



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Cost Summary Crystal Crossover Sale 341-02-42

District: Tillamook

Date: 9/6/01

	Conifer	Hardwood	Total
Gross Timber Sale Value	\$366,820.81	\$0.00	\$366,820.81
		Project Work	(\$143,135.00)
		Advertised Value	\$223,685.81



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Timber Description Crystal Crossover Sale 341-02-42

District: Tillamook

Location: Sec. 7,8,17,18, T2N, R9W

Date: 9/6/01

Stand Stocking: 20%

Species	Avg. DBH	Amortized%	Recovery%
Douglas - Fir	14	0	95
Western Hemlock / Fir	13	0	95

Volume by Grade	Douglas - Fir	Western Hemlock / Fir	Total
2S	413	333	746
3S	398	1,039	1,437
Total	811	1,372	2,183

Comments: Pond Values Used: 2nd Quarter 2001 + Local Pond Values

8"+ Hardwoods: \$400.00* - \$274.90** = \$125.10

*Local Pond Value, Northwest Hardwoods, 4/18/01

** Hardwood Logging Cost



Timber Sale Appraisal

Logging Conditions

Crystal Crossover

Sale 341-02-42

"STEWARDSHIP IN FORESTRY"

Combination#: 1	Douglas - Fir	83.53%
	Western Hemlock / Fir	86.63%
Yarding Distance:	Medium (800 ft)	Downhill Yarding No
Logging System:	Cable: Medium Tower >40 - <70	Process: Manual Delimiting
Tree Size:	Small / Thinning 12in (130 Bft/tree), 12-17 logs/MBF	
Loads/Day:	6	Bd. Ft./Load: 3,500
Cost/MBF:	\$157.93	
Machines:		
	Log Loader (A)	
	Tower Yarder (Medium)	
Combination#: 2	Douglas - Fir	16.47%
	Western Hemlock / Fir	13.37%
Yarding Distance:	Short (400 ft)	Downhill Yarding No
Logging System:	Track Skidder	Process: Manual Felling/Delimiting
Tree Size:	Small / Thinning 12in (130 Bft/tree), 12-17 logs/MBF	
Loads/Day:	9	Bd. Ft./Load: 3,500
Cost/MBF:	\$103.66	
Machines:		
	Log Loader (B)	
	Track Skidder	



Timber Sale Appraisal Logging Costs Crystal Crossover Sale 341-02-42

"STEWARDSHIP IN FORESTRY"

Date: 9/6/01

Operating Seasons: 2.0

Profit & Risk: 20%

Project Costs: \$143,135

Other Costs (P/R): \$6,366

Slash Disposal: \$1,509

Other Costs: \$4,530

Road Maintenance: \$1.64

Miles of Road			
Dirt	Rock (Contractor)	Rock (State)	Paved
0.0	0.0	0.0	0.0

Hauling Costs

Species	\$/MBF	Trips/Day	MBF/Load
Douglas - Fir	\$0.00	2.0	3.5
Western Hemlock / Fir	\$0.00	3.0	3.5



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Logging Costs Breakdown Crystal Crossover Sale 341-02-42

Costs	Douglas - Fir	Western Hemlock / Fir
Logging	148.99	150.67
Road Maintenance	1.73	1.73
Fire Protection	2.48	2.48
Hauling	69.16	46.11
Other (P/R appl.)	2.92	2.92
Profit & Risk	45.06	40.78
Slash Disposal	0.69	0.69
Scaling	2.00	2.00
Other	2.08	2.08
Total	275.11	249.46

Amortization	0.00	0.00
Pond Value	557.82	349.71
Stumpage	282.71	100.25
Amortized	0.00	0.00



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Summary Crystal Crossover Sale 341-02-42

Amortized

	Douglas - Fir	Western Hem lock / Fir
MBF	0.00	0.00
Value	0.00	0.00
Total	0.00	0.00

Unamortized

	Douglas - Fir	Western Hem lock / Fir
MBF	811.00	1,372.00
Value	282.71	100.25
Total	229,277.81	137,543.00

Gross Timber Sale Value

Recovery \$366,820.81

Prepared by: Colleen Holmen

Date: 9/6/01

District: Tillamook

Phone: (503) 842-2545

Additional Costs

Crystal Crossover



"STEWARDSHIP IN FORESTRY"

Area I Volume:	1488 MBF
Area II Volume:	500 MBF
Area III Volume:	195 MBF
Total Sale Volume:	2183 MBF

ADDITIONAL COSTS - PROFIT & RISK TO BE ADDED						
Yarding & Loading:	Cost / MBF		Volume (MBF)			
Brand & Paint:	\$ 2	x	2183	=		\$4,366
	Cost / Each		#			\$4,366
Intermediate Supports (per support)	\$ 100	x	20	=		\$2,000
						\$2,000
OTHER COSTS TOTAL						\$6,366
ADDITIONAL COSTS - PROFIT & RISK INCLUDED						
Non-Project Roads						
Road 1	8	Stations	x	\$ 65	=	\$520
Road 2	7	Stations	x	\$ 110	=	\$770
Road 3	9	Stations	x	\$ 100	=	\$900
Total						\$2,190
				Yrd ³		\$/Yard
Pit Run Rock	18	Stations	x	20	x	\$ 6.50
						\$2,340
OTHER COSTS TOTAL						\$ 4,530

ROAD MAINTENANCE					
	\$/Mile	MMBF	Miles		\$/MBF
*Grading:	\$500	2.18	4		\$1.00
	\$/Yd	MMBF	Miles	CuYd	\$/MBF
**Surfacing Crushed:	\$5.00	2.18	4	50	\$0.50
	\$/Sta	Sta	Total		\$/MBF
***Ditch Clearing and End Hauling	\$20.00	15	\$300		\$0.14
TOTAL ROAD MAINTENANCE COST / MBF:					\$1.64

- *Assumes grading the road once per 2 MMBF
- **Assumes 50 cy for normal maintenance /2 MMBF/mile
- ***Includes cost for excavating, hauling, compaction, and sediment control devices.

PROJECT SUMMARY SHEET

Sale: Crystal Crossover

IMPROVEMENT

Point	A to B	51 + 80	stations =	\$2,669.37
Point	C to D	11 + 65	stations =	\$12,616.77
Point	E to F	281 + 65	stations =	\$112,399.16
SUBTOTAL IMPROVEMENT				\$127,685.30

SPECIAL PROJECTS

<u>2 1/2"-0" Crushed Rock Stockpile (1,000 cy) @ 1.52 Miles</u>	\$10,896.90
<u>South of Crushed Rock Pit on Miami Forest Road</u>	
<u>Road Vacating Between Points G and H</u>	\$3,159.67
SUBTOTAL SPECIAL PROJECTS	\$14,056.57

