

INCIDENTAL CONSTRUCTION

Incidental Construction

SECTION 601 - MINOR CONCRETE STRUCTURES (Labor 40 percent)

Method A or B: Concrete for minor structures (about 30 cy or less). Unit price may vary from \$300 to \$400 per cy. (\$392 to \$523 per m³), depending upon quantity, distance from concrete source, forming difficulty, etc.

Where applicable, make a subsidiary allowance to this item for contractor quality control.

Method C: Very small quantities of concrete for fence posts, gate post, etc. (no forms required). Cost will be about \$100/CY or greater, depending on number of sites, access, etc.

SECTION 602 CULVERTS AND DRAINS

Labor for culverts to and including 36 inches (914 mm) in diameter and CMPA's to and including 42 inches by 29 inches (1,067 mm by 737 mm): compaction Method A, 30%; compaction Methods B and C, 40-60 %. Labor for larger culverts and CMPA's: 40-60 %. Method A should not be used for these pipe sizes.

Average units costs for metal culverts in this guide may be used without adjustment for projects having culverts in excess of 10,000 pounds (4,563 kg) total. For quantities less than 10,000 pounds (4,563 kg), an additional allowance for material only (not installation costs) should be made using the following factors:

To 5,000 lbs (2,268 kg), factor = 1.35 5,000 - 10,000 lbs (2,268 - 4,563 kg), factor = 1.25

There are 3 compaction conditions, Methods A, B, and C noted in the standard specification and R-1 SPS 603. The unit prices shown in this Section need to be adjusted for the compaction method and quality control as follows:

Compaction Method:

- Method A. Multiply unit costs by 0.90.
- Method B. Multiply unit costs by 1.10.
- Method C. No adjustment.

Quality Control:

Where applicable, make a subsidiary allowance to this pay item for contractor quality control.

Costs for *excavation* for culverts 36" and smaller in diameter and for CMPA's 42" x 29" (1,067 mm by 737 mm) and smaller are included in the table below. Unit cost for culverts installed in existing roads and pipes installed "after grade" will normally be higher than for pipes in new construction due to the increased amount of excavation. The following culvert prices which includes bands should be used for the condition indicated:

Size in (mm) *	New Construction ID and MT**	"After Grade" & Reconstruction (Shallow Installation) ID and MT**
15" (400)	\$19.00/ft.(\$62.34)/m	\$21.00/ft. (\$68.90)/m
18" (450)	\$20.00 (\$65.62)	\$22.00 (\$72.18)
24" (600)	\$24.00 (\$78.74)	\$26.00 (\$84.30)
30" (800)	\$32.00 (\$104.92)	\$34.00 (\$111.48)
36" (900)	\$39.00 (\$127.87)	\$41.00 (\$134.43)

* Rounded to Metric Industry Standard

** In Montana, include costs for all required permits under Section 151.

Increase the above costs by a factor of 1.1 to 1.3 to reflect longer lengths or steepness of side slopes. Estimate larger pipes by time and equipment methods. Following are some items that should be considered under Sections 602 and 209 when estimating installation of larger pipes:

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1. Analyze the cost of materials for different culvert corrugations. Often a lighter metal thickness can be used with the wider corrugations which may result in a savings in materials costs.

2. Allow costs for metal end sections, culvert end treatments, shop ellipsing, special coatings, and adjustment for pipe arches if required. Call culvert suppliers for quotes.

3. Estimate the amount of time and equipment required (excavation equipment, compaction equipment, labor, operators, etc.) to excavate and construct the culvert bed including excavation below the invert elevation for removal of unsuitable or unstable material and to bed and backfill the pipe (compaction method B). Allow time for diversion of the stream and cost for special materials or equipment needed for diversion such as plastic sheeting, piping, pumps, etc.

4. If springs, seeps, or underground flows are expected in the culvert area, allowance should be made for filter cloth, drain rock, cutoffs, special bedding, or special backfill material.

Check results against bid history

5. Costs for excavation of culverts larger than 36 inches or the squash equivalent is included in the cost for the culvert under Section 602. The cost for this type of excavation is approximately \$25/cy (\$33/m²). Bedding material for culvert backfill ranges from \$5 to \$15/cy (\$6 to \$20/m³). Depending on haul distance, excavation conditions, etc..

The following materials and shop prices are provided as a guide for use in estimating culvert prices (based on truck load quantities). Local suppliers' prices and discounts may be substituted, if available.

