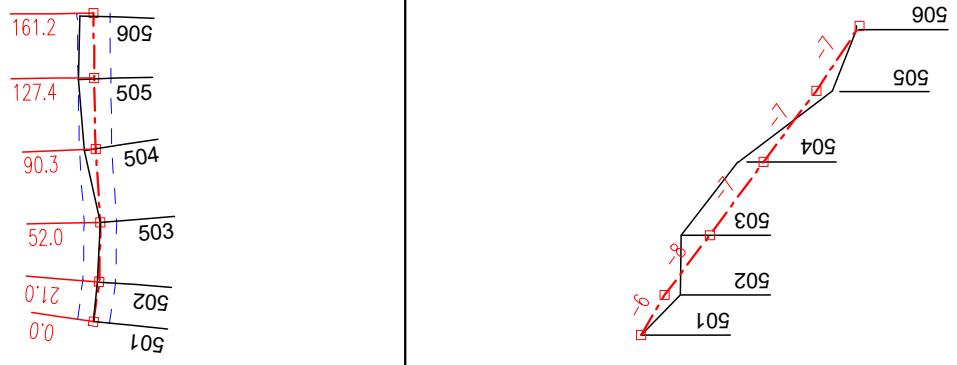
Engineer: J. Gardner  
23/08/18  
Page 1 of 1





A hand-drawn sketch of a lightning bolt, consisting of a long diagonal line with a jagged, zig-zagging stroke extending from its middle.

DRAFT



10/25/2023

Page 64 of 73

950  
900  
850  
800  
750  
700  
650  
600  
550  
500  
450  
400  
350  
300  
250  
200  
150  
100  
50  
0

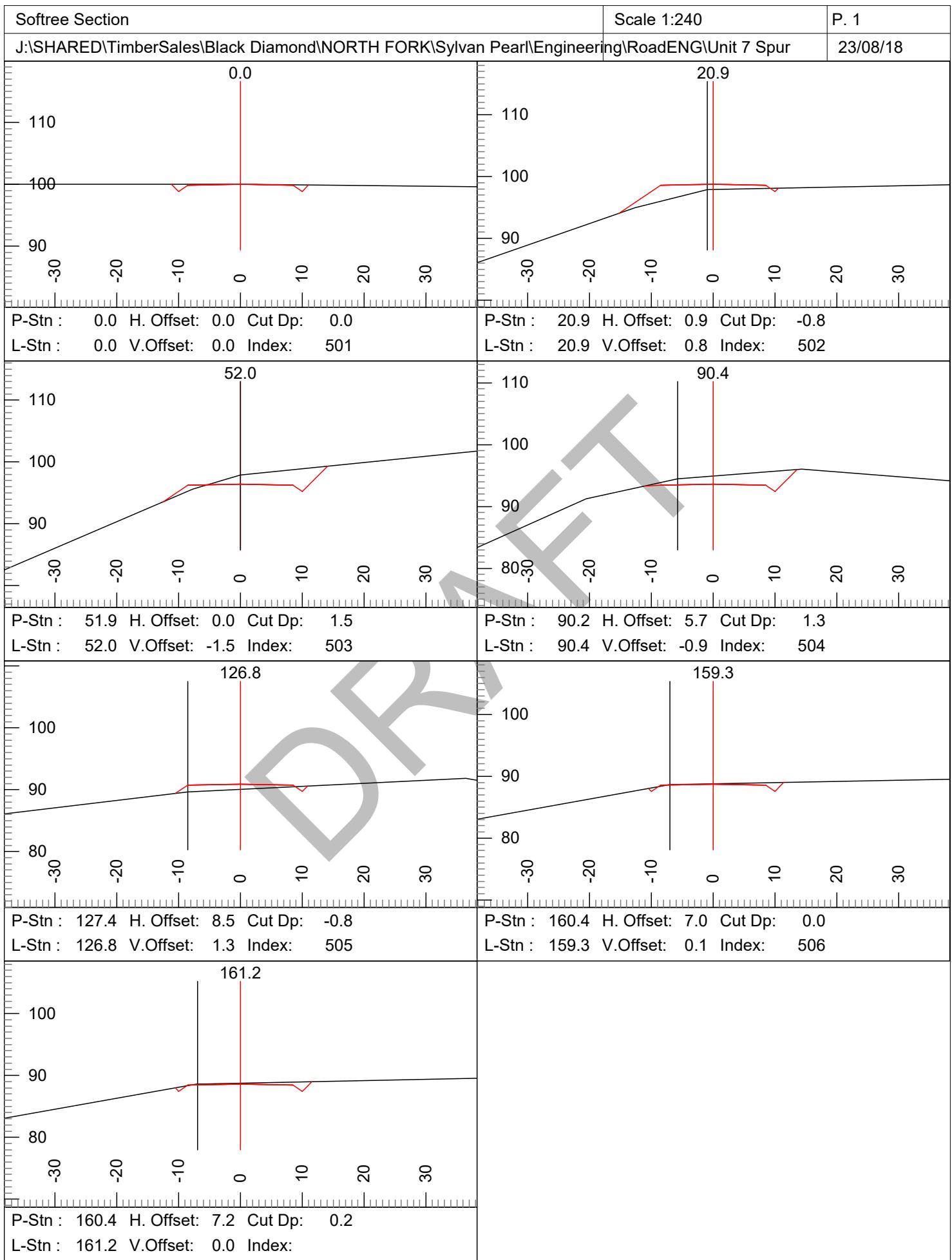
Sylvan Pearl Timber Sale  
Spur 7 Spur  
Contract #: 30-103620



WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

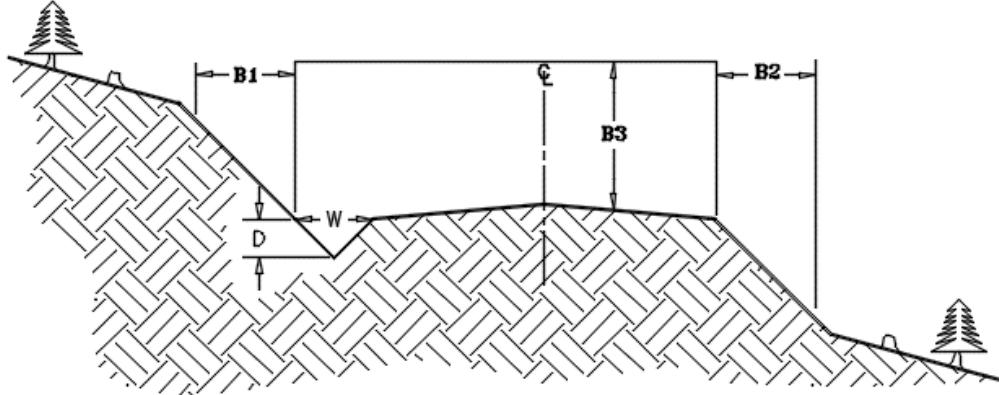
Engineer: J. Gardner  
23/08/18

Plan Scale 1:1200  
Profile Vert Scale 1:120  
Profile Horz Scale 1:1200



## BRUSHING DETAIL

*(not to scale)*



### BRUSHING LIST

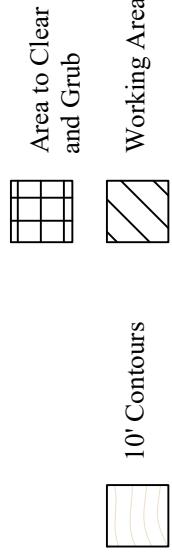
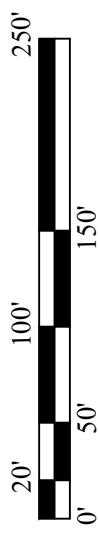
Road Number	Stations	Road Width (feet)	Ditch		Brushing Limits (feet)			Remarks <u>In addition to brushing...</u>
			Width (feet)	Depth (feet)	W	D	B1	
5470 Alt	0+00 to 16+90	variable	3	1	5	5	14	Remove brush an extra 16 feet on the inside of curves to provide extra visibility on switchbacks and curves
5477	26+25 to 32+65	variable	3	1	5	5	14	
5477-4	0+00 to 1+75	variable	3	1	5	5	14	

B1 extends horizontally the specified distance in feet from the back of the ditch. B2 extends horizontally the specified distance in feet from the outside edge of the running surface. Brush is defined as all non-merchantable vegetative material found within the specified limits. Brush must be cut to a height of 3 inches above the ground. Brush that is cut shall be removed to the downhill side of the road and placed such that it will not block ditches, ditch-outs, or drainage structures. Signs, culverts, culvert location markers, or any other identification features damaged by brushing shall be replaced at the Purchasers expense.

LOAD N GO PIT DEVELOPMENT PLAN  
SE ¼, NW ¼, Section 20, Township 21 North, Range 09 East, W.M.

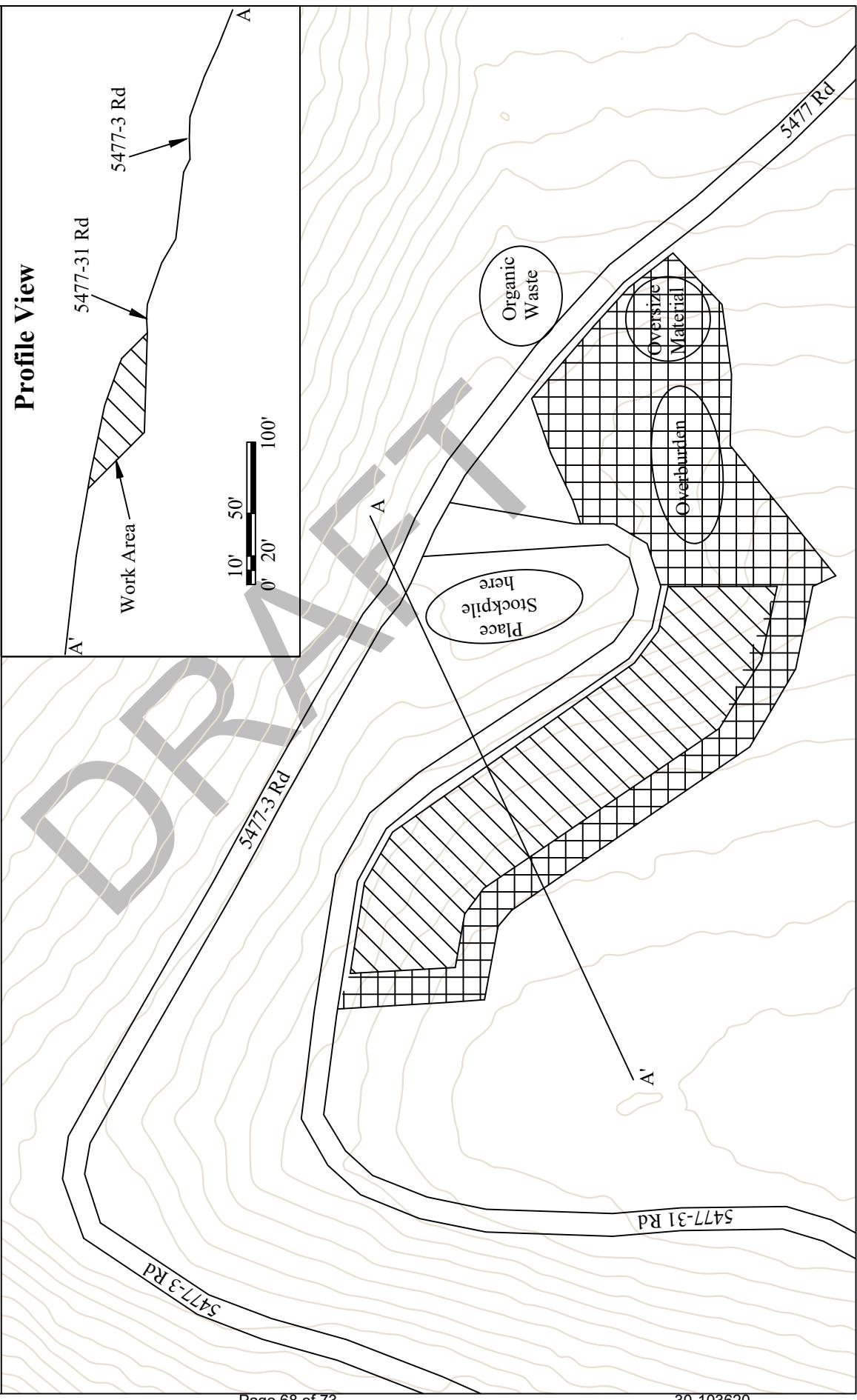
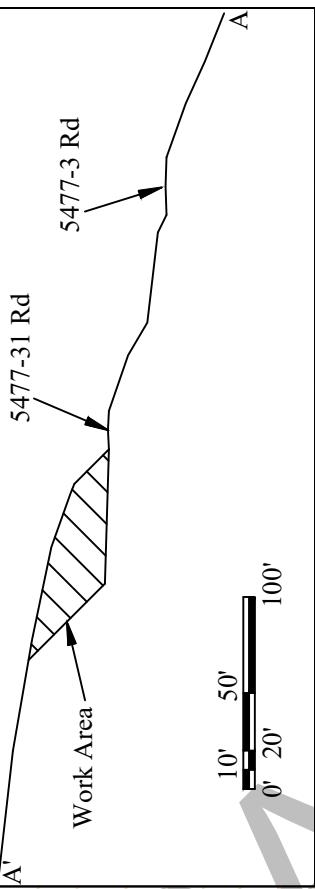
1. All vegetation including stumps shall be cleared a minimum of 25 feet beyond the top of all working faces and piled as shown on drawing.
2. All dirt shall be stripped for a minimum of 25 feet from working faces.
3. Quarry faces shall not have a slope steeper than 1/4(H):1(V).
4. The width of the pit benches shall be a minimum of 1.5 times the maximum length of the largest machine used.
5. The surface of the pit floors and benches shall be uniform and free-draining at a minimum 2% outslope gradient. No ponding will be allowed.
6. Oversized material remaining in the rock source at the conclusion of the timber sale may not exceed 10% of the total volume mined in that source. Oversize material is defined as rock fragments larger than two feet in any direction. Oversize material will be piled as shown on drawing.
7. At the end of operations, pit faces and walls shall be scaled and cleared of loose and overhanging material. No pit face shall be more than 30 vertical feet tall.
8. At the end of operations, the Load N Go Pit Road shall be left in a condition that allows highway vehicle access through the pit area.
9. All operations shall be carried out in compliance with all regulations:
  - a- "Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations" (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration.
  - b- "Safety Standards for Construction Work" (296-155 WAC) Washington Department of Labor and Industries.
10. At the completion of rock source operations, Purchaser shall ask Contract Administrator for written approval of final rock source condition and compliance with the terms of this plan.
11. Upon completion of rock source operations, the quarry site shall be cleared of temporary structures, equipment and rubbish and left in a neat and presentable condition.
12. Quantity and Quality of rock is not guaranteed by the State.