MOVE IN for A to B and C to D	\$942.35
MOVE IN for E to F	\$450.68

GRAND TOTAL **\$143,135**

SUMMARY OF CONSTRUCTION COST

Sale:	<u>Crystal Crossover</u>		Road:	<u>A to B</u>
Construction -	_____ stations _____ miles		Improvement-	_____ 51 + 80 stations _____ 0.98 miles
CLEARING AND GRUBBING -				
		0.00 acres @	\$0.00 per acre =	\$0.00
			TOTAL CLEARING AND GRUBBING	
				\$0.00
EXCAVATION -				
		0 cys. @	\$0.00 per c.y. =	\$0.00
			TOTAL EXCAVATION	
				\$0.00
CULVERTS - MATERIALS & INSTALLATION				
	Culverts			
	54 LF of 18"	\$796.50		
	0 LF of 30"	\$0.00		
	0 LF of 42"	\$0.00		
	0 LF of 54"	\$0.00		
		<u>\$796.50</u>		
	0 LF of 24"	\$0.00		
	0 LF of 36"	\$0.00		
	0 LF of 48"	\$0.00		
	0 LF of 60"	\$0.00		
		<u>\$0.00</u>		
	Half Rounds			
	0 LF of 21"	\$0.00		
	0 LF of 36"	\$0.00		
		<u>\$0.00</u>		
	0 LF of 30"	\$0.00		
	0 LF of 42"	\$0.00		
		<u>\$0.00</u>		
	Half Round Stakes			
	0 stakes	\$0.00		
	Culvert Markers			
	2 markers	\$12.00		
		<u>\$12.00</u>		
			TOTAL CULVERTS	
				\$808.50
SURFACING-				
Surfacing over culverts	40 cy. of	pit-run	@	\$6.35 per c.y. = \$254.00
3 + 10 & 12 + 70				
Road 21 + 50 to 21 + 80	50 cy. of	pit-run	@	\$6.80 per c.y. = \$340.00
Road 29 + 50 to 29 + 80	40 cy. of	pit-run	@	\$6.80 per c.y. = \$272.00
				<u>\$866.00</u>
			TOTAL SURFACING	
				\$866.00
SPECIAL PROJECTS				
Remove 2 old culverts from State Lands				\$136.91
Attach existing half-round - labor, hardware and 2 stakes				\$54.00
Grade and Shape Subgrade - ditch	51.80 Stations @	\$14.20/Station		\$735.56
Grass Seed and Fertilize - ditch	0.38 Acres @	\$180/Acre		\$68.40
			TOTAL SPECIAL PROJECTS	
				\$994.87
GRAND TOTAL				\$2,669.37

SUMMARY OF CONSTRUCTION COST

Sale: Crystal Crossover Road: C to D

Construction - stations Improvement- 11 + 65 stations
 miles miles

CLEARING AND GRUBBING -

Scattering 1.10 acres @ \$815.00 per acre = \$896.50
TOTAL CLEARING AND GRUBBING \$896.50

EXCAVATION -

Widening & drifting - common construction 5.70 sta. @ \$100.00 per sta. = \$570.00
 Excavate -0 + 00-5 + 95 1,187 cys. @ \$1.15 per c.y. = \$1,365.05
 Drift fill end-Haul 0 + 00-5 + 95 417 cys. @ \$0.15 per c.y. = \$62.55
 Truck end-Haul 4 + 00-5 + 95 770 cys. @ \$0.61 per c.y. = \$469.70
 Place fill 1,187 cys. @ \$0.30 per c.y. = \$356.10
TOTAL EXCAVATION \$2,823.40

CULVERTS - MATERIALS & INSTALLATION

Culverts

102 ✓ LF of 18"	\$1,504.50	0	LF of 24"	\$0.00
0 LF of 30"	\$0.00	0	LF of 36"	\$0.00
0 LF of 42"	\$0.00	0	LF of 48"	\$0.00
0 LF of 54"	\$0.00	0	LF of 60"	\$0.00
	<u>\$1,504.50</u>			<u>\$0.00</u>

Half Rounds

20 ✓ LF of 21"	\$228.00	0	LF of 30"	\$0.00
0 LF of 36"	\$0.00	0	LF of 42"	\$0.00
	<u>\$228.00</u>			<u>\$0.00</u>

Half Round Stakes

4 stakes \$32.00

Culvert Markers

3 markers \$18.00 ✓

TOTAL CULVERTS \$1,782.50

SURFACING-

Road 12"	820 ✓ cy. of	pit-run	@	\$7.25 per c.y. =	\$5,945.00
Junction 12"	33 ✓ cy. of	pit-run	@	\$7.25 per c.y. =	\$239.25
1 Turnouts 12"	22 ✓ cy. of	pit-run	@	\$7.25 per c.y. =	\$159.50
1 Turnarounds 12"	22 ✓ cy. of	pit-run	@	\$7.25 per c.y. =	\$159.50
				TOTAL SURFACING	\$6,503.25

SPECIAL PROJECTS

Remove old growth stumps	1.5Hrs w/ D8 @ \$130.00/Hr	\$195.00
Construct Turnaround & Turnout	0.5 Hr w/ D8 @ \$130.00/Hr	\$65.00
Compact Subgrade - vibratory roller	11.65 Stations @ \$11.00/Station	\$128.15
Grade and Shape Subgrade - outslope	3.25 Stations @ \$9.75/Station	\$31.69
Grade and Shape Subgrade - ditch	8.40 Stations @ \$14.20/Station	\$119.28
Grass Seed and Fertilize - road	0.40 Acres @ \$180/Acre	\$72.00
	TOTAL SPECIAL PROJECTS	\$611.12

GRAND TOTAL \$12,616.77

SURFACING-

Road 6"	3,425 ✓	cy. of	2 1/2"-0"	@	\$15.24' per c.y. =	\$52,197.00
3 Junctions 6"	66 ✓	cy. of	2 1/2"-0"	@	\$15.24" per c.y. =	\$1,005.84
10 Turnouts 6"	110 ✓	cy. of	2 1/2"-0"	@	\$15.24" per c.y. =	\$1,676.40
Culvert bedding-194 + 80	99	cy. of	2"-0"	@	\$3.72 per c.y. =	\$368.28
Culvert bedding-244 + 40	85	cy. of	2"-0"	@	\$4.65 per c.y. =	\$395.25
Culverts and road 0 + 00 to 131 + 70	260	cy. of	2"-0"	@	\$4.73 per c.y. =	\$1,229.80
Culverts and road 187 + 90 to 279 + 25	170	cy. of	2"-0"	@	\$4.43 per c.y. =	\$753.10
194 + 05 to 195 + 55 9"	101 ✓	cy. of	pit-run	@	\$7.71 per c.y. =	\$778.71
243 + 65 to 245 + 15 9"	101 ✓	cy. of	pit-run	@	\$6.79 per c.y. =	\$685.79
Riprap-120 + 15-243 + 50	30 ✓	cy. of	48"-24"	@	\$8.21 per c.y. =	\$246.30
Riprap-263 + 45-264 + 45	178 ✓	cy. of	48"-36"	@	\$10.45 per c.y. =	\$1,860.10

