



TIMBER NOTICE OF SALE

SALE NAME: Q FLY BY NIGHT

AGREEMENT NO: 30-106349

AUCTION: June 13, 2024 starting at 10:00 a.m., Southeast Region Office, Ellensburg, WA

COUNTY: Chelan, Kittitas

SALE LOCATION: Sale located approximately 22 miles north of Ellensburg, WA and 20 miles south of Wenatchee, WA.

PRODUCTS SOLD AND SALE AREA: All timber meets the Schedule A Cutting Prescription except for trees bounded out by yellow "Leave Tree Area" tags bounded by white "Timber Sale Boundary" tags and pink flagging.

All forest products above located on part(s) of Sections 4 and 6 all in Township 20 North, Range 20 East, Sections 32 all in Township 21 North, Range 20 East, W.M., containing 514 acres, more or less.

CERTIFICATION: This sale is certified under the Sustainable Forestry Initiative® program Standard (cert no: BVC-SFIFM-018227)

ESTIMATED SALE VOLUMES AND QUALITY:

Table with columns: Species, Avg Ring DBH Count, Total MBF, Total Tons, Price \$/Ton, MBF by Grade (1P, 2P, 3P, SM, 1S, 2S, 3S, 4S). Rows include Larch, Lodgepole, White fir, Grand fir, Douglas fir, Spruce, and Sale Total.

MINIMUM BID: \$0/ton (est. value \$51,000.00)

BID METHOD: Sealed Bids

PERFORMANCE SECURITY: \$10,200.00

SALE TYPE: Tonnage Scale

EXPIRATION DATE: October 31, 2026

ALLOCATION: Export Restricted

BIDDABLE SPECIES: Larch, Douglas fir

BID DEPOSIT: \$5,100.00 or Bid Bond. Said deposit shall constitute an opening bid at the appraised price.

HARVEST METHOD: All ground-based equipment. No harvesting is allowed from November 1 to May 1. Falling and Yarding will not be permitted from November 1 to May 1 unless authorized in writing by the Contract Administrator.

ROADS: 4.35 stations of required construction. 34.20 stations of required reconstruction. 55.65 stations of optional reconstruction. 729.10 stations of required prehaul maintenance. 76.30 stations of abandonment. The operation of road construction equipment is not



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allowed between November 1 to April 30, or **on weekends or state recognized holidays**, unless authorized in writing by the Contract Administrator. The hauling of forest products will not be permitted from November 1 to May 15 unless authorized in writing by the Contract Administrator.

### ACREAGE DETERMINATION

**CRUISE METHOD:** Approximately 13 acres were deducted from the gross acres for roads and non-tradable leave tree areas. Variable plot cruise-See narrative for details

**FEES:** \$53,476.00 is due on day of sale. \$1.00 per ton is due upon removal. \$1,364.00 is AARF fees and is due on day of sale. This is in addition to the bid price. \$1,364.00 is due on day of sale. This is in addition to the bid price.

**SPECIAL REMARKS:** There is an estimated 170 mbf of utility on this sale. Utility is optional removal a \$1.00 per ton. Existing down wood as defines as having at least 1-2 inches of rot in the outer sap wood are not to be removed or yarded with this sale.

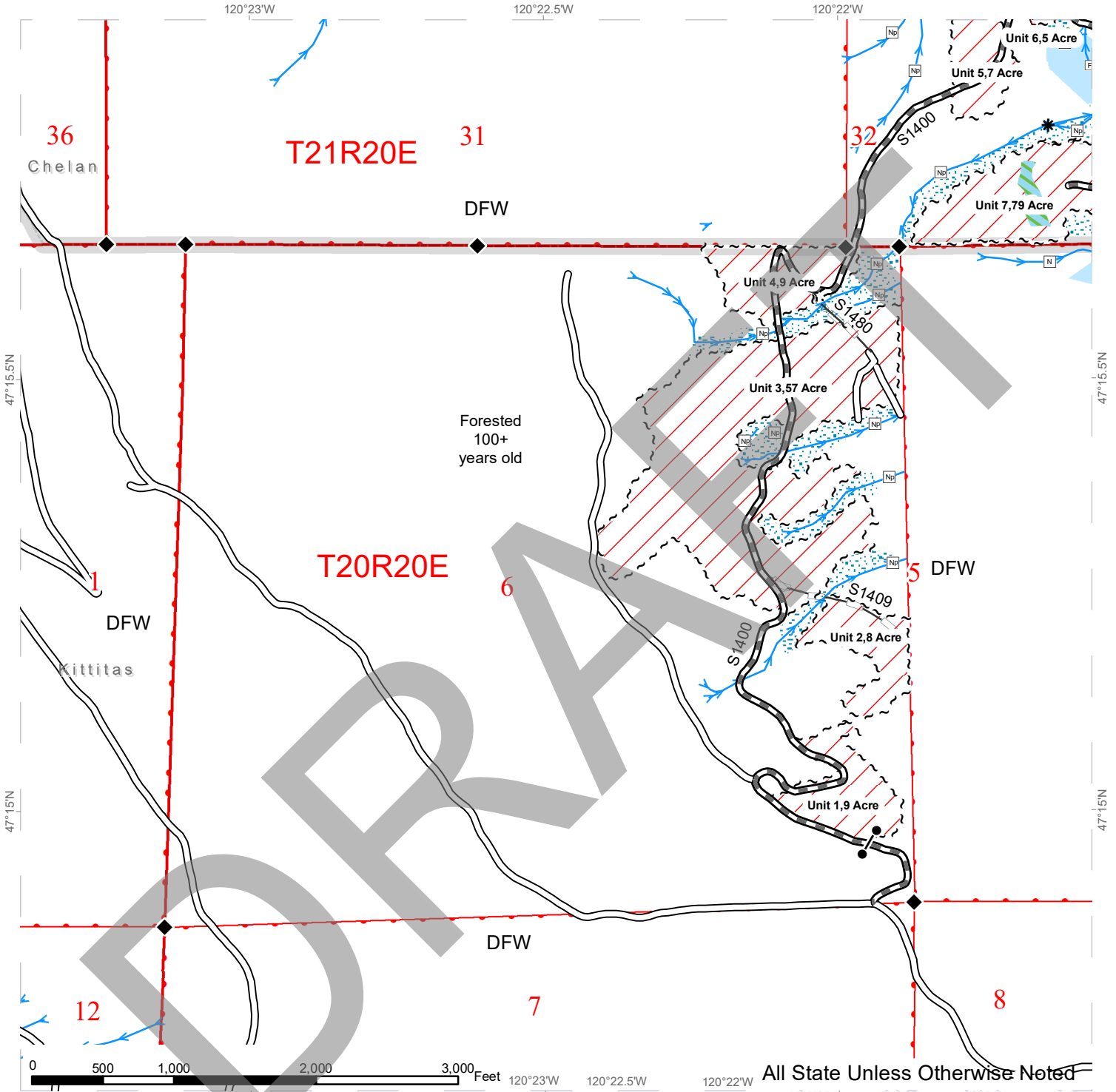
Dust abatement will be required by purchaser on all purchaser maintained roads from June 1-Nov 1 or as directed by the CA.

S1450: no work is to be done from 12+40 to 15+35 except abandoning.

# TIMBER SALE MAP

**SALE NAME:** Q FLY BY NIGHT  
**AGREEMENT #:** 30-106349  
**TOWNSHIP(S):** T20R20E, T21R20E  
**TRUST(S):** Agricultural School (4), Common School and Indemnity (3)

