

EXHIBIT "B"
FOREST ROAD SPECIFICATIONS

SUBGRADE WIDTH	SURFACED WIDTH	POINT TO POINT	STATION TO STATION	DRAINAGE
14 feet	12 feet	A to B	0+00 to 12+15	Ditch
*	*	A to B	12+15 to 15+75	Outslope
14 feet	12 feet	A to B	15+75 to 153+10	Ditch
14 feet	12 feet	A to B	153+10 to 187+10	Outslope
14 feet	12 feet	E to F	0+00 to 10+70	Outslope
14 feet	12 feet	G to H	0+00 to 12+05	Outslope

*Subgrade and surface width varies as specified in Exhibit L and as marked in the field.

CLEARING. This work shall consist of clearing, removing, and disposing of all trees, snags, down timber, brush, surface objects, and protruding obstructions within the clearing limits.

Where clearing limits have not been marked, the "Road Brushing Specifications" in Exhibit B shall apply. Clearing debris shall not be placed or permitted to remain in or under any road embankment sections. Clearing debris shall not be left lodged against standing trees.

All danger trees, leaners, and snags outside the clearing limits which could fall and hit the road shall be felled.

GRUBBING. This work shall consist of the removal or digging out of stumps and protruding objects.

All stumps shall be completely removed within the limits of required grubbing. Stumps overhanging cutslopes shall be removed. Grubbing debris shall not be placed or permitted to remain in or under any road embankment sections. Grubbing debris shall not be left lodged against standing trees. Grubbing classifications are as follows:

New construction - From the top of the cutslope to the toe of the fill.

Improvements and reconstructions - 4 feet back from the shoulder of the subgrade or ditch, whichever is widest, or as marked in the field.

Sidecast Pullback - From top of pullback to toe of pullback.

CLEARING AND GRUBBING DISPOSAL. Scatter through openings in the timber outside of the cleared right-of-way, except areas where end-haul is required.

EXHIBIT "B"

FOREST ROAD SPECIFICATIONS

EXCAVATION. Excavation and grading shall not be done when weather and/or ground conditions are such that damage will result to existing subgrade or cause excessive erosion.

Excavation shall conform to STATE-engineered lines, grades, dimensions, and plans when provided.

All suitable excavated material shall be used where possible for the formation of fills, shoulders, and drainage structure backfills. Embankment materials shall be free of woody debris, brush, muck, sod, frozen material, and other deleterious materials. All fills and drainage structure backfills shall be machine compacted according to the specifications in Exhibits C and E.

Unless road design plans show otherwise, all roads shall be on a balanced cross section, except when the slope is over 50 percent, the road shall be on full bench for the width specified.

Excess excavation shall not be sidecast where material will enter a stream course or where material will accumulate in areas deemed a high landslide hazard location by STATE.

ROAD WIDTH LIMITATIONS. PURCHASER shall obtain advance written approval from STATE to construct the road to a greater width than specified. Extra subgrade width shall be required for:

Fill Widening. Add to each fill shoulder 1 foot for fills 3 feet to 6 feet high; 2 feet for fills over 6 feet high.

Curve Widening. Widen the inside shoulder of all curves as follows: 400 divided by the radius of the curve equals the amount of extra width.

DRAINAGE

Ditch. Construct "V" ditch 3 feet wide and to a depth of 1 foot below subgrade. Subgrade shall be crowned at 4 to 6 percent. Construct ditchouts away from subgrade at locations marked in field.

Outslope. Road subgrade shall be outsloped at 4 to 6 percent.

TURNOUTS. Increase roadbed width an additional 8 feet for both subgrade and surfacing. Length shall be at least 25 feet, or as staked on the ground, plus 25-foot approaches at each end.

Location: As marked in the field.

JUNCTIONS. Increase roadbed width to allow a curve radius of at least 50 feet, as marked in field.

GRADING

Rock
Common

Back Slopes
Vertical to 1/4:1
3/4:1

Fill Slopes
Not steeper
than 1½:1

Top of cutslope shall be rounded.

TURNAROUNDS. Increase subgrade width an additional 20 feet for a length of 20 feet at locations marked in the field.

EXHIBIT "B"

ADDITIONAL INSTRUCTIONS

Point A to B

- Remove existing culverts from the following locations according to the specifications in Exhibit E: Stations 15+15, 18+75, and 31+55. Reestablish subgrade with suitable onsite material.
- Remove buried logs from subgrade and place logs perpendicular to roadway outside of right-of-way between the following Stations: 45+90 to 46+10, 77+40 to 77+50, 122+35 to 122+65, and 161+00 to 161+20. Reestablish subgrade with onsite material.
- Retrieve sidecast material between the following Stations according to the specifications in Exhibits B and H, and as marked in the field: 101+55 to 105+70.
- Remove berm between roadway and fill slope to subgrade elevation and outslope at least 4 to 6 percent between the following Stations: 113+00 to 119+85, and 125+65 to 132+30. Excavated material shall be scattered outside of right-of-way.
- Remove berm between roadway and fill slope to subgrade elevation and outslope at least 4 to 6 percent between the following Stations: 17+50 to 56+25, 72+75 to 74+20, 105+70 to 113+00, 132+30 to 134+40, 134+90 to 140+60, 142+10 to 147+65, and 149+50 to 151+55.
- Remove boulders larger than 10 inches in diameter at the road surface between Stations 15+75 to 153+10, and as marked in the field.
- Reduce subgrade elevation 2.5 feet to establish a constant road grade between the existing subgrade elevations of Stations 133+60 and 134+10. Remove material from roadway and fill slope to subgrade elevation and outslope at least 4 to 6 percent.
- Raise subgrade elevation 2 feet to establish a constant road grade between the existing subgrade elevations of Stations 25+15 and 26+00, and the existing elevations of Stations 61+10 and 61+60. Suitable onsite material may be used for fill.
- Widen road subgrade 8 feet to the left to improve alignment between Stations 170+10 to 171+75.
- Widen road subgrade 6 feet to the right to improve alignment between the following Stations: 18+50 to 19+00, and 143+45 to 143+85.
- Widen road subgrade 4 feet to the right to improve alignment between Stations 20+60 to 24+00.
- Construct typical road section with ground water drain between Stations 12+15 to 15+75 according to specifications in Exhibits B, C, and L.
- Install carsonite marker specified in Exhibit O three feet easterly of the edge of completed rock surfacing at the following Stations: 12+15, 13+35, 14+55, and 15+75.
- Construct 3 waterbars on spur road to the left of Station 156+90 according to the specifications in Exhibit F, and as marked in the field.
- Construct waterbars between Stations 153+10 and 187+10 according to the specifications in Exhibit F, and as marked in the field.

EXHIBIT "B"

ADDITIONAL INSTRUCTIONS

Point A to B (Cont.)

- Construct sediment catch basins as shown in Exhibit N at the following locations, and as marked in the field: 15+90, 19+30, 22+85, and 27+40.
- Construct a culvert catch basin 20' wide x 20' long x 4' deep with 1 1/2:1 side slopes at Station 46+00, as marked in the field.
- Construct culvert catch basins 10' wide x 10' long x 4' deep with 1 1/2:1 side slopes at the following locations and as marked in the field: Stations 81+00 and 81+35.
- Place geotextile fabric on subgrade prior to rocking between the following Stations according to the specifications in Exhibit J: 80+00 to 82+00, 109+00 to 111+00, and 121+50 to 123+50.
- Establish profile grade at 18 percent or less between Stations 86+90 and 101+55. Vacate portion of old road grade between Points C and D as specified below.
- Place riprap excavated on site below the following culvert outlet locations according to Exhibits C and E, and as marked in the field: Stations 46+00, 81+00, and 81+30.
- Stabilize road prism by placing riprap at the toe of the left fill slope between the following Stations according to Exhibits B, C and M, and as marked in the field: 13+40 to 14+80.

Point C to D

- Block access at Points C and D by piling local woody debris across existing subgrade to a minimum height of 4 feet, as marked in the field.
- Rip subgrade to the depth of 1 foot between Points C and D according to the specifications in Exhibit B.
- Construct waterbars between Points C and D according to the specifications in Exhibit F, and as marked in the field.

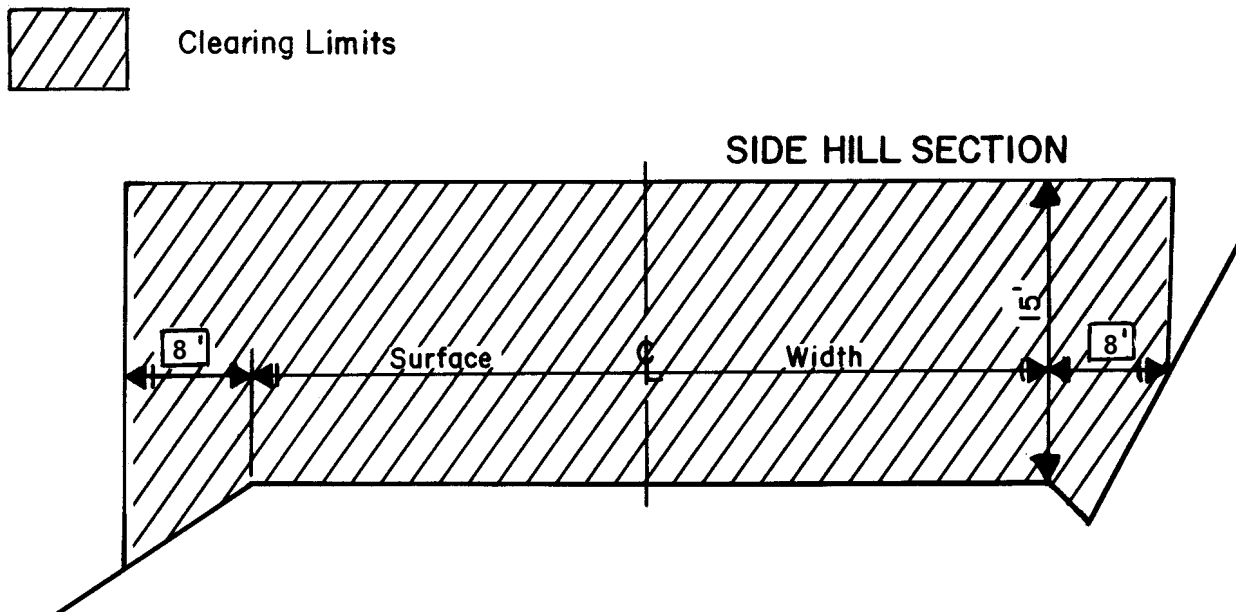
Point E to F

- Construct waterbars between Points E and F according to the specifications in Exhibit F, and as marked in the field.