**Load N Go Pit**  
**Rock Source Development Plan**  
**SE  $\frac{1}{4}$  NW  $\frac{1}{4}$  Sec. 20 T21R09E**



Drawn By: J. Gardner  
August 15, 2018

**Profile View**



**FIR SURE PIT DEVELOPMENT PLAN**  
NW ¼, SE ¼, Section 20, Township 21 North, Range 09 East, W.M.

1. Light Loose Rip Rap may be developed from pit floor to the top of Bench 2, by picking through existing loose pit run material.
2. Quarry faces shall not have a slope steeper than 1/4(H):1(V).
3. The width of the pit benches shall be a minimum of 1.5 times the maximum length of the largest machine used.
4. The surface of the pit floors and benches shall be uniform and free-draining at a minimum 2% outslope gradient. No ponding will be allowed.
5. Oversized material remaining in the rock source at the conclusion of the timber sale may not exceed 10% of the total volume mined in that source. Oversize material is defined as rock fragments larger than two feet in any direction. Oversize material will be piled as shown on drawing.
6. At the end of operations, pit faces and walls shall be scaled and cleared of loose and overhanging material.
7. At the end of operations, the 5476 Road shall be left in a condition that allows highway vehicle access through the pit area.
8. All operations shall be carried out in compliance with all regulations of:
  - a- "Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations" (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration.
  - b- "Safety Standards for Construction Work" (296-155 WAC) Washington Department of Labor and Industries.
9. At the completion of rock source operations, Purchaser shall ask Contract Administrator for written approval of final rock source condition and compliance with the terms of this plan.
10. Upon completion of rock source operations, the quarry site shall be cleared of temporary structures, equipment and rubbish and left in a neat and presentable condition.
11. Quantity and Quality of rock is not guaranteed by the State.

# Fir Sure Pit

## Rock Source Development Plan

### NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 20 T21R09E



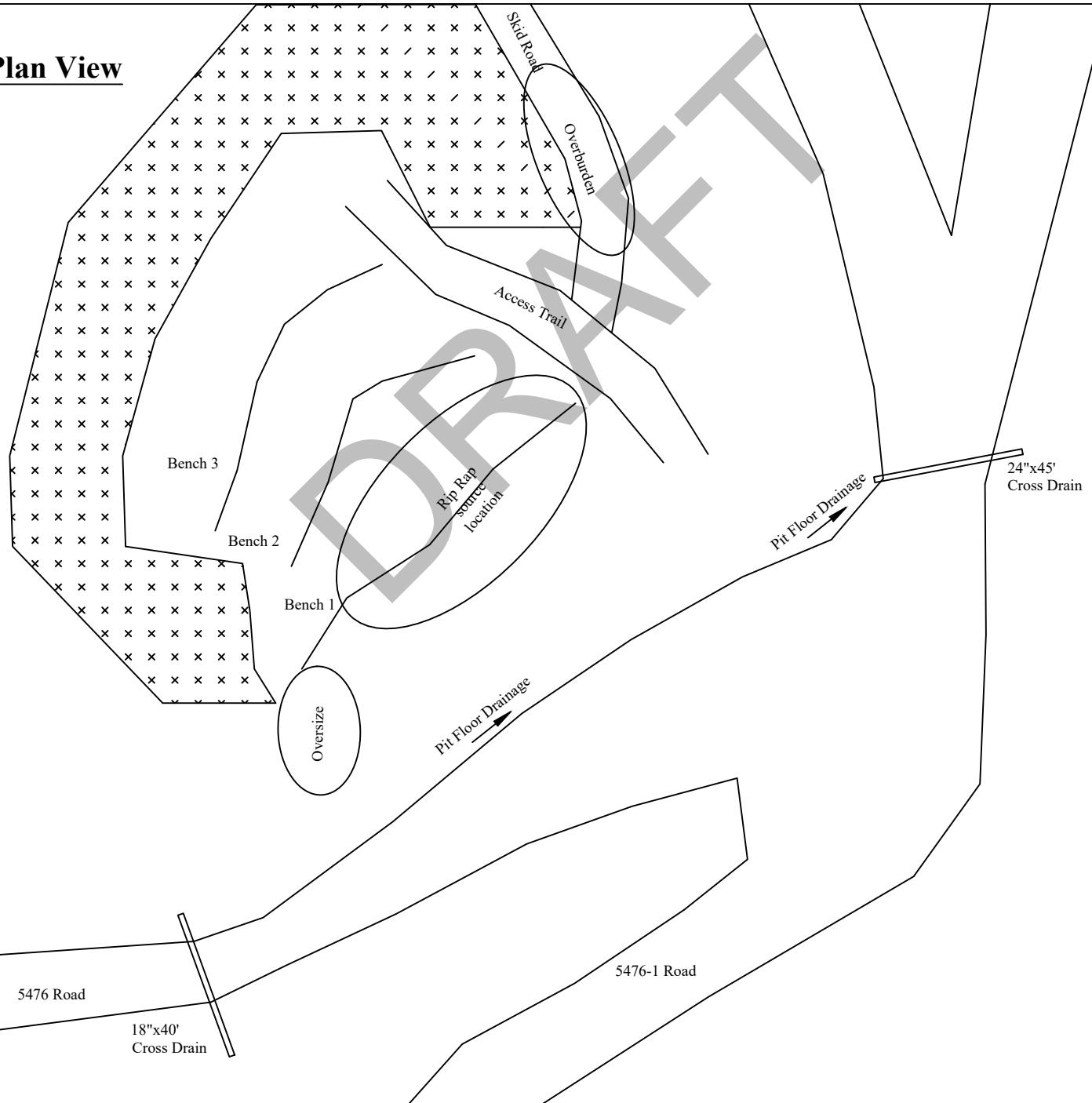
= Cleared and Grubbed Area.