**REGION:** Southeast Region  
**COUNTY(S):** Chelan, Kittitas  
**ELEVATION RGE:** 4440-6160

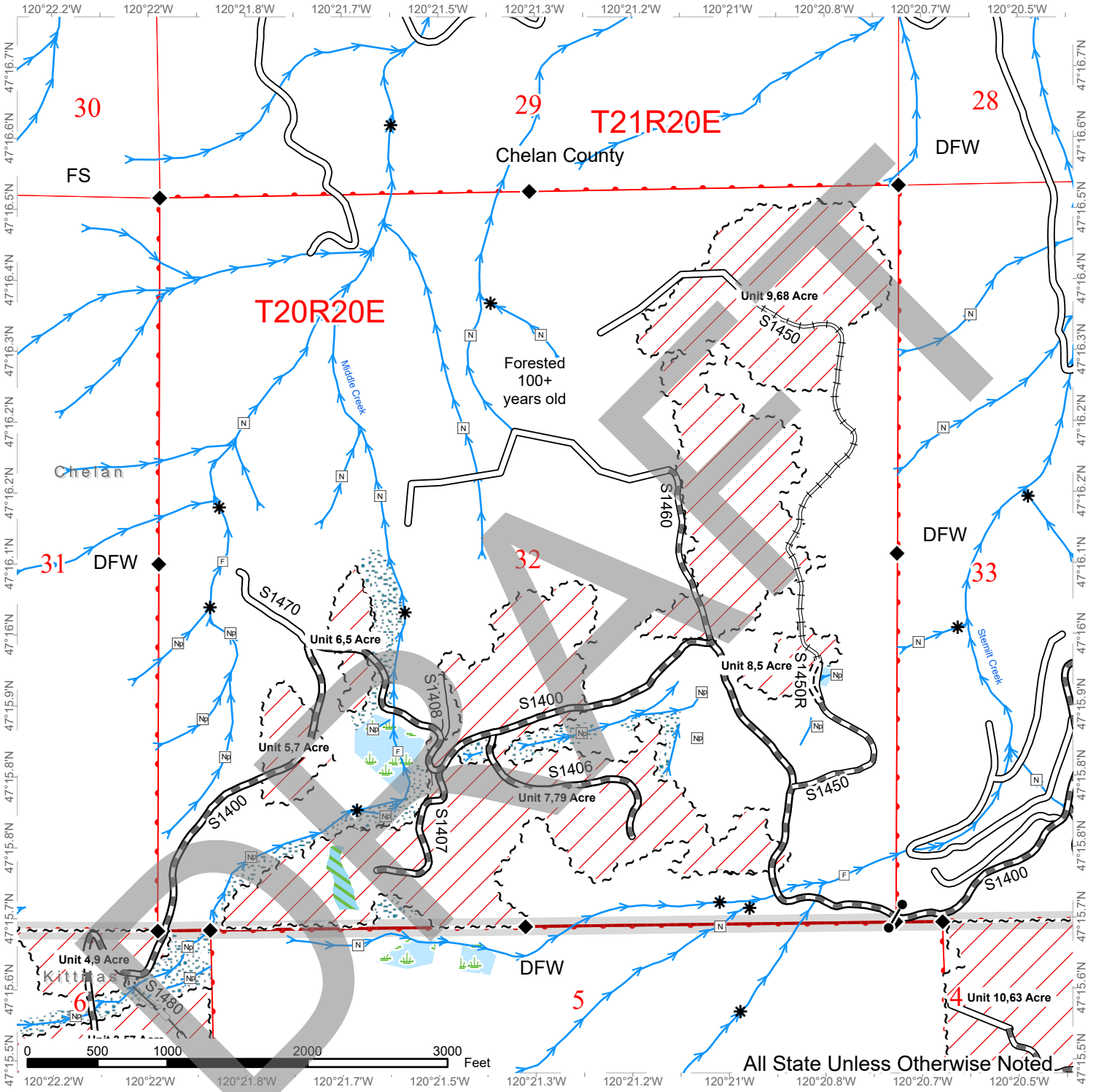


~~~~~ Sale Boundary Tags	Gate	Existing Roads
DNR Managed Lands	Survey Monument	Required Pre-Haul Maintenance
Sale Area	Wetlands - Non-forested	Optional Reconstruction
Public Land Survey Townships	Riparian Mgt Zone	Required Reconstruction
County Boundary	Non-Tradable Leave Tree Area	Stream Type
Streams	Stream Type Break	

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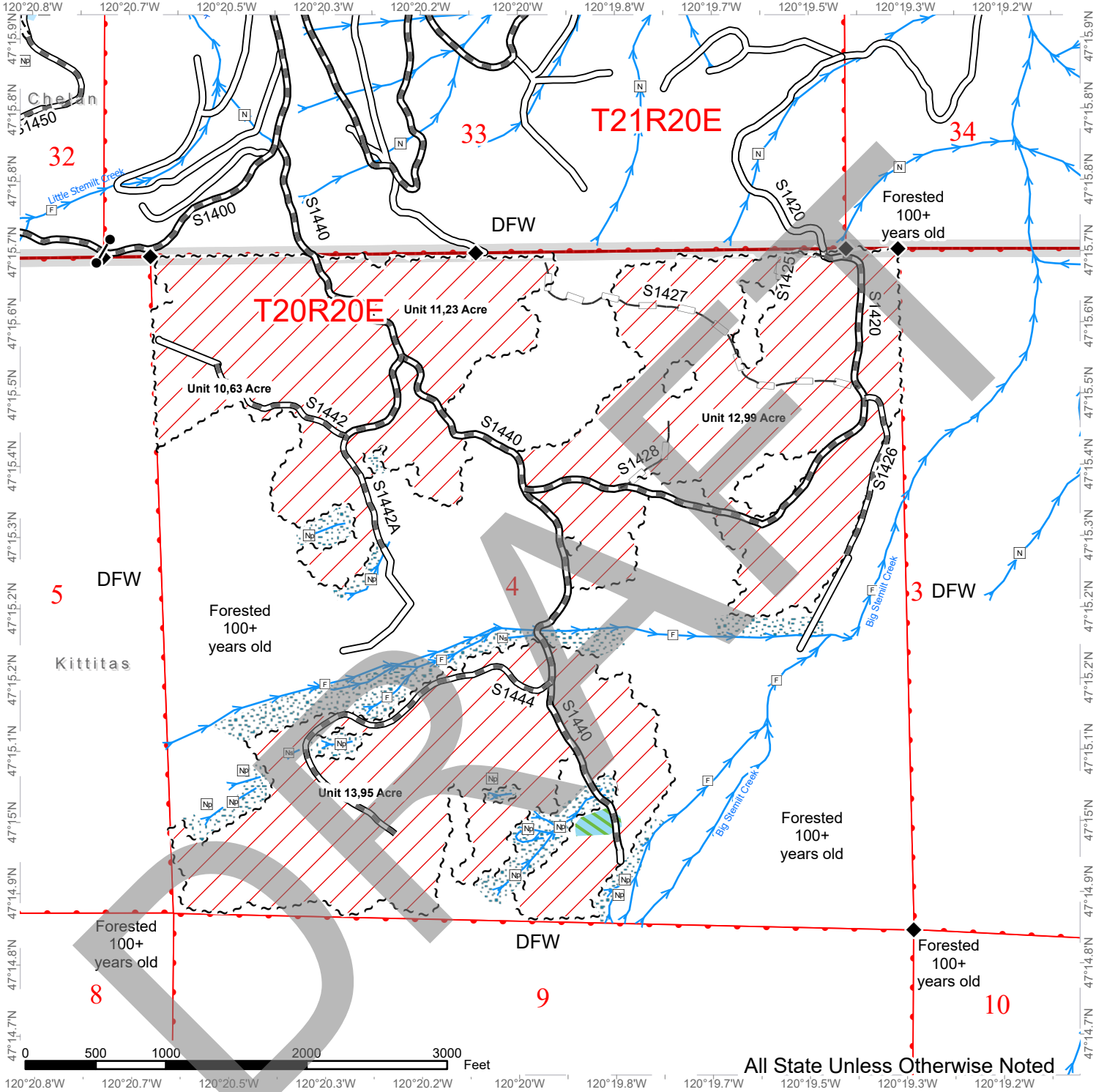


~ ~ ~ Sale Boundary Tags	● Gates	Existing Roads
DNR Managed Lands	◆ Survey Monument	Required Pre-Haul Maintenance
Sale Area	Wetlands - Non-forested	Optional Reconstruction
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County Boundary	Non-Tradable Leave Tree Area	Stream Type
	Streams	* Stream Type Break
		- - - Required Construction

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All State Unless Otherwise Noted

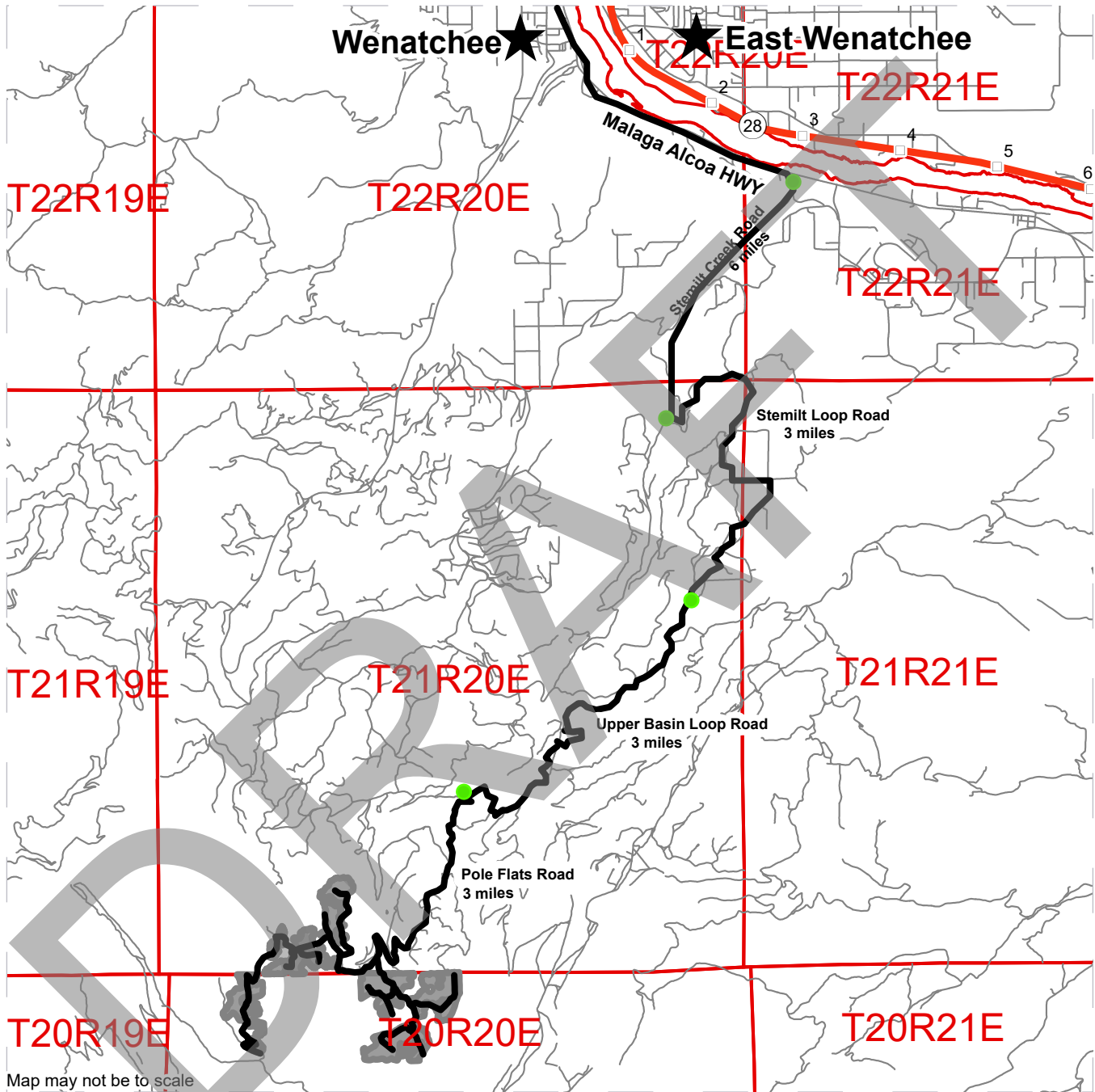
~ ~ ~ ~ Sale Boundary Tags	◆ Gates	— Existing Roads
▭ DNR Managed Lands	◆ Survey Monument	▬ Required Pre-Haul Maintenance
▨ Sale Area	▭ Wetlands - Non-forested	▬ Optional Reconstruction
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	▬ Streams	* Stream Type Break



# DRIVING MAP

**SALE NAME:** Q FLY BY NIGHT  
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**TOWNSHIP(S):** T20R20E, T21R20E  
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Map may not be to scale

**Legend**

- Timber Sale Unit
- Haul Route
- Town
- Highway
- Other Road
- Milepost Markers
- Distance Indicator

**DRIVING DIRECTIONS:**

The sale area is approximately 20 miles south of Wenatchee, WA in the Naneum Ridge State Forest. From Wenatchee drive southeast to Malaga HWY. Turn right at Stemilt Creek road. In about 6 miles turn left onto Stemilt Loop road. Continue for about 3 miles. Turn onto S1200 (Upper Basin Loop road). Continue for about 3 miles and turn left onto S1400 (Pole Flats road) and continue for about 3 miles.

**U10-13 Access:**  
Turn left onto S1440. Units 10 and 11 are in 800 feet. Units 12 and 13 are about 0.5 mile along S1444.

**U1-9 Access:**  
Continue on Pole Flats road through the gate. The rest of the units are past the gate.  
**U8-9:** After passing the gate, in about 0.3 miles turn right on S1450. Both units are along the main road (S1400).  
**U1-7:** Continue on the main road (S1400) for about 3 miles. Units are along the road until the second gate.

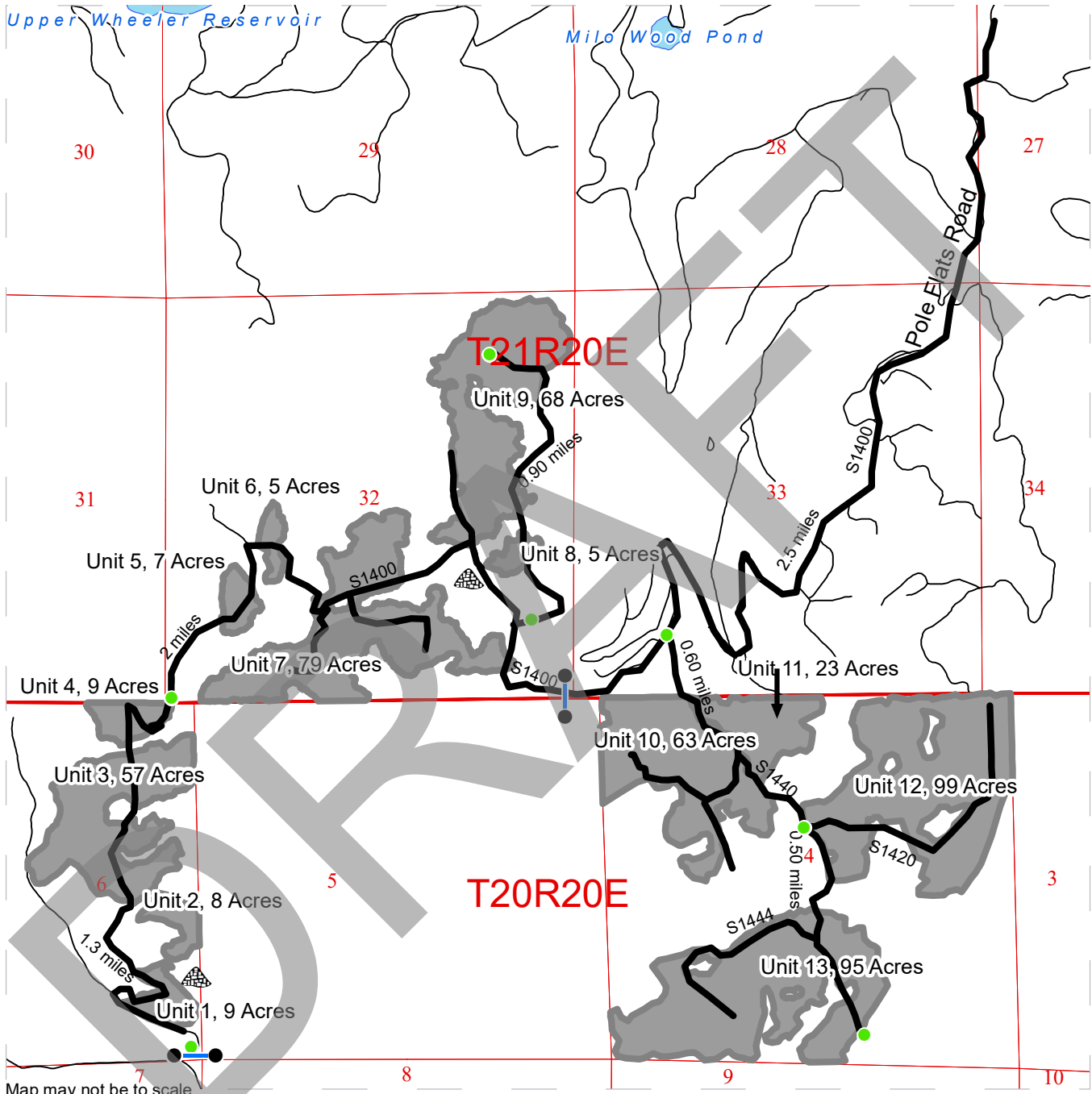
Modification Date: mman490 3/1/2024



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Map may not be to scale

	Timber Sale Unit
	Haul Route
	Gate
	Distance Indicator
	Other Road
	Stock Pile/Rock Source

**Driving Directions:**

The sale area is approximately 20 miles south of Wenatchee, WA in the Naneum Ridge State Forest. From Wenatchee drive southeast to Malaga HWY. Turn right at Stemilt Creek road. In about 6 miles turn left onto Stemilt Loop road. Continue for about 3 miles. Turn onto S1200 (Upper Basin Loop road). Continue for about 3 miles and turn left onto S1400 (Pole Flats rd) and continue for about 3 miles.

**U10-13 Access:**

Turn left onto S1440. Units 10 and 11 are in 800 feet. Units 12 and 13 are in about 0.5 mile along S1444.

**U1-9 Access:**

Continue on Pole Flats road through the gate. The rest of the units are past the gate.  
 U8-9: After passing the gate, in about 0.3 miles turn right on S1450. Both units are along the main road (S1400).  
 U1-7: Continue on the main road (S1400) for about 3 miles. Units are along the road until the second gate.



## Timber Sale Cruise Report Q Fly By Night

**Sale Name:** Q FLY BY NIGHT

**Sale Type:** WEIGHT SCALE

**Region:** SOUTHEAST

**District:** ALPINE

**Lead Cruiser:** Brendan Cockrum

**Other Cruisers:**

**Cruise Narrative:**

**Location:** The sale area is approximately 20 miles south of Wenatchee, WA on the Naneum State Forest. The sale is located in Sec. 4 and 6 Township 20N Range 20E and Sec. 32 Township 21N Range 20E.

**Access:** From Wenatchee drive southeast to Malaga Alcoa Hwy. Turn right at Stemilt Creek road. In approximately 6 miles turn left onto Loop road. Continue for about 0.70 miles and turn onto Upper Basin Loop road. Continue for about 2.5 miles and turn right onto W Basin road. In about 0.70 miles turn left onto Pole Flats road (S1400) and continue for about 3 miles.

**Units 10-13 Access:**

Turn left onto S1440 continue 800 feet to arrive at Units 10 and 11. From Units 10 and 11, continue on the S1440 approximately 0.5 miles to junction of S1440 and S1444 to arrive at Unit 12. From junction of S1440 and S1444, turn right onto S1444 and continue 0.5 miles to arrive at Unit 13.

**Unit 1-9 Access:**

Continue on Pole Flats road until reach the gate. Once passed the gate, continue 0.3 miles and turn right onto S1450. On S1450, drive approximately 0.25 miles to arrive at Unit 8. From Unit 8, continue approximately 0.10 miles to arrive at Unit 9. For Units 1-7, continue on S1400 to access units.

**Aspect:** North, South, East, West

**Elevation:** 4440 - 6160

**Slope:** The majority of slopes within the sale area are less than 30%. Steepest pitches up to 60%.

**Cruise Design:** All plots were cruised. All units utilized a 33.61 BAF. All stems  $\geq 7$ " dbh were cruised. There are seven species present on this sale: Douglas-fir (DF), Grand fir (GF), Western Larch (WL), Lodgepole Pine (LP), Englemann Spruce (ES), Sub-Alpine fir (AF), and a minor component of Ponderosa Pine (PP). No dead trees were cruised.

**Take/Leave Prescription:** All units will be harvest by prescription. All units will retain 6 trees per acre (tpa) of the largest available greater than 10" dbh. All ponderosa pine will be left. All standing dead trees will be left unless unsafe to due so. Leave tree selection preference is as follows: DF, WL (with DMT rating of 2 or less), ES, GF, LP, AF.

**Log Length:** All species utilized 40' logs where possible, with a minimum log length of 12'. Top DIB for all species is 5" and Utility is 2".

**Cruise Acres Determination:** Road acreages and Leave Tree Areas were subtracted.

**Timber Quality:** The removal volume is composed of 27% WL, 26% LP, 14% AF, 12% GF, 11% DF, and 10% ES. Defect mainly found in LP, GF, and AF. Defect in LP and AF mainly from scarring. Defect in the GF mainly due to Dwarf Mistletoe infection as well as sweep in the lower bole. Minimal defect found in the WL.



Logging and Stand Conditions: The sale is mostly on gentle slopes and will be 100% ground-based harvest. These are all high elevation stands. Units 1-9 are extremely overstocked with a significant component of non-merchantable small diameter stems throughout. There is a significant component of standing dead and downed wood in all units. Past and present mountain pine beetle activity is evident in the lodgepole in all units. Individual and patch mortality is found in all units.

### Timber Sale Notice Volume (MBF)

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
WL	11.5			956	15	437	442	62
LP	10.7			914		284	578	53
AF	11.4			472		248	207	17
GF	12.3			394	14	167	201	12
DF	11.4			377	13	128	216	19
ES	13.9			321		230	83	8
ALL	11.4			3,435	43	1,494	1,727	170

### Timber Sale Notice Weight (tons)

Sp	Tons by Grade				
	All	2 Saw	3 Saw	4 Saw	Utility
WL	8,899	119	3,982	3,929	869
LP	8,851		2,711	5,363	777
GF	4,549	130	1,886	2,310	224
AF	4,417		2,449	1,717	252
DF	4,104	132	1,346	2,274	352
ES	3,161		2,147	869	145
ALL	33,982	380	14,522	16,462	2,618

### 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 (%)
105.5	5.5	74.1	2.0	7,860	5.8

### Timber Sale Unit Cruise Design

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
Q FLY BY NIGHT U1	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	8.6	9.2	6	6	1
Q FLY BY	B1: VR, 1 BAF (33.61) Measure	7.3	7.5	5	5	0

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
NIGHT U2	All, Sighting Ht = 4.5 ft					
Q FLY BY NIGHT U3	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	55.9	56.8	11	11	0
Q FLY BY NIGHT U4	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	8.7	9.2	5	5	0
Q FLY BY NIGHT U5	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	6.8	7.0	5	5	0
Q FLY BY NIGHT U6	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	4.9	5.0	6	6	0
Q FLY BY NIGHT U7	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	76.2	79.1	16	16	0
Q FLY BY NIGHT U8	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	4.4	4.5	5	5	0
Q FLY BY NIGHT U9	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 0 ft	67.5	68.5	15	15	0
Q FLY BY NIGHT U10	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	61.2	63.0	11	11	0
Q FLY BY NIGHT U11	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 0 ft	23.1	23.1	6	6	0
Q FLY BY NIGHT U12	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	96.7	99.0	20	20	0
Q FLY BY NIGHT U13	B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	92.3	95.1	19	19	0
All		513.6	526.9	130	130	1

### Timber Sale Log Grade x Sort Summary

Sp	Status	Grade	Sort	Dia	Len	BF Gross	BF Net	Defect %	Tons	MBF Net
AF	LIVE	3 SAW	Domestic	7.5	40	511	483	5.5	2,448.8	247.9
AF	LIVE	4 SAW	Domestic	5.1	25	434	403	7.2	1,716.8	206.8
AF	LIVE	UTILITY	Pulp	2.1	16	33	33	0.0	251.6	16.9
DF	LIVE	2 SAW	Domestic	15.9	40	26	26	0.0	132.0	13.4
DF	LIVE	3 SAW	Domestic	7.6	40	262	249	4.7	1,346.4	128.1
DF	LIVE	4 SAW	Domestic	5.2	29	448	421	6.0	2,273.8	216.3
DF	LIVE	UTILITY	Pulp	2.0	20	37	37	0.0	351.9	19.1
ES	LIVE	3 SAW	Domestic	7.8	40	455	447	1.6	2,146.8	229.8
ES	LIVE	4 SAW	Domestic	5.2	25	163	162	0.3	868.9	83.2
ES	LIVE	UTILITY	Pulp	2.1	16	15	15	0.0	145.2	7.9
GF	LIVE	2 SAW	Domestic	12.2	40	30	27	7.7	129.6	14.1
GF	LIVE	3 SAW	Domestic	7.9	40	345	326	5.7	1,886.3	167.2
GF	LIVE	4 SAW	Domestic	5.2	28	409	392	4.0	2,309.6	201.5

Sp	Status	Grade	Sort	Dia	Len	BF Gross	BF Net	Defect %	Tons	MBF Net
GF	LIVE	CULL	Cull	7.6	35	46	0	100.0	0.0	0.0
GF	LIVE	UTILITY	Pulp	2.1	16	23	23	0.0	223.6	11.6
LP	LIVE	3 SAW	Domestic	7.2	40	589	553	6.0	2,711.3	284.3
LP	LIVE	4 SAW	Domestic	5.3	32	1,240	1,125	9.3	5,363.3	577.6
LP	LIVE	CULL	Cull	5.3	38	53	0	100.0	0.0	0.0
LP	LIVE	UTILITY	Pulp	2.1	19	103	102	1.2	776.7	52.5
WL	LIVE	2 SAW	Domestic	12.8	40	30	30	0.0	118.8	15.4
WL	LIVE	3 SAW	Domestic	7.8	40	871	851	2.2	3,982.4	437.1
WL	LIVE	4 SAW	Domestic	5.2	30	885	860	2.8	3,929.2	441.9
WL	LIVE	UTILITY	Pulp	2.3	19	121	121	0.6	869.0	61.9

### Timber Sale Log Sort x Diameter Bin Summary

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
AF	< 5	LIVE	Pulp	2.1	16	33	0.0	251.6	16.9
AF	5 - 8	LIVE	Domestic	5.7	30	820	5.6	3,865.1	421.1
AF	9 - 11	LIVE	Domestic	10.0	40	65	14.8	300.4	33.6
DF	< 5	LIVE	Pulp	2.0	20	37	0.0	351.9	19.1
DF	5 - 8	LIVE	Domestic	5.4	31	577	5.2	3,149.7	296.3
DF	9 - 11	LIVE	Domestic	9.9	40	74	6.7	339.5	37.9
DF	12 - 14	LIVE	Domestic	12.4	40	20	10.2	130.9	10.2
DF	15 - 19	LIVE	Domestic	15.9	40	26	0.0	132.0	13.4
ES	< 5	LIVE	Pulp	2.2	16	15	0.0	145.2	7.9
ES	5 - 8	LIVE	Domestic	5.9	31	484	0.9	2,531.5	248.6
ES	9 - 11	LIVE	Domestic	10.5	40	75	0.0	310.9	38.3
ES	12 - 14	LIVE	Domestic	12.5	40	9	0.0	38.3	4.8
ES	15 - 19	LIVE	Domestic	17.3	40	42	7.4	135.0	21.3
GF	< 5	LIVE	Pulp	2.1	16	23	0.0	223.6	11.6
GF	5 - 8	LIVE	Cull	5.0	33	0	100.0	0.0	0.0
GF	5 - 8	LIVE	Domestic	5.5	31	618	3.5	3,683.7	317.2
GF	9 - 11	LIVE	Domestic	10.3	40	100	12.0	512.2	51.5
GF	12 - 14	LIVE	Domestic	12.2	40	27	7.7	129.6	14.1
GF	12 - 14	LIVE	Cull	13.2	40	0	100.0	0.0	0.0
LP	< 5	LIVE	Pulp	2.1	19	84	1.4	723.4	43.2
LP	5 - 8	LIVE	Pulp	5.0	20	18	0.0	53.3	9.3
LP	5 - 8	LIVE	Cull	5.3	38	0	100.0	0.0	0.0
LP	5 - 8	LIVE	Domestic	5.5	33	1,535	8.5	7,373.6	788.4
LP	9 - 11	LIVE	Domestic	9.9	39	119	6.2	584.3	60.9

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
LP	12 - 14	LIVE	Domestic	13.7	40	24	0.0	116.7	12.5
WL	< 5	LIVE	Pulp	2.1	20	76	1.0	726.9	38.9
WL	5 - 8	LIVE	Pulp	5.0	21	45	0.0	142.0	23.0
WL	5 - 8	LIVE	Domestic	5.6	33	1,544	2.5	7,227.7	792.8
WL	9 - 11	LIVE	Domestic	9.9	40	168	2.4	683.9	86.2
WL	12 - 14	LIVE	Domestic	12.8	40	30	0.0	118.8	15.4

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## Cruise Unit Report Q FLY BY NIGHT U1

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U1

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
AF	10.6			13	4	8	1
ES	15.4			12	10	2	0
LP	12.6			10	7	3	0
WL	16.8			4	3	1	
ALL	12.5			39	24	14	1

### Unit Cruise Design: Q FLY BY NIGHT U1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	8.6	9.2	6	6	1

### Unit Cruise Summary: Q FLY BY NIGHT U1

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
ES	3	4	0.7	0
WL	1	3	0.5	0
AF	4	4	0.7	0
LP	3	3	0.5	0
ALL	11	14	2.3	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