A. Culvert Material Base Price

Polyethylene Corrugated Pipe 20 Foot (6.1 meter) Sections		
<i>Double Wall Rigid</i>		
<i>Size inches (mm)*</i>	<i>Cost/ft (mm)</i>	<i>Bands (Each)</i>
12(300)	\$ 5.30(17.39)	\$ 5.30
15(400)	7.30(23.95)	7.30
18(450)	9.00(29.53)	9.00
24(600)	13.70(44.95)	13.70
30(800)	20.70(67.91)	20.70
36(900)	27.50(90.22)	27.50
42(1000)	58.00(190.29)	58.00
48(1200)	64.70(212.70)	64.70

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Metal - 2.66"x1/2" (67.56mm x 12.7mm) Corrugations							
Thickn ess	Size inches (mm)*	Cost/ft (m)	Wt/ft (kg/m)	Thickn ess	Size inches (mm)*	Cost/ft (m)	Wt/ft (kg/m)
0.064 (16ga)	12(300)	\$6.30(20.60)	10(13.0)	0.079 (14ga)	18(450)	\$11.70(38.40)	18(23.5)
	15(400)	7.80(25.60)	12(15.6)		24(600)	15.50(50.80)	24(31.3)
	18(450)	9.30(30.50)	15(19.6)		30(800)	20.20(66.20)	30(39.1)
	24(600)	12.30(40.35)	19(24.8)		36(900)	24.15(79.20)	36(46.1)
	30(800)	16.75(54.90)	24(31.3)		42(1000)	32.60(106.95)	42(54.7)
	36(900)	20.00(65.75)	29(37.8)		48(1200)	35.70(117.05)	48(62.6)
	42(1000)	25.30(83.10)	34(44.3)		54(1400)	39.25(128.80)	54(70.4)
	48(1200)	30.10(98.80)	38(49.5)		0.138	48(1200)	59.25(194.45)
0.109 (12ga)	24(600)	23.15(75.90)	33(49.1)	(10ga)	54(1400)	67.25(220.70)	92(136.9)
	30(800)	28.85(94.65)	41(61.0)		60(1500)	75.40(247.35)	103(153.3)
	36(900)	34.50(113.15)	49(71.4)		66(1700)	82.40(270.25)	113(168.2)
	42(1000)	40.10(131.55)	57(84.8)		72(1800)	90.35(296.40)	123(183.2)
	48(1200)	45.75(150.20)	65(97.7)				
	54(1400)	52.30(171.65)	73(108.6)				
	60(1500)	58.30(191.30)	81(120.5)				
	66(1700)	64.10(210.30)	89(132.4)				

* Rounded to Metric Industry Standard

Metal - 3"x1" (76.2mm x 25.4mm) and 5"x1" (127.0mm x 25.4mm) Corrugations							
Thick- ness	Size inches (mm)*	Cost/ft (m)	Wt/ft (kg/m)	Thick- ness	Size inches (mm)*	Cost/ft (m)	Wt/ft (kg/m)
1.064 (16ga)	42(1000)	\$32.80(107.60)	39(58.0)	0.109 (12ga)	54(1400)	\$73.45(241.05)	83(123.5)
	48(1200)	36.25(118.90)	44(65.5)		60(1500)	81.75(268.15)	92(136.9)
	54(1400)	41.80(137.20)	50(74.4)		66(1700)	89.75(294.40)	101(150.3)
	60(1500)	46.55(152.65)	55(81.8)		72(1800)	97.70(320.55)	110(163.7)
	66(1700)	51.10(167.65)	60(98.2)		78(2000)	104.25(342.00)	119(177.1)
	72(1800)	55.65(182.55)	66(98.2)		84(2200)	111.95(367.25)	128(190.5)
	78(2000)	59.40(194.80)	71(105.7)		90(2300)	119.30(395.41)	137(203.9)
	84(2200)	63.75(209.10)	77(114.6)		96(2500)	127.80(419.70)	147(218.8)
0.079 (14ga)	42(1000)	40.85(134.05)	47(69.9)	0.138 (10ga)	72(1800)	123.10(403.95)	140(208.3)
	48(1200)	46.50(152.55)	54(80.4)		78(2000)	133.20(437.05)	152(226.2)
	54(1400)	52.15(171.15)	61(90.8)		84(2200)	143.30(470.20)	164(244.1)
	60(1500)	57.75(189.45)	67(99.7)		90(2300)	153.40(503.35)	175(260.4)
	66(1700)	64.10(210.30)	74(110.1)		96(2500)	163.55(536.90)	188(279.8)
	72(1800)	69.80(229.05)	81(120.5)		108(2700)	185.75(602.78)	211(314.0)
	78(2000)	74.45(244.30)	87(129.5)		120(3000)	203.95(669.05)	234(348.2)
	84(2200)	79.95(262.35)	94(139.9)		132(3400)	224.15(735.35)	259(385.4)
	90(2300)	85.65(281.05)	100(148.8)		144(3700)	244.35(801.10)	282(419.7)
	96(2500)	91.40(299.80)	107(159.2)				
	102(2600)	97.50(319.90)	114(169.6)				
	108(2700)	103.20(338.60)	120(178.6)				

Coupling Bands: Equivalent cost:

7" (200mm) - same as 1.5' (450mm) of pipe

12" (150mm) - same as 2' (600mm) of pipe

24" (600mm) - same as 3' (900mm) of pipe

Arched pipe: More than 100' (30.5m) of one diameter, add 15 percent. Between 30 to 100' (9 to 30.5m) of one diameter, add 25 percent, less than 30' (9m) of one diameter add 40 percent.

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B. Culvert Pipe End Treatment (does not include material).