0' 10' 30' 100'  
5' 20' 50'

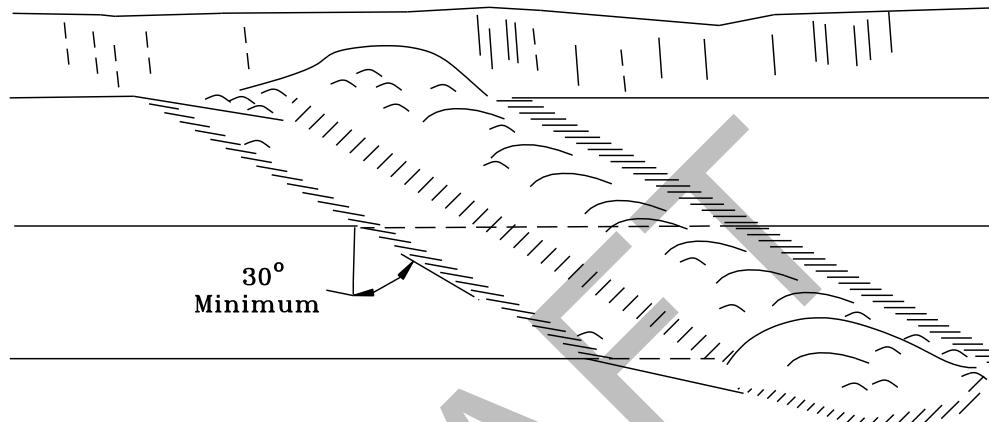
Drawn By: J. Gardner  
August 18, 2023

#### Plan View

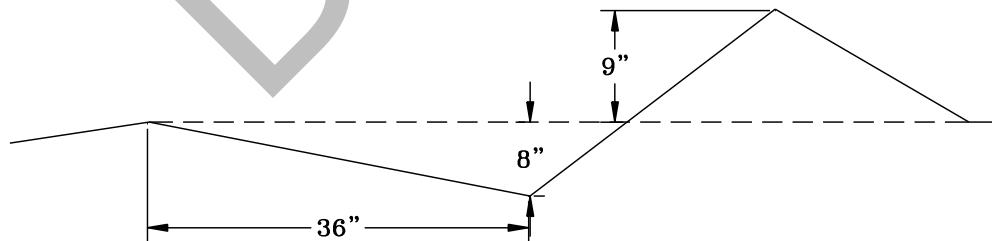


# Drivable Water Bar Detail

## Cross Ditch



## Cross Section at Centerline



### Water Bar Detail

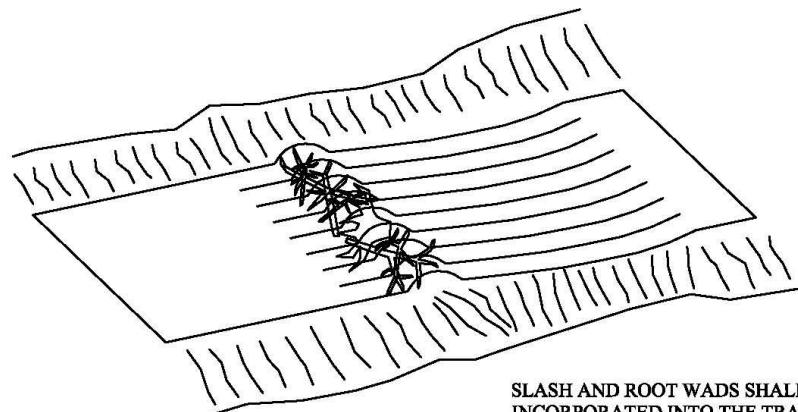
Date:  
Scale : None  
App#  
Drawn by: M.A.D.



WASHINGTON STATE DEPARTMENT OF  
**NATURAL RESOURCES**

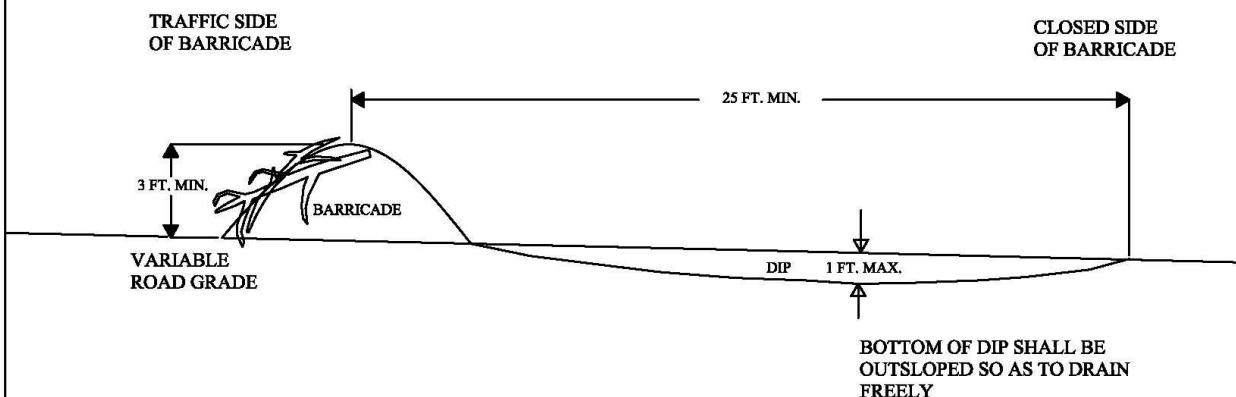
SPS REGION

# BARRICADE DETAIL



SLASH AND ROOT WADS SHALL BE INCORPORATED INTO THE TRAFFIC SIDE OF THE BARRICADE.