Point G to H

- Construct waterbars between Points G and H according to the specifications in Exhibit F, and as marked in the field.

EXHIBIT "B"
ROAD BRUSHING SPECIFICATIONS



REQUIREMENTS

Brush and trees shall be cut to a height of 6 inches or less above the ground surface or obstructions such as rocks or existing stumps. Brushing on project road segment shall be completed prior to subgrade approval.

Debris resulting from the brushing operation shall be removed from the roadway, cutslope, ditches, and water courses within 72 hours and may be scattered downslope from the road or placed in other stable locations, unless otherwise approved in writing by STATE.

Trees outside the clearing limits shall not be felled, unless approved in writing by STATE.

EXHIBIT "B"
END-HAULING REQUIREMENTS

POINT TO POINT	STATION TO STATION
A to B	15+75 to 90+50
A to B	101+55 to 113+00
A to B	132+30 to 147+65
A to B	149+50 to 151+55
A to B	170+10 to 171+75

End-Haul Areas General Requirements

Material shall not be intentionally side cast.

Clearing and grubbing debris shall be end-hauled.

When blasting is required, it shall be accomplished using timing devices, delayed charges, low intensity shots, or other suitable means to contain as much material as possible within the road prism.

Containment

Full containment: The amount of material lost over the outside edge of the road shall not exceed 6 inches in depth measured perpendicular to the natural ground slope. Pioneer excavation shall be removed by digging, loading, and hauling rather than by pushing or scraping methods.

Trees and stumps may have up to 12 inches of material directly above them. Any amount of material exceeding the containment requirements shall be removed by whatever means necessary and end-hauled to a designated waste area.

Waste Area Location

As shown on Exhibit A and as marked in the field.

Waste Area Treatment

Deposit at waste area, spread evenly, compact, and provide adequate drainage, and pile woody debris separate from other waste material.

EXHIBIT "C"
ROAD SURFACING

TYPE OF ROCK	SIZE OF ROCK	COMPACTED DEPTH	POINT TO POINT	STATION TO STATION	APPROX. TOTAL TRUCK MEASURE VOLUME
Crushed	Jaw-Run	9"	A to B	0+00 to 12+15	626 CY
Crushed	Jaw-Run	*	A to B	12+15 to 15+75	385 CY
Crushed	Jaw-Run	9"	A to B	15+75 to 153+10	7,074 CY
Crushed	2"-0"	2"	A to B	0+00 to 153+10	1,735 CY
Crushed	Jaw-Run	9"	E to F	0+00 to 2+00	104 CY
Crushed	Jaw-Run	9"	G to H	0+00 to 2+00	104 CY
TURNOUTS:			NO. OF T.O.	POINT TO POINT	
Crushed	Jaw-Run	9"	26	A to B	442 CY
Crushed	2"-0"	2"	26	A to B	104 CY
JUNCTIONS:			NO. OF JCTS.		
Crushed	Jaw-Run	9"	2	A to B	70 CY
Crushed	2"-0"	2"	2	A to B	10 CY
Crushed	Jaw-Run	9"	1	E to F	10 CY
Crushed	Jaw-Run	9"	1	G to H	10 CY
STOCKPILE:			DESCRIPTION	POINT TO POINT	
Crushed	2"-0"	--	Stockpile	**	1,998 CY

* Minimum 12-inch depth (depth varies) as shown on Exhibit L.

** As shown on Exhibit A and as marked in field.

Additional rock for curve widening is required and has been included in the volume estimates.

Roads shall be uniformly graded and approved by STATE prior to rocking. For typical cross section, see Forestry Department Drawing Nos. 351-C and 351-D at the Forestry Department District Office.

Turnouts, turnarounds, and junctions shall be rocked concurrently with road.

End-dumping of riprap shall not be allowed unless in writing by STATE.

Obtain approval from STATE for jaw-run rock prior to spreading 2"-0" crushed rock on Point A to B.

EXHIBIT "C"

MISCELLANEOUS ROCK

MISC. TYPE OF ROCK	SIZE OF ROCK	COMPACTED DEPTH	LOCATION	USE	APPROX. TOTAL TRUCK MEASURE VOLUME
Riprap	48"-24"	--	A to B 13+40 to 14+80	Slope Stabilization	218 CY
Riprap	48"-24"	--	A to B 46+00	Energy Dissipator	80 CY
Riprap	48"-24"	--	A to B 51+85	Energy Dissipator	20 CY
Riprap	48"-24"	--	A to B 81+00	Energy Dissipator	60 CY
Riprap	48"-24"	--	A to B 81+35	Energy Dissipator	40 CY
Riprap	48"-24"	--	A to B 110+15	Energy Dissipator	30 CY
Washed Drain Rock	1-7/8"-7/8"	***	A to B 12+15 to 15+75	Ground Water Drain	40 CY

*** As shown on Exhibit L.

EXHIBIT "C"

CRUSHED ROCK SPECIFICATIONS

Materials. The material shall be fragments of rock or other hard, durable particles crushed to the required size and a filler of finely crushed stone, sand, or other finely divided mineral matter. The material shall be free from vegetation and lumps of clay.

Quality and Grading Requirements. The stone base materials shall be crushed rock, including sand. River gravel shall not be used.

The material from which base material is produced or manufactured shall conform to the general requirements of Section 2630 of the "Standard Specifications for Highway Construction" prepared by the Highway Division, Oregon Department of Transportation, and shall meet the following test requirements:

Hardness - Test Method AASHTO T 96 35% Maximum

Durability - Test Method ODOT TM 208
Passing No. 20 Sieve: 30% Maximum
Sediment Height: 3" Maximum

The rock crusher shall be calibrated to produce rock as specified in Exhibit C. Prior to the commencement of production crushing, PURCHASER shall sample, test, and provide rock test results meeting STATE specifications. STATE may then sample and test crushed rock for approval to proceed. PURCHASER shall take one sample of each 1,000 cubic yards of crushed rock material produced thereafter, using approved AASHTO sampling procedures. PURCHASER shall submit samples to a certified laboratory or shall perform testing for gradation requirements using AASHTO T 11 and AASHTO T 27 testing procedures. Prior to testing, each sample shall be split, making one-half of the sample, with proper identification, available for testing by STATE. Each sample and the results of PURCHASER testing shall be made available to STATE within 24 hours of sampling. Any rock crushed prior to STATE approval to proceed shall not be credited to the required rock quantity. Any subsequent rock tests not meeting STATE specifications shall be reason for rejection of that portion of crushed rock produced after that test and shall not be credited to the required rock quantity. STATE may sample the crushed rock at any time during the operation. Results of STATE's tests shall prevail over all other test results.

EXHIBIT "C"

CRUSHED ROCK SPECIFICATIONS

Grading Requirements

<u>For 2"-0"</u>	Passing	2½" sieve	100%
	Passing	2" sieve	95-100%
	Passing	1" sieve	55-75%
	Passing	1/4" sieve	30-45%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No. 10 sieve.

<u>For Jaw-Run</u>	Passing	6" sieve	100%
	Passing	3" sieve	45-65%

<u>For 1-7/8"-7/8" Washed Round Drain Rock</u>	Passing	2" sieve	100%
	Passing	7/8" sieve	0%

<u>For 48"-24" Riprap</u>	50 percent or more of the rock shall be at least one cubic yard in volume. 100% of the rock shall be at least four cubic feet in volume.		
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Control of riprap gradation shall be by visual inspection by STATE.

The referenced sieve shall have square openings as set forth in AASHTO M 92, Woven Cloth Series. The determinations of size and gradings shall be as set forth in AASHTO T 27.

EXHIBIT "C"

ROCK ACCOUNTABILITY

The rock shall meet the quality and size specifications in Exhibit C. A sample of the rock shall be supplied to STATE for testing and approval prior to rocking. PURCHASER shall obtain subgrade approval from STATE prior to rocking. Rocking shall be limited to periods when weather conditions are acceptable to STATE and when sediment will not enter streams.

Rock accountability shall be determined by the following methods, as directed by STATE. STATE shall be given 24 hours' notice prior to rocking.

Depth Measurement. Road rock shall be spread and compacted according to the depths specified in Exhibit C. Truck measure volumes are given, but shall not limit the amount of rock spread.

