

Attachment

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Drum Stewardship Specified Road Reconstruction

06/26/2013

Drum Stewardship

Specified Road Reconstruction

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Drum Stewardship Specified Road Reconstruction

06/26/2013

RECONSTRUCTION COSTS

Road Reconstruction Total Estimated Costs

<u>Proj. Number</u>	<u>Estimated Costs</u>
#01	\$49,075.86
#02	\$65,305.02
#03	\$58,069.37
<hr/>	
Total	\$172,450.24

\$ 5,473.00 <- K-F.2.13# Deposits for Reconstruction
Engineering Services

TOTAL RECONSTRUCTION **\$177,923.24**

Public Works Cost = **\$197,144.97**

Drum Stewardship Specified Road Reconstruction

06/26/2013

SCHEDULE OF ITEMS

PROJECT #01

National Forest System Road 6350: 2.84 miles

ITEM NO.	DESCRIPTION	PAY UNIT	EST. QTY.	UNIT PRICE	TOTAL COST
15101	Mobilization	Lump Sum	ALL	\$6,400.00	\$6,400.00
15201	Miscellaneous Survey and Staking, Method I, Tolerance D	Lump Sum	ALL	\$800.00	\$800.00
15713	Soil Erosion & Pollution Control	Lump Sum	ALL	\$1,800.00	\$1,800.00
20303	Removal of Asphalt	Square Yard	610	\$9.64	\$5,881.32
20358	Removal of Existing Culvert, Remove from Project	Each	1	\$500.00	\$500.00
20415	Unsuitable Excavation	*Cubic Yard	70	\$12.04	\$842.48
21001	Structural Backfill	*Cubic Yard	380	\$27.70	\$10,524.86
21002	Geogrid, Category 4	Square Yard	800	\$7.77	\$6,215.88
30305	Road Reconditioning, Ditch	Each	2	\$742.88	\$1,485.76
32203	Aggregate Base, Grading A, Compaction Method C	Cubic Yard	150	\$39.10	\$5,865.14
32211	Aggregate Surface Course, Grading H, Compaction Method C	Cubic Yard	55	\$51.00	\$2,805.00
60211	18 inch Corrugated Steel Pipe, 0.064 inch thickness	Foot	50	\$41.11	\$2,055.44
65102	Pit and Quarry Development	Lump Sum	ALL	\$3,900.00	\$3,900.00
				TOTAL:	\$49,075.86

* Denotes a Contract Quantity

Payment will be made on actual work performed as described in FP-03 109.01 unless otherwise noted.

Drum Stewardship Specified Road Reconstruction

06/26/2013

SCHEDULE OF ITEMS

PROJECT #02

National Forest System Road 63: 3.22 miles

ITEM NO.	DESCRIPTION	PAY UNIT	EST. QTY.	UNIT PRICE	TOTAL COST
15101	Mobilization	Lump Sum	ALL	\$8,500.00	\$8,500.00
15201	Miscellaneous Survey and Staking, Method I, Tolerance D	Lump Sum	ALL	\$416.86	\$416.86
15713	Soil Erosion & Pollution Control	Lump Sum	ALL	\$1,800.00	\$1,800.00
20303	Removal of Asphalt	Square Yard	720	\$9.62	\$6,929.26
20415	Unsuitable Excavation	*Cubic Yard	90	\$13.14	\$1,182.81
21001	Structural Backfill	*Cubic Yard	640	\$30.16	\$19,299.98
21002	Geogrid, Category 4	Square Yard	1330	\$7.23	\$9,621.88
30305	Road Reconditioning, Ditch	Each	7	\$373.52	\$2,614.62
32203	Aggregate Base, Grading A, Compaction Method C	Cubic Yard	160	\$39.71	\$6,353.49
32211	Aggregate Surface Course, Grading H, Compaction Method C	Cubic Yard	70	\$49.80	\$3,486.10
65102	Pit and Quarry Development	Lump Sum	ALL	\$5,100.00	\$5,100.00
				TOTAL:	\$65,305.02

* Denotes a Contract Quantity

Payment will be made on actual work performed as described in FP-03 109.01 unless otherwise noted.