<i>Diameter or equivalent Span & Rise*</i>	<i>Price per cut (skew or bevel)</i>	<i>Diameter or equivalent Span & Rise*</i>	<i>Price per cut (skew or bevel)</i>
18(450)	\$65.00	48(1200)	\$200.00
24(600)	90.00	54(1400)	225.00
30(800)	110.00	60(1500)	245.00
36(900)	150.00	66(1700)	270.00
42(1000)	175.00	72(1800)	295.00

C. Five percent Shop Ellipse (same cost additions as for arch pipe). Call for quotes.

D. Special Coatings Call culvert distributor for quotes.

* Rounded to Metric Industry Standard

E. End Sections (Flared End Terminal Sections).

Diameter of pipe*	Gage	Price	Galvanized Weight (kg)	Dimensions of Arch	Gage	Price	Galvanized Weight (kg)
12(300)	16	\$ 55.00	28(12.7)	17x13(423x330)	16	\$ 75.00	30(13.6)
15(400)	16	68.00	36(16.3)	21x15(533x381)	16	87.00	37(16.8)
18(450)	16	91.00	50(22.7)	29x20(711x508)	16	130.00	60(27.2)
24(600)	16	135.00	76(34.5)	35x24(889x610)	14	216.00	109(49.4)
30(800)	14	271.00	157(71.2)	42x29(1067x737)	14	348.00	165(74.8)
36(900)	14	412.00	209(94.8)	49x33(1245x838)	12	546.00	276(125.2)
42(1000)	12	663.00	430(195.0)	57x38(1448x965)	12	691.00	361(163.7)
48(1200)	12	770.00	509(230.9)	64x43(1626x1092)	12	1205.00	520(235.9)
54(1400)	12	912.00	630(285.8)	71x74(1803x1194)	2/10	1471.00	790(358.3)
60(1500)	12/10	1226.00	826(374.7)	77x52(1956x1321)	2/10	1905.00	818(402.3)
72(1800)	12/10	1481.00	998(452.7)	83x57(2109x1448)	2/10	2050.00	887(402.3)
84(2200)	12/10	1798.00	1200(544.3)				

SECTION 603 - STRUCTURAL PLATE STRUCTURES (Labor 20 percent)

Costs do not include the cost of the footing, structural excavation, embankment, or riprap. Each project should be estimated on material, time, and equipment basis. When applicable, make a subsidiary allowance to this pay item for contractor quality control.

Arches:Material \$.90/lb (\$1.98/kg), Installation For 12 gage, \$0.65/lb (\$1.43/kg),
reduce cost for lower gages = \$1.55/lb. (\$3.42/kg)

Pipes & Pipe-Arches:Matls \$.90/lb (\$1.98/kg), Install \$.50/lb (\$1.10/kg),
Total = \$1.40/lb (\$3.09/kg)

Call for quotes on material cost.

SECTION 604 - MANHOLES, INLETS, AND CATCH BASINS (Labor 25 percent)

Costs range from \$200.00 to \$500.00 based on type. Call culvert manufacturer for prices. Use time and equipment for installation.

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SECTION 605 - UNDERDRAINS, SHEET DRAINS, AND PAVEMENT EDGE DRAINS (See items below for labor and reductions)

Underdrains

- A. Perforated pipe cost per lineal foot (Labor 40 percent). Add 12 percent to standard culvert price.
- B. Special sections. Material cost is per table below. The labor cost is in the table is a production cost therefore do not reduce. Costs for bands are in Section 602E. Add labor for installation. Add 20% for arch pipe fittings.

Diameter inches (mm)*	Labor Cost (Each)		Material Cost per Lineal ft (meter)
	Elbows (30-90 degrees)	Wyes & Tees	
6(150)	\$26.50	\$27.75	\$5.00(16.40)
8(200)	28.00	29.00	6.50(21.32)
12(300)	42.00	44.00	7.50(24.61)
15(400)	52.00	55.00	8.50(27.89)
18(450)	63.00	66.00	10.00(32.81)
24(600)	78.50	82.50	13.00(42.65)

- C. Porous backfill (filter material) (Labor 10 percent): Develop price from rock costs plus the haul cost as determined from the chart in Section the haul section of the cost guide. Haul cost to be estimated from the nearest point of manufacture.
- D. Geotextiles (Labor 10 percent): When using geotextiles, the pipe must be placed in open graded porous material.
- E. Granular underdrain (Labor 25 percent): The cost of granular underdrain is normally on a cu. yd. (m³) basis which includes cost of production, loading, hauling, spreading, and compaction. Develop cost by using same criteria as used for Section 301 (screened material).
- F. Sheet Drains (Labor 30 percent): Due to the variable nature of availability, type and gradation of the rock, the different geotextile materials that may be specified, and the different site conditions that may be encountered this work should be estimated using "time and equipment" estimating procedures.

* Rounded to Metric Industry Standard.

SECTION 606 - CORRUGATED METAL SPILLWAYS (Labor 20 percent)

Use time, material, and equipment.

- A. If round pipe is used, 70 percent of the unit price in Section 602 will apply, unless difficult slope conditions are encountered.
- B. Elbows - include two connecting bands.
- C. Anchors - Estimate by material and time.
- D. Berm Drain - Unit cost consists of installation of prefabricated corrugated metal catch basin 12" (305 mm) diameter with slip joint and 20 feet (meters) of 8" (203 mm) corrugated metal downspout with downspout anchors.
- E. Flexible Downdrain - lowest price for larger quantity of 200 or more lineal feet (61 meters).
- F. Inlet assemblies are estimated the same as Section 602, End Sections.