Depth shall be determined in the most compacted area of the surface cross section. If additional rock is required because of insufficient depth, it shall be added by truck measure to those areas that were slighted. The conversion from compacted yardage to truck yardage is 1.3 multiplied by the compacted yardage equals truck yardage.

The depth of compacted aggregates shall not vary more than 1 inch from the depth specified in Exhibit C. The average depth for each road segment shall be the specified depth or greater.

Junctions shall have a surfaced area as marked in the field at the compacted depths specified in Exhibit C.

Turnouts shall have a surfaced area of at least 44 square yards each at the depths shown in Exhibit C.

Load Records. Notify STATE before placing the riprap rock and maintain a record of all rock delivered for placing. Make the record available for STATE inspection.

EXHIBIT "C"

COMPACTION AND PROCESSING REQUIREMENTS

Subgrade. Subgrade surfaces of the road segments listed below shall be graded and compacted prior to rocking. Compaction shall be accomplished by traveling all surfaces from shoulder to shoulder until visible deformation ceases, or in the case of a sheepsfoot roller, the roller "walks out." At least 3 passes shall be made over the entire width and length of the road. A pass is defined as traveling a road section in one direction and then back over that same section again. Compaction shall be accomplished by using the approved equipment listed below or others approved by STATE:

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
A to B, Stations 0+00 to 12+15 and 15+75 to 187+10	Vibratory Roller

Fills. Embankments and fills shall be placed in (approximately) horizontal layers not more than 8 inches in depth. Each layer shall be separately, and thoroughly, compacted. Compaction equipment shall be operated over the entire width of each layer until visible deformation of the layers ceases or, in the case of a sheepsfoot roller, the roller "walks out." At least of 3 passes shall be made over the entire width and length of each layer. A pass is defined as traveling a fill layer in one direction and then back over that same layer again.

Placing individual rocks or boulders with more depth than the allowed layer thickness shall be permitted, provided the embankment will accommodate them. Such rocks and boulders shall be at least 6 inches below the subgrade. They shall be carefully distributed and the voids filled with finer material, forming a dense and compacted mass. Compaction shall be accomplished by using the approved equipment listed below or others approved by STATE:

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
All	Crawler Tractor

Crushed Rock. The rock shall be uniformly mixed and spread in layers on the approved roadbed. Each layer of crushed rock shall be moistened or dried to a uniform moisture content suitable for maximum compaction and compacted in layers not to exceed 6 inches in depth. When more than 1 layer is required, each shall be shaped and compacted before the succeeding layer is placed. Any irregularities or depressions that develop during compaction of the top layer shall be corrected by loosening the material at these places and adding or removing material until the surface is smooth and uniform. Each layer shall be compacted with at least 3 passes over the entire width and length of the road. A pass is defined as traveling a road section in one direction and then back over that same section again. Compaction shall be accomplished by using the approved equipment listed below or others approved by STATE:

Rock shall be compacted and processed during the same project period it is spread, unless otherwise approved in writing by STATE.

Rock shall be crowned at 4 to 6 percent unless otherwise specified.

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
All	Vibratory Roller

EXHIBIT "C"

COMPACTION EQUIPMENT OPTIONS

- (1) Vibratory Rollers. The drum shall have a smooth surface, a diameter not less than 48 inches, a width not less than 58 inches, and a turning radius of 15 feet or less. Vibration frequency shall be regulated in steps to 1400, 1500, and 1600 VPM, corresponding to engine speeds of 1575, 1690, and 1800 RPM. The centrifugal force developed shall be 7 tons at 1600 VPM. It shall be activated by a power unit of not less than 25 horsepower. The vibratory roller shall be self-propelled and operated at speeds ranging from 0.9 mile to 1.8 miles per hour, as directed by STATE.
- (2) Vibratory Hand-Operated or Backhoe-Mounted Tamper. Vibratory hand-held or hydraulic tampers shall be used for compaction of backfill materials around culverts (and/or bridge approach embankment materials around abutments). The tamper shoe dimensions shall be a minimum of 10" X 13" and capable of a centrifugal force of 2,250 pounds.
- (3) Crawler Tractors. D-7 Caterpillar or equivalent or larger.

EXHIBIT "D"

ROCK PIT DEVELOPMENT AND USE

- (1) PURCHASER shall conduct the operations relative to the disposal of waste material in such manner that silt, rock, debris, dirt, or clay shall not be washed, conveyed, or otherwise deposited in any stream. All waste shall be deposited at an approved "waste disposal site."
- (2) Where overburden removal limits have not been staked, they shall extend for a distance of at least 20 feet beyond the developed rock source. Overburden and woody debris shall be hauled to a designated waste area. Overburden shall be spread evenly, grass seeded, and compacted at the waste area and woody debris stacked separately. Prior to drilling or rock removal, completion of overburden removal shall be approved in writing by STATE.
- (3) The rock pit floor shall be developed to provide drainage away from the rock pit. Rock pit drainage ditches shall be developed and maintained. Benches shall be constructed at intervals of 40 feet or less in height and shall be a minimum of 20 feet in width. Any gravel or talus slopes shall be left with a working face at an angle of 60 degrees or less. There shall be a minimum of 1 bench with an access road to it. Said bench shall be easily accessible with tractors.
- (4) Blasting shall be accomplished using timing devices, delay charges, low intensity shots, or other suitable means to contain as much material as possible in the rock pit prism.
- (5) Pit face shall be developed in a uniform manner.
- (6) Oversized material that is produced or encountered during development shall be broken down and utilized for crushing.
- (7) PURCHASER shall prepare a written development plan for the pit area. The plan shall be submitted to STATE for approval prior to conducting any operation in the pit area.

The plan shall include, but not be limited to:
 - (a) Location of benches and roads to benches.
 - (b) Disposal site for debris and overburden.
- (8) Upon completion of use, the pit site and access roads shall be left in a condition free from overburden and debris. Rock pit roads shall be waterbarred to provide drainage as specified in Exhibit F and blocked as directed by STATE.

EXHIBIT "E"

CULVERT SPECIFICATIONS

All culvert materials shall be furnished and installed by PURCHASER, unless otherwise specified in the contract. Culverts shall be constructed of corrugated, aluminized steel. Corrugated polyethylene culverts may be used for sizes up to 36 inches in diameter. All culverts shall conform to the material and fabricating requirements of Sections 2410 or 2420 of the "Standard Specifications for Highway Construction" prepared by the Highway Division of the Oregon State Department of Transportation. Corrugation types and shapes other than those meeting the above minimum Highway requirements, shall be approved in writing by STATE.

Culverts shall be located according to the alignment and grade as shown on the Plan and Profile, and/or as staked in the field, or as stipulated in special instructions.

The STATE Representative shall determine final culvert locations and stake the locations in the field prior to installation.

Culvert grade shall slope away from ditch grade at least 2 percent unless otherwise specified.

Culverts less than 36 inches in diameter shall be installed with the lock seam on the inlet end placed within 30 to 60 degrees from the bottom of the trench, measured counter-clockwise, facing the inlet.

The foundation and trench walls for all culverts shall be free from logs, stumps, limbs, stones, and other objects which would dent or damage the pipe. The culvert trench shall be excavated 3 pipe diameters wide to permit compaction and working on each side of the pipe. Tamping shall be done in 6-inch lifts, 1 pipe diameter each side of the pipe to 95 percent density or over. Bedrock shall be excavated as required to provide a uniform foundation for the full length of the culvert.

A bedding of granulated material or crushed rock as specified shall be placed to provide a wide band of support and to transmit the load from above evenly over the entire length of the pipe. Minimum bedding depth shall be 6 inches.

Backfill shall consist of granulated material, crushed rock, or job-excavated soil free of stumps, limbs, rocks, or other objects which would damage the pipe.

Transporting of the pipe shall be done carefully. Dragging or allowing free fall from trucks or into trenches shall not be permitted.

Joining shall be done with bands of like material and corrugations. Manufacturers' instructions shall be followed for prefabricated pipe assembly.

Polyethylene joints shall be made with split couplings, corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of the pipe joint.

A manufacturer's certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Project Engineer upon request.

EXHIBIT "E"

CULVERT SPECIFICATIONS

Minimum height of cover over top of culvert to subgrade when road is to be rocked shall be as follows: 12" for culverts 18" to 36", add 6" for roads which will not be rocked. Minimum vertical cover for other steel designs shall be as specified by STATE.

Lengths of individual culvert sections shall be not less than 10 feet, unless otherwise provided for in special instructions.

The ends of each culvert shall be free of logs and debris which would restrict the free flow of water. The intake end of relief culverts shall be provided with a sediment catching basin 3 feet in diameter at the bottom. The outlet end of any culvert which would allow water to erode embankment soil shall be provided with a half round or other approved slope protection device. Construct the lead-off ditch away from the culvert outlet where the slope gradient restricts the free flow of water.

Following are the minimum standard gauges for pipe and coupling bands.