Drum Stewardship Specified Road Reconstruction

06/26/2013

SCHEDULE OF ITEMS

PROJECT #03

National Forest System Road 6350: 1.80 miles

ITEM NO.	DESCRIPTION	PAY UNIT	EST. QTY.	UNIT PRICE	TOTAL COST
15101	Mobilization	Lump Sum	ALL	\$7,600.00	\$7,600.00
30358	Asphalt Pavement Pulverization, 10 in. Depth	*Square Yard	16,600	\$1.35	\$22,410.00
32211	Aggregate Surface Course, Grading H, Compaction Method C	Cubic Yard	500	\$41.96	\$20,980.29
30304	Road Reconditioning, Ditch	Mile	1.8	\$3,932.82	\$7,079.07
				TOTAL:	\$58,069.37

* Denotes a Contract Quantity

Payment will be made on actual work performed as described in FP-03 109.01 unless otherwise noted.

PLOTTED SHEET SIZE: 11" x 17"

DESIGNED BY <i>[Signature]</i>	DATE 07/16/13
REVIEWED BY <i>[Signature]</i>	DATE 7/24/13
RECOMMENDED BY <i>[Signature]</i>	DATE 7/24/13
APPROVAL <i>[Signature]</i>	DATE 8/1/13
DISTRICT RANGER <i>[Signature]</i>	DATE 7/24/13



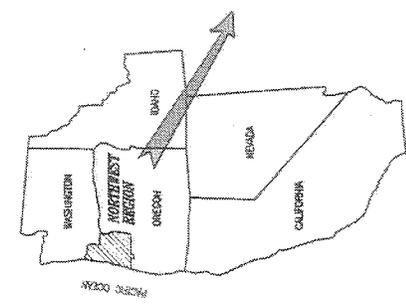
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE - REGION SIX
SUB-REGIONAL ENGINEERING GROUP
Mt. Hood National Forest



PLANS FOR Drum Stewardship Specified Road Reconstruction

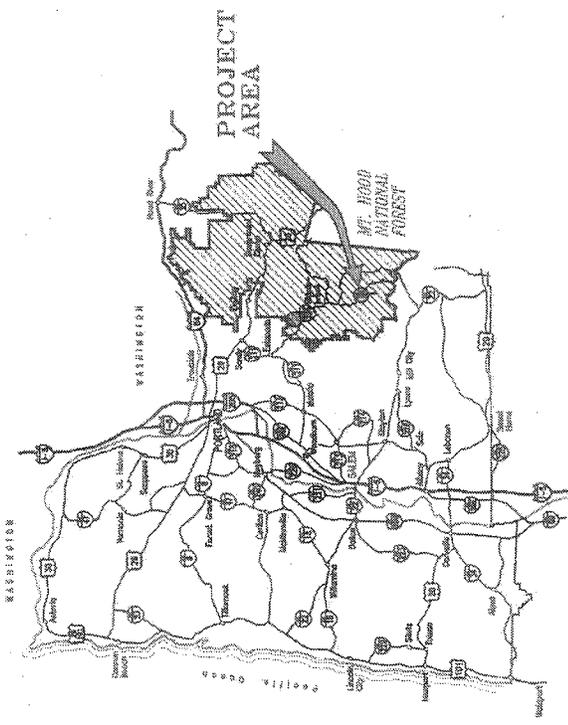
SHEET NO.	SHEET TITLE
1 of 10	TITLE AND PROJECT LOCATION
2 of 10	PROJECT VIGNETTE MAP
3 of 10	ESTIMATE OF QUANTITIES
4 of 10	RECONSTRUCTION SCHEDULES AND RECONSTRUCTION SUMMARIES
5 of 10	ROAD RECONSTRUCTION TYPICALS: METHODS A & B
6 of 10	ROAD RECONSTRUCTION TYPICALS: METHODS C1 & C2
7 of 10	ROAD RECONSTRUCTION TYPICALS: METHODS D1 & D2
8 of 10	ROAD RECONSTRUCTION TYPICALS: METHOD E
9 of 10	ROAD RECONSTRUCTION TYPICALS: METHOD F
10 of 10	PIT AND QUARRY DEVELOPMENT PLAN