ES	22.4	122.5	50.0	85.4	49.2	28.4	1,913	132.0	57.5
WL	16.8	109.5	44.7	88.3	0.0	0.0	1,484	109.5	44.7
AF	22.4	122.5	50.0	64.7	29.4	14.7	1,450	126.0	52.1
LP	16.8	167.3	68.3	68.9	46.9	27.1	1,157	173.8	73.5
ALL	78.4	64.5	26.3	76.6	36.3	10.9	6,005	74.0	28.5

**Unit Summary: Q FLY BY NIGHT U1**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	4	ALL	10.6	47	57	1,480	1,450	2.1	36.6	22.4	6.9	12.5
ES	LIVE	CUT	3	ALL	15.4	57	70	1,435	1,435	0.0	13.0	16.8	4.3	12.4
LP	LIVE	CUT	3	ALL	12.6	44	52	1,184	1,157	2.2	19.4	16.8	4.7	10.0
WL	LIVE	CUT	1	ALL	16.8	66	83	517	495	4.2	3.6	5.6	1.4	4.3
ALL	LIVE	CUT	11	ALL	12.5	49	60	4,616	4,537	1.7	72.6	61.6	17.3	39.2
ALL	ALL	ALL	11	ALL	12.5	49	60	4,616	4,537	1.7	72.6	61.6	17.3	39.2

DRAFT



## Cruise Unit Report Q FLY BY NIGHT U2

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U2

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
LP	10.3			40	14	24	2
AF	12.1			36	20	15	1
WL	10.6			29	8	20	1
ES	13.7			5	3	3	
ALL	11.1			110	46	61	4

### Unit Cruise Design: Q FLY BY NIGHT U2

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	7.3	7.5	5	5	0

### Unit Cruise Summary: Q FLY BY NIGHT U2

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
LP	11	11	2.2	0
AF	9	9	1.8	0
WL	6	7	1.4	0
ES	2	3	0.6	0
ALL	28	30	6.0	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
LP	73.9	174.3	77.9	74.7	28.0	8.5	5,521	176.5	78.4
AF	60.5	46.5	20.8	81.5	35.9	12.0	4,932	58.7	24.0
WL	47.1	119.5	53.5	97.5	23.7	9.7	4,587	121.9	54.3
ES	20.2	149.1	66.7	52.2	20.1	14.2	1,053	150.4	68.2
ALL	201.7	71.7	32.1	79.8	32.1	6.1	16,093	78.5	32.6

**Unit Summary: Q FLY BY NIGHT U2**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	9	ALL	12.1	53	65	5,073	4,932	2.8	75.8	60.5	17.4	36.1
ES	LIVE	CUT	2	ALL	13.7	45	56	732	702	4.1	13.1	13.4	3.6	5.1
LP	LIVE	CUT	11	ALL	10.3	56	69	6,426	5,521	14.1	127.8	73.9	23.0	40.4
WL	LIVE	CUT	6	ALL	10.6	55	69	3,963	3,932	0.8	65.8	40.3	12.4	28.8
ALL	LIVE	CUT	28	ALL	11.1	54	67	16,194	15,086	6.8	282.5	188.2	56.5	110.4
ALL	ALL	ALL	28	ALL	11.1	54	67	16,194	15,086	6.8	282.5	188.2	56.5	110.4

## Cruise Unit Report Q FLY BY NIGHT U3

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U3

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
AF	12.0			258	159	92	8
ES	13.1			181	126	50	5
LP	11.6			175	107	62	6
WL	12.1			73	59	12	2
ALL	12.1			687	451	216	20

### Unit Cruise Design: Q FLY BY NIGHT U3

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	55.9	56.8	11	11	0

### Unit Cruise Summary: Q FLY BY NIGHT U3

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
AF	19	19	1.7	0
ES	12	13	1.2	0
LP	12	12	1.1	0
WL	4	6	0.5	0
ALL	47	50	4.5	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
AF	58.1	82.2	24.8	79.5	25.5	5.8	4,616	86.1	25.5
ES	39.7	83.1	25.0	88.5	29.2	8.4	3,514	88.0	26.4
LP	36.7	244.1	73.6	85.2	35.0	10.1	3,124	246.6	74.3
WL	18.3	150.4	45.3	107.3	12.0	6.0	1,967	150.8	45.7
ALL	152.8	57.7	17.4	86.5	28.3	4.1	13,221	64.3	17.9

## Unit Summary: Q FLY BY NIGHT U3

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	19	ALL	12.0	56	69	4,886	4,616	5.5	73.9	58.1	16.8	257.9
ES	LIVE	CUT	12	ALL	13.1	59	73	3,244	3,244	0.0	39.2	36.7	10.1	181.2
LP	LIVE	CUT	12	ALL	11.6	59	74	3,513	3,124	11.1	50.0	36.7	10.8	174.5
WL	LIVE	CUT	4	ALL	12.1	67	83	1,324	1,311	1.0	15.3	12.2	3.5	73.3
ALL	LIVE	CUT	47	ALL	12.2	58	72	12,967	12,295	5.2	178.4	143.6	41.2	686.9
ALL	ALL	ALL	47	ALL	12.2	58	72	12,967	12,295	5.2	178.4	143.6	41.2	686.9

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## Cruise Unit Report Q FLY BY NIGHT U4

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U4

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
LP	10.4			52	23	27	3
WL	10.4			40	15	24	2
AF	11.5			21	5	14	1
ES	10.6			6		6	0
ALL	10.6			120	43	71	6

### Unit Cruise Design: Q FLY BY NIGHT U4

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	8.7	9.2	5	5	0

### Unit Cruise Summary: Q FLY BY NIGHT U4

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
LP	11	11	2.2	0
WL	7	9	1.8	0
AF	6	6	1.2	0
ES	2	2	0.4	0
ALL	26	28	5.6	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
LP	73.9	74.7	33.4	81.9	21.2	6.4	6,052	77.6	34.0
WL	60.5	91.3	40.8	98.9	24.8	9.4	5,983	94.6	41.9
AF	40.3	69.7	31.2	60.0	40.5	16.5	2,421	80.6	35.3
ES	13.4	136.9	61.2	53.9	49.4	34.9	724	145.6	70.5
ALL	188.2	20.4	9.1	80.7	31.9	6.3	15,181	37.9	11.1

**Unit Summary: Q FLY BY NIGHT U4**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	6	ALL	11.5	47	58	2,626	2,421	7.8	55.9	40.3	11.9	21.0
ES	LIVE	CUT	2	ALL	10.6	43	52	757	724	4.3	21.9	13.4	4.1	6.3
LP	LIVE	CUT	11	ALL	10.4	51	63	6,307	6,052	4.0	125.3	73.9	22.9	52.4
WL	LIVE	CUT	7	ALL	10.4	59	73	4,667	4,654	0.3	79.8	47.1	14.6	40.3
ALL	LIVE	CUT	26	ALL	10.6	52	64	14,357	13,851	3.5	282.9	174.8	53.5	120.0
ALL	ALL	ALL	26	ALL	10.6	52	64	14,357	13,851	3.5	282.9	174.8	53.5	120.0



## Cruise Unit Report Q FLY BY NIGHT U5

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U5

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
WL	9.6			38	5	30	3
LP	9.1			35		32	2
ALL	9.4			72	5	62	5

### Unit Cruise Design: Q FLY BY NIGHT U5

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	6.8	7.0	5	5	0

### Unit Cruise Summary: Q FLY BY NIGHT U5

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WL	10	13	2.6	0
LP	9	9	1.8	0
ALL	19	22	4.4	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
WL	87.4	43.9	19.6	82.2	19.9	6.3	7,186	48.1	20.6
LP	60.5	91.3	40.8	85.0	15.8	5.3	5,141	92.6	41.2
ALL	147.9	41.3	18.5	83.4	17.6	4.0	12,327	44.9	18.9

### Unit Summary: Q FLY BY NIGHT U5

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
LP	LIVE	CUT	9	ALL	9.1	53	65	5,296	5,141	2.9	134.0	60.5	20.1	34.9
WL	LIVE	CUT	10	ALL	9.6	56	69	5,755	5,528	3.9	133.7	67.2	21.7	37.5
ALL	LIVE	CUT	19	ALL	9.4	54	67	11,051	10,669	3.5	267.7	127.7	41.8	72.4
ALL	ALL	ALL	19	ALL	9.4	54	67	11,051	10,669	3.5	267.7	127.7	41.8	72.4

## Cruise Unit Report Q FLY BY NIGHT U6

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U6

Sp	DBH	Rings/In	Age	MBF Volume by Grade		
				All	4 Saw	Utility
LP	7.8			18	17	1
WL	9.1			7	6	0
ES	7.9			2	2	0
AF	12.3			1	1	0
ALL	8.3			28	26	2

### Unit Cruise Design: Q FLY BY NIGHT U6

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	4.9	5.0	6	6	0

### Unit Cruise Summary: Q FLY BY NIGHT U6

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF		1	0.2	0
LP	7	7	1.2	0
WL	3	4	0.7	0
ES	1	1	0.2	0
AF	1	1	0.2	0
ALL	12	14	2.3	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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	5.6	244.9	100.0						
LP	39.2	113.9	46.5	92.6	30.3	11.4	3,630	117.9	47.9
WL	22.4	122.5	50.0	83.8	21.8	12.6	1,878	124.4	51.6
ES	5.6	244.9	100.0	70.5	0.0	0.0	395	244.9	100.0
AF	5.6	244.9	100.0	50.9	0.0	0.0	285	244.9	100.0
ALL	78.4	51.9	21.2	85.0	30.0	8.7	6,664	60.0	22.9

**Unit Summary: Q FLY BY NIGHT U6**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	1	ALL	12.3	50	61	305	285	6.7	6.8	5.6	1.6	1.4
ES	LIVE	CUT	1	ALL	7.9	41	49	395	395	0.0	16.5	5.6	2.0	1.9
LP	LIVE	CUT	7	ALL	7.8	45	55	3,835	3,630	5.3	118.2	39.2	14.0	17.9
WL	LIVE	CUT	3	ALL	9.1	52	64	1,409	1,409	0.0	37.2	16.8	5.6	6.9
ALL	LIVE	CUT	12	ALL	8.3	46	56	5,944	5,719	3.8	178.7	67.2	23.2	28.1
ALL	ALL	ALL	12	ALL	8.3	46	56	5,944	5,719	3.8	178.7	67.2	23.2	28.1

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## Cruise Unit Report Q FLY BY NIGHT U7

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U7

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
LP	11.4			231	68	151	11
WL	11.0			133	41	86	6
DF	9.9			112	41	65	6
AF	10.8			68	41	25	2
ES	11.9			34	30	3	1
ALL	11.0			578	222	329	27

### Unit Cruise Design: Q FLY BY NIGHT U7

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	76.2	79.1	16	16	0

### Unit Cruise Summary: Q FLY BY NIGHT U7

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
LP	22	22	1.4	0
WL	10	15	0.9	0
DF	9	11	0.7	0
AF	5	5	0.3	0
ES	2	3	0.2	0
ALL	48	56	3.5	0

### Unit Cruise Statistics: Q FLY BY NIGHT 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 (%)
LP	46.2	135.1	33.8	65.5	42.1	9.0	3,028	141.5	34.9
WL	31.5	126.0	31.5	83.1	26.6	8.4	2,617	128.8	32.6
DF	23.1	165.6	41.4	77.6	35.3	11.8	1,793	169.3	43.0
AF	10.5	192.7	48.2	85.2	28.7	12.8	895	194.8	49.8
ES	6.3	290.1	72.5	106.5	24.5	17.3	671	291.1	74.6
ALL	117.6	48.9	12.2	76.5	35.5	5.1	9,004	60.4	13.3

**Unit Summary: Q FLY BY NIGHT U7**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	5	ALL	10.8	48	59	939	895	4.7	16.5	10.5	3.2	68.2
DF	LIVE	CUT	9	ALL	9.9	48	59	1,503	1,467	2.4	35.4	18.9	6.0	111.8
ES	LIVE	CUT	2	ALL	11.9	58	72	447	447	0.0	5.4	4.2	1.2	34.1
LP	LIVE	CUT	22	ALL	11.4	50	62	3,323	3,028	8.9	65.2	46.2	13.7	230.8
WL	LIVE	CUT	10	ALL	11.0	55	68	1,745	1,745	0.0	31.8	21.0	6.3	133.0
ALL	LIVE	CUT	48	ALL	10.9	51	62	7,958	7,582	4.7	154.3	100.8	30.4	578.0
ALL	ALL	ALL	48	ALL	10.9	51	62	7,958	7,582	4.7	154.3	100.8	30.4	578.0

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## Cruise Unit Report Q FLY BY NIGHT U8

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U8

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
GF	10.2			9		9	0
DF	10.8			8	2	5	0
WL	10.0			2		2	0
ES	10.1			2		2	0
AF	14.0			1		1	0
ALL	10.6			23	2	20	1

### Unit Cruise Design: Q FLY BY NIGHT U8

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	4.4	4.5	5	5	0

### Unit Cruise Summary: Q FLY BY NIGHT U8

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	4	5	1.0	0
GF	5	5	1.0	0
WL	1	2	0.4	0
ES	1	1	0.2	0
AF	1	1	0.2	0
ALL	12	14	2.8	0

### Unit Cruise Statistics: Q FLY BY NIGHT U8

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	33.6	173.2	77.5	70.1	18.6	9.3	2,358	174.2	78.0
GF	33.6	100.0	44.7	60.0	44.0	19.7	2,015	109.2	48.9
WL	13.4	136.9	61.2	84.3	0.0	0.0	1,134	136.9	61.2
ES	6.7	223.6	100.0	80.9	0.0	0.0	544	223.6	100.0
AF	6.7	223.6	100.0	42.1	0.0	0.0	283	223.6	100.0
ALL	94.1	111.2	49.7	67.3	30.6	8.8	6,333	115.4	50.5



**Unit Summary: Q FLY BY NIGHT U8**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	1	ALL	14.0	50	62	283	283	0.0	6.3	6.7	1.8	1.2
DF	LIVE	CUT	4	ALL	10.8	51	63	1,997	1,886	5.6	42.3	26.9	8.2	8.3
ES	LIVE	CUT	1	ALL	10.1	52	64	544	544	0.0	12.1	6.7	2.1	2.4
GF	LIVE	CUT	5	ALL	10.2	42	52	2,015	2,015	0.0	59.2	33.6	10.5	8.8
WL	LIVE	CUT	1	ALL	10.0	61	76	567	567	0.0	12.3	6.7	2.1	2.5
ALL	LIVE	CUT	12	ALL	10.6	48	59	5,406	5,295	2.1	132.2	80.7	24.7	23.2
ALL	ALL	ALL	12	ALL	10.6	48	59	5,406	5,295	2.1	132.2	80.7	24.7	23.2

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## Cruise Unit Report Q FLY BY NIGHT U9

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U9

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
WL	10.2			181	68	89	24
DF	10.6			112	29	74	9
GF	10.8			94	18	73	3
LP	10.2			82	9	66	6
ALL	10.4			469	125	302	42

### Unit Cruise Design: Q FLY BY NIGHT U9

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 0 ft	67.5	68.5	15	15	0

### Unit Cruise Summary: Q FLY BY NIGHT U9

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
PP		1	0.1	0
WL	17	19	1.3	0
DF	13	14	0.9	0
GF	11	11	0.7	0
LP	12	12	0.8	0
ALL	53	57	3.8	0

### Unit Cruise Statistics: Q FLY BY NIGHT U9

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 (%)
PP	2.2	387.3	100.0						
WL	42.6	150.6	38.9	70.5	32.9	8.0	3,001	154.1	39.7
DF	31.4	131.0	33.8	57.2	22.0	6.1	1,793	132.9	34.4
GF	24.6	131.1	33.8	56.4	25.6	7.7	1,391	133.5	34.7
LP	26.9	190.2	49.1	45.0	48.4	14.0	1,210	196.2	51.0
ALL	127.7	58.2	15.0	58.9	35.3	4.8	7,527	68.0	15.8

**Unit Summary: Q FLY BY NIGHT U9**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	13	ALL	10.6	50	62	1,833	1,665	9.2	47.5	29.1	8.9	112.4
GF	LIVE	CUT	11	ALL	10.8	42	51	1,452	1,391	4.2	38.7	24.6	7.5	93.9
LP	LIVE	CUT	12	ALL	10.2	46	56	1,624	1,210	25.5	47.4	26.9	8.4	81.7
WL	LIVE	CUT	17	ALL	10.2	51	62	2,783	2,685	3.5	67.1	38.1	11.9	181.2
ALL	LIVE	CUT	53	ALL	10.4	48	58	7,692	6,951	9.6	200.7	118.8	36.8	469.2
ALL	ALL	ALL	53	ALL	10.4	48	58	7,692	6,951	9.6	200.7	118.8	36.8	469.2

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## Cruise Unit Report Q FLY BY NIGHT U10

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U10

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
GF	10.6			120	42	73	6
LP	9.5			71		68	2
AF	9.6			64	18	41	4
ES	12.8			50	34	15	1
WL	10.6			35	11	10	13
DF	10.4			14		14	1
ALL	10.4			353	105	220	28

### Unit Cruise Design: Q FLY BY NIGHT U10

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	61.2	63.0	11	11	0

### Unit Cruise Summary: Q FLY BY NIGHT U10

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
GF	11	11	1.0	0
LP	5	5	0.5	0
AF	6	6	0.5	0
DF	1	4	0.4	0
ES	4	4	0.4	0
WL	3	4	0.4	0
ALL	30	34	3.1	0

### Unit Cruise Statistics: Q FLY BY NIGHT U10

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 (%)
GF	33.6	118.3	35.7	58.4	39.7	12.0	1,964	124.8	37.6
LP	15.3	180.4	54.4	75.4	17.3	7.8	1,152	181.3	55.0
AF	18.3	222.5	67.1	56.7	35.3	14.4	1,039	225.3	68.6