<u>Dia.</u>	<u>Steel Pipe Gauge</u>	<u>Band Gauges</u>	<u>Band Widths (")</u>			<u>Hugger Band Widths (")</u>	
	<u>Aluminized</u>		<u>Annular</u>	<u>Helical</u>	<u>Dimpled</u>	<u>Annular</u>	<u>Helical</u>
18-24	16	16	12	12	12	13 1/8	10 1/2
30-36	16	16	12	12	12	13 1/8	10 1/2

EXHIBIT "E"
CULVERT LIST

CULVERT NO.	DIAMETER (Inches)	LENGTH (Feet)	ROAD SEGMENT POINT TO POINT	STATION
1	18	28	A to B	15+75
2	24	32	A to B	19+20
3	18	28	A to B	22+75
Half Round	21	20	A to B	22+75
4	30	36	A to B	27+30
5	18	34	A to B	31+35
6	18	32	A to B	32+75
7	18	32	A to B	35+80
8	24	34	A to B	40+65
9	24	34	A to B	43+65
10	30	36	A to B	46+00
11	18	32	A to B	48+00
Half Round	21	10	A to B	48+00
12	24	32	A to B	49+25
Half Round	30	10	A to B	49+25
13	36	36	A to B	51+85
14	24	48	A to B	61+40
15	18	44	A to B	65+40
16	18	28	A to B	74+70
Half Round	21	10	A to B	74+70
17	30	34	A to B	81+00
18	30	30	A to B	81+35
19	18	38	A to B	85+40
20	18	34	A to B	93+55
21	18	34	A to B	95+45
22	18	34	A to B	101+55
Half Round	21	10	A to B	101+55

EXHIBIT "E"
CULVERT LIST

CULVERT NO.	DIAMETER (Inches)	LENGTH (Feet)	ROAD SEGMENT POINT TO POINT	STATION
23	18	28	A to B	106+00
Half Round	21	10	A to B	106+00
24	30	32	A to B	110+15
25	18	32	A to B	113+50
Half Round	21	10	A to B	113+50
26	18	30	A to B	124+00
27	18	32	A to B	127+70
28	18	28	A to B	132+30
Half Round	21	10	A to B	132+30
29	18	38	A to B	137+65
30	18	26	A to B	143+65
Half Round	21	20	A to B	143+65
31	18	30	A to B	146+35
Half Round	21	20	A to B	146+35
32	18	44	A to B	149+50
Half Round	21	20	A to B	149+50

The intake ends of culverts smaller than 48 inches in diameter shall be marked by installing a 5-foot long painted steel fence post 2 feet into the ground, within 6 inches of the inlet on the downgrade side.

Culverts 36 inches in diameter or larger shall have 1:1 beveled inlets.

Tamping is required on all culverts. Backfills on culverts over 30 inches in diameter shall be compacted with a vibratory hand-operated or backhoe-mounted tamper as per Exhibit C.

All metal culverts scheduled for replacement shall become property of PURCHASER and be removed from STATE land in the same project period in which replacement occurred.

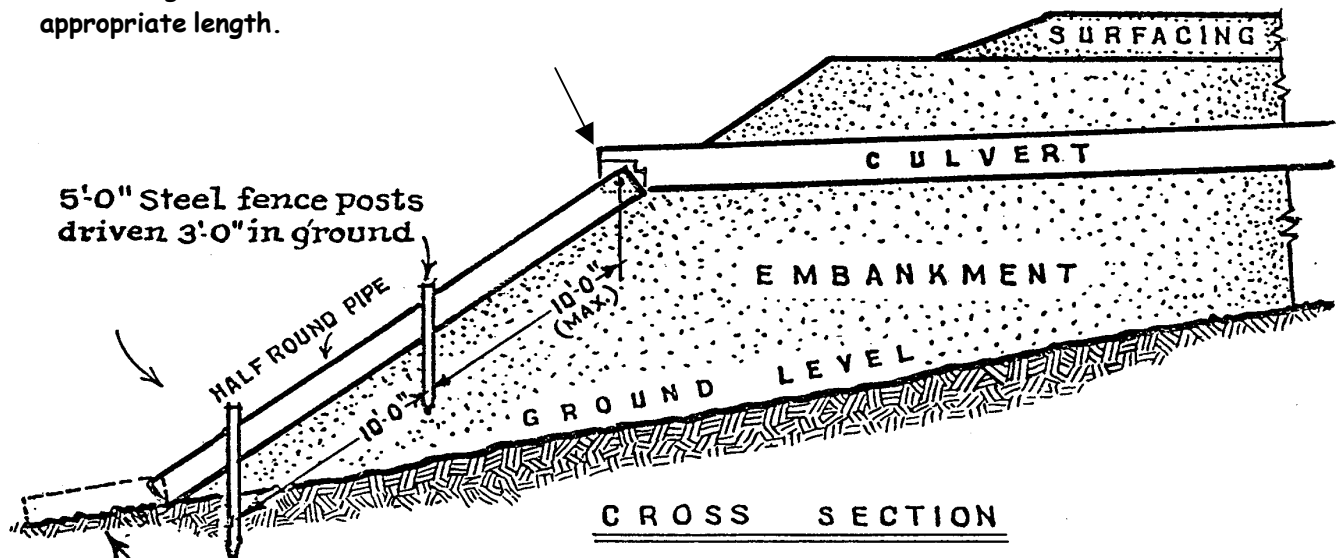
Half rounds shall be installed within 72 hours of culvert installation, unless otherwise approved in writing by STATE. Steel posts used with half-round installation shall be painted with rust preventative paint.

EXHIBIT "E"

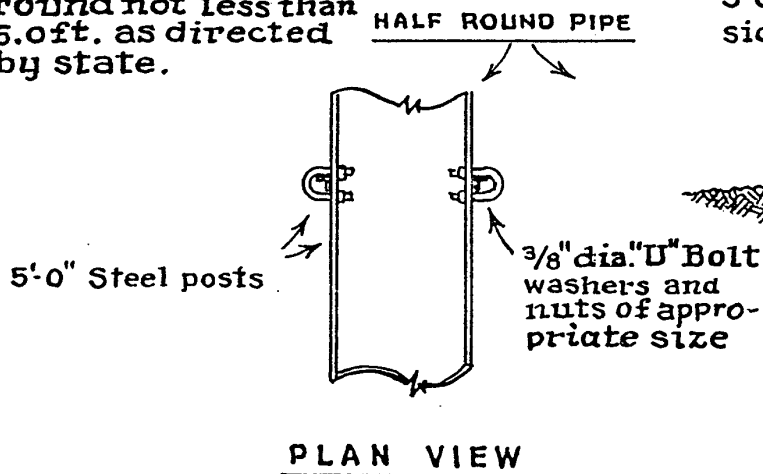
TYPICAL HALF ROUND CULVERT INSTALLATION

(no scale)

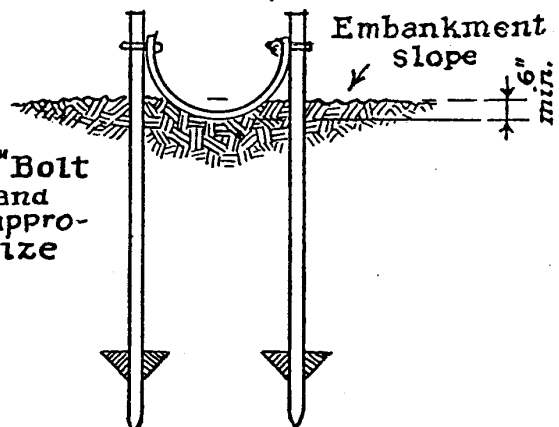
Half round pipe bolted to culvert with $\frac{3}{8}$ " diameter galvanized bolts and washers of appropriate length.



Solid rock, boulders etc.
If erodable, install half
round not less than
5.0ft. as directed
by state.



5'-0" Steel Fence posts both
sides of pipe



END VIEW

REV. 6-10-95 LH

659
B

EXHIBIT "E"