TOTAL SURFACING

\$61,196.57

SPECIAL PROJECTS

Remove old growth stumps	1.5Hrs w/ D8 @ \$130.00/Hr	\$195.00
Remove 23 old culverts from State Lands		\$1,391.06
Excavate 15' long x 15' wide x 4'deep catch basin @ Sta. 191 + 80		\$57.50
Excavate 18 sediment catch basins and install 1 strawbale per basin		\$675.00
Construct Turnouts	1.75 Hr w/ D8 @ \$130.00/Hr	\$227.50
Compact Subgrade - vibratory roller	97.90 Stations @ \$11.00/Station	\$1,076.90
Grade and Shape Subgrade - ditch	97.90 Stations @ \$14.20/Station	\$1,390.18
Straw Mulch	1.55 Acres @ \$1000/Acre	\$1,550.00
Grass Seed and Fertilize - road	1.55 Acres @ \$180/Acre	\$279.00

TOTAL SPECIAL PROJECTS

\$6,842.14

GRAND TOTAL

\$112,399.16

SUMMARY OF CONSTRUCTION COST

Sale: Crystal Crossover

Road: G to H - Road Vacating

Construction - _____ stations
 _____ miles

Improvement- 14 + 65 stations
0.28 miles

CLEARING AND GRUBBING -

Scattering 0.00 acres @ \$790.00 per acre = \$0.00
TOTAL CLEARING AND GRUBBING \$0.00

EXCAVATION -

Remove fill and place logs @ Sta. 9 + 70 to 10 + 35

Excavator	6 hrs. @	\$115.00 per hr. =	\$690.00	
Cat	2 hrs. @	\$130.00 per hr. =	\$260.00	
Waterbars installation	1.25 hrs. @	\$115.00 per hr. =	\$143.75	
Fill removal and resploping old culvert location at 1 1/2 : 1 fill slopes				
Excavator	4 hrs. @	\$115.00 per hr. =	\$460.00	
Cat	2 hrs. @	\$130.00 per hr. =	\$260.00	
		TOTAL EXCAVATION		\$1,813.75

CULVERTS - MATERIALS & INSTALLATION

Culverts

0 LF of 18"	\$0.00	0 LF of 24"	\$0.00
0 LF of 30"	\$0.00	0 LF of 36"	\$0.00
0 LF of 42"	\$0.00	0 LF of 48"	\$0.00
0 LF of 54"	\$0.00	0 LF of 60"	\$0.00
	<u>\$0.00</u>		<u>\$0.00</u>

Half Rounds

0 LF of 21"	\$0.00	0 LF of 30"	\$0.00
0 LF of 36"	\$0.00	0 LF of 42"	\$0.00
0 LF of 48"	\$0.00	0 LF of 54"	\$0.00
0 LF of 60"	\$0.00	0 LF of 66"	\$0.00
	<u>\$0.00</u>		<u>\$0.00</u>

Half Round Stakes

0 stakes \$0.00

Culvert Markers

0 markers \$0.00

TOTAL CULVERTS \$0.00

SURFACING-

0 cy. of @ \$0.00 per c.y. = \$0.00
TOTAL SURFACING \$0.00

SPECIAL PROJECTS

Within area move-in for an excavator and cat		\$42.60
Block access at Points G and H		\$172.50
Remove 1 old culvert from State Lands		\$98.87
Rip subgrade and outslope	14.65 Stations @ \$35/Station	\$512.75
Straw Mulch - old roadbed	0.44 Acres @ \$1000/Acre	\$440.00
Grass seed and fertilize - old roadbed	0.44 Acres @ \$180/Acre	\$79.20
	TOTAL SPECIAL PROJECTS	\$1,345.92

GRAND TOTAL

\$3,159.67

SUMMARY OF CONSTRUCTION COST

Sale:	<u>Crystal Crossover</u>		Road:	<u>Stockpile on Miami Forest Road</u>
Construction -	_____ stations _____ miles		Improvement -	0 stations 0.00 miles
CLEARING AND GRUBBING -				
Sidecast - stockpile location	0.11 acres @	\$540.00 per acre =	\$59.40	
		TOTAL CLEARING AND GRUBBING		\$59.40
EXCAVATION -				
Level stockpile location - D-8 cat	0.75 hrs. @	\$130.00 per hr. =	\$97.50	
		TOTAL EXCAVATION		\$97.50
Stockpile Rock-				
Miami MP 7.64	1,000 cy. of 2 1/2"-0" @	\$10.74 per c.y. =	\$10,740.00	
		TOTAL SURFACING		\$10,740.00
SPECIAL PROJECTS				
			\$0.00	
		TOTAL SPECIAL PROJECTS		\$0.00
GRAND TOTAL			\$10,896.90	

ROCK PIT DEVELOPMENT AND CRUSHING COST SUMMARY

Sale: Crystal Crossover

Pit:	Upper Miami Pit
Rock:	2 1/2"-0"
Swell:	1.40
Shrinkage:	1.16
Drill Pct.:	100%

Location:	W1/2SE1/4 SEC11 T2N R9W W. M.
Road:	3,601 c.y.
Stockpile:	1,000 c.y.
Total Truck Loads:	4,601 c.y.
In Place Total:	3,286 c.y.

Clear, scalp, load & compact overburden; construct access road:

D-8 Cat and excavator - 12 Hrs. @ \$260.00/Hr	\$3,120.00
End-haul overburden to waste area at 1.52 miles East of Pit on Miami Forest Rd: Dump Truck-36 Hrs. @ \$57.00/Hr	\$2,052.00
Grass seed and fertilize waste area and access road : 0.5 acres @ \$180.00/ac	\$90.00
Drill & shoot access road: \$2.50 /cu.yd. x 666 cu.yds. =	\$1,665.00
Drill & Shoot: \$2.10 /cu.yd. x 2,620 cu.yds. =	\$5,502.00
Push Rock: \$0.60 /cu.yd. x 4,601 cu.yds. =	\$2,760.60
Load Crusher: \$0.60 /cu.yd. x 4,601 cu.yds. =	\$2,760.60
Crushing: 2 1/2"-0" \$2.25 /cu.yd. x 4,601 cu.yds. =	\$10,352.25
Load truck - crushed: \$0.60 /cu.yd. x 4,601 cu.yds. =	\$2,760.60
Load truck- pit-run: \$0.60 /cu.yd. x 202 cu.yds. =	\$121.20
Load truck- riprap: \$1.40 /cu.yd. x 208 cu.yds. =	\$291.20
Oversize Reduction: \$4.00 /cu.yd. x 115 cu.yds. =	\$460.00
Subtotal	\$31,935.45

Move in and set up crusher	\$2,907.54
Move in and set up drill and compressor	\$207.14
Move in D-8	\$367.93
Move in loader	\$338.11
Move in grader	\$94.89
Move in roller	\$207.14
Move in water truck	\$76.08
Move in 5 dump trucks	\$323.63
Subtotal	\$4,522.46

TOTAL PRODUCTION COSTS	\$36,457.91
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Base Cost = \$7.92 Per Cu.Yd.