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Downpipe is measured by the quantity of lineal feet installed including accessories except inlets. Inlet assemblies are measured by the number installed and accepted. Estimates should include gaskets. An 18" (457 mm) downpipe with all accessories will cost about \$30/LF (\$98.43 m) installed.

Anchors are required for downpipes. Anchors should be placed approximately every 10 feet (3.05 meters) and at the outlet. A culvert anchor installation may consist of stakes and bands or two metal fence posts and wire. The metal fence post culvert anchor may be used for downpipe up to 30 inches (762 mm) in diameter. Thirty-inch (813 mm) diameter pipe and larger will require anchors especially designed for them.

SECTION 607 - CLEANING, RECONDITIONING, AND REPAIRING EXISTING DRAINAGE STRUCTURES (Labor 75 percent)

Caution needs to be taken in using this item on metal culverts that have any significant age and or deterioration. Unit price should include cost of removing pipe, cleaning pipe, and relaying pipe or stockpiling pipe, except for Section 607.03 or 607.04. Costs for cleaning pipe range from \$75 to \$100 each.

Excavation for removing pipe should be estimated at the unit price for culvert excavation, or use time and equipment. Removing, cleaning, and relaying of pipe should cost approximately 70 percent of the in place price per foot (meter) for new construction for a given size of pipe as listed in Section 602.

Example:

Given: Montana, Zone 3 (adjustment factor: 1.0), 40 lineal feet (12.2 meters) of 24" (600 m) culvert pipe to be removed and relayed.

In-place cost = \$24.00 x 1.0 x 0.70 x 40 ft. = \$672.00

In-place cost = \$78.74/m x 1.0 x 0.70 x 12.19m = \$672.00

SECTIONS 609 - CURB AND GUTTER (Labor 40-50 percent)

Use time, materials, and equipment estimate.

SECTIONS 615 - SIDEWALKS, DRIVE PADS, AND PAVED MEDIANS (Labor 40-50 percent)

Use time, materials, and equipment estimate.

SECTION 617 - GUARDRAIL (Contract Item)

Use \$35 per lineal foot (\$114.84/m) (installed). Cost includes posts on 6'3" (1.90 meters) centers and regular sections. Add 20 % to unit price for curved rail sections. Estimate about \$500 - \$2000 each for end anchorage or terminal sections based on type of system used. Add 40 % for Rustic guardrail.

Call manufacturer for price quotes on material prices.

When guardrail is required on both sides of the roadway, include the total length of rail on both sides. The length of the rail is determined by measuring the length necessary where it is installed adjacent to the road shoulder, and not from the road centerline length. Also, the length of guardrail is determined by slope distance, not horizontal distance.

SECTION 618 - CONCRETE BARRIERS AND PRECAST GUARDWALLS (Contract Item)

Concrete barriers (Jersey) will cost about \$25 per lineal foot (\$82.02/m) installed.

Call manufacturer for price quotes on material prices.

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SECTION 619 - FENCES, GATES AND CATTLE GUARDS

Use this specification only for facilities being built for campgrounds and rights-of-way. Use FSSS 640 for Road closure Devices.

Fences: (Labor 60 percent) Four strand barbed wire

Estimate by time, equipment and material. Costs average about \$4.00/LF (\$13.12/m) for fencing.

Gates: (Labor 15 percent metal gates, 65 percent wire gates)

Costs range from \$1,000 to \$2,000 each for double-lane metal gates, and \$1,000 to \$1,500 each for single-lane metal gates. Wire gates cost about \$100 to \$200 each. Powder River type gates cost from \$200 to \$300 each.

Cattleguards: (Labor 10 percent) Prices include wings and base.

Costs range from \$3,500 to \$4,500 for 16'-0 width (4.88m) cattle guard.

Cattleguard, Steel Decked with HS20-44 Loading

	12'-0" (3.66m)	14'-0" (4.27m)	16'-0" (4.88m)	24'-0" (7.31m)	28'-0" (8.53m)
Cost Adjustment Factors	0.75	0.9	1.0	1.5	1.75

Precast concrete base weighs 5,250 pounds/side (2,381 kg/side).

SECTION 621 - MONUMENTS AND MARKERS (Labor 25 percent)

Estimate by time, equipment, and material.

SECTION 622 - RENTAL EQUIPMENT

The total hourly rate for equipment includes the equipment rate and the operator rate. The figures shown in this section are for equipment rates only. Operator rates are not included. The equipment rates include fuel, oil, lubrication, repairs, maintenance, and insurance. The cost of moving most equipment to the job is included in Section 151 - Mobilization. Profit and overhead charged to equipment are included herein (6 percent).

The rates shown herein were derived from the *Rental Rate Blue Book For Construction Equipment*. The models shown should be considered typical and their rates can be applied to similar equipment. Under most situations, the estimator should use the equipment rates listed for equipment that is 15 years of age with compatible production rates. Equipment rates for equipment that is 5 years of age may be used when it is expected to be used for the work being estimated. Local rates should be used if local equipment is generally available at a rate different than those shown herein.