TYPICAL EMBEDDED ENERGY DISSIPATOR

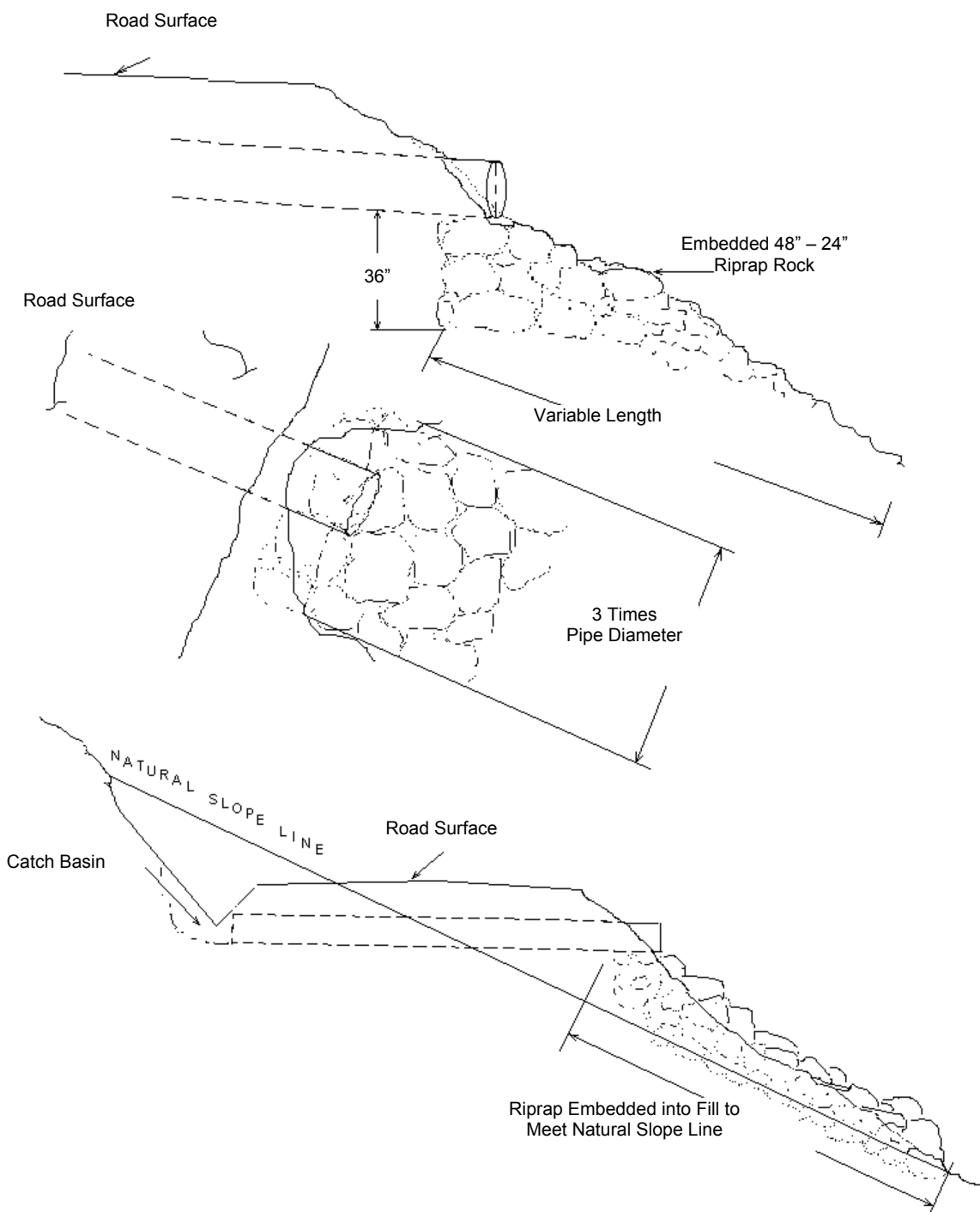
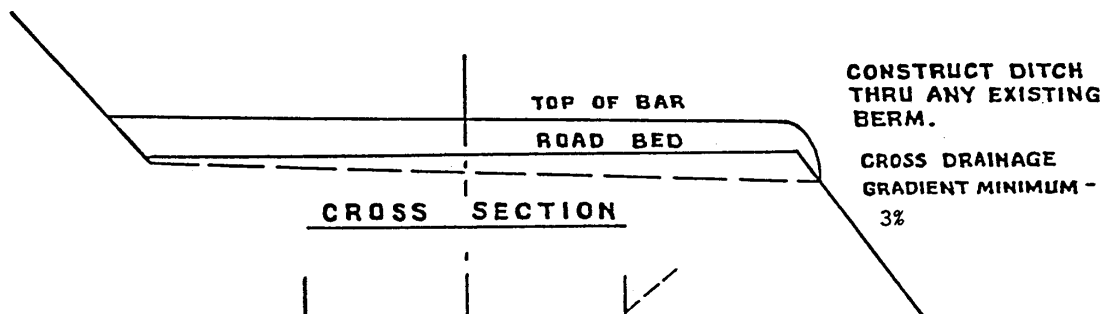
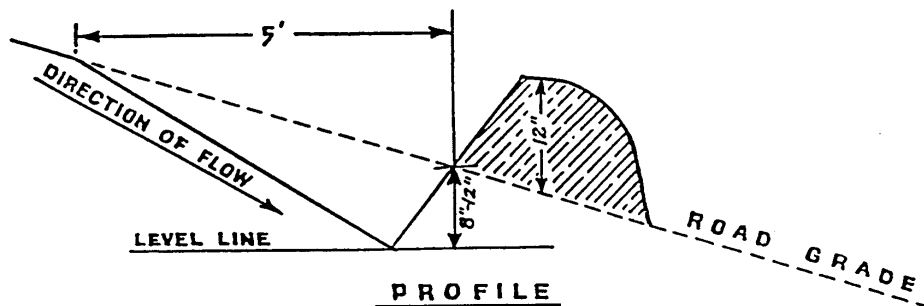


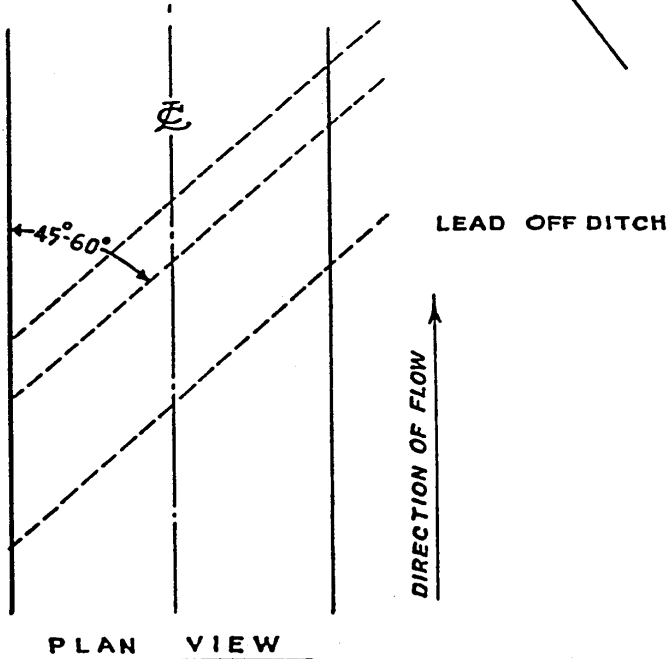
EXHIBIT "F"

WATERBAR SPECIFICATIONS



SPACING OF WATERBARS

ROAD GRADE	DISTANCE
≤ 5%	600'
6-10%	300'
11-15%	150'
16-20% or greater	100'



WATERBAR SPECIFICATIONS
 FOR CROSS DITCHING #298

EXHIBIT "G"

TYPICAL CROSS SECTION VIEW OF ROAD VACATING SIDECAST PULLBACK

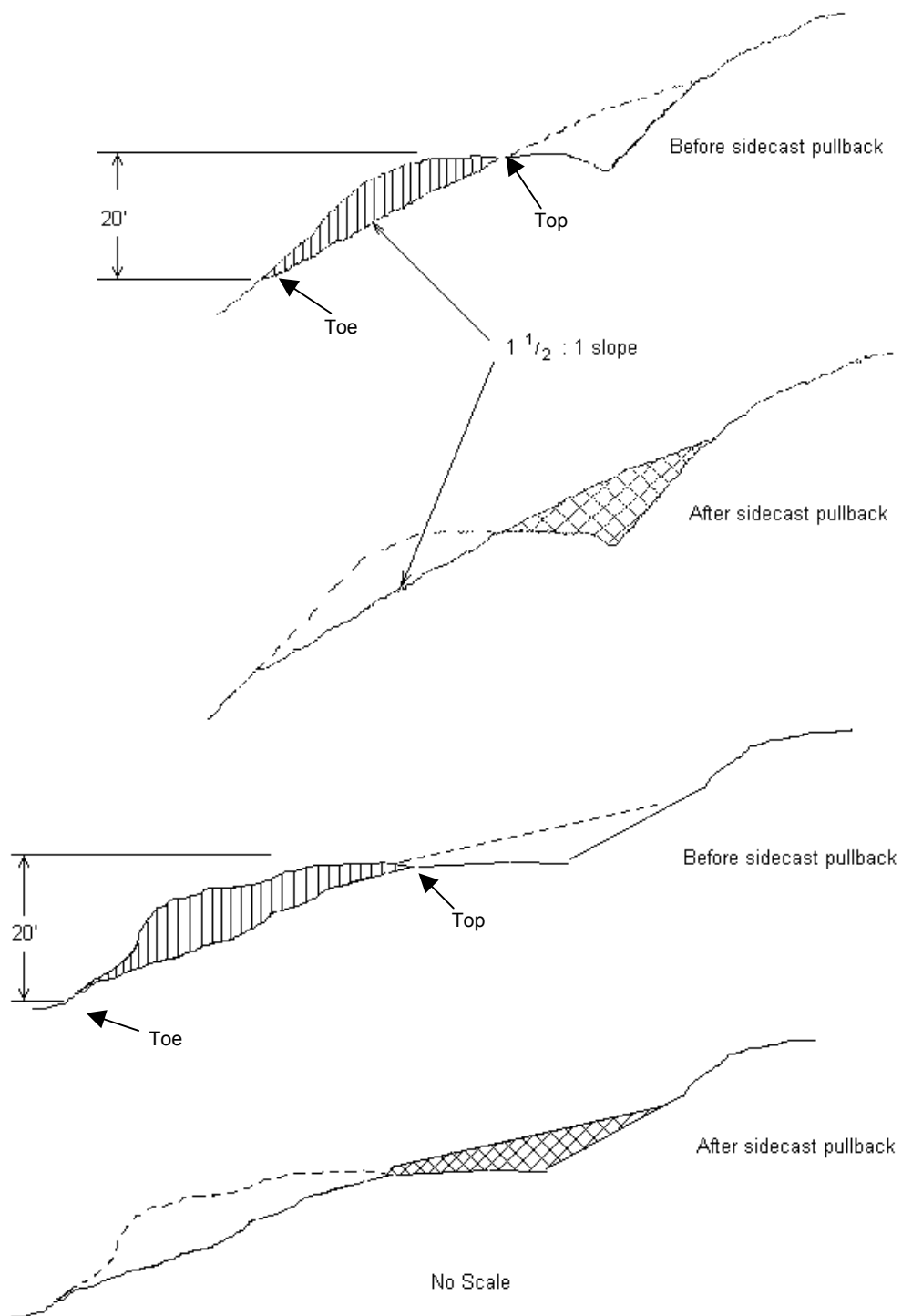


EXHIBIT "H"