2 1/2"-0" Crushed	Haul Cost	Proc Cost	Base Cst.	Cost	Number	ROCK
Road Segment	/cu.yd.	/cu.yd.	/cu.yd.	/cu.yd.	Cu. Yds	COST
E to F	\$5.91	\$1.41	\$7.92	\$15.24	3,601 ✓	\$54,879.24
183 + 75 to 281 + 65						
Total C.Y.					3,601	Sub Total \$54,879.24

Pit-run	Haul Cost	Proc Cost	Base Cst.	Cost	Number	ROCK
Road Segment	/cu.yd.	/cu.yd.	/cu.yd.	/cu.yd.	Cu. Yds	COST
E to F	\$6.51	\$0.60	\$0.60	\$7.71	101 ✓	\$778.71
194 + 05 to 195 + 55						
E to F	\$5.59	\$0.60	\$0.60	\$6.79	101 ✓	\$685.79
243 + 65 to 245 + 15						
Total C.Y.					202	Sub Total \$1,464.50

2 1/2"-0" Crushed	Haul Cost	Proc Cost	Base Cst.	Cost	Number	ROCK
Stockpile	/cu.yd.	/cu.yd.	/cu.yd.	/cu.yd.	Cu.Yds.	COST
7.64 mile Miami Frst Rd	\$2.52	\$0.30	\$7.92	\$10.74	1,000	\$10,740.00
Total C.Y.					1,000	Sub Total \$10,740.00

Riprap	Haul Cost	Proc Cost	Base Cst.	Cost	Number	ROCK
Road Segment	/cu.yd.	/cu.yd.	/cu.yd.	/cu.yd.	Cu. Yds	COST
E to F-120 + 15-243 + 50	\$5.41	\$1.40	\$1.40	\$8.21	30 ✓	\$246.30
E to F-263 + 45-264 + 45	\$7.65	\$1.40	\$1.40	\$10.45	178 ✓	\$1,860.10
Total C.Y.					208	Sub Total \$2,106.40

TOTAL ROCKING COSTS	\$69,190.14
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ROCK SUMMARY FOR HAUL AND PLACEMENT FROM STOCKPILE

Crystal Crossover

Station 135 + 50 on E to F

Pit: Miami Forest Road
 Rock: 2"-0"
 Swell: 0.00
 Shrinkage: 0.00
 Drill Pct.: 0%

Location: N1/2 NE1/4 SEC29 T2N R9W W. M.
 Road: 614 c.y.
 Stockpile: c.y.
 Total Truck Loads: 614 c.y.
 In Place Total: 614 c.y.

Load Rock: \$0.60 /cu.yd. x 614 cu.yds. = \$368.40
 Subtotal \$368.40

Move in loader \$176.35
 Subtotal \$176.35

TOTAL PRODUCTION COSTS \$544.75

Base Cost \$0.89 Per Cu.Yd.

2"-0" from Stockpile on Miami Forest Road

Road	Haul Cost /cu.yd.	Proc Cost /cu.yd.	Base Cst. /cu.yd.	Cost /cu.yd.	Number Cu. Yds	ROCK COST
E to F @ 194 + 80 culvert bedding	\$1.43	\$1.40	\$0.89	\$3.72	99	\$368.28
E to F @ 244 + 40 culvert bedding	\$2.36	\$1.40	\$0.89	\$4.65	85	\$395.25
E to F O + 00 to 131 + 70	\$2.94	\$0.90	\$0.89	\$4.73	260	\$1,229.80
E to F 187 + 90 to 279 + 25	\$2.94	\$0.60	\$0.89	\$4.43	170	\$753.10
Total C.Y.					614	Sub Total \$2,746.43

TOTAL ROCKING COSTS \$2,746.43

ROCK PIT DEVELOPMENT AND CRUSHING COST SUMMARY

Sale: Crystal Crossover		0.2 miles on Crystal Crossover Rd from junction with East Foley Rd	
Pit:	<u>Crystal Cross</u>	Location:	<u>NW1/4 NW1/4 Sec 17, T2N, R9W, W.M.</u>
Rock:	<u>Pit-run</u>	Road:	<u>1,027 c.y.</u>
Swell:	<u>1.40</u>	Stockpile:	<u> </u>
Shrinkage:	<u> </u>	Total Truck Loads:	<u>1,027 c.y.</u>
Drill Pct.:	<u> </u>	In Place Total:	<u>734 c.y.</u>

Construct access road, clear, scalp, drift overburden to waste area & compact overburden:			
D-8 Cat and excavator - 6 Hrs. @ \$260.00/Hr			\$1,560.00
Grass seed and fertilize waste area and access road : 0.2 acres @ \$180.00/acre			\$36.00
Strip:	<u>\$1.50 /cu.yd.</u>	x <u>734 cu.yds.</u>	= \$1,101.00
Push Rock:	<u>\$0.60 /cu.yd.</u>	x <u>1,027 cu.yds.</u>	= \$616.20
Load Dump Truck:	<u>\$0.60 /cu.yd.</u>	x <u>1,027 cu.yds.</u>	= \$616.20
		Subtotal	<u>\$3,929.40</u>

Move in Excavator		\$340.27
Move in D8 Cat		\$254.80
Move in Loader		\$220.28
Move in 3 Trucks		<u>\$137.35</u>
	Subtotal	<u>\$952.70</u>

Base Cost	<u>\$4.75</u>	Per Cu.Yd.	Total Production Costs	\$4,882.10
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Pit-run

Road Segment	Haul Cost /cu.yd.	Proc Cost /cu.yd.	Base Cst. /cu.yd.	Cost /cu.yd.	Number Cu. Yds	ROCK COST
A to B - culverts	\$1.00	\$0.60	\$4.75	\$6.35	40	<u>\$254.00</u>
3 + 10 & 12 + 70						
A to B	\$1.45	\$0.60	\$4.75	\$6.80	90	<u>\$612.00</u>
21 + 50 to 29 + 80						
C to D	\$1.60	\$0.90	\$4.75	\$7.25	897	<u>\$6,503.25</u>
			Total C.Y.		1,027	Sub Total <u>\$7,369.25</u>

Total Rocking Costs	\$7,369.25
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MOVE-IN CALCULATIONS

Sale: **Crystal Crossover**

A to B and C to D Roads

LOWBOY HAUL (One Way)		
DISTANCE	ROADWAY	AVE SPEED (MPH)
21.10	Highway	45
2.32	Main Lines (Off Road)	12
0.00	Pulling Steep Grades	2