DF	12.2	138.7	41.8	76.3	0.0	0.0	932	138.7	41.8
ES	12.2	185.4	55.9	67.0	14.8	7.4	819	186.0	56.4

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 (%)
WL	12.2	254.2	76.6	61.8	7.1	4.1	756	254.3	76.8
ALL	103.9	74.4	22.4	64.1	28.8	5.3	6,661	79.8	23.0

### Unit Summary: Q FLY BY NIGHT U10

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	6	ALL	9.6	38	46	1,151	1,039	9.7	36.5	18.3	5.9	63.6
DF	LIVE	CUT	1	ALL	10.4	49	60	233	233	0.0	5.2	3.1	0.9	14.3
ES	LIVE	CUT	4	ALL	12.8	52	65	847	819	3.3	13.7	12.2	3.4	50.1
GF	LIVE	CUT	11	ALL	10.6	45	55	2,167	1,964	9.4	54.8	33.6	10.3	120.2
LP	LIVE	CUT	5	ALL	9.5	47	57	1,204	1,152	4.3	31.0	15.3	5.0	70.6
WL	LIVE	CUT	3	ALL	10.6	47	57	582	567	2.7	15.0	9.2	2.8	34.7
ALL	LIVE	CUT	30	ALL	10.4	45	54	6,184	5,773	6.6	156.2	91.7	28.4	353.5
ALL	ALL	ALL	30	ALL	10.4	45	54	6,184	5,773	6.6	156.2	91.7	28.4	353.5

## Cruise Unit Report Q FLY BY NIGHT U11

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U11

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
LP	8.2			18		9	9
DF	18.3			12	11	1	
GF	14.7			8	4	4	
WL	10.6			6		6	
ALL	10.9			44	15	20	9

### Unit Cruise Design: Q FLY BY NIGHT U11

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 0 ft	23.1	23.1	6	6	0

### Unit Cruise Summary: Q FLY BY NIGHT U11

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	1	2	0.3	0
GF	2	5	0.8	0
LP	2	2	0.3	0
WL	1	1	0.2	0
ALL	6	10	1.7	0

### Unit Cruise Statistics: Q FLY BY NIGHT U11

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	11.2	244.9	100.0	95.3	0.0	0.0	1,067	244.9	100.0
GF	28.0	118.0	48.2	32.0	11.3	8.0	897	118.5	48.8
LP	11.2	244.9	100.0	69.3	6.1	4.3	776	245.0	100.1
WL	5.6	244.9	100.0	45.7	0.0	0.0	256	244.9	100.0
ALL	56.0	62.0	25.3	53.5	47.1	19.2	2,996	77.8	31.8



**Unit Summary: Q FLY BY NIGHT U11**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	1	ALL	18.3	62	78	534	534	0.0	3.1	5.6	1.3	12.3
GF	LIVE	CUT	2	ALL	14.7	43	53	439	359	18.2	9.5	11.2	2.9	8.3
LP	LIVE	CUT	2	ALL	8.2	42	51	776	776	0.0	30.5	11.2	3.9	17.9
WL	LIVE	CUT	1	ALL	10.6	36	43	274	256	6.7	9.1	5.6	1.7	5.9
ALL	LIVE	CUT	6	ALL	10.9	42	51	2,022	1,924	4.9	52.2	33.6	9.9	44.4
ALL	ALL	ALL	6	ALL	10.9	42	51	2,022	1,924	4.9	52.2	33.6	9.9	44.4

DRAFT

## Cruise Unit Report Q FLY BY NIGHT U12

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U12

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	3 Saw	4 Saw	Utility
WL	12.2			196	107	84	5
GF	15.1			76	57	18	1
DF	11.1			67	23	42	2
LP	9.8			64		61	4
ALL	12.0			404	187	205	12

### Unit Cruise Design: Q FLY BY NIGHT U12

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	96.7	99.0	20	20	0

### Unit Cruise Summary: Q FLY BY NIGHT U12

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
PP		3	0.2	0
WL	15	19	1.0	0
DF	6	9	0.5	0
GF	8	9	0.5	0
LP	5	5	0.3	0
ALL	34	45	2.3	0

### Unit Cruise Statistics: Q FLY BY NIGHT U12

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 (%)
PP	5.0	326.2	72.9						
WL	31.9	79.9	17.9	80.5	29.4	7.6	2,571	85.2	19.4
DF	15.1	168.7	37.7	68.9	23.0	9.4	1,041	170.3	38.9
GF	15.1	134.4	30.1	58.4	54.1	19.1	884	144.9	35.6
LP	8.4	286.5	64.1	79.2	7.4	3.3	666	286.6	64.2
ALL	75.6	47.6	10.6	73.1	32.9	5.6	5,531	57.8	12.0

**Unit Summary: Q FLY BY NIGHT U12**

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	6	ALL	11.1	47	57	728	694	4.7	15.0	10.1	3.0	67.1
GF	LIVE	CUT	8	ALL	15.1	51	62	968	786	18.8	10.8	13.4	3.5	75.9
LP	LIVE	CUT	5	ALL	9.8	51	63	741	666	10.1	16.0	8.4	2.7	64.4
WL	LIVE	CUT	15	ALL	12.2	57	71	2,107	2,030	3.7	31.1	25.2	7.2	196.2
ALL	LIVE	CUT	34	ALL	12.0	53	65	4,545	4,175	8.1	72.9	57.1	16.4	403.6
ALL	ALL	ALL	34	ALL	12.0	53	65	4,545	4,175	8.1	72.9	57.1	16.4	403.6

DRAFT

## Cruise Unit Report Q FLY BY NIGHT U13

### Unit Sale Notice Volume (MBF): Q FLY BY NIGHT U13

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
WL	13.0			212	15	119	73	5
LP	11.1			119		55	59	5
GF	13.8			87	14	47	25	2
DF	15.5			51	13	22	14	1
ES	24.5			27		27		0
AF	9.3			10			10	
ALL	12.6			506	43	270	181	12

### Unit Cruise Design: Q FLY BY NIGHT U13

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (33.61) Measure All, Sighting Ht = 4.5 ft	92.3	95.1	19	19	0

### Unit Cruise Summary: Q FLY BY NIGHT U13

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WL	14	19	1.0	0
LP	11	11	0.6	0
DF	4	7	0.4	0
GF	6	6	0.3	0
ES	1	2	0.1	0
AF	1	1	0.1	0
ALL	37	46	2.4	0

### Unit Cruise Statistics: Q FLY BY NIGHT U13

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 (%)
WL	33.6	94.3	21.6	92.6	20.0	5.3	3,111	96.4	22.3
LP	19.5	144.7	33.2	66.2	35.1	10.6	1,289	148.9	34.8
DF	12.4	225.5	51.7	77.6	14.1	7.1	961	225.9	52.2
GF	10.6	184.4	42.3	89.1	23.8	9.7	945	186.0	43.4
ES	3.5	299.5	68.7	167.1	0.0	0.0	591	299.5	68.7

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 (%)
AF	1.8	435.9	100.0	59.4	0.0	0.0	105	435.9	100.0
ALL	81.4	53.9	12.4	86.1	30.5	5.0	7,003	61.9	13.3

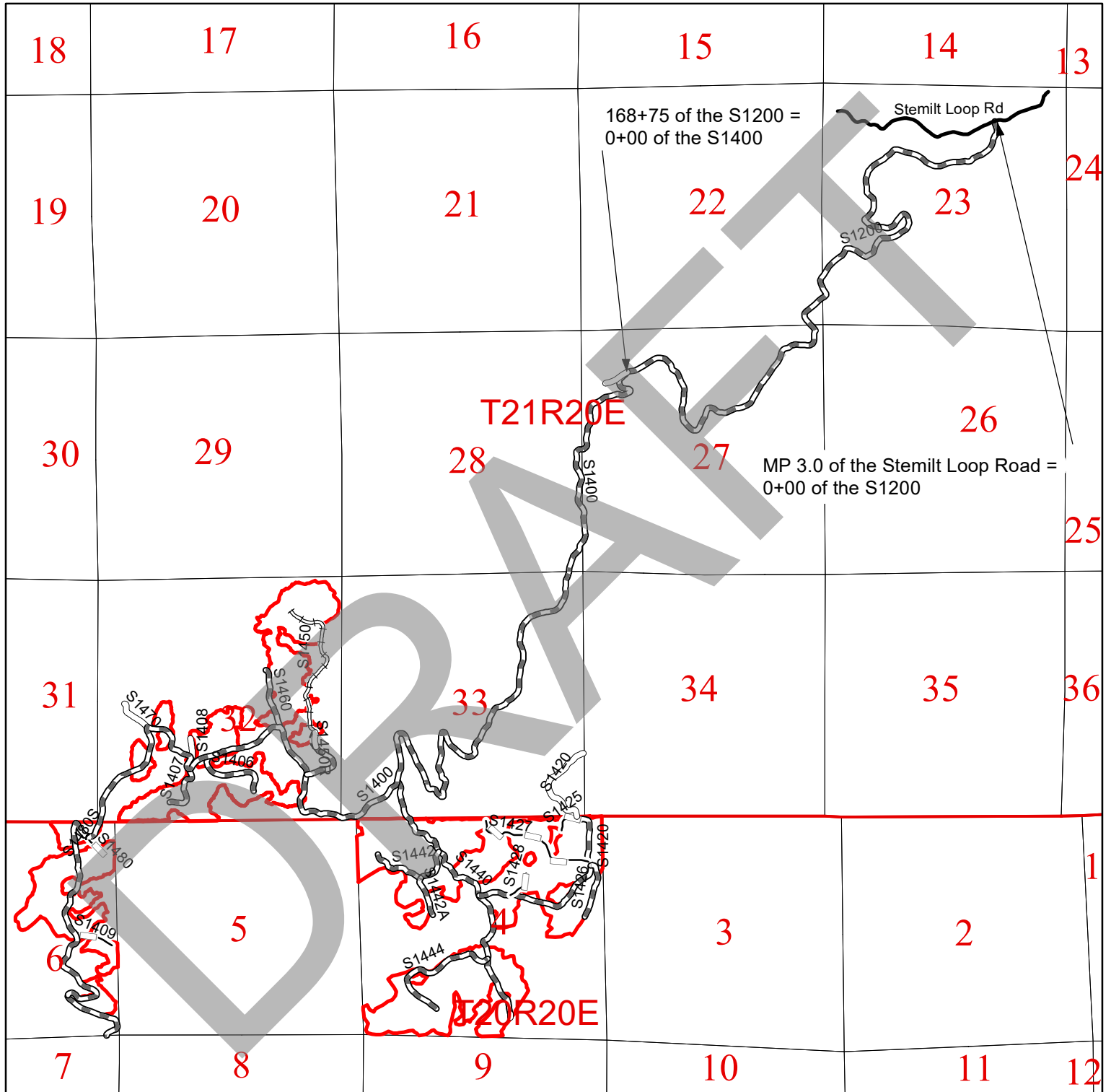
### Unit Summary: Q FLY BY NIGHT U13

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
AF	LIVE	CUT	1	ALL	9.3	45	54	128	105	17.6	3.8	1.8	0.6	9.7
DF	LIVE	CUT	4	ALL	15.5	58	72	573	549	4.2	5.4	7.1	1.8	50.7
ES	LIVE	CUT	1	ALL	24.5	89	114	314	296	5.9	0.5	1.8	0.4	27.3
GF	LIVE	CUT	6	ALL	13.8	56	70	1,026	945	7.8	10.2	10.6	2.9	87.3
LP	LIVE	CUT	11	ALL	11.1	51	62	1,412	1,289	8.7	29.0	19.5	5.8	119.0
WL	LIVE	CUT	14	ALL	13.0	61	76	2,346	2,293	2.3	26.9	24.8	6.9	211.7
ALL	LIVE	CUT	37	ALL	12.6	56	69	5,798	5,476	5.5	75.8	65.5	18.3	505.7
ALL	ALL	ALL	37	ALL	12.6	56	69	5,798	5,476	5.5	75.8	65.5	18.3	505.7

# ROAD PLAN MAP 1 OF 5

SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



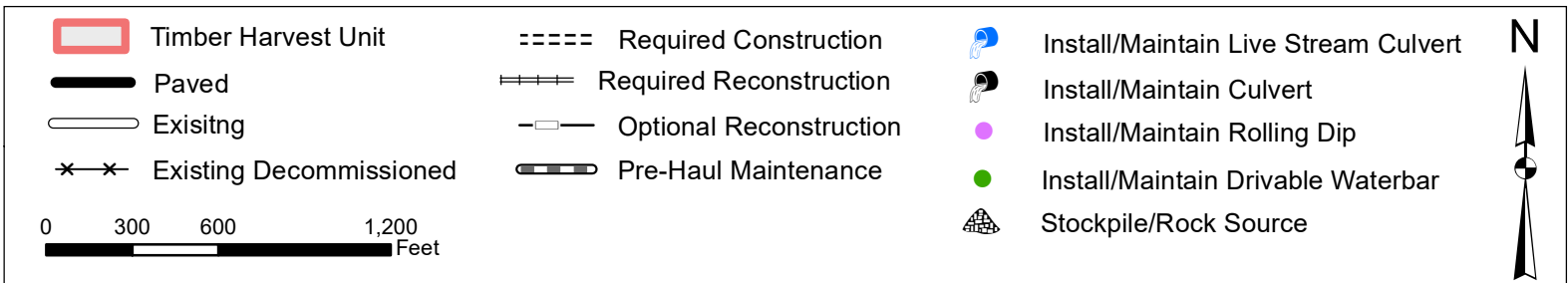
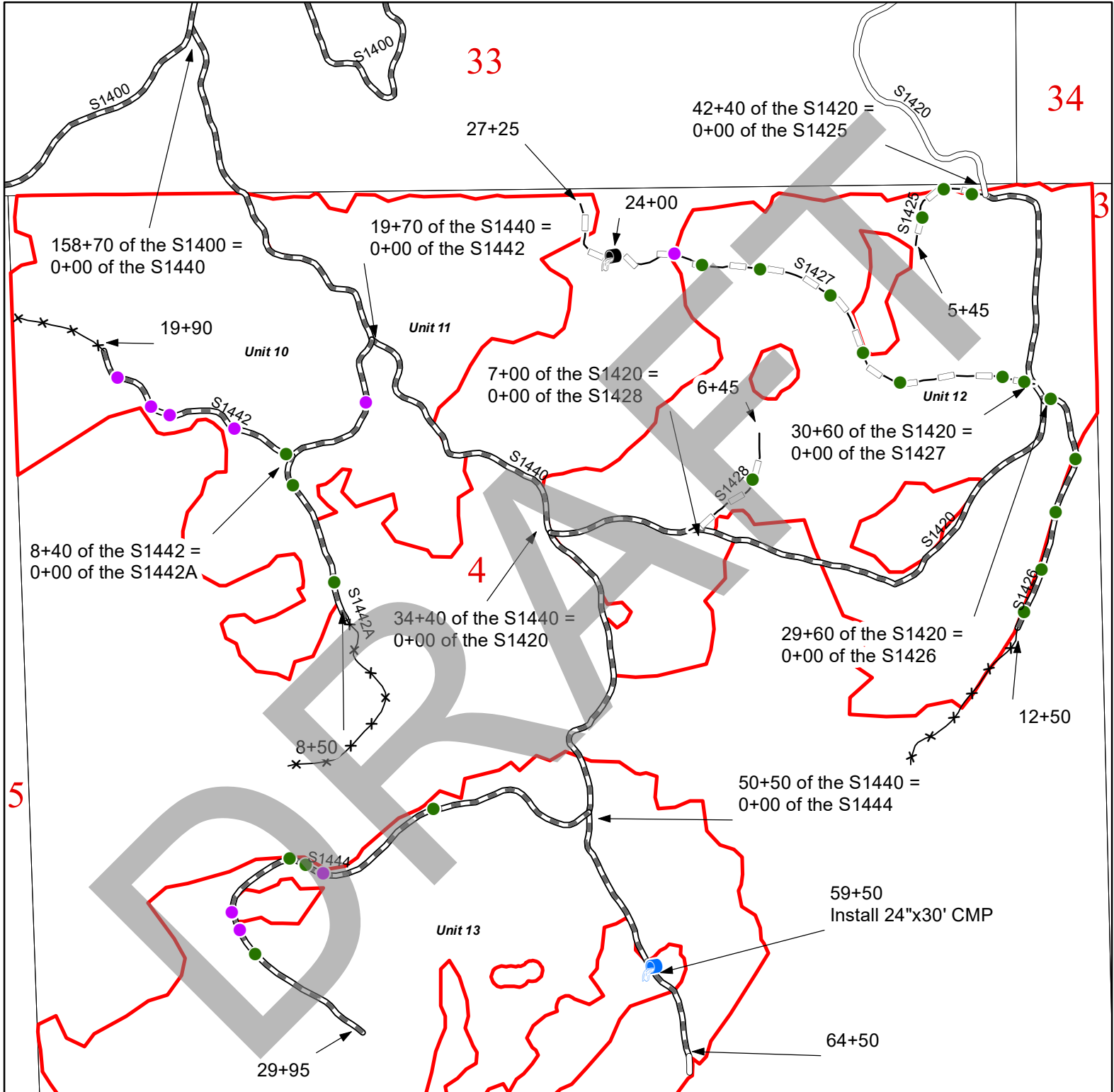
- Timber Harvest Unit
- Paved
- Existing
- Required Construction
- Required Reconstruction
- Optional Reconstruction
- Pre-Haul Maintenance



# ROAD PLAN MAP 2 OF 5

**SALE NAME:** Q FLY BY NIGHT  
**AGREEMENT #:** 30-106349  
**TOWNSHIP/RANGE:** T20N R20E W.M., T21N R20E

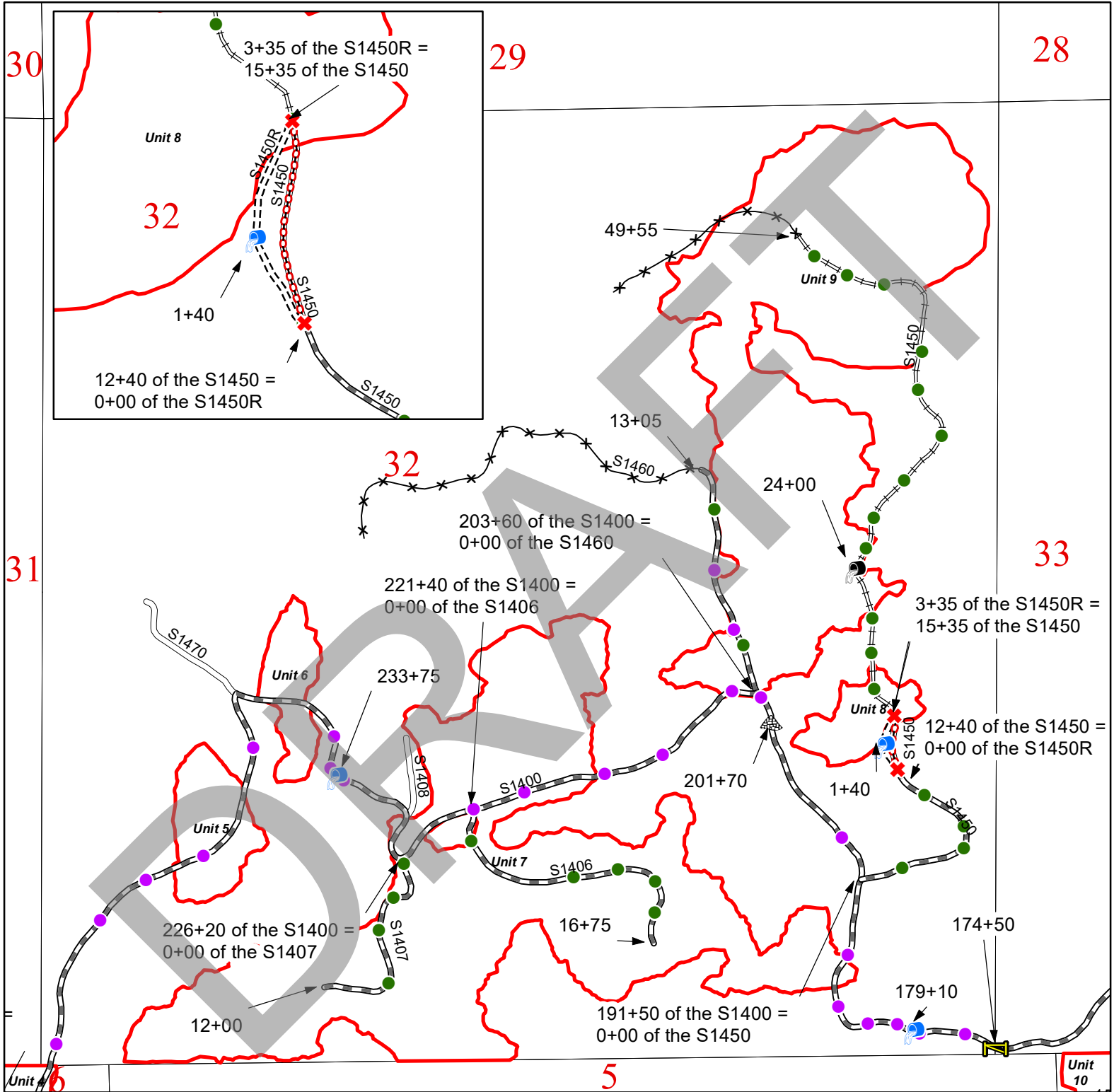
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**COUNTY:** Kittitas, Chelan  
**ELEVATION:** 4,000' to 5,500'



# ROAD PLAN MAP 3 OF 5

SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



Timber Harvest Unit	Required Construction	Install/Maintain Live Stream Culvert
Paved	Required Reconstruction	Install/Maintain Culvert
Existing	Optional Reconstruction	Install/Maintain Rolling Dip
Existing Decommissioned	Pre-Haul Maintenance	Install/Maintain Drivable Waterbar
	Abandonment	Stockpile/Rock Source
		Earthen Barricade

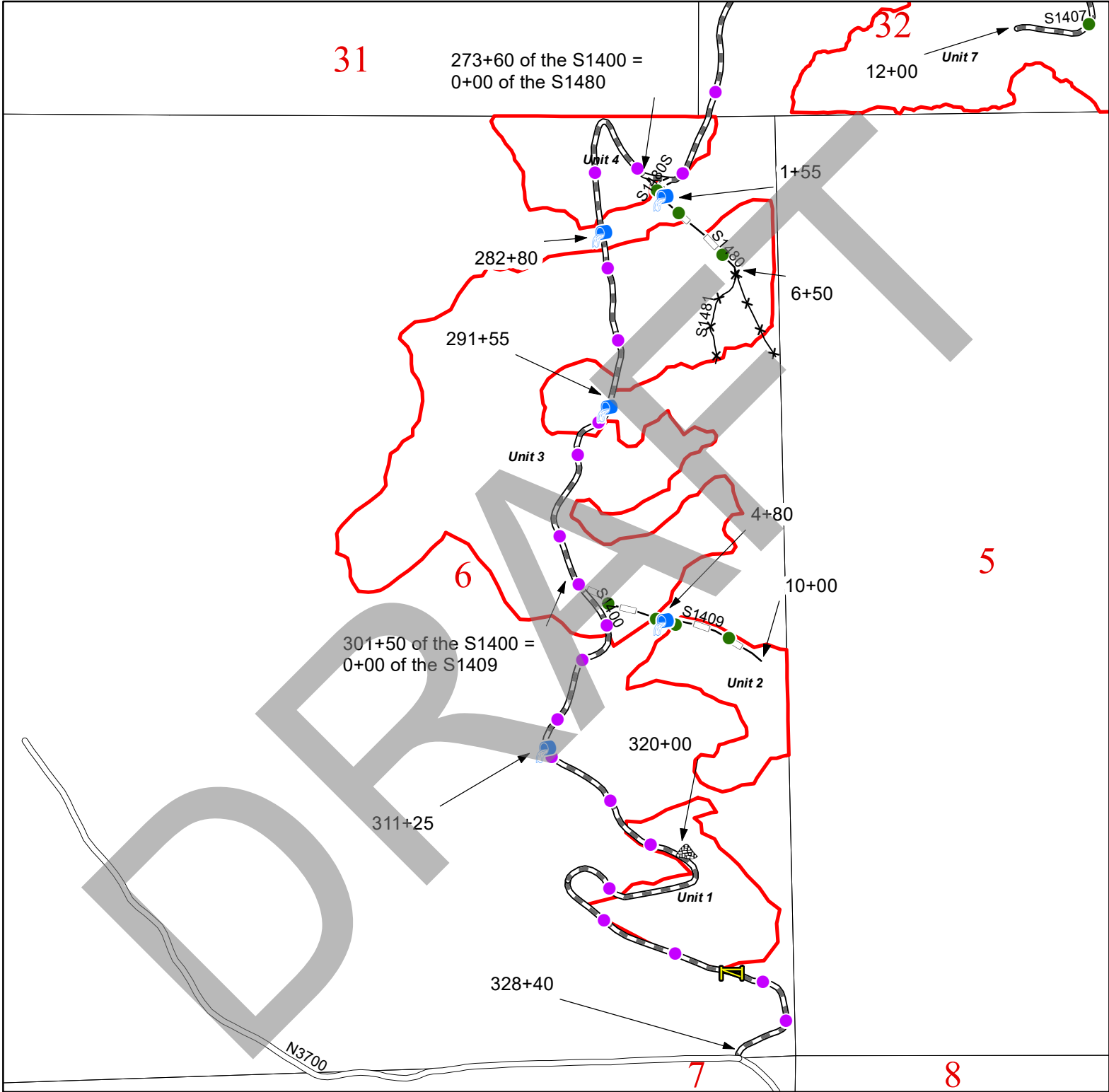
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# ROAD PLAN MAP 4 OF 5

SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



Timber Harvest Unit	Required Construction	Install/Maintain Live Stream Culvert
Paved	Required Reconstruction	Install/Maintain Culvert
Existing	Optional Reconstruction	Install/Maintain Rolling Dip
Existing Decommissioned	Pre-Haul Maintenance	Install/Maintain Drivable Waterbar
Abandonment	Stockpile/Rock Source	Earthen Barricade

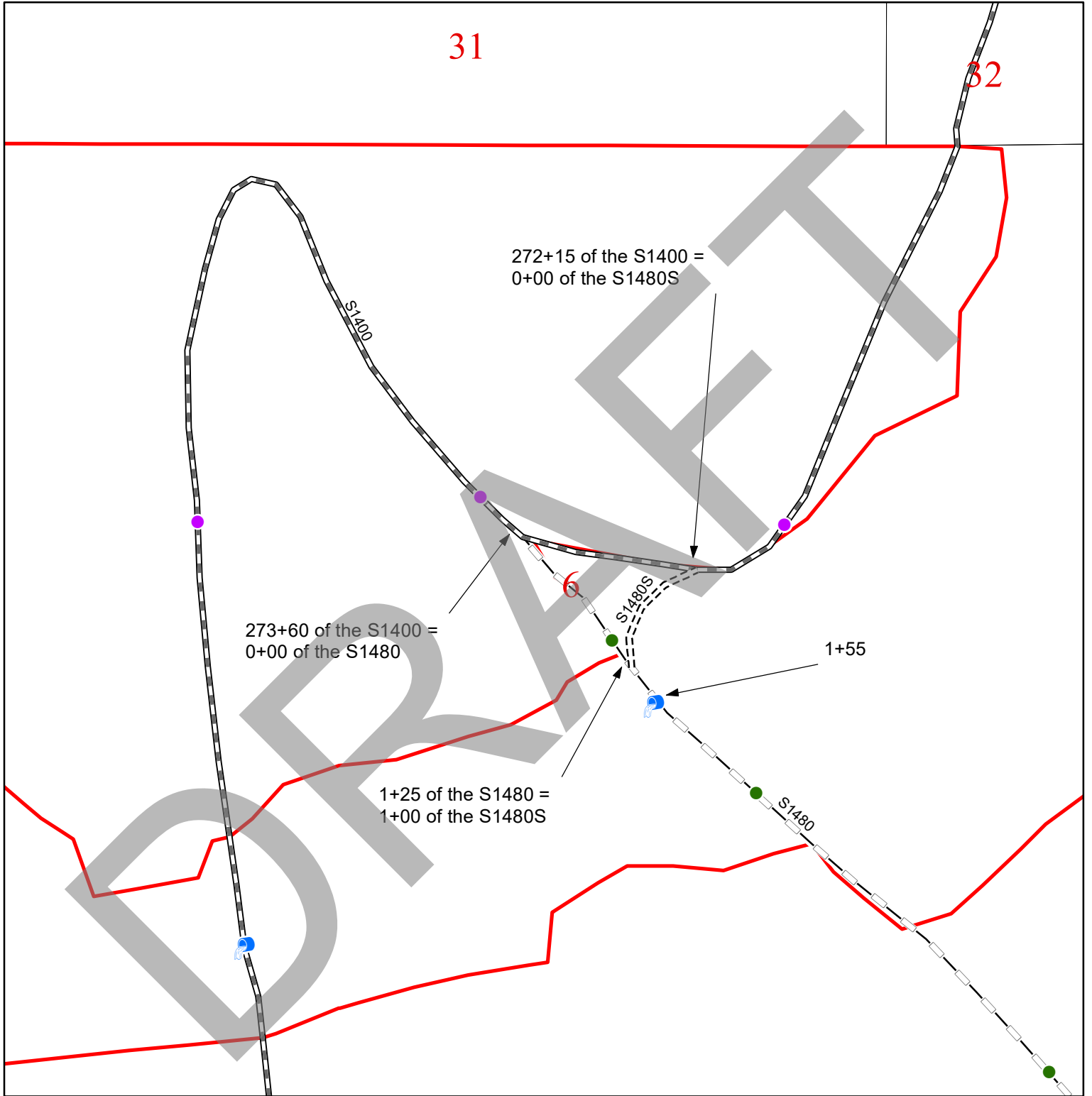
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# ROAD PLAN MAP 5 OF 5

SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

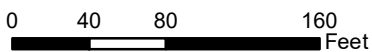
REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



- Timber Harvest Unit
- Paved
- Existing

- Required Construction
- Required Reconstruction
- Optional Reconstruction
- Pre-Haul Maintenance

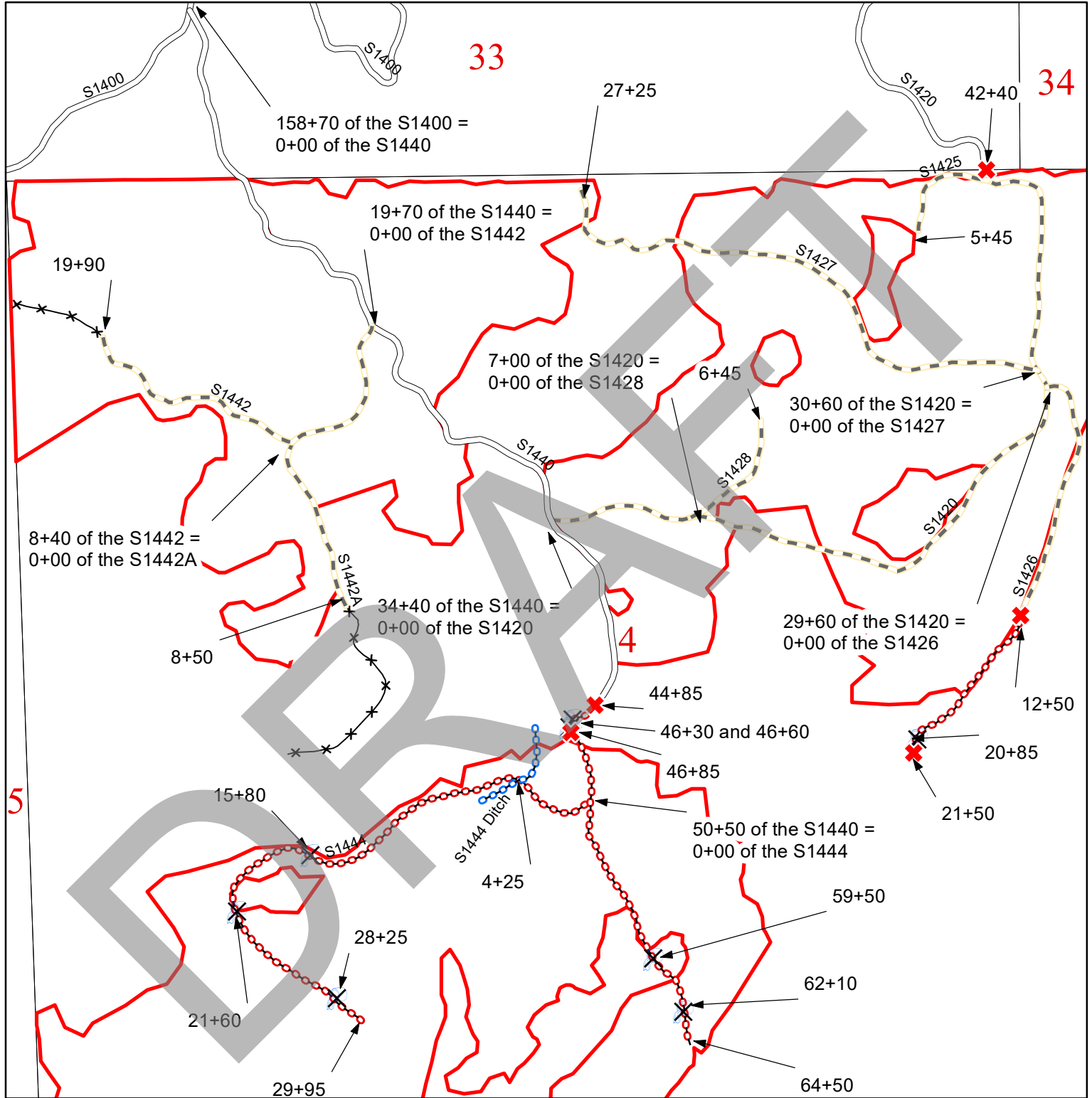
- ⦿ Install/Maintain Live Stream Culvert
- ⦿ Install/Maintain Culvert
- Install/Maintain Rolling Dip
- Install/Maintain Drivable Waterbar
- ⚠ Stockpile/Rock Source












# ROAD PLAN POST HAUL MAP 1 OF 3


SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



 Timber Harvest Unit	 Remove Culvert
 Required Abandonment	 Install Earthen Barricade
 Ditch Abandonment	 Existing
 Post-Haul Maintenance	 Existing Decommissioned
	 Gate

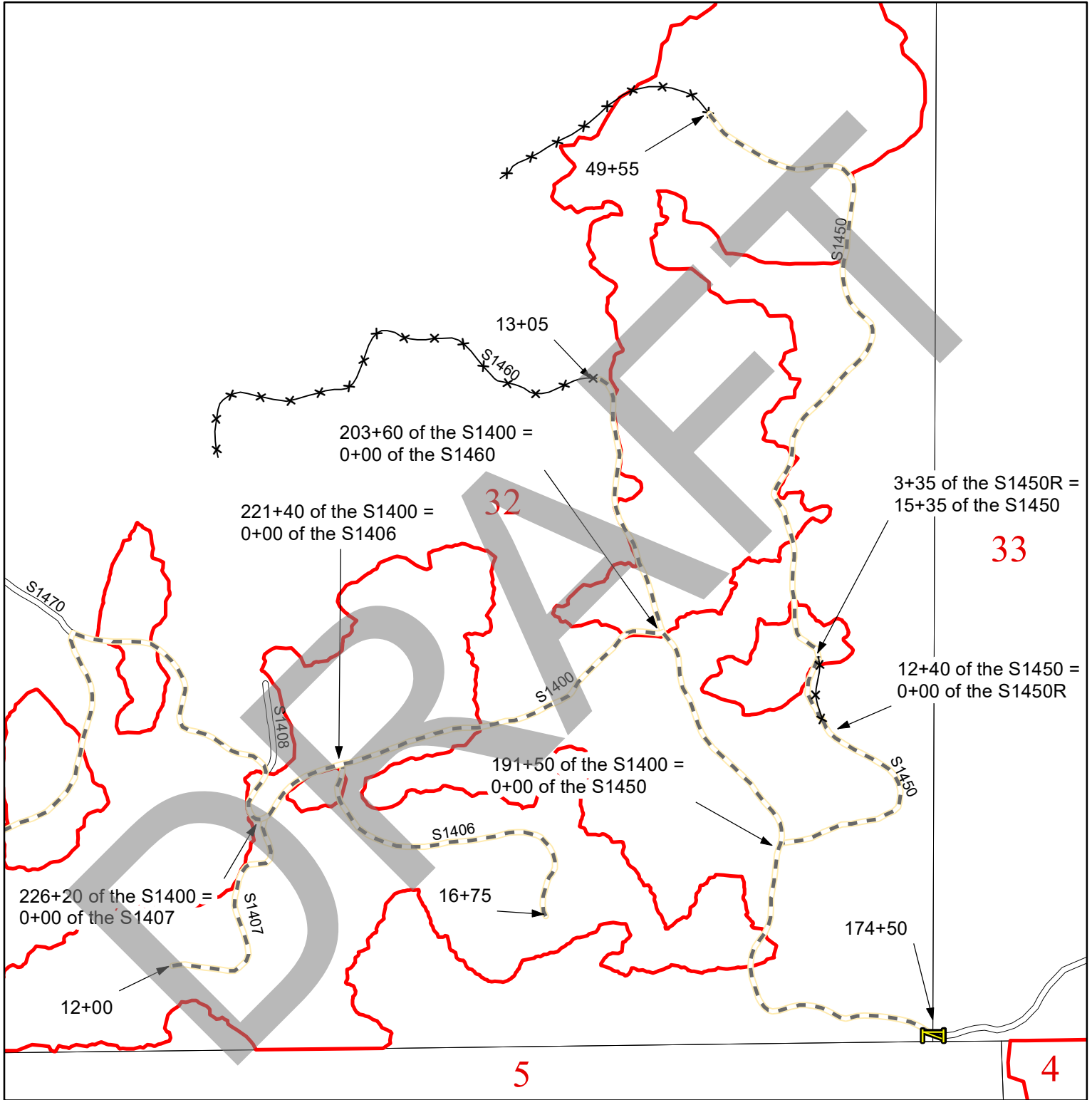
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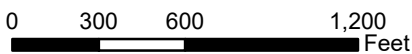
# ROAD PLAN POST HAUL MAP 2 OF 3

SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



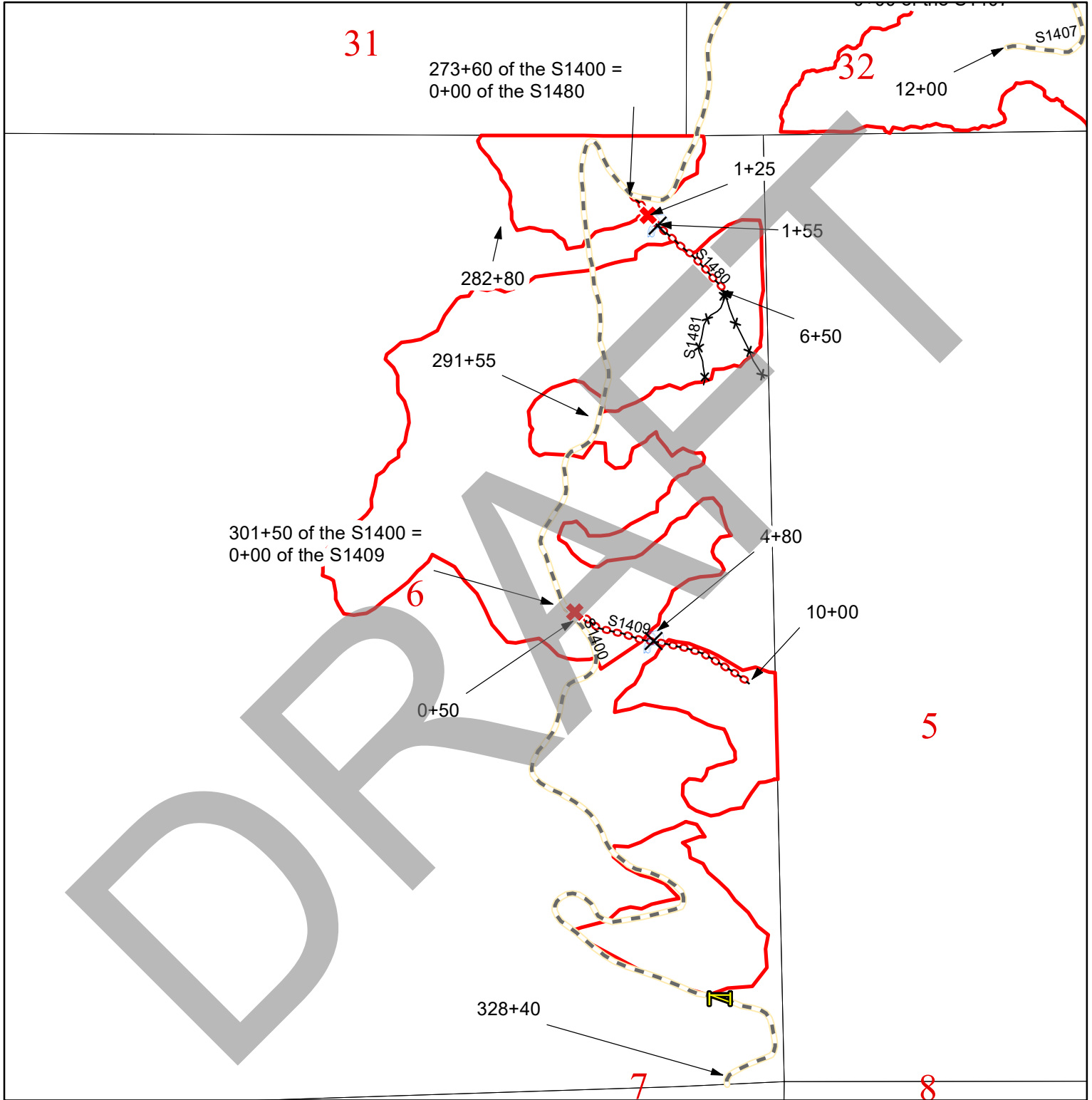
- |                       |                           |
|-----------------------|---------------------------|
| Timber Harvest Unit   | Remove Culvert            |
| Required Abandonment  | Install Earthen Barricade |
| Ditch Abandonment     | Existing                  |
| Post-Haul Maintenance | Existing Decommissioned   |
|                       | Gate                      |












# ROAD PLAN POST HAUL MAP 3 OF 3


SALE NAME: Q FLY BY NIGHT  
 AGREEMENT #: 30-106349  
 TOWNSHIP/RANGE: T20N R20E W.M., T21N R20E

REGION: Southeast  
 COUNTY: Kittitas, Chelan  
 ELEVATION: 4,000' to 5,500'



 Timber Harvest Unit	 Remove Culvert
 Required Abandonment	 Install Earthen Barricade
 Ditch Abandonment	 Existing
 Post-Haul Maintenance	 Existing Decommissioned
	 Gate

0 300 600 1,200 Feet



STATE OF WASHINGTON  
DEPARTMENT OF NATURAL RESOURCES

Q FLY BY NIGHT TIMBER SALE ROAD PLAN  
CHELAN AND KITTITAS COUNTIES  
SOUTHEAST REGION

AGREEMENT NO.: 30-106349

STAFF ENGINEER: JOE SMITH

DATE: 12/21/2023

COMPILED BY: JOE SMITH

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.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
S1200	0+00 to 168+75	Pre-haul Maintenance
S1400	0+00 to 328+40	Pre-haul Maintenance
S1406	0+00 to 16+75	Pre-haul Maintenance
S1407	0+00 to 12+00	Pre-Haul Maintenance
S1420	0+00 to 42+40	Pre-haul Maintenance
S1426	0+00 to 12+50	Pre-haul Maintenance
S1440	0+00 to 64+50	Pre-haul Maintenance
S1442	0+00 to 19+90	Pre-haul Maintenance
S1442A	0+00 to 8+50	Pre-haul Maintenance
S1444	0+00 to 29+95	Pre-haul Maintenance
S1450	0+00 to 12+40	Pre-haul Maintenance
S1450	15+35 to 49+55	Reconstruction
S1450R	0+00 to 3+35	Construction
S1460	0+00 to 13+05	Pre-haul Maintenance
S1480S	0+00 to 1+00	Construction

**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 this road plan.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
S1409	0+00 to 10+00	Reconstruction
S1425	0+00 to 5+45	Reconstruction
S1427	0+00 to 27+25	Reconstruction
S1428	0+00 to 6+45	Reconstruction
S1480	0+00 to 6+50	Reconstruction

**0-4 CONSTRUCTION**

Construction includes, but is not limited to:

- clearing;
- grubbing;
- right-of way debris disposal;
- excavation and/or embankment to subgrade;
- subgrade compaction;
- landing construction;
- installation of drainage structures as specified;
- acquisition and application of rock as specified.

**0-5 RECONSTRUCTION**

This project includes, but is not limited to the following reconstruction requirements:

<u>Road</u>	<u>Stations</u>	<u>Requirements</u>
S1409	0+00 to 10+00	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Apply rock as specified in the ROCK LIST; Shape and compact surface.
S1425	0+00 to 5+45	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Shape and compact surface.

**0-5 RECONSTRUCTION (CONTINUED)**

S1427	0+00 to 27+25	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Shape and compact surface.
S1428	0+00 to 6+45	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Shape and compact surface.
S1450	15+35 to 49+55	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Shape and compact surface.
S1480	0+00 to 6+50	Clear as needed; Re-establish road prism to the dimensions on the TYPICAL SECTION SHEET to facilitate haul; Install drainage as shown in the CULVERT AND DRAINAGE LIST; Shape and compact surface.

**0-6 PRE-HAUL MAINTENANCE**

This project includes, but is not limited to the following pre-haul maintenance requirements:

<u>Road</u>	<u>Stations</u>	<u>Requirements</u>
S1200	0+00 to 168+75	Grade and shape to facilitate haul.
S1400	0+00 to 328+40	Brush as indicated in Clause 3-1 BRUSHING; Clean ditches as indicated in Clause 2-7 CLEANING DITCHES; Install drainage as specified in the CULVERT AND DRAINAGE LIST; Apply rock as specified in the ROCK LIST; Blade off rocks, grade, and shape as needed to facilitate haul.
S1406	0+00 to 16+75	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.



**0-6 PRE-HAUL MAINTENANCE (CONTINUED)**

S1407	0+00 to 12+00	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1420	0+00 to 42+40	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1426	0+00 to 12+50	Fill in non-drivable waterbars; brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1440	0+00 to 64+50	Grade and shape to facilitate haul.
S1442	0+00 to 19+90	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1442A	0+00 to 8+50	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1444	0+00 to 29+95	Fill in non-drivable waterbars; brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1450	0+00 to 12+40	Brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.