TYPICAL CROSS SECTION VIEW OF SIDECAST PULLBACK AND ROAD REALIGNMENT

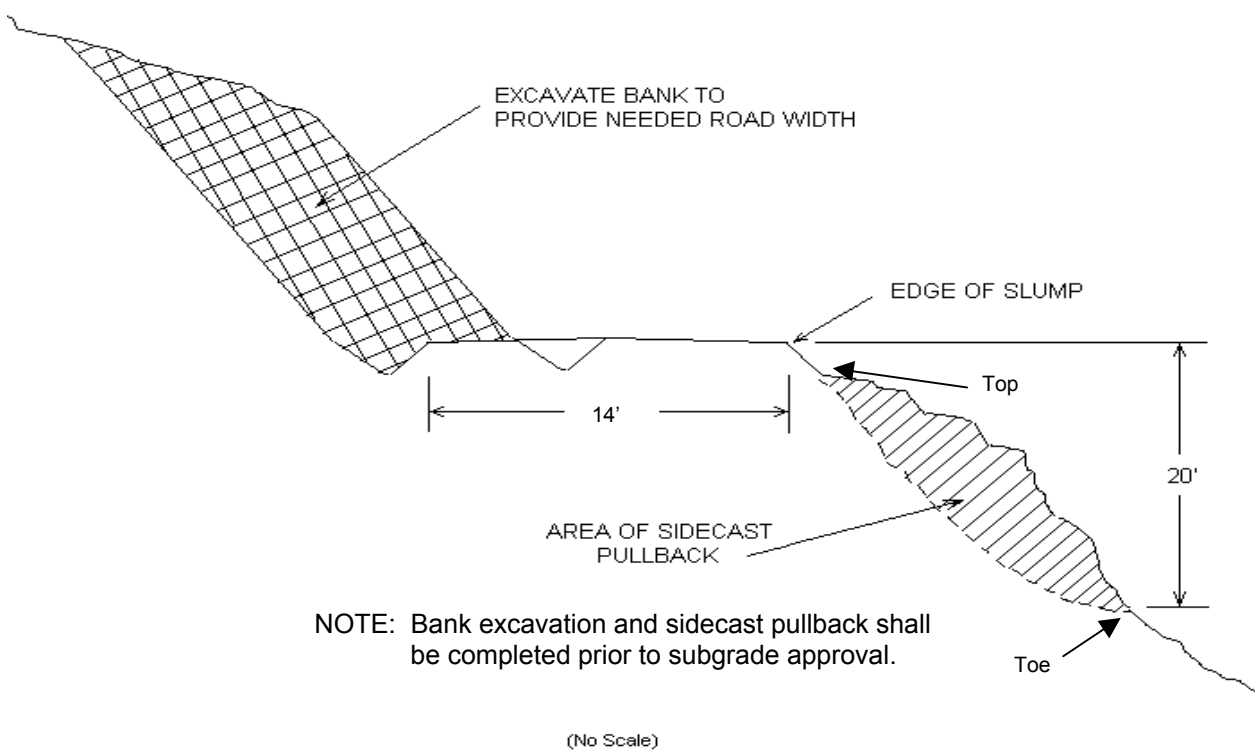


EXHIBIT "I"

SEEDING AND FERTILIZING

This work shall consist of preparing seedbeds and furnishing and placing required seed and fertilizer.

Seeding Seasons. Seeding shall be performed only from March 1 through June 15 and August 15 through October 15. Seeding materials shall not be applied during windy weather or when the ground is excessively wet or frozen. Areas of disturbed soil shall be seeded by the end of the project period in which work was started. PURCHASER shall notify STATE 24 hours prior to seeding.

Soil Preparation. Areas to be seeded that have been damaged by erosion or other causes shall be restored prior to seeding. All areas to be seeded shall be finished and then cultivated to provide a reasonably firm, but friable seedbed. A minimum of 1/2 inch of surface soil shall be in a loose condition.

Application Methods for Seed and Fertilizer

Dry Method. Mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment shall be used to apply the seed and fertilizer in the amounts and mixtures specified. Hand-operated seeding devices may be used when seed and fertilizer are applied in dry form.

Application Rates for Seed and Fertilizer

Seed listed below shall be applied at the following rates per acre:

SPECIES	LB./ACRE	MIXTURE	PURE LIVE SEED	POISON AND/OR REPELLENT
Fine Fescue	12	40%	98%	0
Annual Ryegrass	6	20%	98%	0
Perennial Ryegrass	9	30%	98%	0
White Dutch Clover	3	10%	98%	0

Fertilizer: Chemical analysis shall be 16-20-0 and shall be applied at the rate of 300 pounds per acre.

Seeding will be considered acceptable when all other specified project requirements in Exhibits I and K have been completed and a healthy, uniform, close stand of grass has been established, unless otherwise approved in writing by STATE.

EXHIBIT "J"

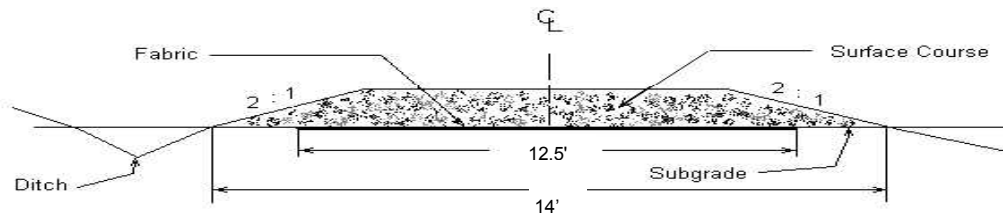
FABRIC SPECIFICATIONS

FABRIC SPECIFICATIONS - shall be woven fabric designed for forest road subgrade surfacing purposes and shall meet or exceed the following requirements, unless otherwise approved in writing by STATE:

- | | | | |
|-----|--|----------|------------|
| (1) | Grab Tensile | 300 lbs. | ASTM D4632 |
| (2) | Puncture Strength | 110 lbs. | ASTM D4833 |
| (3) | Mullen Burst | 600 lbs. | ASTM D3786 |
| (4) | Width – 12.5 feet – Road | | |
| (5) | Width – 17.5 feet – Ground water drain | | |

INSTALLATION REQUIREMENTS - fabric shall be installed according to the following requirements:

- (1) Typical cross section:



- (2) Subgrade surface shall be leveled and smoothed to remove humps and depressions which exceed 6 inches in height and depth. Small pieces of woody debris shall be removed or pushed below subgrade surface. Light vegetation (grass, weeds, leaves, and fine woody debris) may be left in place.
- (3) Fabric shall be installed directly on the prepared surface. Longitudinal and traverse joints shall be overlapped at least 3 feet.
- (4) Surfacing course material shall be placed to the designated thickness in one lift and spread in the direction of fabric overlap. Hauling and spreading equipment shall not be operated on the fabric until the total thickness of surfacing course material is placed.
- (5) Torn, punctured, or separated sections of the fabric shall be repaired by installing a fabric patch over the break prior to placing the surfacing course material. The patch shall be at least 4 feet larger in horizontal dimensions than the break to be repaired.

Fabric failures resulting after rock placement and as evidenced by subgrade pumping or roadbed distortion shall be corrected. Correction measures shall consist of: (1) removing at least three-quarters the depth of surfacing course material in the affected area, (2) placing a fabric patch over the affected area with a minimum 4-foot overlap around the circumference of the area, and (3) replacing enough rock to cover the patch and blend in with the rest of the road.

State Timber Sale Contract
No. 341-04-76
Powderhouse

EXHIBIT "K"

MULCHING

This work shall consist of furnishing and placing required mulch. Mulch shall consist of straw that is free of noxious weeds.

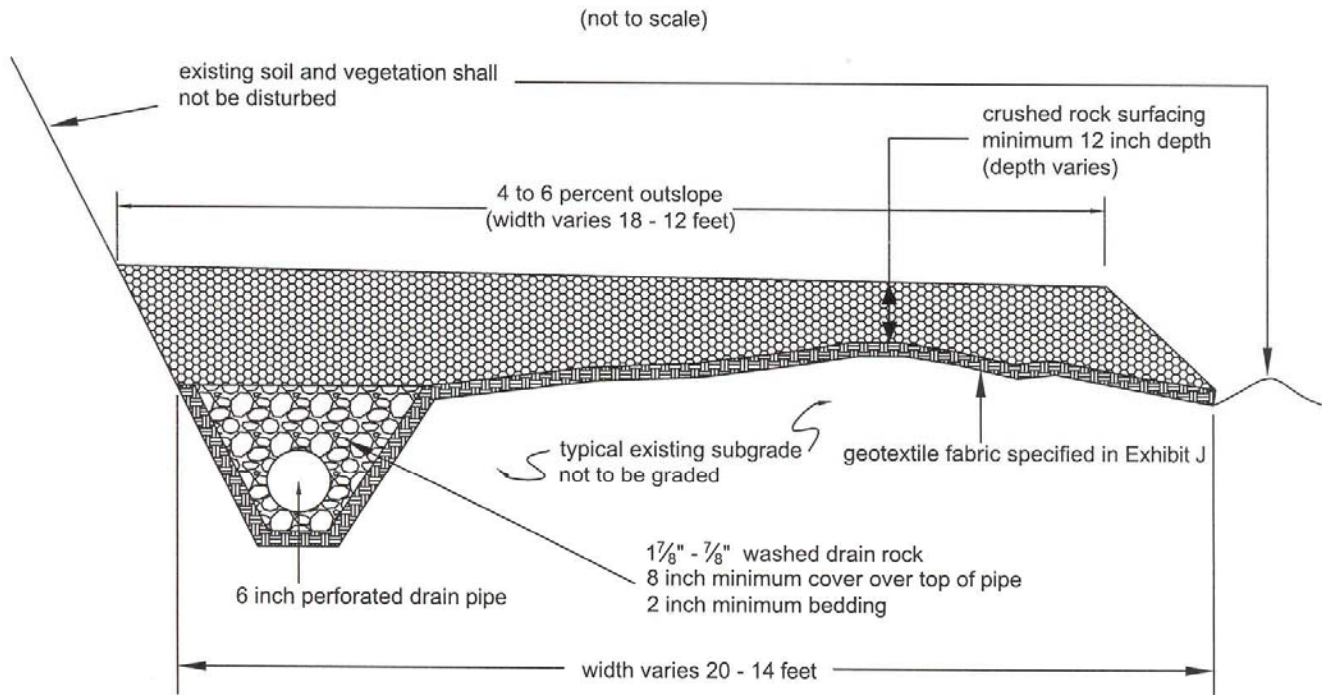
Mulching Period. Straw mulch shall be applied within 24 hours of spreading grass seed and fertilizer.