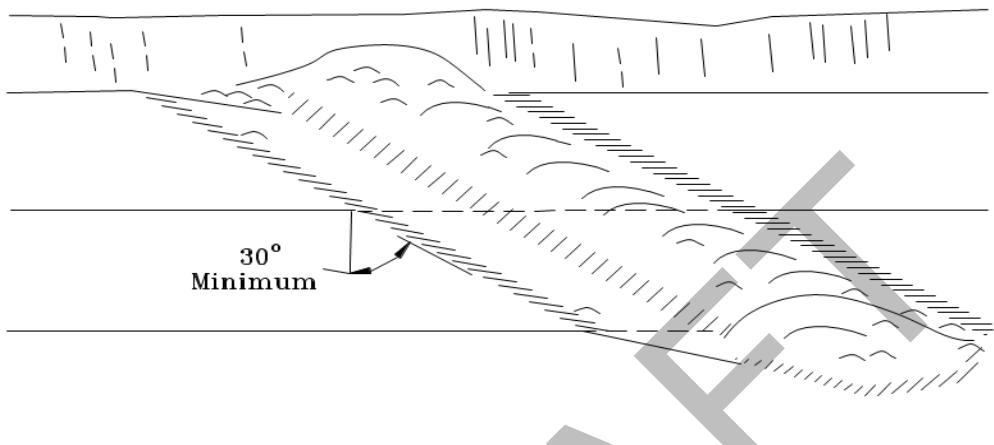
PLAN VIEW



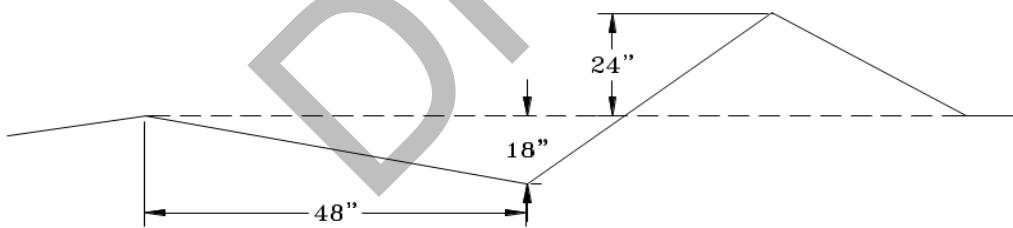
PROFILE VIEW

## Non-Drivable Water Bar Detail

### Cross Ditch



### Cross Section at Centerline



#### Water Bar Detail

Date:  
Scale : None  
App#  
Drawn by: M.A.D.

WASHINGTON STATE DEPARTMENT OF  
Natural Resources

SRS Region

## DEPARTMENT OF NATURAL RESOURCES - SOUTH PUGET SOUND REGION

FORM 9-87(Rev. 01-09)

## Road Development Cost Estimate

(For internal DNR use only. Costs are estimates only &amp; are not guaranteed by the State or part of the Road Plan.)

REGION: SPS

UNIT: Black Diamond

SALE/PROJECT NAME: Sylvan Pearl

CONTRACT NUMBER: 30-103620

LEGAL DESCRIPTION: Sects 19,20,29&amp;30 T21R09E, Sects 18,19,20,21,22,23,25,26,27&amp;28 T21R08E

ROAD NUMBER:	5476-1,5476-3,5477Ext,Unit 1 Spur,Unit 7 Spur	na	5500,5470,5470-5,5474,5476,5477,5477-3,5477-4
ROAD STANDARD:	Construction	Reconstruction	Pre-haul maintenance
NUMBER OF STATIONS:	44.64	0.00	716.25
SIDESLOPE:	0-50%	na	0-70%
CLEARING AND GRUBBING:	\$6,584	\$0	
EXCAVATION AND FILL:	\$24,366	\$0	
MISC. MAINTENANCE:			\$3,692
ROCK TOTALS (Cu. Yds.):			
1.25" Minus	258	\$0	\$6,589
2" Minus	3677	\$0	\$35,962
4" In-Place	677	\$6,032	\$0
RipRap/QS	93	\$567	\$2,198
Landing Rock	4,000	\$55,241	
CULVERTS AND FLUMES:	\$5,009	\$0	\$11,686
STRUCTURES:	\$0	\$0	\$0
GENERAL EXPENSES:	\$7,824	\$0	\$5,411
MOBILIZATION:	\$8,225	\$0	\$8,225
TOTAL COSTS:	\$113,847	\$0	\$73,763
COST PER STATION:	\$2,550	\$0	\$103
POST HAUL COSTS:		\$15,590	

NOTE<sup>1</sup>: This appraisal has no allowance for profit and risk.