S1460	0+00 to 13+05	Fill in non-drivable waterbars; brush as indicated in Clause 3-1 BRUSHING; spot grade as needed; install drainage as specified in the CULVERT AND DRAINAGE LIST.

**0-7 POST-HAUL MAINTENANCE**

This project includes post-haul road maintenance listed in Clause 9-4 POST HAUL MAINTENANCE.

**0-10 ABANDONMENT**

This project includes abandonment listed in Clause 9-22 ROAD ABANDONMENT.

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 any submitted plan that changes the scope of work or environmental condition from the original road 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.

**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.

<u>Tolerance Class</u>	<u>A</u>	<u>B</u>	<u>C</u>
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 Plan/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.

**1-7 TEMPORARY ROAD CLOSURE**

Purchaser shall notify the Contract Administrator a minimum of 14 calendar days before the closure of any road. Green Dot roads shall remain open to recreational traffic on weekends and after 5 PM weekdays, unless otherwise approved, in writing, by the Contract Administrator.

**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, and may not begin without written approval from the Contract Administrator.

**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. Road centerline location for new construction is marked with orange flagging.

**1-21 HAUL APPROVAL**

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

**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
- Drainage installation
- Subgrade compaction
- Rock application
- Rock compaction

**1-25 ACTIVITY TIMING RESTRICTION**

The operation of road construction equipment is not allowed between November 1 to April 30, or on weekends or state recognized holidays, unless authorized in writing by the Contract Administrator.

**1-26 OPERATING DURING CLOSURE PERIOD**

If permission is granted to operate during a closure period listed in Clause 1-25 ACTIVITY TIMING RESTRICTION or Contract Clause H-130 HAULING SCHEDULE, Purchaser shall provide a maintenance plan to include further protection of state resources. Purchaser shall obtain written approval from the Contract Administrator for the maintenance plan, and shall put preventative measures in place before operating during the closure period. Purchaser shall be required to maintain all haul roads at their own expense including those listed in Contract Clause C-060 DESIGNATED ROAD MAINTAINER. If other operators are using, or desire to use these designated maintainer roads, a joint operating plan must be developed. All parties shall follow this plan.

**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:

- Wheel track rutting exceeds 4 inches on any roads.
- Surface or base stability problems persist.
- Weather is such that satisfactory results cannot be obtained in an area of operations.
- When, in the opinion of the Contract Administrator excessive road damage or rutting may occur.

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.

**1-32 BRIDGE OR ASPHALT SURFACE RESTRICTION**

The use of metal tracked equipment is not allowed on bridges or asphalt surfaces at any time. If Purchaser must run equipment on bridges 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 bridges 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 surfaces and have surfaces evaluated by the District Engineer or their designee for any damage caused by equipment. Any damage to the surfaces will be repaired, at the Purchaser's expense, as directed by the Contract Administrator.

If damage has occurred from Purchaser activity, Purchaser shall have asphalt surfaces reviewed by a third party, specializing in asphalt construction and repair. The third party's scope of the damage and repairs must be agreed upon between the Purchaser and the Contract Administrator. Damage to the asphalt will be repaired at the Purchaser's expense.

**1-33 SNOW PLOWING RESTRICTION**

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.

**1-40 ROAD APPROACHES TO PAVED ROADS, COUNTY ROADS AND STATE HIGHWAYS**

Purchaser shall immediately remove any mud, dirt, rock, or other material tracked or spilled on to paved roads, county roads and state highways.

If additional damage to the surface, signs, guardrails, etc. occurs then the damage will be repaired, at the Purchaser's expense, as directed by the Contract Administrator when authorized by the road controller, county or WSDOT.

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.

**2-3 ROAD MAINTENANCE – DESIGNATED MAINTAINER**

Purchaser may be required to perform maintenance on roads listed in Contract Clause C-060 DESIGNATED ROAD MAINTAINER as directed by the Contract Administrator. Purchaser shall maintain roads in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

**2-4 PASSAGE OF LIGHT VEHICLES**

Purchaser shall maintain all roads in a condition that will allow the passage of light administrative vehicles.

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

On the following roads, Purchaser shall use a grader or dozer to shape the existing surface before timber haul.

<u>Road</u>	<u>Stations</u>	<u>Requirements</u>
S1200	0+00 to 168+75	Spot grade/blade as needed for haul.
S1400	0+00 to 328+40	Spot grade/blade as needed for haul.
S1406	0+00 to 16+75	Spot grade/blade as needed for haul.
S1407	0+00 to 12+00	Spot grade/blade as needed for haul.
S1420	0+00 to 42+40	Spot grade/blade as needed for haul.
S1426	0+00 to 12+50	Fill in existing earthen berms and spot grade/blade as needed for haul.
S1440	0+00 to 64+50	Grade, shape, and compact road.
S1442	0+00 to 19+90	Spot grade/blade as needed for haul.
S1442A	0+00 to 8+50	Spot grade/blade as needed for haul.
S1444	0+00 to 29+95	Fill in existing earthen berms and spot grade/blade as needed for haul.
S1450	0+00 to 12+40	Spot grade/blade as needed for haul.
S1460	0+00 to 13+05	Fill in existing earthen berms and spot grade/blade as needed for haul.

**2-6 CLEANING CULVERTS, HEADWALLS AND CATCH BASINS**

On the following roads, Purchaser shall clean the inlets and outlets, headwalls, and catch basins of culverts in conjunction with the CULVERT AND DRAINAGE LIST. Work must be completed before timber haul on each road respectively. Live stream culverts shall be dewatered, as approved by the Contract Administrator, prior to cleaning.

<u>Road</u>	<u>Stations</u>	<u>Water Type</u>
S1400	179+10	Seep
	233+75	F
	282+80	Np
	291+55	Np
	311+25	Np
S1427	24+00	XD
S1450	24+00	XD

\*XD = cross drain

**2-7 CLEANING DITCHES**

On the following road, Purchaser shall clean the ditch. Pulling ditch material across the road or mixing in with the road surface is not allowed.

<u>Road</u>	<u>Stations</u>
S1400	233+85 to 234+40

## SECTION 3 – CLEARING, GRUBBING, AND DISPOSAL

### 3-1 BRUSHING

On the following roads, Purchaser shall cut vegetative material up to 5 inches in diameter, including limbs, as shown on the BRUSHING DETAIL. Brushing must be achieved by manual or mechanical cutting, pulling, or breaking of brush, trees, and branches. Root systems and stumps of cut vegetation may not be disturbed unless directed by the Contract Administrator. Purchaser shall remove brushing debris from the road surface, ditchlines, and culvert inlets and outlets.

<u>Road</u>	<u>Stations</u>
S1400	174+50 to 328+40
S1406	0+00 to 16+75
S1407	0+00 to 12+00
S1420	0+00 to 42+40
S1426	0+00 to 12+50
S1442	0+00 to 19+90
S1442A	0+00 to 8+50
S1444	0+00 to 29+95
S1450	0+00 to 12+40
S1460	0+00 to 13+05

### 3-5 CLEARING

Purchaser shall fell all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries 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.

### 3-7 RIGHT-OF-WAY DECKING

Purchaser shall deck all right-of-way timber. Decks must be parallel to the road centerline and placed within the cleared right-of-way. Decks must be free of dirt, limbs, and other right-of-way debris, and removable by standard log loading equipment from the roadbed.

### 3-8 PROHIBITED DECKING AREAS

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

- Within the grubbing limits.
- Within 100 feet of any stream.
- In locations that interfere with the construction of the road prism.
- In locations that impede drainage.
- On slopes greater than 40%.
- Against live standing trees.



### **3-10 GRUBBING**

Purchaser shall remove all stumps between the grubbing limits specified on the TYPICAL SECTION SHEET. Purchaser shall also remove stumps with undercut roots outside the grubbing limits. Stumps over 24 inches in diameter must be split. Stumps over 40 inches must be quartered. Grubbing must be completed before starting excavation and embankment.

### **3-12 STUMP PLACEMENT**

Purchaser shall place grubbed stumps outside of the clearing limits and in compliance with all other clauses in this road plan. Stumps must be positioned upright, with root wads in contact with the forest floor on stable locations.

### **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 clearing brushing area limits as shown on the TYPICAL SECTION SHEET or BRUSHING DETAIL.

### **3-21 DISPOSAL COMPLETION**

Purchaser shall remove organic debris from the road surface, ditchlines, and drainage 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 100 feet of a live stream, or wetland.
- On road subgrades, or excavation and embankment slopes.
- On slopes greater than 50%.
- Within the operational area for 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 unless otherwise detailed in this road plan. 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 adhere to the following standards for road grade and alignment:

- 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:

<u>Material Type</u>	<u>Excavation Slope Ratio</u>	<u>Excavation Slope Percent</u>
Common Earth (on side slopes up to 50%)	1:1	100
Common Earth (50% 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:

<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**

If necessary, turnarounds must be no larger than 30 feet long and 30 feet wide. Locations are subject to written approval by the Contract Administrator.

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

Ditches must drain to cross drain culverts or ditchouts.

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

Purchaser shall construct ditchouts as needed to facilitate drainage. 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.

#### **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 and meets the conditions of Clause 4-38 PROHIBITED WASTE DISPOSAL AREAS. Other areas for waste material require approval, in writing, prior to use by the Contract Administrator.

#### **4-38 PROHIBITED WASTE DISPOSAL AREAS**

Purchaser shall not deposit waste material in the following areas:

- Within 50 feet of a cross drain culvert.
- Within 100 feet of a live stream or wetland unless otherwise specified herein.
- 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.
- In locations that impede drainage.
- Within the operational area for landings.
- Against standing timber.

#### **4-46 COMMON BORROW**

Common borrow consists of soil, and/or aggregate that is non-plastic and contains no more than 5% clay, organic debris, or trash by volume. The material is considered non-plastic if the fines in the sample cannot be rolled, between the hand and a smooth surface, into a thread at any moisture content.

#### **4-48 NATIVE MATERIAL**

Native material consists of naturally occurring material that is free of organic debris and trash.

#### **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 construction equipment over the entire width of each lift.

#### **4-61 SUBGRADE COMPACTION**

Purchaser shall compact constructed and reconstructed subgrades in accordance with the COMPACTION LIST by routing construction equipment over the entire width. Purchaser shall obtain written approval from the Contract Administrator for subgrade compaction before timber haul.

SECTION 5 – DRAINAGE

**5-1 REMOVAL OF SHOULDER BERMS**

Purchaser shall remove berms from road shoulders as shown in the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS. The construction of ditchouts, as described in Clause 4-29 DITCHOUTS, is required where ponding could result from the effects of sidecast debris.

**5-5 CULVERTS**

Purchaser shall supply and 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 may be new or used material as indicated in 5-7 USED CULVERT MATERIAL and must meet the specifications in Clauses 10-15 through 10-24.

**5-6 CULVERT TYPE**

On the following roads, Purchaser shall install metal or plastic culverts in accordance with Clauses 10-15 through 10-24.