Application Rates for Mulch

Place straw mulch to a reasonably uniform thickness of $\frac{3}{4}$ to $1\frac{1}{4}$ inches. This rate requires between 1 and $1\frac{1}{2}$ tons of dry mulch per acre.

EXHIBIT "L"

Typical Road Section With Ground Water Drain

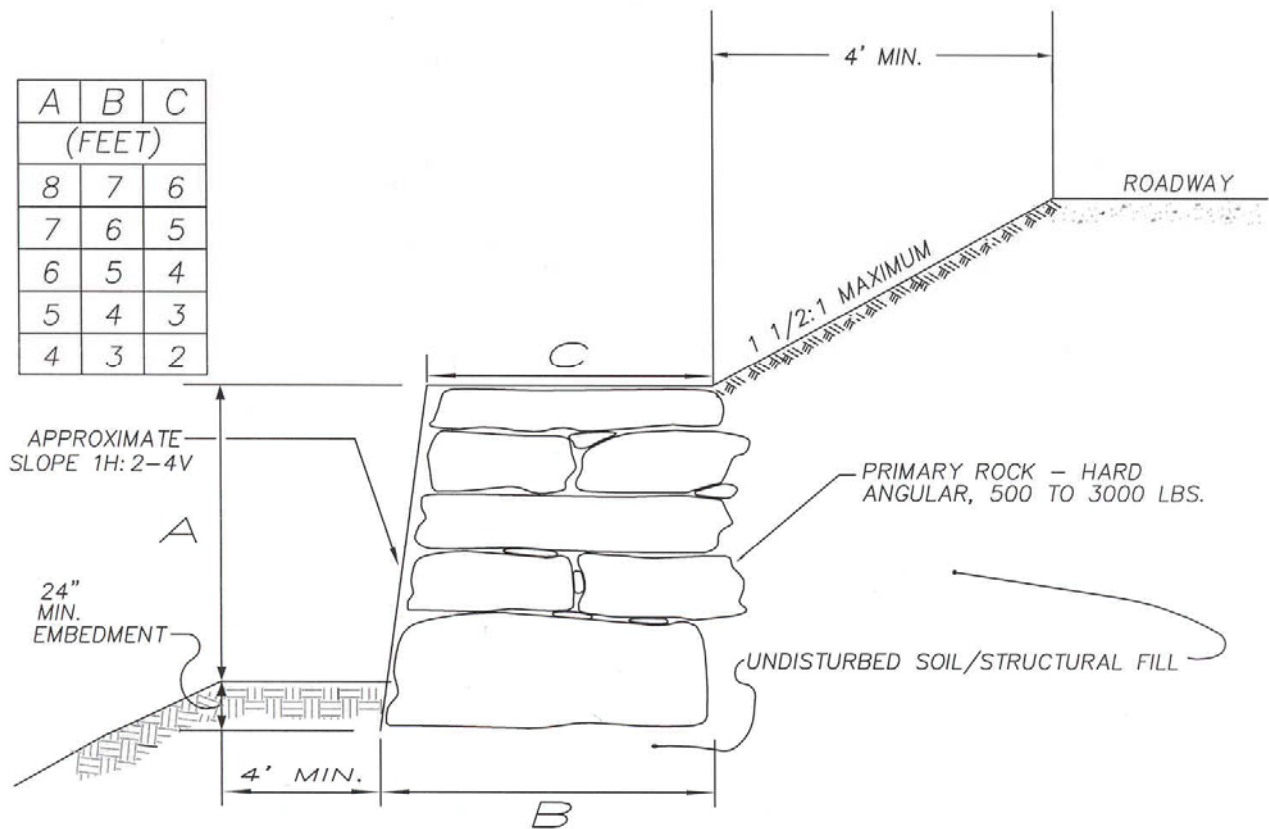


A - B, Station 12+15 to 15+75

6 inch perforated pipe specifications

High density polyethylene ASTM D3350
minimum cell classification 324420C
annular interior and exterior corrugations
6 inch inside diameter meeting ASTM F405
and AASHTO HS-25
Pipe couplers shall cover at least two full
corrugations on each end of pipe and
meet specifications stated above

EXHIBIT "M"
FILL SLOPE STABILIZATION



ALL ROCKS TO BE SOUND, UNWEATHERED ANGULAR ROCK. PRIMARY ROCK SHALL BE 500-3000 LBS AND SHALL NOT BE MOVABLE WITH A PRY BAR. ROCKS SHALL BE TIGHTLY NESTED (LOCKED TOGETHER) WITH ALTERNATING JOINTS AND WITH LARGER ROCKS AT BOTTOM. RIPRAP SHALL BE FREE DRAINING THROUGH SMALLER RIPRAP FILLED VOIDS. EACH ROCK SHOULD REST ON LEAST TWO ROCKS BELOW IT.

EXHIBIT "N"

SEDIMENT CATCH BASIN (TYPICAL)

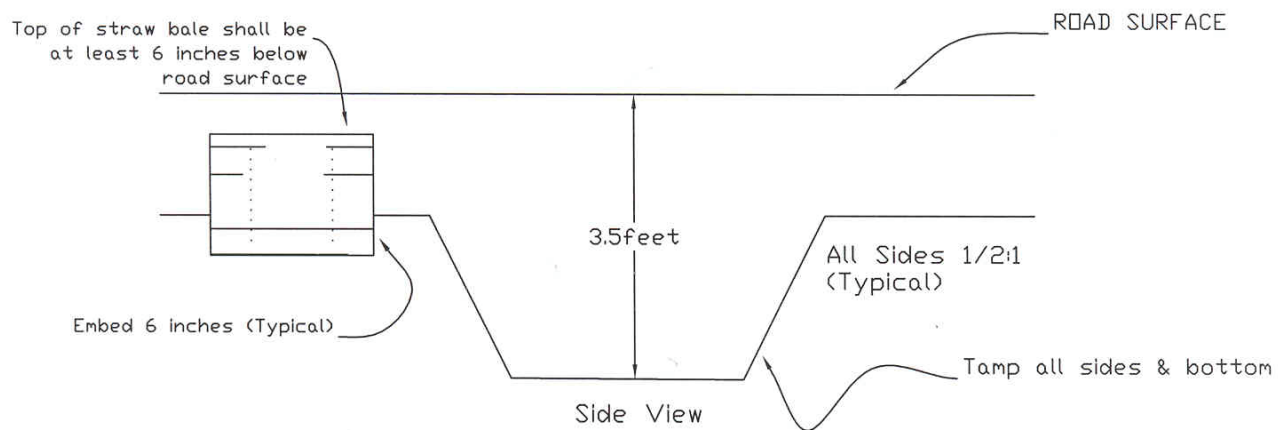
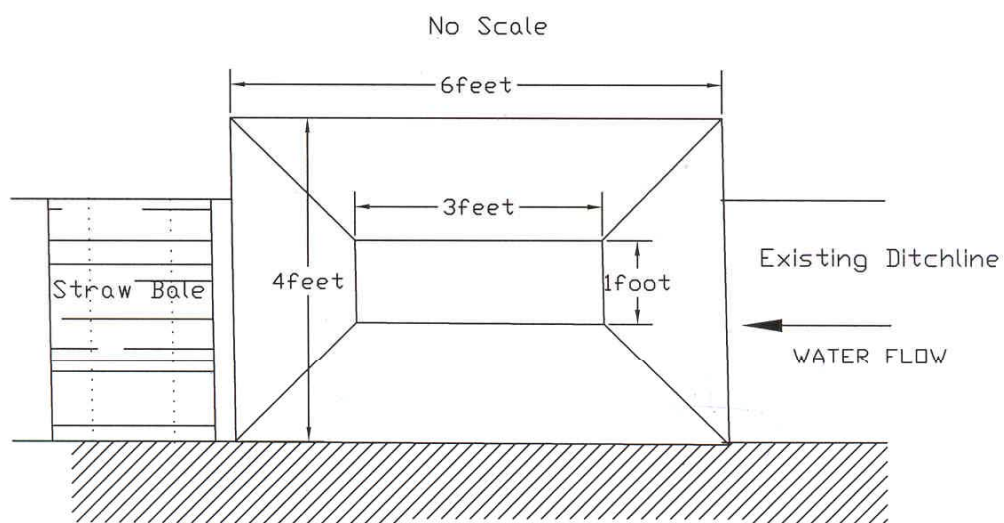
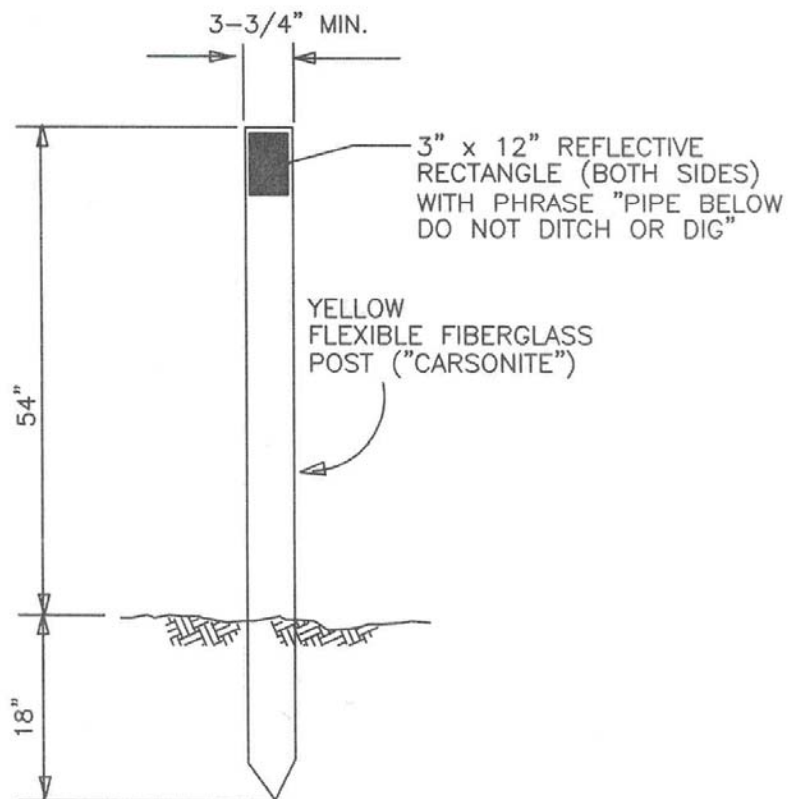