TOTAL (All Roads) = \$203,200

SALE VOLUME MBF = 6,251

TOTAL COST PER MBF = \$32.51

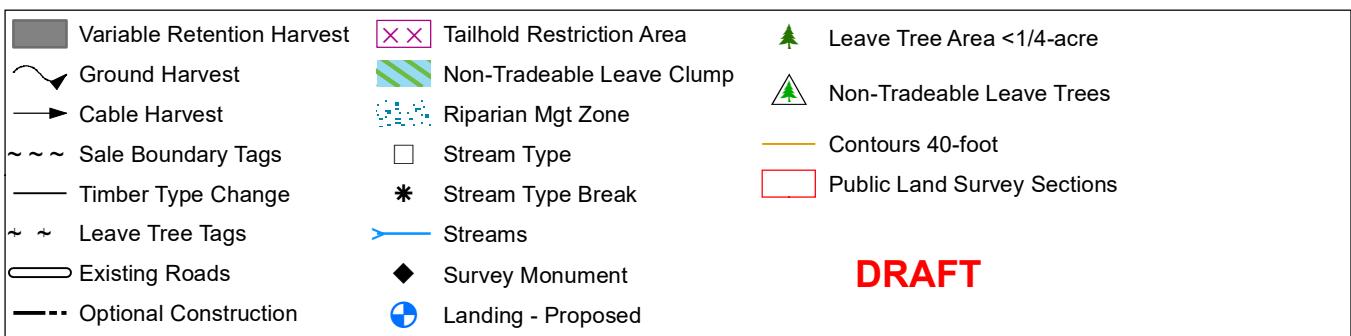
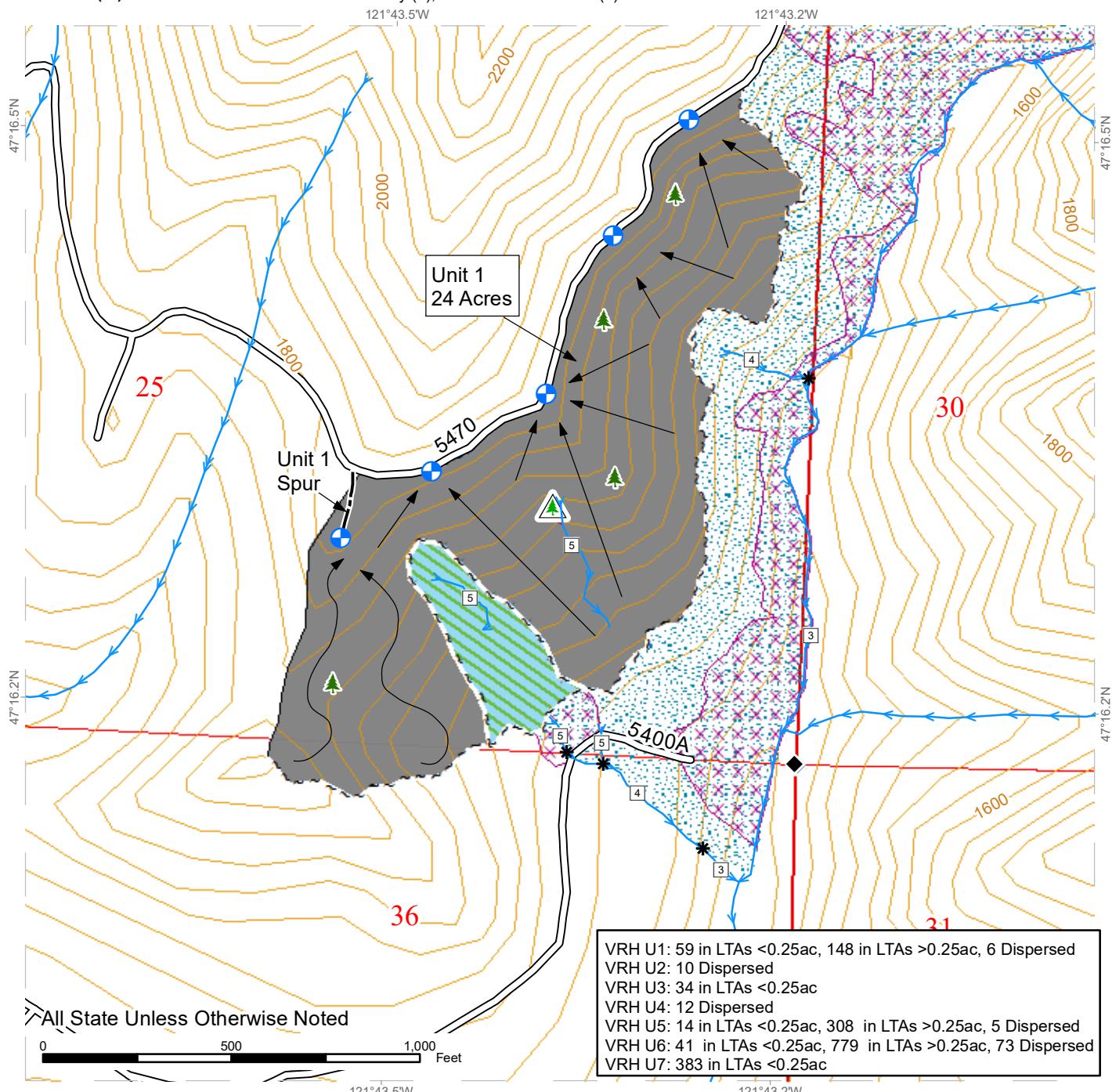
Date: 09/01/23

# LOGGING PLAN MAP

SALE NAME: SYLVAN PEARL  
 AGREEMENT #: 30-103620  
 TOWNSHIP(S): T21R8E, T21R9E  
 TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

REGION: South Puget Sound Region  
 COUNTY(S): King  
 ELEVATION RGE: 1320-3280

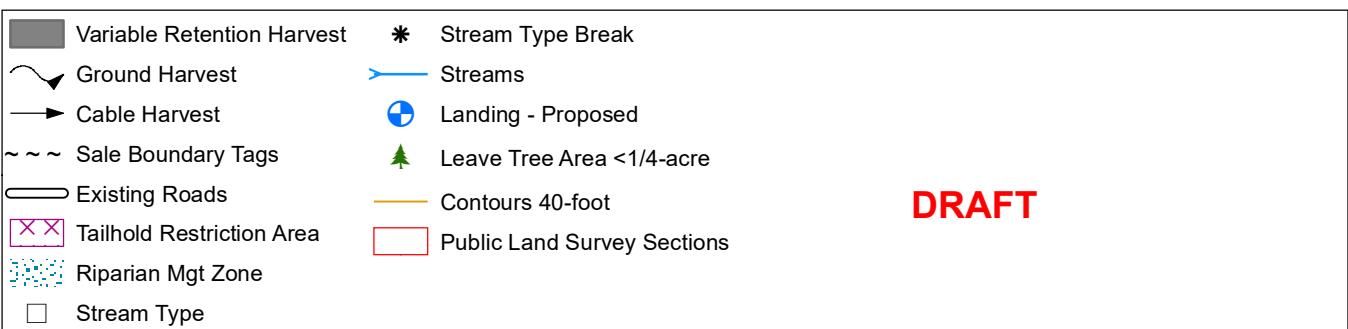
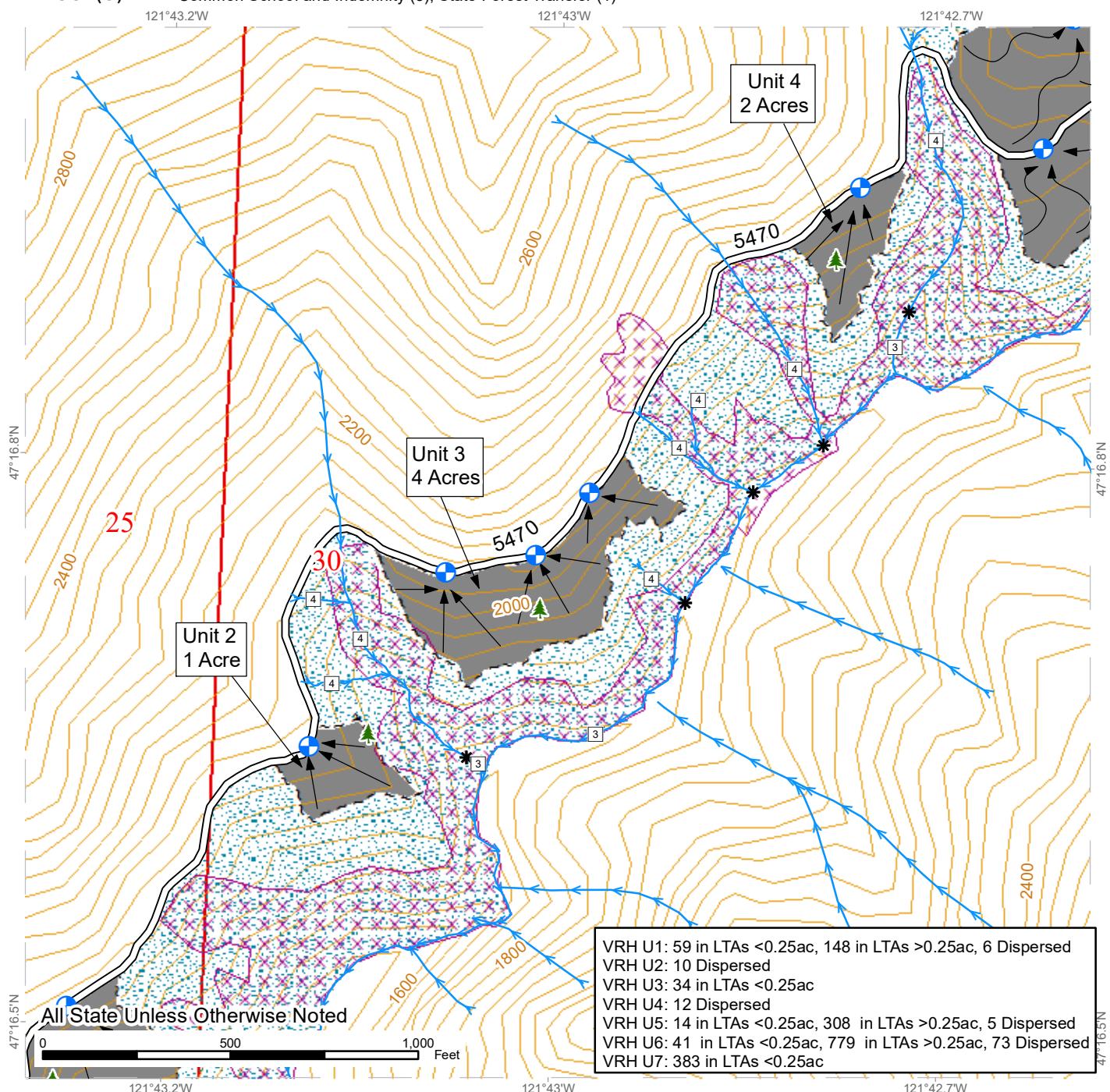