For rates not shown in Table 622, estimator should refer to *Blue Book* equipment rates and correct procedures for age and location factors. For work lasting 40 hours or less, the base rate is determined by dividing the *Blue Book* daily rate by eight. For work lasting over 40 hours, the base rate is determined by dividing the *Blue Book* monthly rate by 170. The rates shown herein (Table 622) are for work in excess of 40 hours.

Location factors from the Blue Book have been applied to the rates in Table 622. They reflect the variations between National averages and local conditions caused by the differences in topography, construction seasons, and the costs of labor, freight, taxes, etc. The location factors are the same for ID and MT.

The use of brand names is for the ease of identification of the type and size of equipment and does not constitute an endorsement of any product. Some models listed are no longer manufactured or were not manufactured during the time period under which they are classified.

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Table 622 - Rental Rates (Cost/Hr w/o Operator)

AIR EQUIPMENT		
Class	Age (years)	
	5	15
Compressor, Diesel		
100 cfm, 35 HP	\$ 7.15	\$ 7.00
160 cfm, 60 HP	10.80	10.55
250 cfm, 95 HP	14.60	14.30
375 cfm, 112 HP	19.10	18.75
450 cfm, 150 HP	23.00	22.65
600 cfm, 200 HP	39.00	38.00
Jackhammer, Pavement Breaker 60-65 lbs	\$ 0.95	\$ 0.90
Pneumatic, Impact Pavement Breaker		
Kent KB-2600 Air Ram 2,000 ft lb	\$13.10	\$11.80
Air Track Drills		
Ingersoll-Rand LM 100/YD90 to 2 1/2", Air Reg, 375 cfm	35.00	32.50
Ingersoll-Rand ECM 350/VL120 to 3 1/2", Air Reg, 600 cfm	48.00	45.00
Ingersoll_Rand ECM 350/VL140 to 4", Air Reg, 700 cfm	50.00	46.00

COMPACTION EQUIPMENT		
Class	Age (Years)	
	5	15
Static		
Pull Type		
Rubber Tire, 9 Wheel, 9 1/2 Tons (Hercules PT-9)	\$11.50	\$11.20
Grid Roller, 60", Single Drum	8.00	7.60
Solid Wedge, 60", Double Drum (Southwest HS-14)	24.00	23.00
Self-Propelled		
Rubber Tire, 9 Wheel, 77 HP (Cat PS-130)	\$32.00	\$31.00
Rubber Tire, 9 Wheel, 93 HP (Sakai TS 60)	41.50	40.00
Vibratory		
Pull Type		
Sheeps Foot, 54" Drum, 35HP (Cat TSF 29)	\$30.00	\$28.00
Smooth, 54" Drum, 35HP (Cat TSM 54)	28.50	27.50

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Self-Propelled Smooth, 39" Drum 35HP (Bomag BW100AD)	\$19.75	\$19.00
Smooth, Tandem, 66" Drum 74HP (Bomag)	51.50	49.50
Smooth, Manually Guided, 29 1/2" Drum, 10 HP, (Bomag BW75WS)	16.00	15.25
Handheld Rammers, 4" x 13" Gas, 5 HP	\$ 5.10	\$ 4.80
Backhoe Compaction Mount Allied 9700C 13,500 lbs	9.75	9.25

CRAWLER TRACTORS		
Class	Age (years)	
	5	15
Cat D3C Series II, 70HP, Power Angle Tilt	\$38.00	\$36.00
Cat D4C Series II, 80HP, Power Angle Tilt	40.50	38.50
Cat D5H Series II, 120HP, Power Angle Tilt	61.50	57.50
Cat D6MXL Series II, 140HP, Power Angle Tilt	70.50	66.00
Cat D7 Series II, 215HP, Angle	103.50	97.50
Cat D8R, 307HP, Semi-U	150.00	120.00
Cat D9N, 370HP, Semi-U	198.00	185.00
Deere 45G, 70HP, Power Angle Tilt	39.00	37.00
Deere 550G, 80HP, Power Angle Tilt	44.00	41.50
Deere 750C, 140HP, Semi-U	68.50	64.00
Deere 850C, 185HP, Semi-U	83.00	78.00
Komatsu D31E-20, 70HP, Power Angle Tilt	39.00	37.00
Komatsu D58E-1B, 130HP, Power Angle Tilt	67.50	63.00
Komatsu D155A, 310HP, U-w/Tilt	140.00	132.00
Komatsu D215A-2, 405HP, Semi-U	171.00	161.00
w/ Ripper for 130HP to 215HP - add	14.00	12.50
w/ Ripper for 285HP to 405HP - add	22.00	20.00

DISTRIBUTORS		
Class	Age (years)	
	5	15
Truck Mounted, Tandem Axle, Gas		
1,600 Gal	\$24.50	\$22.50
2,000 Gal	25.00	22.75
3,100 Gal	28.00	26.50