PROJECT	ROAD NO.	MILE POSTS	TYPE OF WORK
PROJECT #01	NFSR 6350	0.12 to 2.96	RECONSTRUCTION
PROJECT #02	NFSR 63	9.47 to 12.05	RECONSTRUCTION
PROJECT #03	NFSR 6350	0.10 to 1.90	RECONSTRUCTION



AREA MAP
WESTERN STATES
NOT TO SCALE

- LEGEND**
- = INTERSTATE HIGHWAY
 - = FEDERAL HIGHWAY
 - = STATE HIGHWAY



REGIONAL MAP
NORTHWEST REGION - OREGON
NOT TO SCALE

PROJECT: Drum Stewardship Specified Road Reconstruction
SHEET TITLE: TITLE AND PROJECT LOCATION
SHEET NO.: 1 of 10

PROJECT LOCATIONS

Mt. Hood National Forest,
Clackamas River Ranger District,
Clackamas County, Oregon

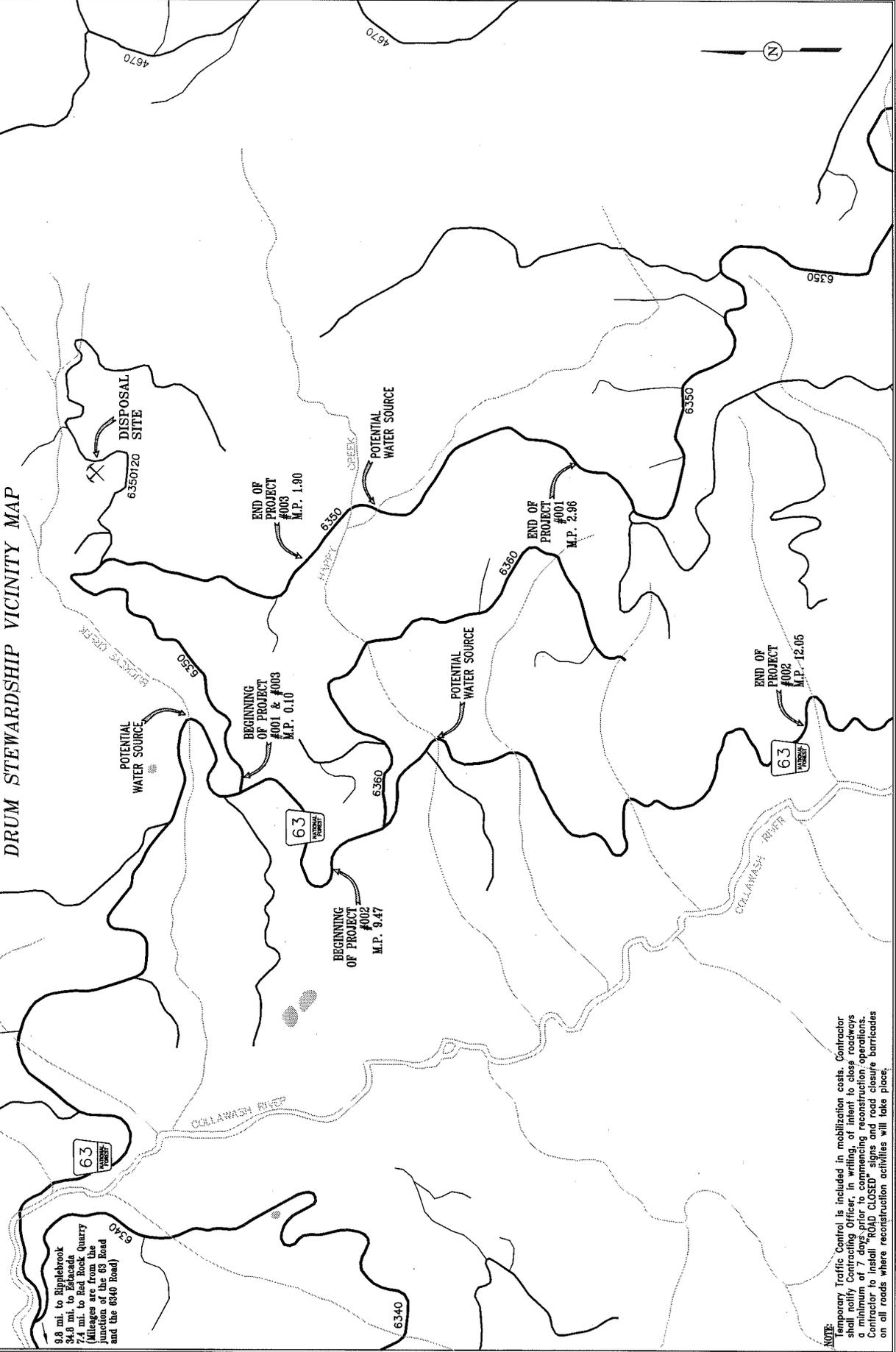
Project #01
NFSR 6350
Reconstruction
Mile Post: 0.1 to 3.0
(Township & Range)
Township: T7 S
Range(s): R6 E, R7 E
Section(s): 13, PB44