<u>Road</u>	<u>Station</u>
S1409	4+80
S1440	59+50
S1450R	1+40
S1480	1+55

**5-7 USED CULVERT MATERIAL**

On the following roads, Purchaser may install used culverts. All other roads must have new culverts installed. Purchaser shall obtain approval from the Contract Administrator for the quality of the used culverts before installation. Culverts must meet the specifications in Clauses 10-15 through 10-24.

<u>Road</u>	<u>Station</u>
S1409	4+80
S1440	59+50
S1480	1+55

**5-8 TEMPORARY STREAM CULVERT INSTALLATION**

Purchaser shall install temporary culverts as shown in the TEMPORARY CULVERT DETAIL. Temporary stream culverts must be located in the natural channel of the stream. Temporary culverts must be removed as indicated below. Geotextile fabric must meet the specifications in Clause 10-2 GEOTEXTILE FOR SEPARATION.

<u>Road</u>	<u>Stations</u>	<u>Comments</u>
S1409	4+80	Install temporary culvert in existing stream channel.
S1440	59+50	Install temporary culvert in existing stream channel. Create short outlet channel/lead out to maintain positive drainage downslope.
S1480	1+55	Install temporary culvert in existing stream channel.

**5-12 UNUSED MATERIALS STATE PROPERTY**

On required roads, any unused materials listed on the CULVERT AND DRAINAGE LIST that are not installed will become the property of the state. Purchaser shall stockpile materials at 713 Bowers Road, Ellensburg, WA as directed by the Contract Administrator.

**5-15 CULVERT INSTALLATION**

Culvert installation must be in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL and, the National Corrugated Metal Pipe Association’s "Installation Manual for Corrugated Steel Drainage Structures" or the Corrugated Polyethylene Pipe Association’s "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings". Corrugated Polyethylene pipe must be installed in a manner consistent with the manufacturer’s recommendations. Culverts over 15 inches in diameter shall be banded using segments of no less than 10 feet, and no more than one segment less than 16 feet unless otherwise specified herein. The shorter segment of banded culvert shall be installed at the inlet end.

**5-16 APPROVAL FOR LARGER CULVERT INSTALLATION**

Purchaser shall obtain written approval from the Contract Administrator for the installation of culverts over 36 inches in diameter before backfilling.

**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. Stream crossing culverts must be installed with a depth of cover recommended by the culvert manufacturer for the type and size of the pipe.

#### **5-20 ENERGY DISSIPATERS**

Purchaser shall install energy dissipaters in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL at all culverts. Energy dissipater installation is subject to approval by the Contract Administrator.

The type of energy dissipater and the amount of material must be consistent with the specifications listed on the ROCK 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. Placement must be with a zero-drop-height only. No placement by end dumping or dropping of rock is allowed.

#### **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 5 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 that specify the placement of rock. Rock used for headwalls must meet the specifications of clause 6-43 QUARRY SPALLS. 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 inlet, 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. Placement must be with a zero-drop-height only.

#### **5-27 ARMORING FOR CULVERTS**

Purchaser shall place quarry spalls in conjunction with or immediately following construction of the embankment. Rock must be placed on shoulders, slopes, and around culvert inlets and outlets as designated on the CULVERT AND DRAINAGE LIST. Rock may not restrict the flow of water into culvert inlets or catch basins. Placement must be with a zero-drop-height only. No placement by end dumping or dropping of rock is allowed.

#### **5-30 DRIVABLE WATERBAR CONSTRUCTION**

Purchaser shall construct drivable waterbars in accordance with the DRIVABLE WATERBAR DETAIL and as specified on the CULVERT AND DRAINAGE LIST. Drivable waterbars must be installed concurrently with construction of the subgrade and must be maintained in an operable condition. Purchaser shall install drivable waterbars using a crawler tractor. Use of any other equipment is not allowed without written approval from the Contract Administrator.

**5-31 ROLLING DIP CONSTRUCTION**

Purchaser shall construct rolling dips in accordance with the ROLLING DIP DETAIL and as specified on the CULVERT AND DRAINAGE LIST. Rolling dips must be installed concurrently with construction of the subgrade and must be maintained in an operable condition. Purchaser shall install rolling dips using a crawler tractor. Use of other equipment is not allowed without written approval of the Contract Administrator.

**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 10 feet between waterbars or between natural drainage paths, and with a maximum spacing of 300 feet.

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SECTION 6 – ROCK AND SURFACING

**6-2 BORROW SOURCE ON STATE LAND**

Rock used in accordance with the quantities on the ROCK LIST may be obtained from the following borrow source 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 borrow source, a joint operating plan must be developed. All parties shall follow this plan. Purchaser shall notify the Contract Administrator a minimum of 7 calendar days before starting any operations in the listed locations.

<u>Road</u>	<u>Locations</u>	<u>Type</u>
S1400	201+70	Select Pit Run, Quarry Spalls

**6-3 ROCK SOURCE STATE LAND, EXISTING STOCKPILE**

Rock used in accordance with the quantities on the ROCK LIST may be obtained from the following existing stockpile on state land at no charge to the Purchaser. Purchaser shall not remove additional yardage without prior written approval from the Contract Administrator.

<u>Source</u>	<u>Location</u>	<u>Rock Type</u>
S1400	320+00	Select Pit Run, Quarry Spalls

**6-23 ROCK GRADATION TYPES**

Purchaser shall provide 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 placed in hauling vehicles. The exact point of evaluation for conformance to specifications will be determined by the Contract Administrator. Purchaser shall provide a sieve analysis upon request from the Contract Administrator.

**6-41 SELECT PIT RUN ROCK**

No more than 20 percent of the rock may be larger than 4 inches in any dimension and no rock may be larger than 8 inches in any dimension. Select Pit Run rock may not contain more than 5 percent by weight of organic debris, dirt, and trash. Rock may require processing to meet this specification.

**6-43 QUARRY SPALLS**

% Passing 8" square sieve	100%
% Passing 3" square sieve	20% maximum
% Passing 3/4" square sieve	5% maximum

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

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

Measurement of specified rock depths, are defined as the compacted depths 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.

**6-70 APPROVAL BEFORE ROCK APPLICATION**

Purchaser shall obtain written approval from the Contract Administrator for subgrade before rock application.

**6-71 ROCK APPLICATION**

Purchaser shall apply rock in accordance with the specifications and quantities shown on the TYPICAL SECTION SHEET and 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.

**6-80 DUST ABATEMENT**

Purchaser shall use water for dust abatement directed by the Contract Administrator from the source shown below. Contract Administrator shall provide written approval for use of source from water owner to Purchaser prior to any withdrawals. Other sources or methods of dust abatement shall be approved in writing by the Contract Administrator prior to use.

<u>Water Source</u>
Clear Lake, Stemilt Irrigation District. (509) 663-4696

SECTION 7 – STRUCTURES

**7-1 SIGN INSTALLATION**

Purchaser shall supply, install, and maintain the following road signs. Signs must be installed a minimum of 7 days before work begins. Signs must comply with the Federal Highway Administration’s Manual on Uniform Traffic Control Devices. Sign wording other than as specified below must be approved, in writing, by the Contract Administrator prior to installation.

<u>Road</u>	<u>Station</u>	<u>Sign</u>
S1200	Station 0+00/168+75	Caution Logging Activity Ahead
S1200/S1400 Jct.	0+00	Caution Logging Activity Ahead
S1440	0+00/328+40	Caution Logging Activity Ahead

SECTION 8 – EROSION CONTROL

**8-15 REVEGETATION**

On the following roads, Purchaser shall supply and spread grass seed as indicated in CLAUSE 10-14 GRASS SEED at a rate of 50 pounds per acre, and a 3-inch-deep layer of straw as indicated in CLAUSE 10-13 STRAW FOR EROSION CONTROL, on all exposed soils resulting from road work activities that are within 50 feet of live water. Other methods of covering must be approved in writing by the Contract Administrator. Required seed not spread by the termination of this contract will become the property of the state.

<u>Road</u>	<u>Location</u>	<u>Grass Seed Qty</u>	<u>Straw Qty</u>
S1409	4+30 to 5+30	5 lbs	2 bales
S1426	20+35 to 21+35	10 lbs	6 bales
S1440	45+80 to 47+10	10 lbs	10 bales
	59+00 to 60+00	6 lbs	3 bales
	61+60 to 62+60	5 lbs	2 bales
S1444	15+30 to 16+30	5 lbs	2 bales
	21+10 to 22+10	5 lbs	2 bales
	27+75 to 28+75	5 lbs	2 bales
S1444 Ditch	4+25	2 lbs	1 bale
S1480	1+05 to 2+05	10 lbs	5 bales

Quantities are minimum acceptable values. Actual quantities may vary and are the responsibility of the Purchaser.

**8-17 REVEGETATION TIMING**

Purchaser shall revegetate between April 15 and June 1 or September 15 and November 15. Soils may not be allowed to sit exposed for longer than one month, or during storm events, without receiving revegetation treatment or other protection unless otherwise approved in writing by the Contract Administrator.

SECTION 9 – POST-HAUL ROAD WORK

**9-1 EARTHEN BARRICADES**

On the following roads at the specified locations, Purchaser shall construct barricades in accordance with the EARTHEN BARRICADE DETAIL.

<u>Road</u>	<u>Stations</u>	<u>Complete By/Comments</u>
S1409	0+50	Termination of Contract
S1420	42+40	Termination of Contract
S1426	12+50, 21+50	Concurrent with Culvert Abandonment
S1440	44+85, 46+85	Concurrent with Culvert Abandonment
S1450	12+30, 15+25	Install concurrently with construction of the S1450R
S1480	1+25	Termination of Contract

**9-2 CULVERT REMOVAL**

On the following roads, Purchaser shall remove existing culverts from roads and leave the resulting channel open with excavation slopes and excavated channel widths as specified. Slopes and channels widths are minimum acceptable values. Natural ground contour where noted may not be less than slope ratio noted unless otherwise approved in writing by Contract Administrator. Culvert removals must be in accordance with the associated Forest Practice Hydraulic Permit (FPH), the STREAM CROSSING AND CROSS DRAIN REMOVAL DETAIL, the CULVERT REMOVAL PROCEDURE, and as applicable the S1426 20+85 and S1440 46+30 AND 46+60 CULVERT REMOVAL PLAN VIEW DETAIL.

<u>Road</u>	<u>Station</u>	<u>Excavated Channel Width</u>	<u>Average Fill Depth</u>	<u>Water Type</u>	<u>Excavation Slope Ratio/Comments</u>
S1409	4+80	3'	2'	Np	2:1, natural ground contour
S1426	20+85	8'	8'	F	2:1, natural ground contour
S1440	46+30	8'	5'	F	3:1, natural ground contour
S1440	46+60	2'	3'	Ns	3:1, natural ground contour
S1440	59+50	2'	1'	Np	2:1, natural ground contour
S1440	62+10	2'	3'	U	2:1, natural ground contour
S1444	15+80	2'	3'	Ns	2:1, natural ground contour
S1444	21+60	2'	3'	Np	2:1, natural ground contour
S1444	28+25	2'	3'	U	2:1, natural ground contour
S1480	1+55	4'	2'	Np	2:1, natural ground contour

F – Fish Bearing  
 Np – Perennial  
 Ns – Seasonal  
 U – Untyped

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

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

**9-4 POST-HAUL MAINTENANCE**

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

<u>Road</u>	<u>Stations</u>	<u>Additional Requirements</u>
S1400	174+50 to 328+40	Grade, shape, and compact surface.
S1406	0+00 to 16+75	Perform additional maintenance as specified in Clause 9-5 ADDITIONAL POST HAUL MAINTENANCE SPECIFICATIONS.
S1407	0+00 to 12+00	
S1420	0+00 to 42+40	
S1425	0+00 to 5+45	
S1426	0+00 to 12+50	
S1427	0+00 to 27+25	
S1428	0+00 to 6+45	
S1442	0+00 to 19+90	
S1442A	0+00 to 8+50	
S1450	0+00 to 12+40, 15+35 to 49+55	
S1450R	0+00 to 3+35	
S1460	0+00 to 13+05	
S1480	0+00 to 1+50	
S1480S	0+00 to 1+00	