EXHIBIT "O"

MARKER

(NOT TO SCALE)



NOTES

1. MARKER: 72" LONG CARSONITE MODEL CRM-375 WITH 3" x 12" REFLECTOR ON EACH SIDE WITH PHRASE "PIPE BELOW, DO NOT DITCH OR DIG" OR APPROVED EQUIVALENT.

State Timber Sale Contract
No. 341-04-76
Powderhouse

EXHIBIT "P"

SPECIFICATIONS FOR ROAD CLOSURE

Retrieve sidecast material between Stations 163+60 and 174+15 according to the specifications in Exhibits B and G.

Construct waterbars between Stations 153+10 and 187+10 according to the specifications in Exhibit F.

Grass seed, fertilize and mulch all disturbed soil between Stations 153+10 and 187+10 according to the specifications in Exhibits I and K.

Place boulders, stumps and or logs at Station 153+10 to close the road to vehicle traffic.

EXHIBIT "Q"
OREGON DEPARTMENT OF FORESTRY

SCALING INSTRUCTIONS -- LOCATION APPROVAL -- BRAND INFORMATION

(1) ORIGINAL REGISTRATION ☐ Date _____
REVISION NUMBER _____ ☐ Date _____
CANCELLATION ☐ Date _____

(2) TO: _____
(Third Party Scaling Organization)

(3) FROM: Tillamook Phone (503) 842-2545
(State Forestry District)
Address 5005 3rd Street, Tillamook, OR 97141

(4) PURCHASER: _____
Address _____

(12) SALE NAME Powderhouse

COUNTY Tillamook

(13) STATE CONTRACT NUMBER 341-04-76

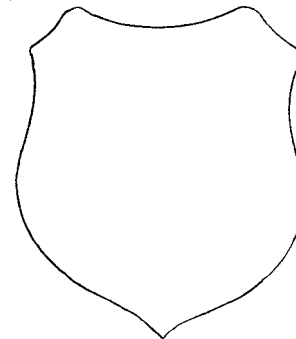
(14) SCALE: westside ☒ eastside ☐ cubic foot ☐

(15) STATE BRAND REGISTRATION NUMBER _____

(16) BUREAU BRAND CODE NUMBER _____

(17) STATE BRAND INFORMATION:

(COMPLETE) ↓



(5) MINIMUM SCALING SPECIFICATIONS			CLASS		
SPECIES	SCALING DIAMETER INCHES	*NET SCALE VOLUME	PER MBF	** SUM	SUB
Conifers	--	10	X		
Hardwoods	--	--		X	

* Apply minimum volume test to whole logs over 40' Westside; 20' Eastside.
** Sum (if indicated): see instructions and explain in Item (20).

(6) WESTSIDE SCALE: YES NO
Actual taper all logs over 40' scaling length ☒ ☐

(7) EASTSIDE SCALE: ☐ ☒
*Actual taper butt logs over 40' scaling length

(8) PENCIL BUCK ☐ ☒
back to Minimum Scaling Diameter _____

(9) ADD-BACK VOLUME -- ☒ ☐
Deductions due to delay

(18) PAINT REQUIRED: YES ☒
COLOR Orange

(19) SPECIAL SCALES
PEELABLE CULL (all species)
UTILITY/PULP (all species)
NO DEDUCTIONS ALLOWED FOR MECHANICAL DAMAGE
OTHER: _____
OTHER: _____

(10) APPROVED SCALING LOCATIONS	Species	Yard	Truck

(20) REMARKS: Loads containing only SUM material need not be accounted for by scale ticket.

Operator's Name (Optional inclusion by District): _____

(21) SIGNATURES:

(11) NOTICE OF CANCELLATION OF BRAND:
Effective Date: _____

State Forester's Representative

Purchaser or Authorized Representative Date

State Forester Representative Date

EXHIBIT "Q"

INSTRUCTIONS FOR FORM 343-307 (rev. 5/01)

- (1) Check appropriate box. REVISION NUMBER requires comments. CANCELLATION requires Item (21). Complete date.
- (2) Designate Third Party Scaling Organization (TPSO). Send 4 copies to TPSO, 1 to purchaser, 1 to Salem, and keep such copies as to district needs.
- (3) State District office, address and phone.
- (4) Enter Purchaser's business name and address as it appears on the contract.
- (5) Minimum Scaling Specifications. Review Section 45, "Log Removal," of the contract. Species, or combined species can be separate entries. Information serves as a basis for scaling (see also Items (13) thru (17)), and is required to show existence on the sale. **PerM** (per mbf). **SUM** (lump sum material). **SUB** (submerchantable material). SUB, as used by the State, references that material containing at least 10 bf (net) but less than the lower merchantable net volume limit or grade requirements for other merchantable (PerM) entries. PerM, SUM, and SUB must be indicated by checking the appropriate column. Species with the same specifications and value are combined into one entry. PerM and SUB require scaling therefore complete specifications. SUM need not be scaled, hence no specifications. Loads containing only SUM are to be ticketed if so instructed in Item (19). Mixed loads of SUM, PERM and/or SUB species will always be scaled.
- (6) Westside -- actual taper segment scale. Check Yes or No. Special Service Rules on file with TPSO. See: Segment Scaling and Grading of Long Logs -- All Species -- State Forestry Department Scaling Practices (Westside).
- (7) Eastside -- actual taper/taper table segment scale. Special Service Rules on file with TPSO. See: Segment Scaling and Grading of Long Logs -- All Species -- State Forestry Department Scaling Practices (Eastside). Items with * follow U.S. Forest Service Eastside rules.
- (8) Pencil Buck. Check NO if a westside sale, optional for eastside sales.
- (9) Add-Back Volume. Add-Back is normally checked YES. Scaler records deductions (sap rot, weather checks, etc.) caused by an abnormal delay in removal. Enter separately on scale ticket. TPSO provides State with summaries that include this as a net volume by species. Salvage sales and certain other circumstances may require that "NO" be checked.
- (10) Show scaling locations only applicable to TPSO. Not necessary to list markets. If all species are scaled at same location, enter "ALL."
- (11) When logging is complete, recall branding hammers, date and sign where indicated, check CANCELLATION box at top of form, and send to TPSO.
- (12) Enter sale name and county.
- (13) Enter sale contract number.
- (14) Check Westside or Eastside log scale. Cubic foot refers to Northwest Log Rules Cubic Foot Scale.
- (15) Oregon Forest Products Brand Registry Number (optional).
- (16) DO NOT USE -- TPSO will fill in when applicable.
- (17) Show one brand only. Complete drawing. If more than one brand is assigned to the sale, (1) make separate form for each brand, and (2) on each form, explain and show other brand(s) under REMARKS, Item 19.
- (18) Check YES and designate orange.
- (19) Special Scales. These are the Special Scales that will be applied. If "Other" is indicated, please describe. Give comments in Item (19).
- (20) Use this space to designate weight conversion factors, or any other explanations to clarify scaling requirements. If additional scaling locations are approved, prepare another form showing all (old and new) locations. Check REVISION box at top of form and explain under remarks. Route as indicated.
- (21) Require purchaser to sign and date completed form.