# LOGGING PLAN MAP

SALE NAME: SYLVAN PEARL  
 AGREEMENT #: 30-103620  
 TOWNSHIP(S): T21R8E, T21R9E  
 TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

REGION: South Puget Sound Region  
 COUNTY(S): King  
 ELEVATION RGE: 1320-3280

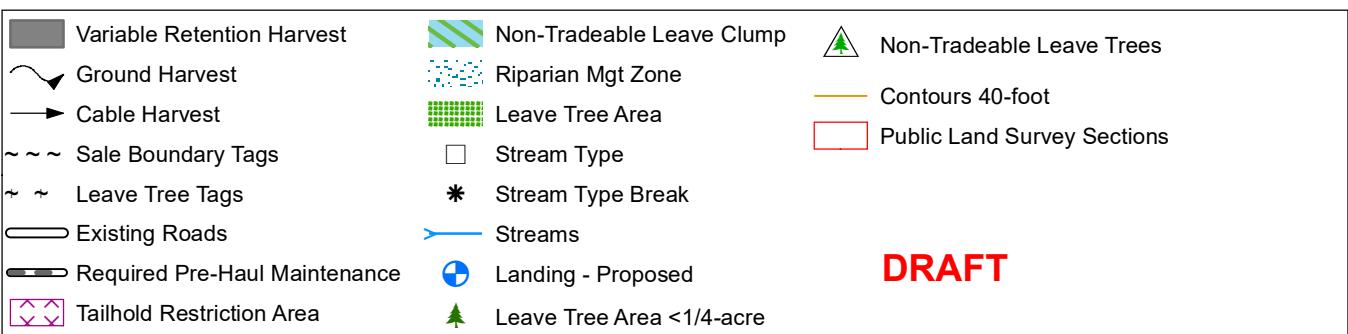
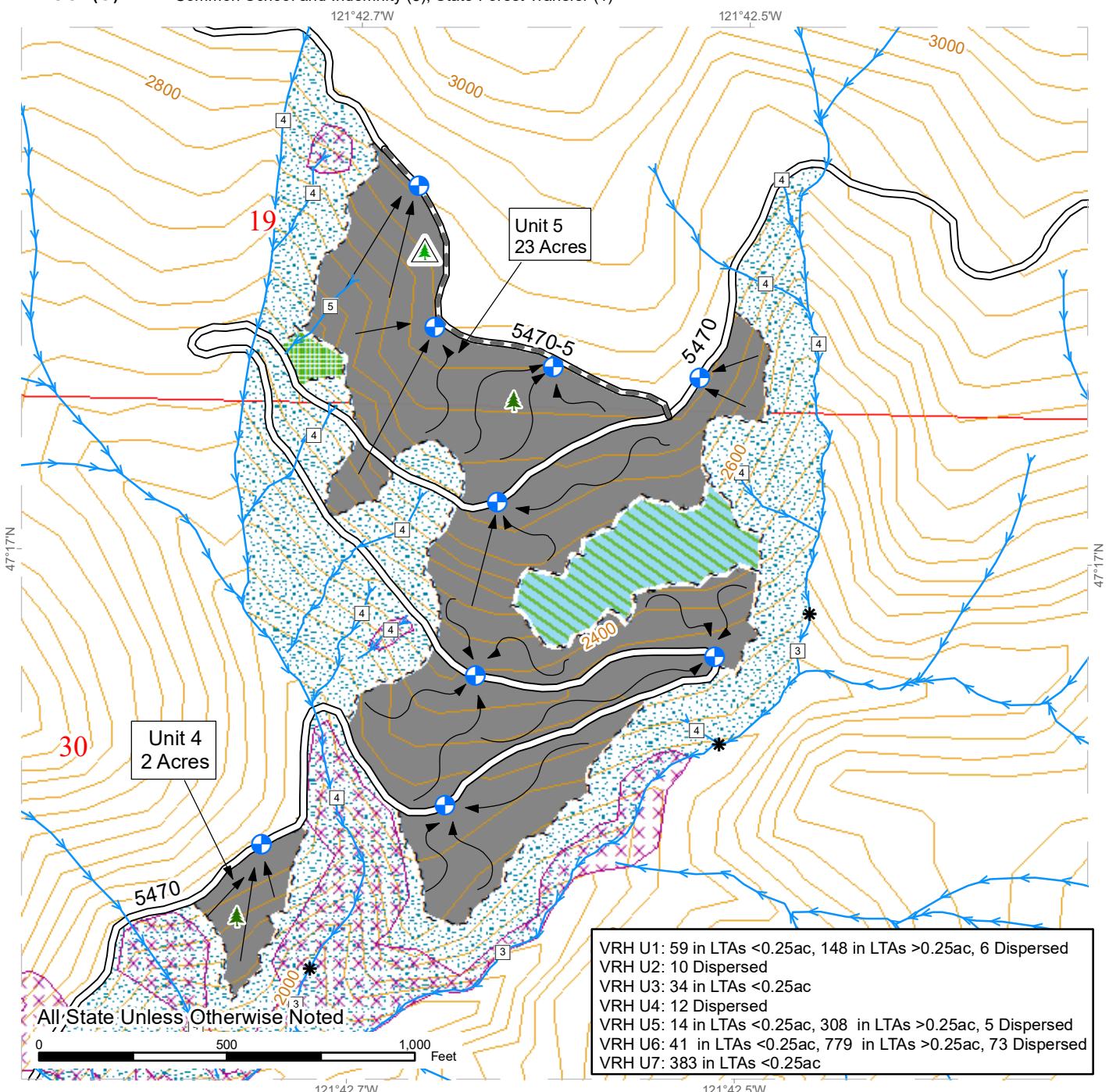