No.	EQUIPMENT DESCRIPTION	Move in Cost	Pilot Cars	Within Area Move (\$/mile)	Begin Mileage	End Mileage	Total Miles	Within Area Cost	Total Cost
0	Drill & Compressor	\$0.00		\$46.00	0	0	0	\$0.00	\$0.00
0	Brush Cutter	\$0.00		\$4.00	0	0	0	\$0.00	\$0.00
1	Graders	\$59.81		\$3.65	0	3.5	3.5	\$12.78	\$72.59
0	Loader (Small)	\$0.00	1	\$3.55	0	0	0	\$0.00	\$0.00
0	Loader (Med. & Large)	\$0.00	1	\$9.00	0	0	0	\$0.00	\$0.00
0	Rollers & Compactors	\$0.00		\$5.00	0	0	0	\$0.00	\$0.00
0	Excavators (Small)	\$0.00		\$22.00	0	0	0	\$0.00	\$0.00
0	Excavators (Med.)	\$0.00		\$35.50	0	0	0	\$0.00	\$0.00
1	Excavators (Large)	\$213.94	1	\$44.80	0	4.52	4.52	\$202.50	\$416.43
0	Rubber Tired Backhoes/Skidlers	\$0.00		\$3.00	0	0	0	\$0.00	\$0.00
0	Tractors (D6)	\$0.00	2	\$7.10	0	0	0	\$0.00	\$0.00
0	Tractors (D7)	\$0.00	2	\$11.30	0	0	0	\$0.00	\$0.00
1	Tractor (D8)	\$212.22	2	\$15.10	0	4.52	4.52	\$68.25	\$280.47
0	Dump Truck (10 cy +)	\$0.00		\$2.85	0	0	0	\$0.00	\$0.00
1	Dump Truck (Off Hiway)	\$165.93	1	\$4.75	0	1.46	1.46	\$6.94	\$172.86
TOTAL MOVE-IN COSTS:									\$942.35

MOVE-IN CALCULATIONS

Sale: **Crystal Crossover**
E to F Road

LOWBOY HAUL (One Way)		
DISTANCE	ROADWAY	AVE SPEED (MPH)
16.75	Highway	45
2.81	Main Lines (Off Road)	12
0.00	Pulling Steep Grades	2

No.	EQUIPMENT DESCRIPTION	Move in	Pilot	Within Area Move	Begin	End	Total	Within Area	Total
		Cost	Cars	(\$/mile)	Mileage	Mileage	Miles	Cost	Cost
0	Drill & Compressor	\$0.00		\$46.00	0	0	0	\$0.00	\$0.00
0	Brush Cutter	\$0.00		\$4.00	0	0	0	\$0.00	\$0.00
1	Graders	\$51.01		\$3.65	0	0	0	\$0.00	\$51.01
0	Loader (Small)	\$0.00	1	\$3.55	0	0	0	\$0.00	\$0.00
0	Loader (Med. & Large)	\$0.00	1	\$9.00	0	0	0	\$0.00	\$0.00
0	Rollers & Compactors	\$0.00		\$5.00	0	0	0	\$0.00	\$0.00
0	Excavators (Small)	\$0.00		\$22.00	0	0	0	\$0.00	\$0.00
0	Excavators (Med.)	\$0.00		\$35.50	0	0	0	\$0.00	\$0.00
1	Excavators (Large)	\$201.21	1	\$44.80	0	0	0	\$0.00	\$201.21
0	Rubber Tired Backhoes/Skidders	\$0.00		\$3.00	0	0	0	\$0.00	\$0.00
0	Tractors (D6)	\$0.00	2	\$7.10	0	0	0	\$0.00	\$0.00
0	Tractors (D7)	\$0.00	2	\$11.30	0	0	0	\$0.00	\$0.00
1	Tractor (D8)	\$198.46	2	\$15.10	0	0	0	\$0.00	\$198.46
0	Dump Truck (10 cy +)	\$0.00		\$2.85	0	0	0	\$0.00	\$0.00
0	Dump Truck (Off Hiway)	\$0.00	1	\$4.75	0	0	0	\$0.00	\$0.00
TOTAL MOVE-IN COSTS:									\$450.68

Oregon Department of Forestry

Cruise Report *Crystal Crossover*

1. **Type of Sale:** Partial Cut and Clearcut
2. **Legal Description:** Portions of Section 7, 8, 17, and 18 Township 2 North, Range 9 West, W.M. Tillamook County, Oregon.
3. **Sale Acreage:** The sale boundaries were plotted on a digital orthophotograph and the acreage was calculated with GIS*.

	<u>Total Acres</u>	<u>Net Acres</u>
Area I (Partial Cut)	135	60
Area II (Clearcut)	15	15
Area III (Partial Cut)	35	20

Deductions from total acreage have been made for areas that are hardwood types, existing roads, and stream buffers.

4. **Cruising Procedures:**
 - A. **Cruising Method:** A total of 21, 21, and 7 variable radius full point plots spaced 200 feet apart were established on Areas I, II, and III respectively. Plots were established in portions of the sale area expected to be harvested to develop a stand table for volume computation. Two trees were measured on each plot for VBAR (volume/basal area ratio).
 - B. **Plot Size:** A basal area factor of 20 was used. Point of observation was at 4.5 feet. Diameters under 8 inches were not recorded.
 - C. **Grading System:** The segment grading system was used for all conifer trees following the Columbia River Official Log Scaling and Grading Bureau rules.
 - D. **Defect and Breakage:** A 5% defect and breakage reduction has been applied to the volume.
 - E. **Cruiser Names/Dates:** Colleen Holmen, Barb Moore, Chris Woodward, April 2001.

5. **Computation Procedures:** Basal area and density was calculated from plot data taken. V-BAR (Volume-Basal Area Ratio) for the take trees was computed using SuperAce 98 from Atterbury Consultant Inc. (see attached Volume Computation Summary)

6. **Timber Description:** The sale contains three areas which are the result of natural seeding. Areas I and II were naturally seeded after the 1933 Tillamook fire. Area I is predominately a natural hemlock, Douglas-fir with scattered sitka spruce, western red cedar, and red alder in the draws. This stand ranges from 55 years old. Area II is primarily a dense hemlock stand with scattered Douglas-fir that is approximately 45 years old. Area III was logged prior to 1954 and left to naturally reseed. The area was also seeded with Douglas-fir in the early 1960's. It now consists of 45 year old hemlock and Douglas-fir.

7. **Revenue Distribution:**
100% FDF
Tax Code: 84% 56-1, 16% 56
Deed Number: 15, 35, 70, 458
No Rehabilitation Obligation

8. **Attachments:**
Stand Table
Volume Summaries
Logging Plan
Cruise Map

Table Summary Area I

DBH	Total TK tr/acre	Total LV tr/acre	Doug-fir TK tr/acre	Doug-fir LV tr/acre	Hemlock TK tr/acre	Hemlock LV tr/acre	Sprce/Cdr TK tr/acre	Sprce/Cdr LV tr/acre	Red Alder TK tr/acre	Red Alder LV tr/acre
8"	5.4	0.0	2.7	0.0	2.7	0.0	0.0	0.0	0.0	0.0
9"	8.6	2.2	0.0	0.0	8.6	0.0	0.0	2.2	0.0	0.0
10"	10.5	5.2	0.0	0.0	10.5	0.0	0.0	3.5	0.0	1.7
11"	10.1	2.9	1.4	0.0	8.7	0.0	0.0	0.0	0.0	2.9
12"	10.9	6.0	2.4	0.0	8.5	0.0	0.0	2.4	0.0	3.6
13"	9.3	3.1	1.0	0.0	8.3	0.0	0.0	2.1	0.0	1.0
14"	18.7	1.8	5.3	0.0	13.4	0.0	0.0	1.8	0.0	0.0
15"	7.0	0.0	1.6	0.0	5.4	0.0	0.0	0.0	0.0	0.0
16"	18.4	0.7	4.1	0.0	14.3	0.0	0.0	0.7	0.0	0.0
17"	4.8	1.2	0.6	0.0	4.2	0.0	0.0	0.6	0.0	0.6
18"	13.5	4.8	4.9	0.0	8.6	0.0	0.0	1.6	0.0	3.2
19"	2.9	6.3	1.0	0.0	1.9	6.3	0.0	0.0	0.0	0.0
20"	3.5	6.1	2.6	0.0	0.9	4.8	0.0	0.9	0.0	0.4
21"	0.8	3.6	0.8	0.0	0.0	3.6	0.0	0.0	0.0	0.0
22"	2.5	4.4	2.5	0.0	0.0	3.6	0.0	0.4	0.0	0.4
24"	3.3	3.3	3.3	0.0	0.0	3.0	0.0	0.3	0.0	0.0
26"	2.3	2.8	2.3	0.0	0.0	1.5	0.0	1.3	0.0	0.0
28"	0.0	2.5	0.0	0.9	0.0	0.9	0.0	0.7	0.0	0.0
30"	0.0	1.2	0.0	0.6	0.0	0.6	0.0	0.0	0.0	0.0
32"	0.0	0.4	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0
34"	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
36"	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
38"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42"	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
44"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Trees/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	192	38	121	19	14
Residual	60	2	25	19	14
Take	133	37	96	0	0