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HYDRAULIC EXCAVATORS - CRAWLER MOUNTED		
Class	Age (Years)	
	5	15
Cat 311, .42yd, 79HP	\$41.50	\$38.50
Cat 312B, .75yd, 84HP	48.00	44.50
Cat 315B, .90yd, 99HP	56.50	52.50
Cat 320BN, 1.25cy, 128HP	72.00	67.00
Cat 322L, 1.38cy, 153HP	82.00	76.00
Cat 325BL, 1.5cy, 168HP	103.00	95.00
Cat 330BL, 2.09cy, 222HP	116.00	107.00
Deere 120, .79cy, 90HP	51.50	48.00
Deere 200LC, 1.12cy, 140HP	72.00	66.50
Hitachi EX110-5, .60cy, 76HP	47.00	43.00
Hitachi EX200LC, 1.12cy, 132HP	76.50	71.00
Hitachi EX270LC, 1.38cy, 136HP	89.00	82.00
Hitachi EX300LC, 1.85cy, 208HP	106.00	98.00
Komatsu PC120-6, .63cy, 84HP	47.00	43.00
Komatsu PC150-6, .88cy, 105HP	59.50	55.00
Komatsu PC200-6, 1.0cy, 133HP	62.50	58.50
Komatsu PC220-6, 1.5cy, 158HP	87.50	81.00
Komatsu PC270-6, 1.63cy, 174HP	101.00	93.50
Linkbelt LD2650C II, .62cy, 87HP	50.50	46.50
Linkbelt LD2800C II, 1.0cy, 125HP	67.00	62.00
Linkbelt LD3400C II, 1.0cy, 153HP	82.00	76.00
Linkbelt LD4300RB C II, 1.5cy, 207HP	105.00	97.10

LOADERS		
Class	Age (Years)	
	5	15
Crawler Loaders		
Cat 943, 1 1/2 yd., 80 HP	\$47.50	\$45.00
Cat 953, 2 yd., 110-130 HP	59.00	56.00
Cat 963, 2 3/4 yd., 150 HP	89.00	85.00
Wheel Loaders with Backhoe		
John Deere 210C, .88 yd. 55HP	\$21.50	\$21.00
Case 580K, 1 yd. 70 HP	23.00	22.50
Case 680L, 4 WD, 1.5 yd. 90 HP	33.00	32.00
Case 780D, 4 WD, 1.7 yd. 112 HP	47.50	46.00
Wheel Loaders - Front Bucket Only		
Bobcat, 1/2 yd., 36 HP	\$13.50	\$ 13.00
Case W11B, 1 yd., 69 HP	21.50	20.50
Komatsu 250, 2.35 yd 144 HP	40.00	38.00
Cat 936E, 2 1/2 yd., 135 HP	35.50	34.00
Cat 966C, 4 yd., 170 HP	52.00	49.00
Skid Steer Loaders		
Bobcat 542B, 800 lbs, 25 HP	\$12.75	\$12.50
Bobcat 642B, 1000 lbs, 32 HP	17.75	17.50

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Motor Graders		
Class	Age (years)	
	5	15
Cat 120G, 125 HP	\$41.00	\$38.75
w/Scarifier w/Ripper	47.00	44.00
Cat 140G, 150 HP	\$50.50	\$47.50
w/Scarifier w/Ripper	56.00	52.75
Deere 770B, 150 HP	\$51.00	\$48.00
w/Scarifier w/Ripper	57.00	53.75
Cat 14G, 200 HP	\$74.00	\$70.00
w/Scarifier w/Ripper	84.00	79.00
Cat 16, 275 HP	\$103.00	\$97.00
w/Scarifier w/Ripper	113.00	106.00

PAVING & CHIP SEALING EQUIPMENT		
Class	Age (years)	
	5	15
Wheel Mounted Paver		
Barber-Greene BG-200A 68 HP, 6' Mat	\$ 71.00	\$ 68.00
BG-200B 108 HP, 8' Mat	116.00	111.00
BG-220B 108 HP, 10' Mat	150.00	143.00
Crawler Mounted Paver		
Ingersol Rand 340T, 30 HP, 4' Mat	\$ 45.00	\$43.50
Cedar Rapids 130 HP, 8' Mat	147.00	141.00
Power Broom		
Broce T-20, Diesel, Self-Propelled 7 ft, 76 HP	\$ 19.00	\$ 18.50
Pull Type Pavement Broom	\$ 9.00	\$ 8.50
Spreader, Aggregate Chip Diesel, Self-Propelled, 10', 152 HP	\$81.50	\$78.00
Chip Spreader Tow Gas 7' w/chain Conveyor	\$ 3.70	\$ 3.50

ROCK CRUSHING EQUIPMENT		
Class	Age (Years)	
	5	15
Belt Conveyor, Diesel, Portable, 18x50	\$17.60	\$17.00
Radial Stacker, 18x100, 170 Tons/Hr, 38 HP	\$30.00	\$29.00
Jaw, 15x36, Requires 75 HP	\$26.00	\$25.00
Double Roller, 30x25, Requires 100-200 HP	\$31.50	\$29.50
Cone, 45 in., Requires 125 HP	\$47.00	\$44.50
Apron Feeder, HD, 36x14, Requires 7 1/2 HP	\$25.50	\$24.00
Screens		
Double Deck, 5x10, 90 HP	\$37.00	\$36.00
Triple Deck, 5x10, 110 HP	52.00	51.00
Universal 880 Senior Travel Plant 295-315 HP	\$130.00	\$125.00