# LOGGING PLAN MAP

SALE NAME: SYLVAN PEARL  
 AGREEMENT #: 30-103620  
 TOWNSHIP(S): T21R8E, T21R9E  
 TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

REGION: South Puget Sound Region  
 COUNTY(S): King  
 ELEVATION RGE: 1320-3280



# LOGGING PLAN MAP

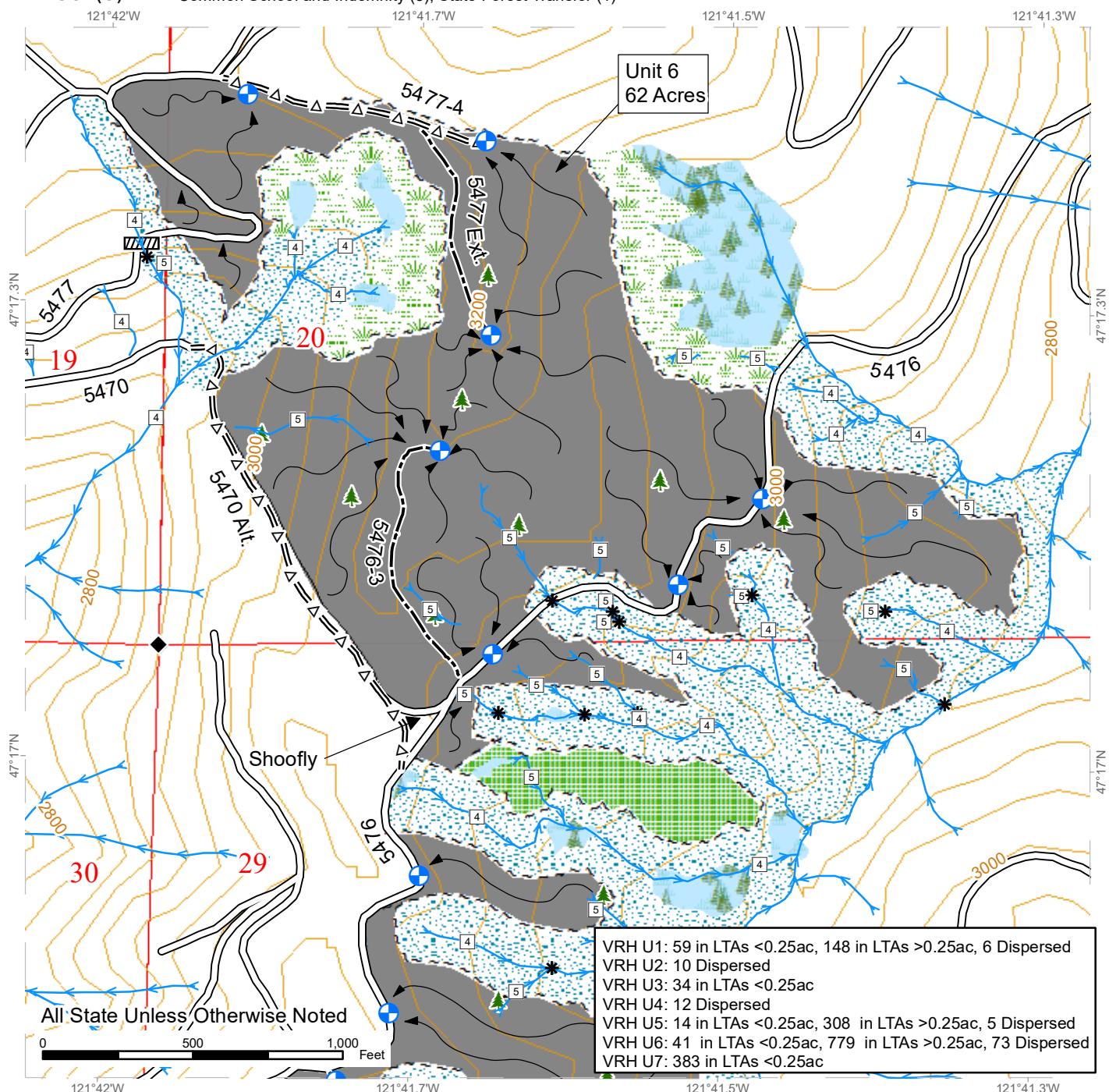
SALE NAME: SYLVAN PEARL  
AGREEMENT #: 30-103620

TOWNSHIP(S): T21R8E, T21R9E

TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

REGION: South Puget Sound Region  
COUNTY(S): King  
ELEVATION RGE: 1320-3280



# LOGGING PLAN MAP

SALE NAME: SYLVAN PEARL  
 AGREEMENT #: 30-103620  
 TOWNSHIP(S): T21R8E, T21R9E  
 TRUST(S): Common School and Indemnity (3), State Forest Transfer (1)

**DRAFT**

REGION: South Puget Sound Region  
 COUNTY(S): King  
 ELEVATION RGE: 1320-3280