Basal Area/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	276	72	165	24	15
Residual	114	9	66	24	15
Take	162	63	99	0	0

Quadratic Mean Diameter

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	16.2	18.6	15.8	15.2	14.0
Residual	18.7	28.7	22.0	15.2	14.0
Take	14.9	17.7	13.8	0.0	0.0

Stand Density Index (%)

	Doug-fir	Hemlock	Sprce/Cdr
Current	69	52	59
Residual	27	20	23

Table Summary Area II

DBH	Total TK tr/acre	Total LV tr/acre	Doug-fir TK tr/acre	Doug-fir LV tr/acre	Hemlock TK tr/acre	Hemlock LV tr/acre	Sprce/Cdr TK tr/acre	Sprce/Cdr LV tr/acre	Red Alder TK tr/acre	Red Alder LV tr/acre
8"	10.9	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0
9"	30.3	0.0	6.5	0.0	21.6	0.0	2.2	0.0	0.0	0.0
10"	34.9	0.0	7.0	0.0	27.9	0.0	0.0	0.0	0.0	0.0
11"	30.3	0.0	5.8	0.0	24.5	0.0	0.0	0.0	0.0	0.0
12"	29.1	1.2	9.7	0.0	19.4	0.0	0.0	0.0	0.0	1.2
13"	18.6	1.0	5.2	0.0	13.4	0.0	0.0	0.0	0.0	1.0
14"	23.2	3.6	3.6	0.0	19.6	0.0	0.0	0.0	0.0	3.6
15"	17.9	0.8	0.8	0.0	17.1	0.0	0.0	0.0	0.0	0.8
16"	16.4	1.4	0.7	0.0	15.7	0.0	0.0	0.0	0.0	1.4
17"	9.1	1.2	0.6	0.0	8.5	0.0	0.0	0.0	0.0	1.2
18"	10.2	1.1	0.5	0.0	9.7	0.0	0.0	0.0	0.0	1.1
19"	3.9	0.0	1.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0
20"	2.6	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0
21"	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0
22"	2.2	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0
24"	0.0	3.6	0.0	1.2	0.0	2.4	0.0	0.0	0.0	0.0
26"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28"	0.0	0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
30"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44"	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Trees/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	254	43	199	2	10
Residual	14	2	2	0	10
Take	240	41	197	2	0

Basal Area/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	245	40	193	0	12
Residual	27	7	8	0	12
Take	218	33	185	0	0

Quadratic Mean Diameter

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	13.3	13.1	13.3	0.0	14.8
Residual	18.8	25.3	27.1	0.0	14.8
Take	12.9	12.1	13.1	0.0	0.0

Stand Density Index (%)

	Doug-fir	Hemlock	Sprce/Cdr
Current	67	50	57
Residual	6	5	5

Table Summary Area III

DBH	Total TK tr/acre	Total LV tr/acre	Doug-fir TK tr/acre	Doug-fir LV tr/acre	Hemlock TK tr/acre	Hemlock LV tr/acre	Sprce/Cdr TK tr/acre	Sprce/Cdr LV tr/acre	Red Alder TK tr/acre	Red Alder LV tr/acre
8"	24.6	0.0	24.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9"	25.9	0.0	25.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10"	31.4	0.0	31.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11"	30.4	8.6	21.7	0.0	8.7	4.3	0.0	0.0	0.0	4.3
12"	43.6	3.6	32.7	0.0	10.9	3.6	0.0	0.0	0.0	0.0
13"	15.5	6.2	12.4	0.0	3.1	6.2	0.0	0.0	0.0	0.0
14"	8.0	18.7	8.0	0.0	0.0	18.7	0.0	0.0	0.0	0.0
15"	4.7	11.6	4.7	0.0	0.0	9.3	0.0	0.0	0.0	2.3
16"	2.0	10.2	2.0	0.0	0.0	8.2	0.0	2.0	0.0	0.0
17"	1.8	5.4	1.8	0.0	0.0	5.4	0.0	0.0	0.0	0.0
18"	0.0	4.9	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0
19"	0.0	1.5	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
20"	0.0	3.9	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0
21"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24"	0.0	0.9	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
26"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Trees/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	264	165	90	2	7
Residual	76	0	67	2	7
Take	188	165	23	0	0

Basal Area/acre

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	219	108	103	2	6
Residual	94	0	86	2	6
Take	125	108	17	0	0

Quadratic Mean Diameter

	All Spec	Doug-fir	Hemlock	Sprce/Cdr	Red Alder
Current	12.3	11.0	14.5	13.5	12.5
Residual	15.1	0.0	15.3	13.5	12.5
Take	11.0	11.0	11.6	0.0	0.0

Stand Density Index (%)

	Doug-fir	Hemlock	Sprce/Cdr
Current	61	46	53
Residual	24	18	21



"STEWARDSHIP IN FORESTRY"