**9-5 ADDITIONAL POST-HAUL MAINTENANCE SPECIFICATIONS**

Purchaser shall perform additional maintenance on roads as specified below.

- Construct DRIVABLE WATERBARS in accordance with the attached 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, or as marked in the field.
  - 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. Waterbars must be outsloped to provide positive drainage. Outlets must drain onto stable locations.
- Block roads with earthen barricades in accordance with Clause 9-1 EARTHEN BARRICADES and the attached EARTHEN BARRICADE DETAIL.

**9-10 LANDING DRAINAGE**

Purchaser shall provide drainage of all landing surfaces.

**9-11 LANDING EMBANKMENT**

Purchaser shall slope landing embankments to the original construction specifications.

## 9-22 ROAD ABANDONMENT

Purchaser shall abandon the following roads as indicated below.

<u>Road</u>	<u>Stations</u>	<u>Type</u>	<u>Complete By/Comments</u>
S1409	0+50 to 10+00	Light	Contract Termination
S1426	12+50 to 21+50	Light	Contract Termination
S1440	44+85 to 64+50	Light	Contract Termination
S1444	0+00 to 29+95	Light	Contract Termination
S1450	12+40 to 15+35	Light	Concurrent with construction of S1450R. Only block ends, do not disturb prism.
S1480	1+25 to 6+50	Light	Contract Termination

## 9-23 LIGHT ABANDONMENT

- Remove road shoulder berms except as directed.
- Outslope roads at a minimum of 10% or natural ground.
- 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 300 feet, or as marked in the field.
- 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.
- Remove culverts in accordance with Clause 9-2 CULVERT REMOVAL.
  - Culverts removed from live streams shall follow the Live Stream Culvert Removal Procedure.
  - Type "F" culvert removals shall only be removed between August 1 and September 30 of any calendar year, unless otherwise approved, in writing, by the Contract Administrator.
  - Type "F" streams shall have a minimum of 5 pieces of woody debris with a small end diameter of 6" and a length of not less than 15' evenly distributed along channel. Larger rocks found during fill excavation shall be placed in channels as available.
  - Type "N" culvert removals shall have slash, woody debris, and rocks placed in channel as available on site.
  - Excavate stream channels to match existing stream profile.
  - Excavate backslopes to the specification in CLAUSE 9-2 CULVERT REMOVAL.
  - Cover, concurrently with abandonment, all exposed soils created from excavation work within 50 feet of any live stream, with grass seed, then straw, then slash and woody debris.
- Apply grass seed and straw concurrently with abandonment and in accordance with Section 8 EROSION CONTROL.
- Scatter woody debris onto at least 25 percent of abandoned road surfaces.
- Block roads with earthen barricades in accordance with the attached EARTHEN BARRICADE DETAIL and Clause 9-1 EARTHEN BARRICADES.

SECTION 10 MATERIALS

**10-2 GEOTEXTILE FOR SEPARATION**

Geotextiles must meet the following minimum requirements for strength and property qualities, and must be designed by the manufacturer to be used for separation. Material must be free of defects, cuts, and tears.

	<u>ASTM Test</u>	<u>Requirements</u>
Type	--	Non-woven
Apparent opening size	D 4751	No. 30 max
Water permittivity	D 4491	0.02 sec <sup>-1</sup>
Grab tensile strength	D 4632	160 lb
Grab tensile elongation	D 4632	>= 50%
Puncture strength	D 6241	310 lb
Tear strength	D 4533	50 lb
Ultraviolet stability	D 4355	50% retained after 500 hours of exposure

**10-13 STRAW FOR EROSION CONTROL**

Straw used for erosion control shall be certified weed free.

**10-14 GRASS SEED**

Grass seed must meet the following specifications:

1. Weed seed may not exceed 0.5% by weight.
2. All seed species must have a minimum 90% germination rate, unless otherwise specified.
3. Seed must be certified.
4. Seed must be furnished in standard containers showing the following information:
  - a. Common name of seed
  - b. Net weight
  - c. Percent of purity
  - d. Percentage of germination
  - e. Percentage of weed seed and inert material
5. Seed must conform to the following mixture unless a comparable mix is approved in writing by the Contract Administrator.

<u>Kind and Variety of Seed in Mixture</u>	<u>% by Weight</u>	<u>Minimum % pure seed</u>	<u>Minimum % germination</u>
Perennial Rye	35-45	95	90
Red Fescue	30-40	95	90
Highland Bent	5-15	95	90
White Clover	10-20	95	90
Inert and Other Crop	0.5		NA



**10-15 CORRUGATED STEEL CULVERT**

Metallic coated steel culverts must meet AASHTO M-36 (ASTM A-760) specifications. Culverts must be galvanized (zinc coated meeting AASHTO M-218).

**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.

**10-20 FLUME AND DOWNSPOUT**

Downspouts and flumes must meet the AASHTO specification designated for the culvert.

**10-21 METAL BAND**

Metal coupling and end bands must meet the AASHTO specification designated for the culvert and must have matching corrugations. Culverts 24 inches and smaller must have bands with a minimum width of 12 inches. Culverts over 24 inches must have bands with a minimum width of 24 inches.

**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. Couplings must be split coupling band. Split coupling bands must have a minimum of four corrugations, two on each side of the pipe joint.

**10-24 GAUGE AND CORRUGATION**

Metal culverts must conform to the following specifications for gage and corrugation as a function of diameter.

<u>Diameter</u>	<u>Gauge</u>	<u>Corrugation</u>
18"	16 (0.064")	2 <sup>2</sup> / <sub>3</sub> " X 1/2"
24" to 48"	14 (0.079")	2 <sup>2</sup> / <sub>3</sub> " X 1/2"

SECTION 11 SPECIAL NOTES

**11-1 DITCH ABANDONMENT**

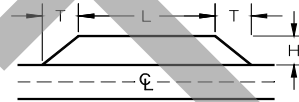
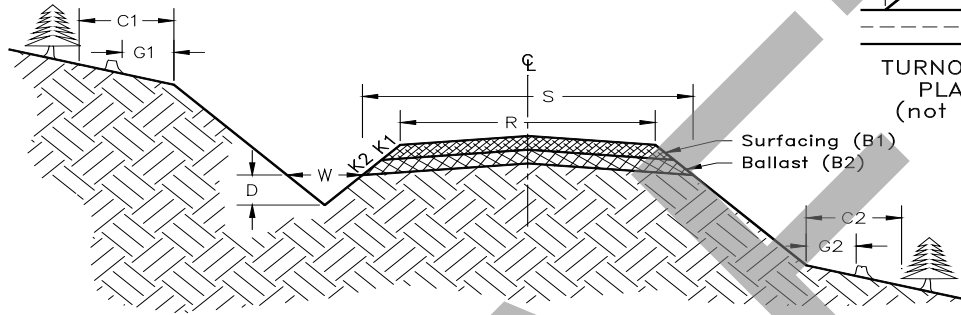
Adjacent to the following road, Purchaser shall abandon existing ditchline. All work shall be in accordance with this clause, or as directed by the Contract Administrator. Abandonment shall consist of pulling ditch berm back into cut and smoothing the ground surface to match the existing slope and contour of the ground so that water will flow over the area in an even unconcentrated manner. Where ditchline intercepts stream channel to the South of the road, Purchaser shall reshape ground to allow stream channel to flow naturally downhill. Excavated channel shall be covered with grass seed and a 2 inch layer of straw.

<u>Road</u>	<u>Location</u>	<u>Approximate Length (ft)</u>
S1444	4+25	525

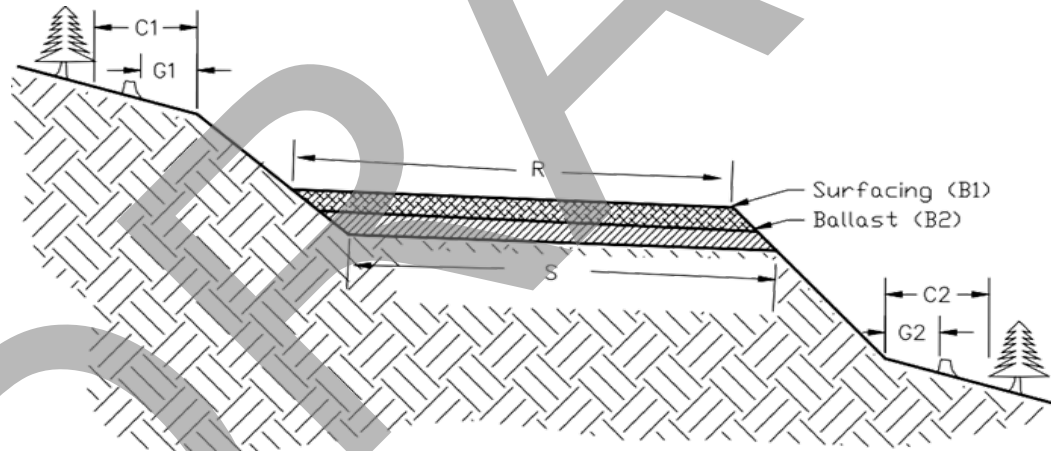
DRAFT

# TYPICAL SECTION SHEET

ROAD CROSS-SECTION  
(not to scale)



TURNOUT DETAIL  
PLAN VIEW  
(not to scale)



## TYPICAL SECTION SHEET

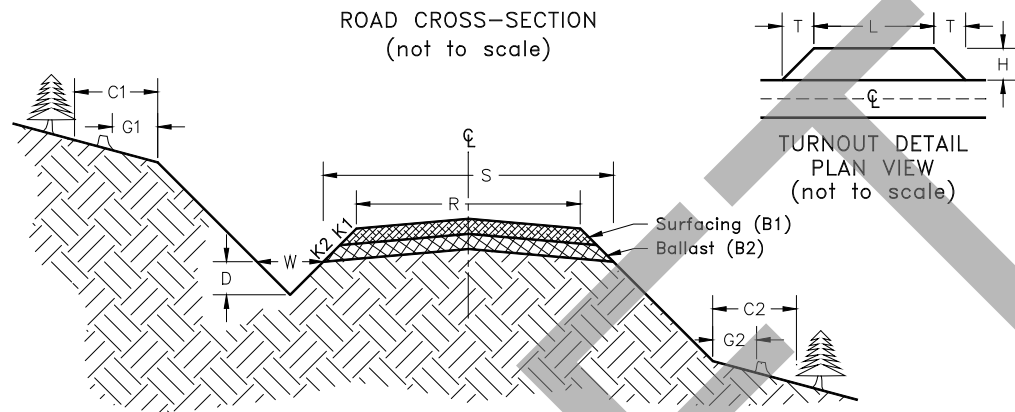
ROAD	PRE-HAUL, RECONSTRUCTION, CONSTRUCTION	FROM STATION	TO STATION	TOL. CLASS	SUBGRADE WIDTH S	CROWN INCHES AT CENTER LINE	INSLOPE/OUT SLOPE INCHES IN 10 FEET	ROAD WIDTH R	DITCH WIDTH/ DEPTH W D	GRUBBING LIMITS		CLEARING LIMITS		
										G1	G2	C1	C2	
S1200	Pre-haul	0+00	168+75	C	14'	4"	4"	12'	2'	1'	-	-	-	-
S1400	Pre-haul	0+00	328+40	C	14'	4"	4"	12'	2'	1'	-	-	-	-
S1406	Pre-haul	0+00	16+75	C	12'	-	4"	12'	-	-	-	-	-	-
S1407	Pre-haul	0+00	12+00	C	12'	-	4"	12'	-	-	-	-	-	-
S1409	Reconstruction	0+00	10+00	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1420	Pre-haul	0+00	42+40	C	12'	-	4"	12'	-	-	-	-	-	-
S1425	Reconstruction	0+00	5+45	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1426	Pre-haul	0+00	12+50	C	12'	-	4"	14'	-	-	-	-	-	-
S1427	Reconstruction	0+00	27+25	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1428	Reconstruction	0+00	6+45	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1440	Pre-haul	0+00	64+50	C	12'	-	4"	12'	-	-	-	-	-	-
S1442	Pre-haul	0+00	19+90	C	12'	-	4"	12'	-	-	-	-	-	-
S1442A	Pre-haul	0+00	8+50	C	12'	-	4"	12'	-	-	-	-	-	-
S1444	Pre-haul	0+00	29+95	C	12'	-	4"	12'	-	-	-	-	-	-
S1450	Pre-haul	0+00	12+40	C	12'	-	4"	12'	-	-	-	-	-	-
	Abandon*	12+40	15+35	C	12'	-	-	-	-	-	-	-	-	-
	Reconstruction	15+35	49+55	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1450R	Construction	0+00	3+35	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1460	Pre-haul	0+00	13+05	C	12'	-	4"	12'	-	-	-	-	-	-
S1480	Reconstruction	0+00	6+50	C	12'	-	4"	12'	-	-	See Note	See Note	-	-
S1480S	Construction	0+00	1+00	C	12'	-	4"	12'	-	-	See Note	See Note	-	-

NOTE: GRUBBING LIMITS FOR CONSTRUCTION/RECONSTRUCTION ARE 1' BEYOND EDGE OF ROAD. CLEARING LIMITS, SEE RIGHT-OF-WAY SPECIFICATION SHEET.

\*See Clause 9-22 ROAD ABANDONMENT

## POST HAUL TYPICAL SECTION SHEET

ROAD	MAINTENANCE, DECOMMISSION, ABANDON	FROM STATION	TO STATION	CROWN INCHES @ CL	OUT/IN SLOPE INCHES IN 10 FEET	ROAD WIDTH R	DITCH WIDTH W	DEPTH D	NOTES
S1400	Maintenance	174+50	328+40	4	4	14'	2'	1'	Road varies from outsloped to crowned w/ ditch
S1406	Maintenance	0+00	16+75	4	4	12'	2'	1'	Road varies from outsloped to crowned w/ ditch
S1407	Maintenance	0+00	12+00	-	4	12'	-	-	
S1409	Abandon	0+50	10+00	-	4	12'	-	-	
S1420	Maintenance	0+00	42+40	-	4	14'	-	-	
S1425	Maintenance	0+00	5+45	-	4	14'	-	-	
S1426	Maintenance	0+00	12+50	-	4	12'	-	-	
	Abandon	12+50	21+50	-	-	-	-	-	
S1427	Maintenance	0+00	27+25	-	4	12'	-	-	
S1428	Maintenance	0+00	6+45	-	4	12'	-	-	
S1440	Abandon	44+85	64+50	-	4	12'	-	-	
S1442	Maintenance	0+00	19+90	-	4	12'	-	-	
S1442A	Maintenance	0+00	8+50	-	4	12'	-	-	
S1444	Abandon	0+00	29+95	-	4	12'	-	-	
S1450	Maintenance	0+00	12+40	-	4	12'	-	-	
	Maintenance	15+35	49+55	-	4	12'	-	-	
S1450R	Maintenance	0+00	3+35	-	4	12'	-	-	
S1460	Maintenance	0+00	13+05	-	4	12'	-	-	
S1480	Maintenance	0+00	1+25	-	4	12'	-	-	
	Abandon	1+25	6+50	-	4	12'	-	-	
S1480S	Maintenance	0+00	1+00	-	4	12'	-	-	



### ROCK LIST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	Type	CY/ Station	# of Stations	CY Subtotal	Rock Source/ Comment
			K2	B2					
S1400	233+40	234+40	1 ½:1	8"	SPR	50	1.00	50	S1400 320+00 (stockpile)
S1409	4+30	5+30	1 ½:1	6"	SPR	30	1.00	30	S1400 320+00 (stockpile)
	4+80		-	-	QS	-	-	1	S1400 320+00 or on site if available/ headwall, dissipater
S1440	59+00	60+00	1 ½:1	6"	SPR	30	1.00	30	S1400 201+70
	59+50		-	-	QS	-	-	.5	S1400 201+70/headwall, dissipater
S1450R	0+40	2+40	1 ½:1	6"	SPR	30	2.00	60	S1400 201+70
	1+40		-	-	QS	-	-	.5	S1400 201+70/headwall, dissipater
S1480	1+05	2+05	1 ½:1	6"	SPR	30	1.00	30	S1400 320+00 (stockpile)
	1+55		-	-	QS	-	-	1	S1400 320+00 or on site if available/ headwall, dissipater

SPR - Select Pit Run Rock TOTAL 200 CY

QS - Quarry Spalls TOTAL 3 CY

### 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)
S1400	174+50	328+40	Existing Surface (Post Haul)	-	Vibratory Roller	16,000	3	3
	233+40	244+40	Rock	4	Excavation	25,000	3	3
S1409	0+00	10+00	Subgrade/Rock	12/6	Excavation	25,000	3	3
S1425	0+00	5+45	Subgrade	12	Excavation	25,000	3	3
S1427	0+00	27+25	Subgrade	12	Excavation	25,000	3	3
S1428	0+00	6+45	Subgrade	12	Excavation	25,000	3	3
S1450R	0+00	3+35	Subgrade/Rock	12/6	Excavation	25,000	3	3
S1480	0+00	6+50	Subgrade/Rock	12/6	Excavation	25,000	3	3
S1480S	0+00	1+00	Subgrade	12	Excavation	25,000	3	3

### CULVERT AND DRAINAGE LIST

Road	Station	Type	Diam. (Inches)	Length (Feet)	Comment
S1400	176+25	Rolling Dip	-	-	Install
	178+80	Rolling Dip	-	-	Install
	179+10	Culvert	-	-	Clean CMP, Seep
	180+15	Rolling Dip	-	-	Install
	181+80	Rolling Dip	-	-	Install
	184+10	Rolling Dip	-	-	Install
	187+20	Rolling Dip	-	-	Install
	194+15	Rolling Dip	-	-	Install
	203+35	Rolling Dip	-	-	Install
	205+10	Rolling Dip	-	-	Install
	210+40	Rolling Dip	-	-	Install
	213+80	Rolling Dip	-	-	Install
	218+40	Rolling Dip	-	-	Install
	221+35	Rolling Dip	-	-	Install
	233+40	Rolling Dip	-	-	Install
	233+75	Culvert	-	-	Clean CMP, F Live Water
	234+40	Rolling Dip	-	-	Install
	236+35	Rolling Dip	-	-	Install
	245+95	Rolling Dip	-	-	Install
	252+85	Rolling Dip	-	-	Install
	256+30	Rolling Dip	-	-	Install
	259+75	Rolling Dip	-	-	Install
	267+25	Rolling Dip	-	-	Install
	271+55	Rolling Dip	-	-	Install
	274+05	Rolling Dip	-	-	Install
	279+65	Rolling Dip	-	-	Install
	282+80	Culvert	-	-	Clean CMP, Np Live Water
	284+40	Rolling Dip	-	-	Install
	288+00	Rolling Dip	-	-	Install
	291+35	Rolling Dip	-	-	Install
	291+55	Culvert	-	-	Clean CMP, Np Live Water
	292+30	Rolling Dip	-	-	Install
	294+45	Rolling Dip	-	-	Install
	298+85	Rolling Dip	-	-	Install
	301+40	Rolling Dip	-	-	Install
	303+85	Rolling Dip	-	-	Install
	306+30	Rolling Dip	-	-	Install
	309+50	Rolling Dip	-	-	Install
	311+25	Culvert	-	-	Clean CMP, Np Live Water
	311+65	Rolling Dip	-	-	Install
	315+30	Rolling Dip	-	-	Install
	318+35	Rolling Dip	-	-	Install
	325+85	Rolling Dip	-	-	Install



Road	Station	Type	Diam. (Inches)	Length (Feet)	Comment
S1400	331+35	Rolling Dip	-	-	Install
	335+25	Rolling Dip	-	-	Install
	339+80	Rolling Dip	-	-	Install
	342+30	Rolling Dip	-	-	Install