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SKIDDERS		
Class	Age (years)	
	5	15
John Deere 440G, 115 HP	\$60.50	\$58.50
Cat 518, 139 HP W/Cable w/grapple	\$59.50 68.25	\$57.50 65.50
Cat 528, 175 HP W/Cable w/grapple	\$83.00 80.00	\$80.00 76.00

TRAILERS		
Class	Age (years)	
	5	15
Athey Bottom Dump, Off-Highway, 30 Ton	\$48.00	\$46.50
Load King Bottom Dump, Off-Highway, 28 Ton	\$28.50	\$27.75
On-Highway Bottom Dump Semi, 3 axle, 18 CY	\$11.50	\$ 10.50
Fixed Gooseneck, 3 Axle, 35 Ton Dp Deck	\$14.75	\$14.25
Fixed Gooseneck, 3 Axle, 50 Ton Dp Deck	\$15.50	\$14.75
Office Trailer		
8x24, Model 810	\$ 1.85	\$ 1.80
8x24, Model 802 w/ toilet	2.15	2.10

TRUCKS		
Class	Age (Years)	
	5	15
Light Trucks, 4x2, 3/4 Ton	\$ 10.75	N/A
Light Trucks, 4x4, 3/4 Ton	10.75	N/A
Light Trucks, 4x4, 1 Ton	13.25	N/A
Light Trucks, 4x4, Crew Cab, 3/4 Ton	14.00	N/A
Flatbed, 4x2, 7 Ton	\$ 22.25	
Flatbed, 4x2, 12 1/2 Ton	23.50	\$ 22.75
Rear Dump, 8-10 yds.	\$ 35.25	\$ 33.50
Rear Dump, 10-12 yds.	41.25	39.00
Rear Dump, 12-18 yds.	51.50	48.50
Cat 769C, 23-30 yds.	\$ 96.00	\$ 92.00
Dresser 210M, 31-44 yds.	\$128.00	\$122.00
Water Tanker, 2000 Gal, Gas	\$ 28.25	\$ 27.00
Water Tanker, 3000 Gal, Diesel	27.50	26.00
Water Tanker, 4000 Gal, Diesel	43.50	40.50
Tractor, 6x4, 35-55,000 GVW, 310 HP	\$ 44.50	\$ 42.50
Tractor, 6x4, 55-75,000 GVW, 400 HP	50.00	47.50

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MISCELLANEOUS		
Class	Age (years)	
	5	15
Rubber Tired Brush Cutter Hydro-Ax 520, 130HP, 8 Ft cut	\$93.00	\$87.50
Brush Chipper, Trailer Mounted Hydro-Ax 621, 185HP, 8 Ft cut	\$104.00	\$98.00
Chainsaw 3 Cubid In., Direct Drive, 16"-24" Bar	\$ 2.00	N/A
Electric Hand Drill Heavy Duty 1/2 inch 500/1000 RPM	\$ 0.70	\$ 0.65
Electric Motors 1200 RPM, 25 HP 1200 RPM, 100 HP	\$ 1.45 4.25	\$ 1.40 4.10
Generators Water Cooled, Diesel Cat 3208, 60 KW Cat 3304, 90 KW Cat 3306, 150 KW Cat 3406, 250 KW Gasoline Powered 1000 watts 3000 watts	 \$17.30 23.75 39.50 61.50 1.40 2.60	 \$16.90 23.25 39.00 60.50 1.35 2.50
Hydroseeder Reinco 10GX, Gas 34 HP, 1250 gal	\$13.10	\$12.40
Mower, Rotary Rear Mount PTO, 90 HP Towed PTO, 55 HP Side Mount PTO, 6' Bar	\$11.00 4.25 4.75	\$ 10.40 3.90 4.45
Mulcher, Diesel Powered Reinco M90, 109 HP, 20 Tons/Hr	\$26.00	\$24.75
Platform Scale 70'x10' Tandam, 60 Ton, Steel Deck, Portable	\$19.00	\$18.40
Pumps Diesel, Air Cooled, Electric Start 3", 10 HP, 18,000 Gal/Hr w/10' Head 4", 40 HP, 40,000 Gal/Hr w/10' Head Centrifugal Pump, Gas Powered 2", 7 HP, 8000 Gal/Hr w/10 Head 3", 18 HP, 20,000 Gal/Hr w/10' Head	 \$ 6.15 14.75 6.90 9.65	 \$ 5.95 14.35 6.75 9.40
Portable Pressure Washers Gas Fired, 4 gpm, 1000 psi Gas Fired, 5 gpm, 3000 psi	\$ 6.70 8.50	\$ 6.25 8.00
Trencher, Walk Along Ditch Witch, Chain Trencher, 8"x36" 16 HP	\$ 8.25	\$ 8.00

Incidental Construction

SECTION 624 - TOP SOILING (Labor 50 percent)

Topsoil needed on disturbed areas of backslopes and fillslopes to establish vegetation will be estimated from a known source before the contract is awarded. Include the following in cost estimates:

- Loading costs - Use time and equipment.
- Spread - Use time and equipment.
- Haul - see Haul Section in this cost guide.
- Clearing and development of pit area - see Section 641.