Crystal Crossover

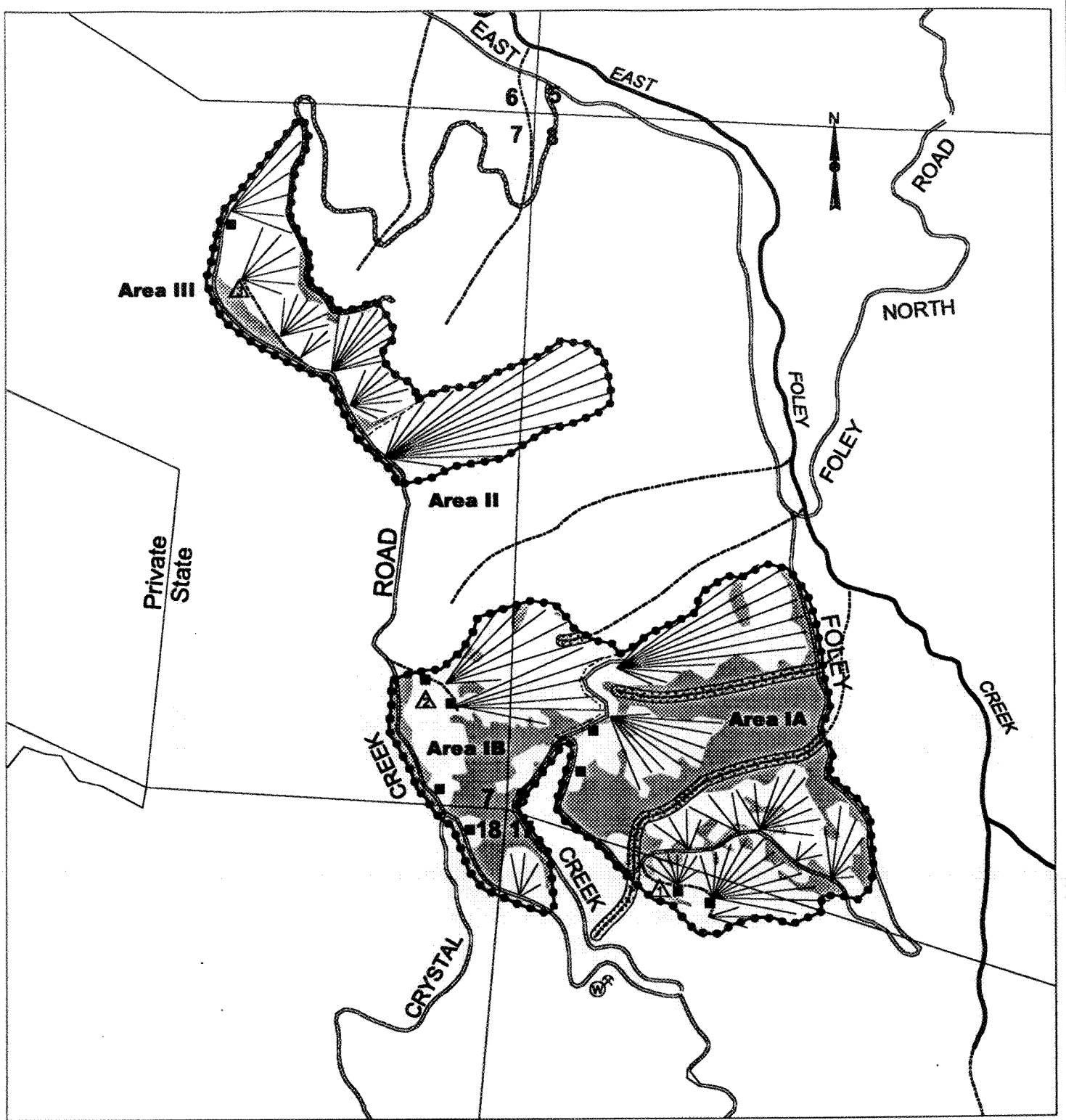
Volume Summary

Area I						
60 acres						
SPECIES	Basal Area Per Acre	V-BAR	Vol/Acre MBF	Volume MBF	D & B	Net Vol MBF
Douglas-fir	63	163	10.3	616	5%	585
Hemlock	99	160	15.8	950	5%	903
TOTAL				1567		1488

Area II						
15 acres						
SPECIES	Basal Area Per Acre	V-BAR	Vol/Acre MBF	Volume MBF	D & B	Net Vol MBF
Douglas-fir	33	128	4.2	63	5%	60.2
Hemlock	185	167	30.9	463	5%	440
TOTAL				527		500

Area III						
20 acres						
SPECIES	Basal Area Per Acre	V-BAR	Vol/Acre MBF	Volume MBF	D & B	Net Vol MBF
Douglas-fir	108	81	8.7	175	5%	166
Hemlock	17	88	1.5	30	5%	29
TOTAL				205		195

TOTAL SALE VOLUME			
SPECIES	MBF		Net Vol. (MBF)
Douglas-fir	854		811
Hemlock	1444		1372
TOTAL	2298		2183



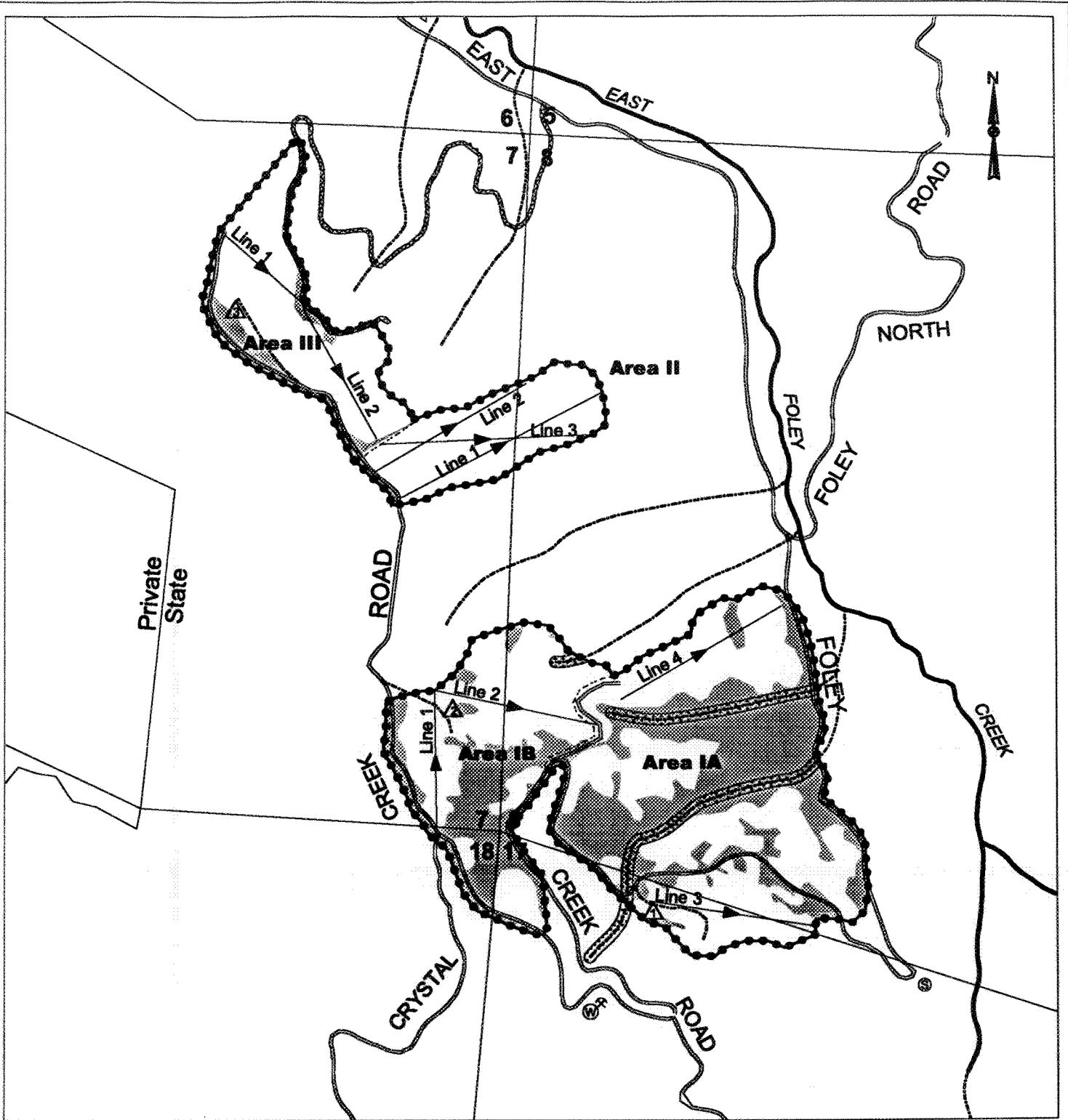
- Timber Sale Boundary
- Area Boundary
- ⊙ Waste Area
- ⊗ Rockpit
- ▨ Stream Buffer
- Type F Stream
- - - Type N Stream
- Surfaced Existing Road
- - - Abandoned Road
- ▲ Non-project road
- Corridor
- ▨ Non-required Harvest