S1406	1+85	Water Bar	-	-	Install
	8+40	Water Bar	-	-	Install
	11+25	Water Bar	-	-	Install
	13+40	Water Bar	-	-	Install
	15+40	Water Bar	-	-	Install
S1407	0+60	Water Bar	-	-	Install
	3+10	Water Bar	-	-	Install
	5+20	Water Bar	-	-	Install
	8+30	Water Bar	-	-	Install
S1409	1+85	Water Bar	-	-	Install
	4+30	Water Bar	-	-	Install
	4+80	Culvert, Np	24	30	Install Temp Culvert, Remove Post Harvest
	5+25	Water Bar	-	-	Install
	8+00	Water Bar	-	-	Install
S1425	0+70	Water Bar	-	-	Install
	2+10	Water Bar	-	-	Install
	4+05	Water Bar	-	-	Install
S1426	0+35	Water Bar	-	-	Install
	3+90	Water Bar	-	-	Install
	6+70	Water Bar	-	-	Install
	9+60	Water Bar	-	-	Install
	11+90	Water Bar	-	-	Install
	20+85	Culvert (F)	36	30	Remove Post Harvest
S1427	0+50	Water Bar	-	-	Install
	1+50	Water Bar	-	-	Install
	6+65	Water Bar	-	-	Install
	9+15	Water Bar	-	-	Install
	12+40	Water Bar	-	-	Install
	16+45	Water Bar	-	-	Install
	19+15	Water Bar	-	-	Install
	20+60	Rolling Dip	-	-	Maintain
	24+00	Culvert	24	30	Clean Inlet/Outlet
S1428	4+00	Water Bar	-	-	Install

Road	Station	Type	Diam. (Inches)	Length (Feet)	Comment
S1440	46+30	Culvert (F)	36	40	Remove Post Harvest
	46+60	Culvert (Ns)	24	40	Remove Post Harvest
	59+50	Culvert (Np)	24	30	Install Temp Culvert, Remove Post Harvest
	62+10	Culvert	30	30	Remove Post Harvest
S1442	3+35	Rolling Dip	-	-	Install
	8+55	Water Bar	-	-	Install
	11+40	Rolling Dip	-	-	Install
	15+00	Rolling Dip	-	-	Install
	16+00	Rolling Dip	-	-	Install
	18+35	Rolling Dip	-	-	Install
S1442A	1+60	Water Bar	-	-	Install
	6+80	Water Bar	-	-	Install
S1444	8+60	Water Bar	-	-	Install
	15+15	Rolling Dip	-	-	Maintain
	15+80	Culvert (Ns)	24	30	Remove Post Harvest
	16+95	Water Bar	-	-	Install
	21+00	Rolling Dip	-	-	Maintain
	21+60	Culvert (Np)	24	30	Remove Post Harvest
	22+00	Rolling Dip	-	-	Maintain
	23+40	Water Bar	-	-	Install
	28+25	Culvert	24	30	Remove Post Harvest
S1450	2+35	Water Bar	-	-	Install
	5+90	Water Bar	-	-	Install
	7+20	Water Bar	-	-	Install
	10+15	Water Bar	-	-	Install
	12+25	Water Bar	-	-	Install
	15+40	Water Bar	-	-	Install
	17+20	Water Bar	-	-	Install
	19+20	Water Bar	-	-	Install
	21+15	Water Bar	-	-	Install
	24+00	Culvert (XD)	-	-	Clean Inlet/Outlet
	25+35	Water Bar	-	-	Install
	27+15	Water Bar	-	-	Install
	29+85	Water Bar	-	-	Install
	33+10	Water Bar	-	-	Install
	36+10	Water Bar	-	-	Install
38+20	Water Bar	-	-	Install	
44+00	Water Bar	-	-	Install	
46+15	Water Bar	-	-	Install	
48+20	Water Bar	-	-	Install	

Road	Station	Type	Diam. (Inches)	Length (Feet)	Comment
S1450R	1+40	Culvert	24	30	Install in dry swale, may intercept flow during excavation.
S1460	2+65	Water Bar	-	-	Install
	3+70	Rolling Dip	-	-	Maintain
	7+20	Rolling Dip	-	-	Maintain
	10+60	Water Bar	-	-	Install
S1480	1+00	Water Bar	-	-	Install
	1+55	Culvert (Np)	36	30	Install Temp Culvert, Remove Post Harvest
	2+10	Water Bar	-	-	Install
	5+60	Water Bar	-	-	Install

F – Fish bearing stream  
Np – Perennial Stream  
Ns – Seasonal Stream  
XD – Cross Drain

DRAFT

# RIGHT-OF-WAY SPECIFICATION SHEET

Based on a 12' road width. All clearing distances are measured horizontally from the centerline of the road. All ditches are 1' deep. Ditched roads are crowned 4" at the centerline. Roads with no ditch are outsloped 4" in 10'.

## CROWNED ROAD WITH DITCH RIGHT

<u>Sideslope</u>	<u>Clearing Left</u>	<u>Clearing Right</u>
0-10%	16'	14'
10-20%	17'	15'
20-30%	19'	17'
30-40%	22'	18'
40-50%	27'	22'

## OUTSLOPE LEFT ROAD

<u>Sideslope</u>	<u>Clearing Left</u>	<u>Clearing Right</u>
0-10%	16'	11'
10-20%	17'	12'
20-30%	19'	13'
30-40%	22'	15'
40-50%	27'	17'

## CROWNED ROAD WITH DITCH LEFT

<u>Sideslope</u>	<u>Clearing Left</u>	<u>Clearing Right</u>
0-10%	14'	16'
10-20%	15'	17'
20-30%	17'	19'
30-40%	18'	22'
40-50%	22'	27'

## OUTSLOPE RIGHT ROAD

<u>Sideslope</u>	<u>Clearing Left</u>	<u>Clearing Right</u>
0-10%	11'	16'
10-20%	12'	17'
20-30%	13'	19'
30-40%	15'	22'
40-50%	17'	27'

## FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

### Cuts and Fills

- Maintain slope lines as constructed. Remove slides from ditches and the roadway. Repair fill-failures, in accordance with Clause 4-6 EMBANKMENT SLOPE RATIO, 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 as directed, 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.
- Remove shoulder berms 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 and culverts 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.

### Structures

- Repair culverts, bridges, gates, fences, cattle guards, signs, and other road structures as required because of purchaser use.

**Preventative Maintenance**

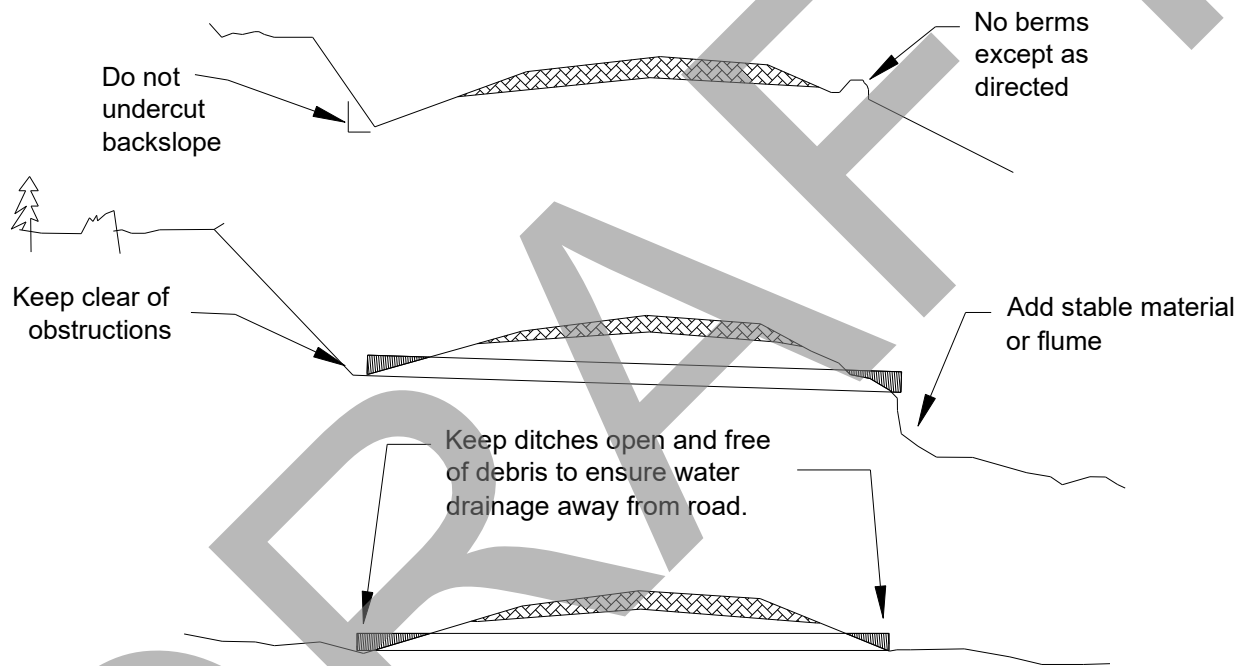
- Perform preventative maintenance work to safeguard against storm damage, such as blading to ensure correct runoff, ditch and culvert cleaning, and waterbar maintenance.

**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.



## CULVERT REMOVAL PROCEDURE

Order of work is as follows, deviations from this procedure require approval from Contract Administrator, in writing, before work commences.

1. Purchaser shall notify the State of intent to start project, and a pre-work conference shall be held before move in of equipment.
2. Culvert removal should not start during rain or threat of rain. Remove 95% of fill (see STREAM CROSSING AND CROSSDRAIN REMOVAL DETAIL) and place in road prism either side of the culvert in stable locations where there is no potential for sediment delivery or as otherwise specified herein.
3. For culverts with live water:
  - a. Assemble the items on the Estimated Materials List onsite before proceeding.
  - b. Set up pumps.
  - c. Dam up stream with sandbags and line floor of dam with plastic (to prevent sub-surface water flow), place rock on plastic to hold in place, and key leading edge of plastic into channel bottom. Build a settling pond at culvert outlet. Fill may need to be removed before the settling pond installation due to space limitations. Pump clean water at catch basin around work site and back into stream. Dirty water shall be pumped away from site and onto a stable location on the forest floor where no potential for sediment delivery can occur.
4. Remove remainder of fill and culvert.
5. Restore channel as indicated in 9-2 CULVERT REMOVAL.
6. Backfill settling pond and compact surfaces to prevent erosion.

### Estimated Materials List:

1. 2 pumps, (dam at culvert catch basin) pumps shall have a minimum capacity to adequately remove all water from stream,
  - a. For type "F" stream, pump intake shall be screened to prevent fish intake. Screen shall be woven wire with a maximum opening in the shortest direction of .087 inches (2.38 mm, 6-14 mesh);
2. Plastic sheeting as needed;
3. Grass seed;
4. Weed free straw bales;
5. Woody Debris, slash etc., as otherwise noted in this plan.

# STREAM CROSSING AND CROSS DRAIN REMOVAL DETAIL

ROAD SURFACE

APPROXIMATE FILL DEPTH  
AS NOTED IN PLAN  
AT CENTERLINE

CULVERT

MATERIAL TO BE REMOVED

EXCAVATE SLOPES TO 2:1 (H:V), PRE-EXISTING GROUND LINE,  
OR OTHER AS SPECIFIED IN PLAN

LEAVE LOW FLOW CHANNEL

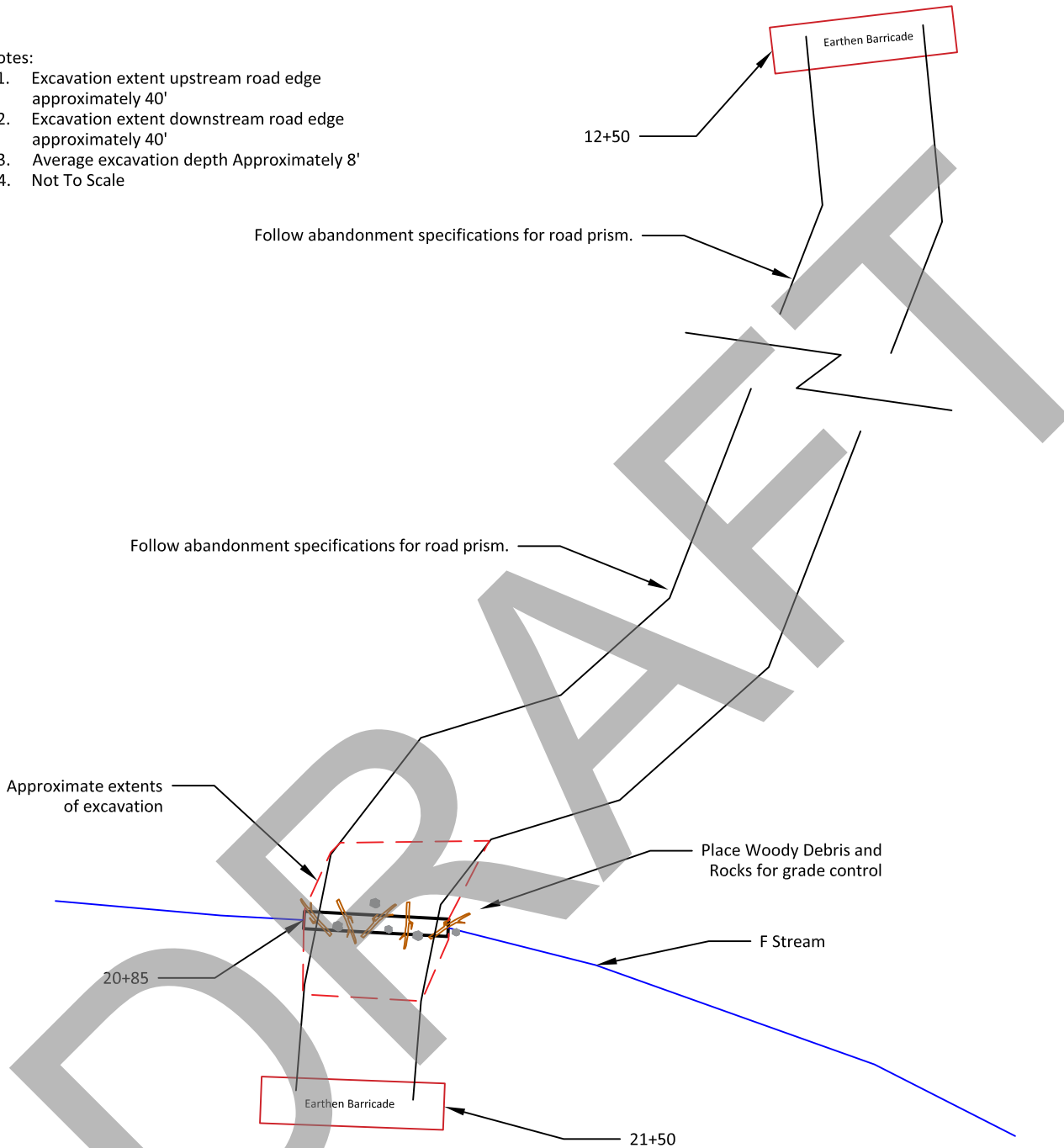
CHANNEL WIDTH  
AS SPECIFIED  
IN PLAN



# S1426 20+85 Culvert Removal Plan View

Notes:

1. Excavation extent upstream road edge approximately 40'
2. Excavation extent downstream road edge approximately 40'
3. Average excavation depth Approximately 8'
4. Not To Scale



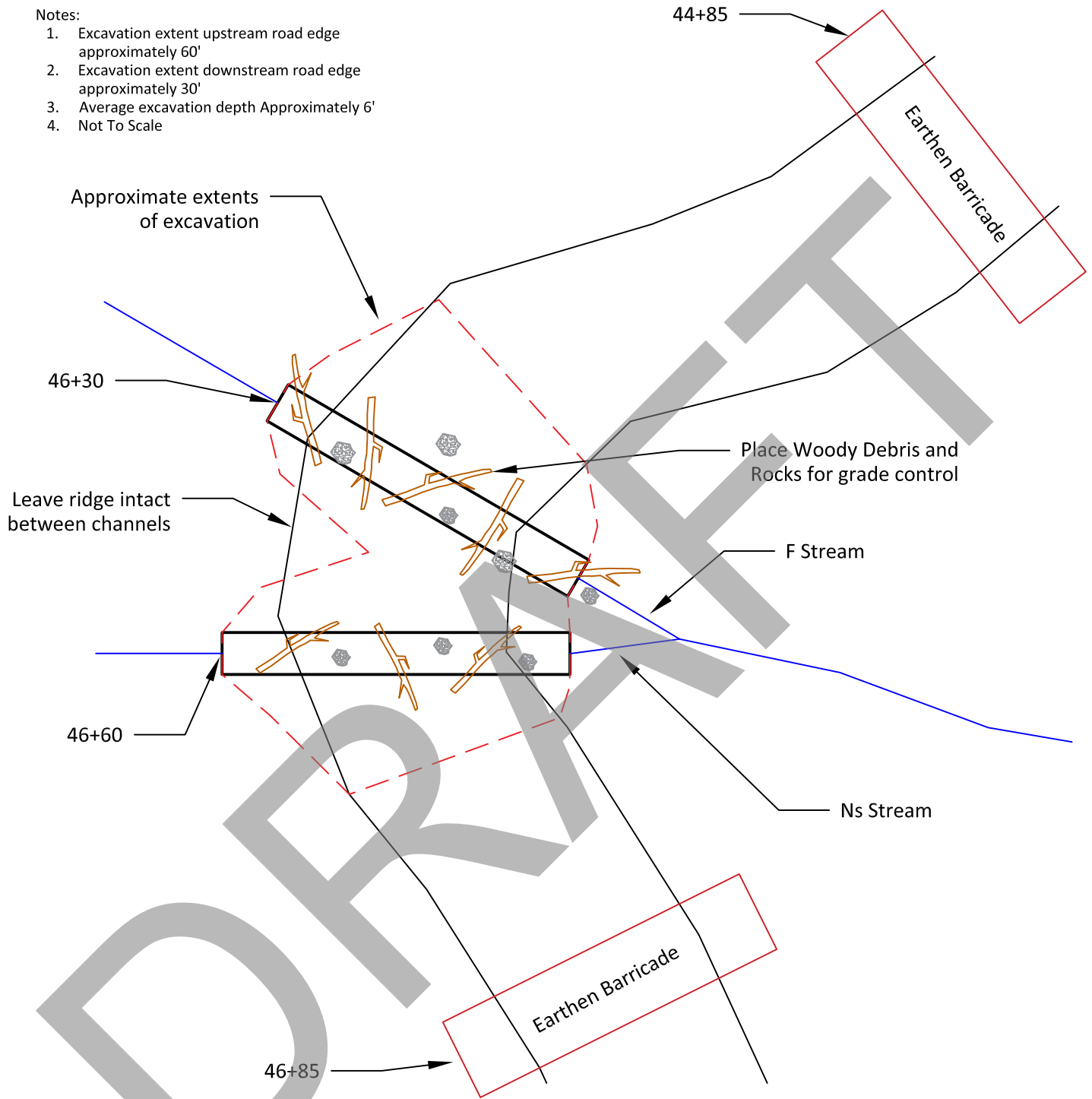
**Live Stream Culvert Removals**

1. Culverts removed from live streams shall follow the Live Stream Culvert Removal Procedure.
  - 1.1. Type "F" culvert removals shall only be allowed between August 1 and September 30 of any calendar year, unless otherwise approved, in writing, by a WDFW Habitat Biologist.
  - 1.2. Type "F" streams shall have a minimum of 5 pieces of woody debris with a small end diameter of 6" and a length of not less than 15', evenly distributed along channel.
2. Larger rocks found during fill excavation shall be placed in channel as available.
3. Excavation backslopes shall be no less than 2:1 horizontal to vertical slope or shall match existing contours.
4. Excavate stream channel to match the existing stream profile.
5. Cover, concurrently with abandonment, all exposed soils created from excavation work within 50 feet of any live stream, with grass seed, then straw, then slash and woody debris.

# S1440 46+30 and 46+60 Culvert Removal Plan View

Notes:

1. Excavation extent upstream road edge approximately 60'
2. Excavation extent downstream road edge approximately 30'
3. Average excavation depth Approximately 6'
4. Not To Scale



Live Stream Culvert Removals

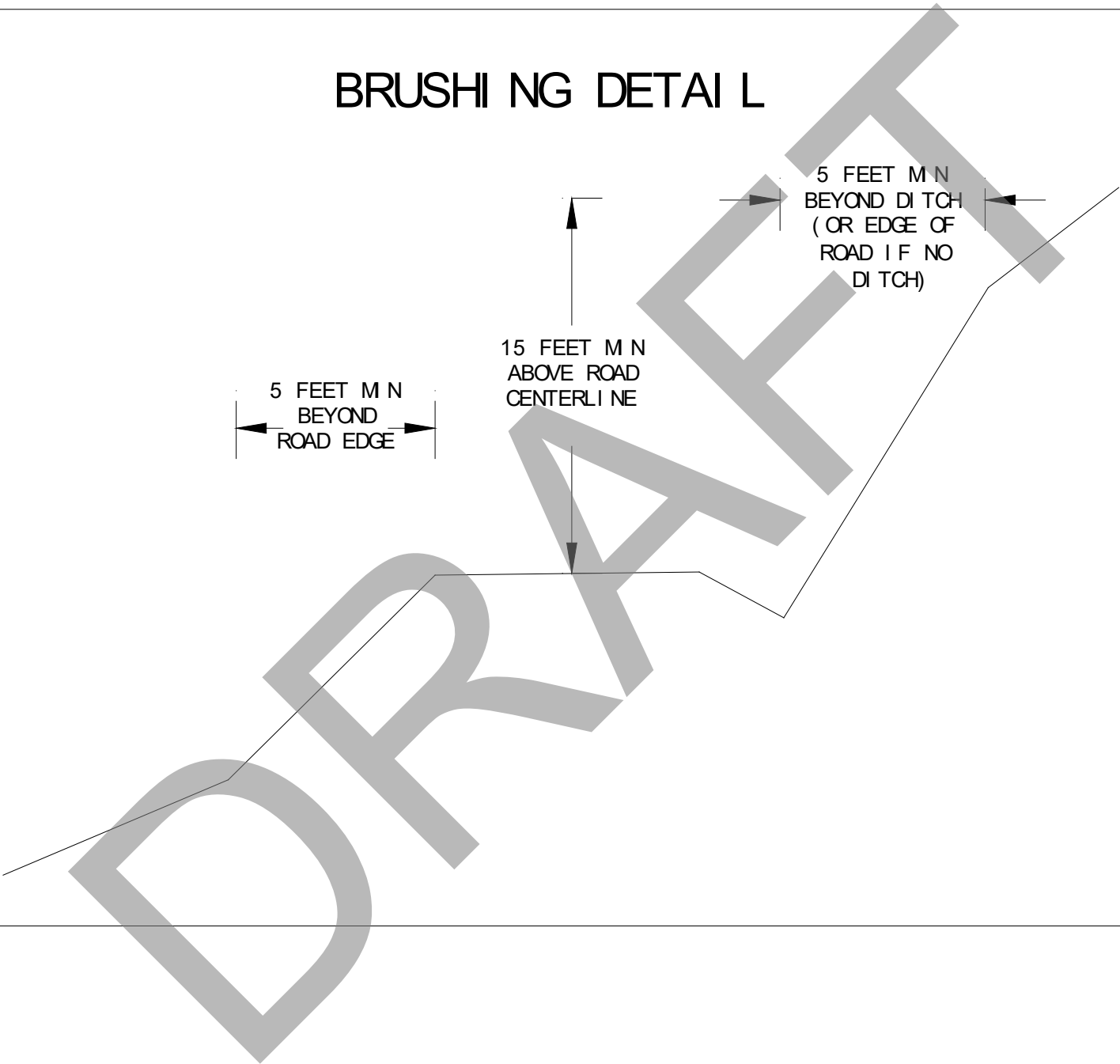
1. Culverts removed from live streams shall follow the Live Stream Culvert Removal Procedure.
  - 1.1. Type "F" culvert removals shall only be allowed between August 1 and September 30 of any calendar year, unless otherwise approved, in writing, by a WDFW Habitat Biologist.
  - 1.2. Type "F" streams shall have a minimum of 5 pieces of woody debris with a small end diameter of 6" and a length of not less than 15', evenly distributed along channel.
2. Type "N" culvert removals shall have slash, woody debris, and rocks placed in channel as available on site.
3. Larger rocks found during fill excavation shall be placed in channel as available.
4. Excavation backslopes shall be no less than 2:1 horizontal to vertical slope or shall match existing contours.
4. Excavate stream channel to match the existing stream profile.
5. Cover, concurrently with abandonment, all exposed soils created from excavation work within 50 feet of any live stream, with grass seed, then straw, then slash and woody debris.

# BRUSHING DETAIL

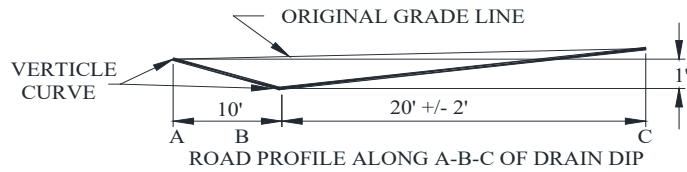
5 FEET MIN  
BEYOND  
ROAD EDGE

15 FEET MIN  
ABOVE ROAD  
CENTERLINE

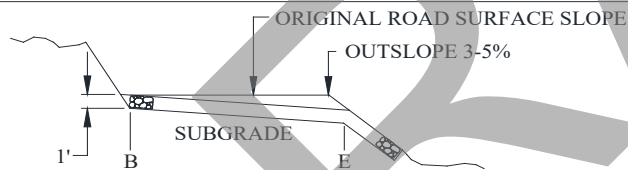
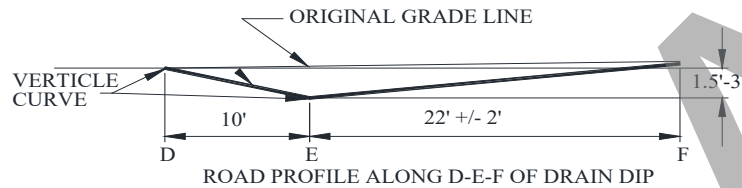
5 FEET MIN  
BEYOND DISTCH  
(OR EDGE OF  
ROAD IF NO  
DISTCH)



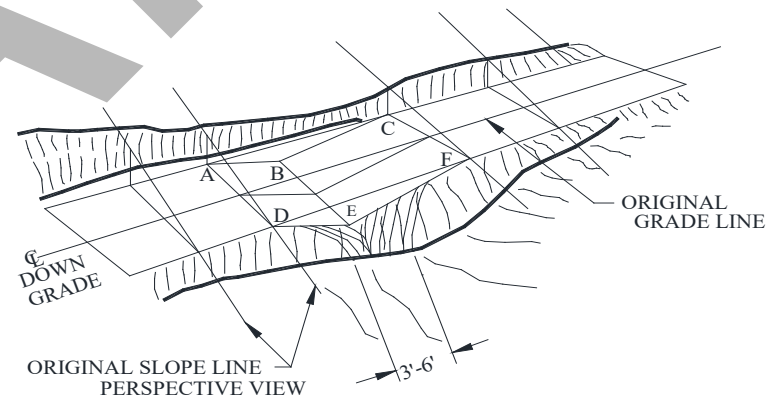
# ROLLING DIP DETAIL



NOTE: PLAN OF DIP SHOWN IS FOR OUTSLOPED ROLLING DIP. DIPS MAY BE EITHER INSLOPED OR OUTSLOPED. WHEN INSLOPED, DIPS SHALL DRAIN FREELY INTO DITCHES OR CULVERT INLETS. WHEN OUTSLOPED, THEY SHALL DRAIN FREELY ONTO NATURAL GROUND. WHERE SOILS ARE ERODABLE, OUTLET SHALL BE ARMORED WITH NATIVE ROCK. THE MINIMUM CROSS GRADE FROM "B" TO "E" IS 4% GREATER THAN THE ROAD SURFACE SLOPE. SKEW LINE B-E TO FIT LOW POINT IN DRAW, IF LOCATED IN NATURAL DRAIN.

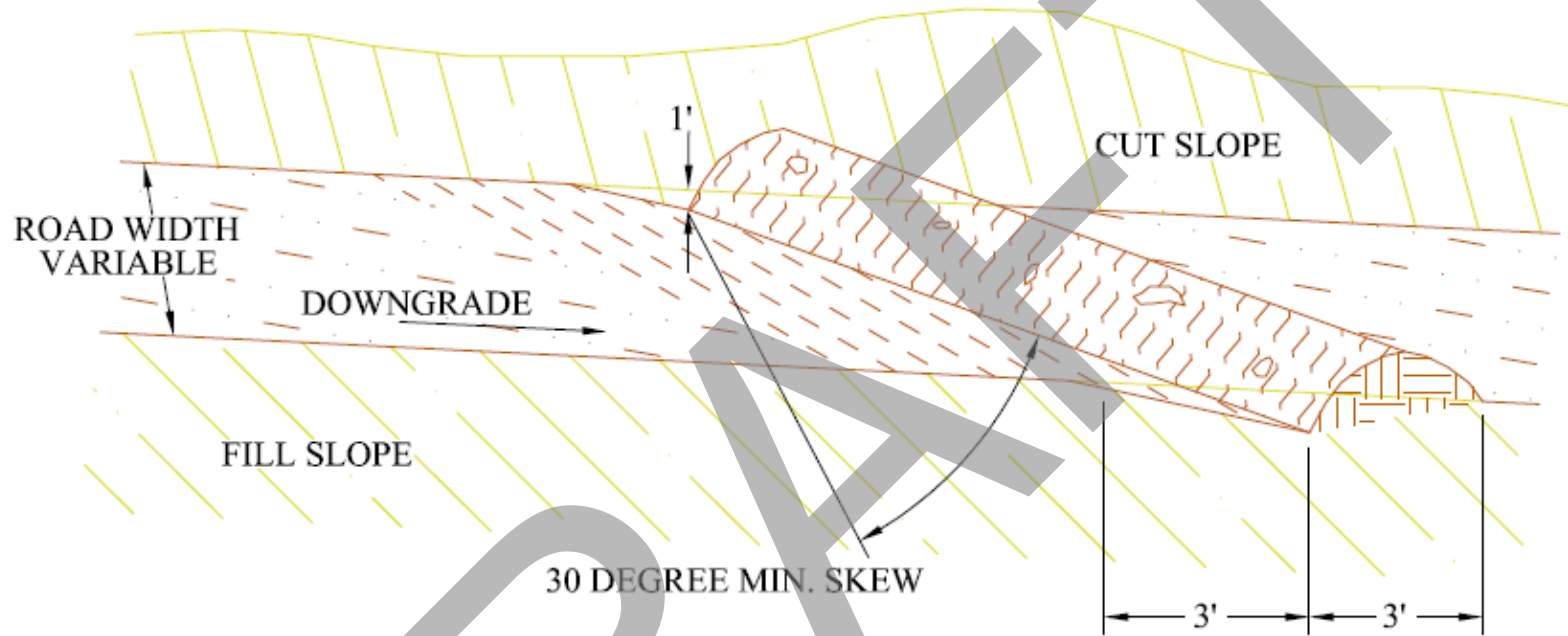


OUTLET OF DIP TO BE CLEAR OF OBSTRUCUTIONS TO ALLOW WATER TO FLOW FREELY. IF SOILS ARE ERODABLE, TOE OF DIP TO BE ARMORED WITH NATIVE ROCK.



# DRIVABLE WATER BAR DETAIL

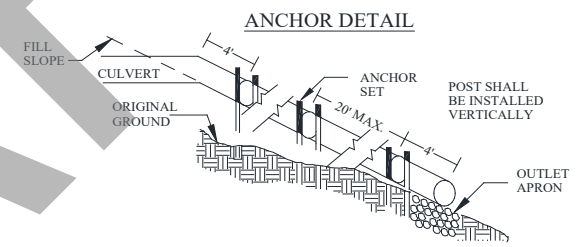
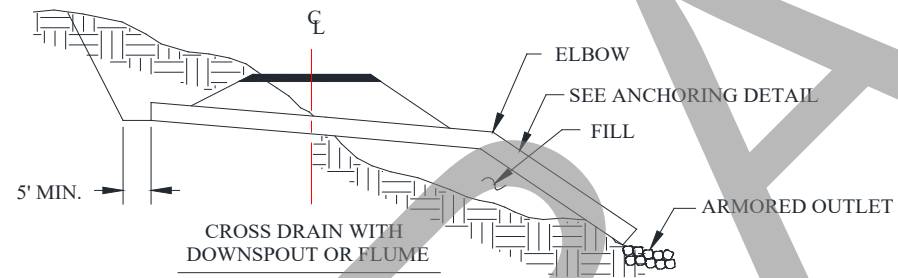
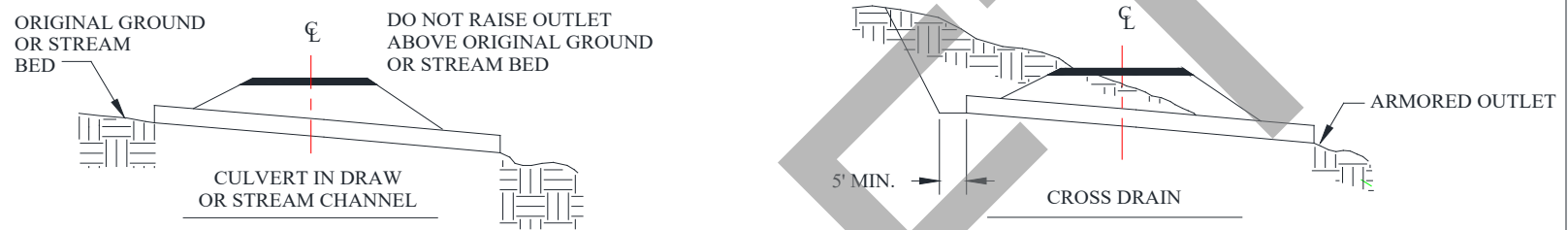
SCALE: NTS



## NOTES:

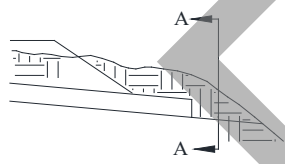
1. ALL WATER BARS SHALL BEGIN AT THE INTERSECTION OF THE ROADBED AND CUT SLOPE AND RUN ACROSS THE ENTIRE WIDTH OF THE ROADBED.
2. ALL WATER BARS SHALL HAVE FREE FLOWING OUTLETS.

# CULVERT AND DRAINAGE SPECIFICATION DETAIL

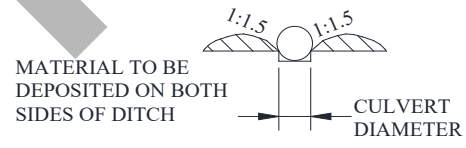


NOTE: MINIMUM COVER OVER CULVERT AT SHOULDER AT INLET SHALL BE 18" OR 1/2 THE CULVERT DIAMETER, WHICHEVER IS GREATER.  
 CATCH BASINS SHALL BE MINIMUM 5' WIDE BY 6' LONG.  
 CUT SLOPES AT CATCH BASINS SHALL BE AS SPECIFIED IN CLAUSE 5.25.

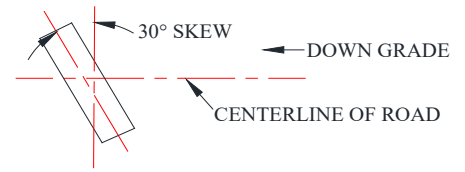
## OUTLET DITCH



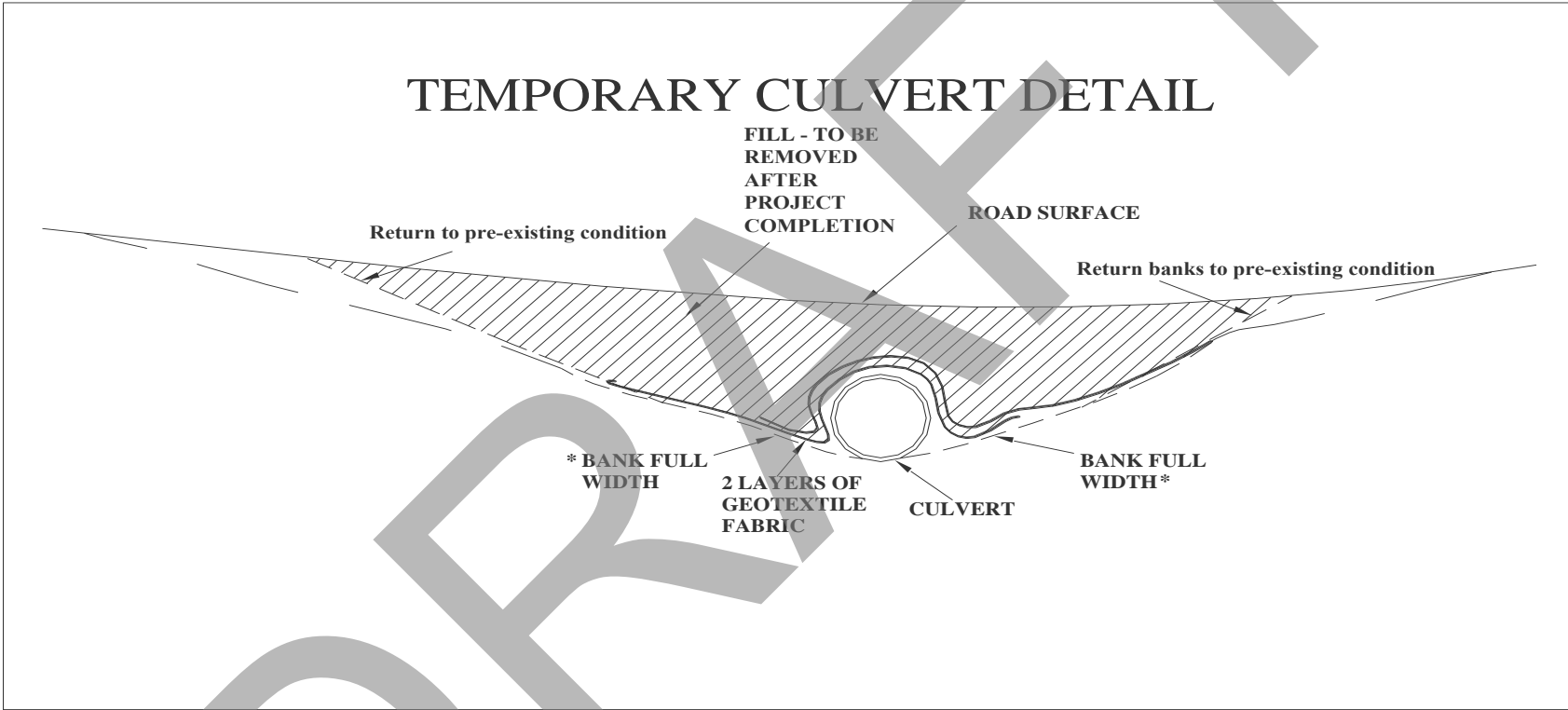
## SECTION A-A



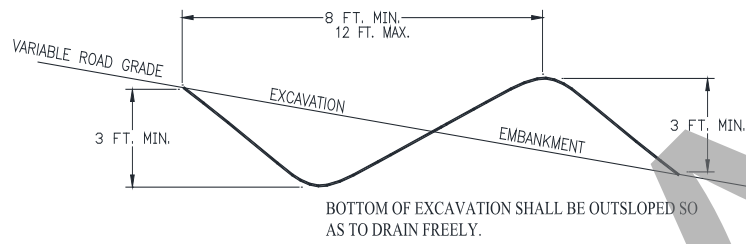
## SKEW DIAGRAM



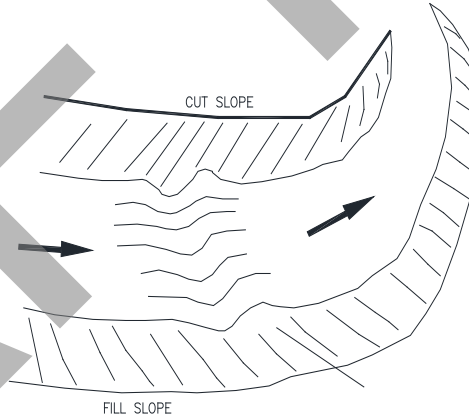
# TEMPORARY CULVERT DETAIL



# NON-DRIVABLE WATER BAR DETAIL



PROFILE VIEW

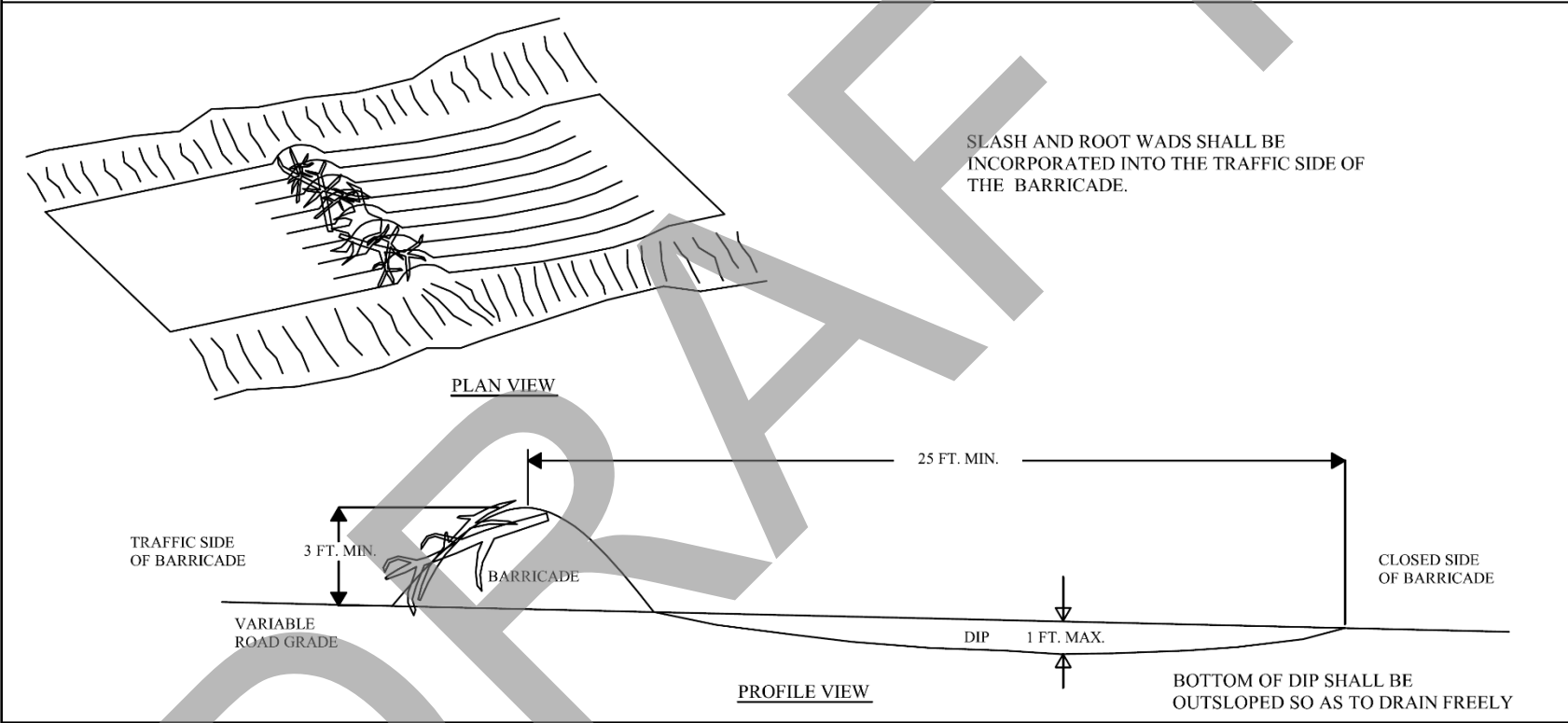


METHOD OF INSTALLATION

NOTE: EMBANKMENT SIDE OF UNDRIVABLE WATER BAR SHALL BE PLACED IN ON SIDE VEHICLE TRAFFIC WILL BE COMING FROM.



# EARTHEN BARRICADE DETAIL



## SUMMARY - Road Development Costs

SALE/PROJECT NAME: FLY BY NIGHT

Region: Southeast

District: Alpine

Agreement #: 30-106349

ROAD STANDARD:	Construction	Reconstruction	Maintenance
NUMBER OF STATIONS:	4.35	89.85	729.10
CLEARING & GRUBBING:	\$350	\$6,259	-
EXCAVATION AND FILL:	\$1,219	\$11,903	-
MISC. MAINTENANCE:	-	-	\$20,886
ROAD ROCK:	\$1,008	\$978	\$1,310
CULVERTS AND FLUMES:	\$1,424	\$4,871	\$1,233
MOBILIZATION:	\$555	\$1,295	\$1,850
TOTAL COSTS:	\$4,555	\$25,305	\$25,279
COST PER STATION:	\$1,047	\$282	\$35
		POST HAUL MAINTENANCE COSTS:	\$8,680
		ROAD DEACTIVATION & ABANDONMENT COSTS:	\$14,113
		SUBTOTAL	\$77,932
		OVERHEAD AND GENERAL EXPENSES:	\$7,793
		<b>TOTAL (All Roads) =</b>	<b>\$85,725</b>
		<b>SALE VOLUME MBF =</b>	<b>3,434</b>
		<b>TOTAL \$/MBF =</b>	<b>\$24.96</b>