The cost of pit development must be included if Section 641 is not included. Elements to consider are move-in costs of equipment needed to clear pit area, cost of clearing and disposal, shaping-up of pit after use, planting and seeding after use, purchase price for topsoil on other than USFS land, etc.

SECTION 625 - TURF ESTABLISHMENT

(Labor: Dry Method = 30-40%, Dry Method W/Mulch = 60%, Hydrolic Method=40-50%)

Note: The costs for seeding and fertilizing are based on applying seed and fertilizer in one application. There are no allowances in the costs for watering or compacting the seedbed. If you include these requirement an additional allownace will have to be made.

Cost for Dry Method is about \$450/acre (\$1110/hectare), cost for Hydrolic Method is about \$2,200/acre (\$5,435/hectare). Cost of fertilizer, where required, should be included in the base item. Fertilizer, Section 625.06, should be used only for supplemental applications.

If Native Grass Seed is required, use a multiplier of 1.20.

SECTION 629 - ROLLED EROSION CONTROL PRODUCTS AND CELLULAR CONFINEMENT SYSTEMS

Costs for erosion control blankets and netting range from \$2 to \$4 per SY..

SECTION 633 - PERMANENT TRAFFIC CONTROL (Labor 60 percent)

<u>Materials</u>	<u>Price</u>
Wood Post	\$1 to \$3/Lineal Ft (\$3.28 to 9.84/m)
Steel Post	\$1.20/Lineal Ft (\$3.90/m)
Signs	\$50 to \$100/Ea
Route Markers	\$15 to \$25/Ea
Aluminum Sign Panels	\$15/Sq Ft (\$161.00/sq m)
Fiberglass Sign Panels	\$15/Sq Ft (\$161.00/sq m)
Wood Sign Panels	\$15/Sq Ft (\$161.00/sq m)
Regulatory/Warning Signs	\$40 to \$120/Ea
Sign and Post(s)	\$60 to \$150/Ea
Delineators w/ posts	\$8 to \$15/Ea
Delineator only Double Sided	\$3.50/EA
<u>Install Only</u>	<u>Price</u>
Sign and Post (one)	\$20-\$40/Ea

Costs must be increased if sign posts are to be installed in rocky fills or other situations requiring difficult excavation.

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SECTION 634 - PERMANENT PAVEMENT MARKINGS (Contract Item)

Costs can be estimated on the basis of the gallons of paint required including the cost of glass beads, paint, cleaning surface to be painted, application, and protection of markings until dry. Rough estimate is that an average two-lane road will require \$1,100 to \$1,600 per mile (\$684 to \$994 per kilometer) to do all customary striping work. Estimator should use designed lengths of single solid, single dashed, and double solid to make estimate; or time, equipment, and materials. Campground and parking area striping will cost more due to the short lengths, intermittent markings, and tighter working areas.

See Section 634 for application rates for paint and beads.

Recent bid prices: \$150 to \$350 per mile (\$93 to \$217 per kilometer) for broken centerline
 \$250 to \$500 per mile (\$155 to \$311 per kilometer) for solid edge strip
 \$300 to \$700 per mile (\$186 to \$435 per kilometer) for double-line centerline

SECTION 640 - ROAD CLOSURE DEVICES.

Labor: Metal Gates - 15 percent
 Concrete Barriers - 10 percent ---- Call for quotes.
 Guardrail Barriers - 30 percent

Costs range from \$1000 to \$2000 each for double-lane metal gates, and \$1000 to \$1500 each for single-lane metal gates..

Cost figures from the Summary of Bid History may be used. Be sure to use cost figures appropriate for the type and size of road closure devices.

In the absence of cost data in the Summary of Bid History, estimate by time, equipment and material.

SECTION 641 - DEVELOPMENT OF PITS AND QUARRIES (Labor percent and reduction as per sections used in estimating)

- A. Clearing, grubbing, and slash clean-up should be estimated as recommended for Section 201, include additional allowance for difficult terrain.
- B. Access roads may be estimated as lump sum based upon equipment and labor hours or unit prices for construction items as covered in Section 204. Pay particular attention to materials and terrain encountered in access road construction that will affect cost of construction.
- C. Quarry stripping, slope rounding, restoration, and clean-up should be estimated as lump sum based upon equipment and labor hours or unit prices for construction items as covered in Section 204.
- D. Turf establishment may be estimated per instructions in Section 625.
- E. Ground and traffic control estimated per requirements in Section 635.

If Section 641 is not included in the contract, development costs should be included in the items requiring the pit or quarry. Estimator should pay close attention to requirements shown on the pit development plan, and R-1 supplements to FSH 7109.21 (Geotechnical & Materials Engineering Handbook). Costs range from \$2,500 for a rock pit to \$12,000 for a quarry.

SECTION 660 - GEOCELL ABUTMENT STABILIZATION (Labor 20 percent)

Estimate by time, equipment, and materials

End of Incidental Construction