Project #02
NFSR 89
Reconstruction
Mile Posts: 9.4 to 12.1
(Township & Range)
Township: T7 S
Range: R6 E
Section(s): 24 & 25

Project #03
NFSR 6350
Reconstruction
Mile Post: 0.1 to 1.9
(Township & Range)
Township: T7 S
Range(s): R6 E, R7 E
Section(s): 13, PB44



USDA FOREST SERVICE
The Pacific Northwest Region
MT. HOOD NATIONAL FOREST
1940 Champion Way
Sandy, OR 97135



DRUM STEWARDSHIP VICINITY MAP

9.8 mi. to Ripplebrook
 34.8 mi. to Esacada
 7.4 mi. to Red Rock Quarry
 (Mileages are from the
 junction of the 63 Road
 and the 6340 Road)

NOTE:
 Temporary Traffic Control is included in mobilization costs. Contractor shall notify Contracting Officer, in writing, of intent to close roadways a minimum of 7 days prior to commencing reconstruction operations. Contractor to install "ROAD CLOSED" signs and road closure barricades on all roads where reconstruction activities will take place.

PROJECT #01 - 6350 ROAD (2.84 MILES)

ITEM NO.	DESCRIPTION	PAY UNIT	QTY	NOTES
15101	MOBILIZATION	LUMP SUM	ALL	TEMPORARY TRAFFIC CONTROL, FIRE PROTECTION, WEED PREVENTION, AND EQUIPMENT CLEANING ARE INDIRECT TO THIS PAY ITEM.
15201	MISCELLANEOUS SURVEYING AND STAKING, METHOD I, TOLERANCE D	LUMP SUM	ALL	
15713	SOIL EROSION AND POLLUTION CONTROL	LUMP SUM	ALL	INCLUDES ALL EROSION AND POLLUTION CONTROL MEASURES, AND EMERGENCY WORK DURING STORM EVENTS TO PREVENT SITE DAMAGE AND POLLUTION.
20303	REMOVAL OF ASPHALT	SQUARE YARD	610	INCLUDES REMOVAL OF ASPHALT FOR ALL DEEP PATCH REPAIRS AND CULVERT REPLACEMENTS. DISPOSE OF ASPHALT PER SECTION 203.05 (g). REMOVE FROM PROJECT.
20358	REMOVAL OF EXISTING CULVERTS, DISPOSAL METHOD A	EACH	1	INCLUDES REMOVAL OF EACH EXISTING CULVERT SHOWN ON DRAINAGE LISTING. DISPOSE OF CULVERTS PER SECTION 203.05 (g) REMOVE FROM PROJECT.
20415	UNSUITABLE EXCAVATION	*CUBIC YARD	70	INCLUDES EXCAVATION, LOADING, HAULING, AND PLACING OF UNSUITABLE MATERIAL TO APPROVED DISPOSAL SITE.
21001	STRUCTURAL BACKFILL	*CUBIC YARD	380	INCLUDES EXCAVATION, FOUNDATION PREPARATION, AND BACKFILLING WITH COMMERCIAL SOURCE DRAIN ROCK OR LOADING, HAULING, AND PLACING GOVERNMENT PROVIDED STRUCTURAL FILL. DEVELOPING A WATER SOURCE IS INCIDENTAL TO THIS PAY ITEM.
21002	GEOGRID, CATEGORY 4	*SQUARE YARD	800	COMMERCIAL SOURCE MATERIAL
30305	ROAD RECONDITIONING, DITCH	EACH	2	INCLUDES DITCH RECONDITIONING AT EACH RECONSTRUCTION SITE. EXCLUDING SITES THAT ARE WITHIN THE PROJECT #03 AREA. FOR SITES WITHIN THE PROJECT #03 AREA, DITCH RECONDITIONING WILL BE MEASURED BY THE MILE UNDER THAT PROJECT.
32203	AGGREGATE BASE, GRADING A, COMPACTION METHOD C	CUBIC YARD	150	COMMERCIAL SOURCE MATERIAL
32211	AGGREGATE SURFACE COURSE, GRADING H, COMPACTION METHOD C	CUBIC YARD	55	COMMERCIAL SOURCE MATERIAL
60211	.18 INCH CORRUGATED STEEL PIPE, 0.064 INCH THICK	FOOT	50	INCLUDES ALL MATERIALS, TIME, AND EQUIPMENT FOR INSTALLATION OF EACH CULVERT OF THE SPECIFIED SIZE LISTED ON THE DRAINAGE LISTING. CULVERT TO BE COMMERCIAL SOURCE GALVANIZED STEEL.
65102	PIT AND QUARRY DEVELOPMENT	LUMP SUM	ALL	INCLUDES TIME, EQUIPMENT, AND LABOR COSTS FOR EXCAVATION OF GOVERNMENT PROVIDED STRUCTURAL FILL.