Logging Plan

Crystal Crossover
 Portions of Sections 7, 8,
 17, and 18, T2N, R9W, W.M.
 Tillamook County, Oregon

	Gross Acres	Net Acres
Area I	160	60
Area II	15	15
Area III	28	20
Total	209	95

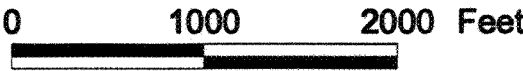




- Timber Sale Boundary
- Area Boundary
- ⊗ Waste Area
- ⊗ Rockpit
- ▨ Stream Buffer
- Type F Stream
- - - Type N Stream
- Surfaced Existing Road
- Abandoned Road
- ▲ Non-project road
- ▶ Cruise Line
- ▨ Non-required Harvest

Cruise Line Map
Crystal Crossover
 Portions of Sections 7, 8,
 17, and 18, T2N, R9W, W.M.
 Tillamook County, Oregon

	Gross Acres	Net Acres
Area I	160	60
Area II	15	15
Area III	28	20
Total	209	95



OREGON DEPARTMENT OF FORESTRY
WRITTEN PLAN
FOR PROJECT WORK ONLY

SALE NAME: Crystal Crossover

PROTECTED WATERS Miami River, Unnamed Tributaries of the Miami River, and Diamond Creek

LOCATIONS: Portions of the following: Sections 15, 20, 21, 22, 29, 30, and 31 T2N, R9W, Section 36 T2N, R10W, W.M. Tillamook County, Oregon.

ACTIVITIES: Culvert removals and installations in Type F streams, road reconstruction, and road vacating within 100 feet of Type F stream

PROTECTION MEASURES:

- No in stream activity will be conducted prior to July 1st or after September 15th without prior approval.
- All necessary measures will be taken to prevent sediment from entering "live" streams, including but not limited to:
 - Machine activity in the stream and disturbance of existing vegetation will be kept to a minimum.
 - Work will be performed only during dry weather periods and low water stream flows.
 - Stream water will be diverted around the work area to protect water quality.
 - Ditchouts and culvert leadoff ditches will be constructed to direct water with sediment away from streams.
 - Fill material will be placed and compacted in 8 inch lifts. Fill slopes will be constructed at a 1 ½:1 fill width to height ratio.
 - Waste material will be end-hauled to stable locations marked in the field.
 - Riprap rock will be placed by a track mount excavator to minimize erosion.
 - All disturbed soil will be grass seeded and fertilized. Mulch will be applied to disturbed soil on Diamond Creek vacating and on work along the Miami River to minimize erosion.
 - Culverts that are removed from the road vacating will have original stream channel grade, width and orientation reestablished.
 - Material removed from the Diamond Creek bridge will be placed outside of high watermark. 5 logs from the bridge will be placed in Diamond Creek as recommended by ODF and W.

PIPE GEOMETRY FOR FISH PASSAGE CULVERTS:

Unnamed Tributary of Miami River at Station 194+80

- The existing stream gradient is 7.8%. The full bank stream width is 12.4 feet.
- Bed material consists of abundant large cobbles.
- A 157" x 101" x 54' aluminized steel culvert will be installed at 6.3%.

- The outlet invert of the culvert will be placed 2.0 feet below the existing stream gradient and the inlet invert will be placed 2.8 feet below the existing stream gradient. This will result in a cross sectional area at the inlet of 62 square feet.
- The required 50 year peak flow (by ODF method) for this drainage is 74.4 cubic feet per second with a minimum cross sectional area of 15 square feet.

Unnamed Tributary of Miami River at Station 244+40

- The existing stream gradient is 6.7%. The full bank stream width is 11.0 feet.
- Bed material consists of abundant large cobbles.
- A 137" x 87" x 54' aluminized steel culvert will be installed at 5.2%.
- The outlet invert of the culvert will be placed 1.5 feet below the existing stream gradient and the inlet invert will be placed 2.0 feet below the existing stream gradient. This will result in a cross sectional area at the inlet of 42 square feet.
- The required 50 year peak flow (by ODF method) for this drainage is 37.8 cubic feet per second with a minimum cross sectional area of 8.6 square feet.

Both sites will be monitored to insure that embedding is achieved. Further information is available in Exhibit "B" of the contract.

PREPARED BY: David L. Stone, Road Specialist
June 7, 2001

OREGON DEPARTMENT OF FORESTRY
WRITTEN PLAN

SALE NAME: **Crystal Crossover**

PROTECTED WATERS: **Type F streams: East Foley Creek (large)**

LOCATIONS: **Portions of Sections 7, 8, 17 and 18, T2N, R9W, W.M., Tillamook County, Oregon.**

ACTIVITY: **Logging cables strung across Type F streams for deflection purposes.**

Riparian Management Area (RMA): The area within 100 feet horizontal distance from the high water mark on each side of the protected Type F streams.

PROTECTION MEASURES:

YARDING and FELLING

- When cable yarding lines are strung across the Type F stream RMA's, they will be at least 150 feet apart and pulled out of the RMA prior to rigging the next yarding road.
- Operator will minimize disturbances in the RMA and take all necessary precautions to protect RMA components.

PREPARED BY: Colleen Holmen
Date: May 16, 2001

OREGON DEPARTMENT OF FORESTRY
WRITTEN PLAN

SALE NAME: **Crystal Crossover**

PROTECTED RESOURCE: **No High Risk Sites were identified on the sale areas. If active landslides and slumps; slopes steeper than 80%; headwalls or draws steeper than 70% are found that constitute a High Risk Site the following practices will apply.**

LOCATION: **Portions of Section 7, 8, 17, and 18 T2N, R9W, W.M.,
Tillamook County, Oregon.**

ACTIVITY: **Cable yarding across or adjacent to High Risk Sites.**

PROTECTION MEASURES:

YARDING:

- Logs will have at least one end suspended when yarding through high risk sites.
- Soil gouging will be limited to a depth of 1 foot (measured vertically) when yarding through high risk sites.

PREPARED BY: **Colleen Holmen
Forester North Unit
May 16, 2001**