PROJECT #02 - 63 ROAD (2.58 MILES)

ITEM NO.	DESCRIPTION	PAY UNIT	QTY	NOTES
15101	MOBILIZATION	LUMP SUM	ALL	TEMPORARY TRAFFIC CONTROL, FIRE PROTECTION, WEED PREVENTION, AND EQUIPMENT CLEANING ARE INDIRECT TO THIS PAY ITEM.
15201	MISCELLANEOUS SURVEYING AND STAKING, METHOD I, TOLERANCE D	LUMP SUM	ALL	
15713	SOIL EROSION AND POLLUTION CONTROL	LUMP SUM	ALL	INCLUDES ALL EROSION AND POLLUTION CONTROL MEASURES, AND EMERGENCY WORK DURING STORM EVENTS TO PREVENT SITE DAMAGE AND POLLUTION.
20303	REMOVAL OF ASPHALT	SQUARE YARD	720	INCLUDES REMOVAL OF ASPHALT FOR ALL DEEP PATCH REPAIRS AND CULVERT REPLACEMENTS. DISPOSE OF ASPHALT PER SECTION 203.05 (g). REMOVE FROM PROJECT.
20415	UNSUITABLE EXCAVATION	*CUBIC YARD	90	INCLUDES EXCAVATION, LOADING, HAULING, AND PLACING OF UNSUITABLE MATERIAL TO APPROVED DISPOSAL SITE.
21001	STRUCTURAL BACKFILL	*CUBIC YARD	640	INCLUDES EXCAVATION, FOUNDATION PREPARATION, AND BACKFILLING WITH COMMERCIAL SOURCE DRAIN ROCK OR LOADING, HAULING, AND PLACING GOVERNMENT PROVIDED STRUCTURAL FILL. DEVELOPING A WATER SOURCE IS INCIDENTAL TO THIS PAY ITEM.
21002	GEOGRID, CATEGORY 4	*SQUARE YARD	1330	COMMERCIAL SOURCE MATERIAL
30305	ROAD RECONDITIONING, DITCH	EACH	7	INCLUDES DITCH RECONDITIONING AT EACH RECONSTRUCTION SITE. EXCLUDING SITES THAT ARE WITHIN THE PROJECT #03 AREA. FOR SITES WITHIN THE PROJECT #03 AREA, DITCH RECONDITIONING WILL BE MEASURED BY THE MILE UNDER THAT PROJECT.
32203	AGGREGATE BASE, GRADING A, COMPACTION METHOD C	CUBIC YARD	160	COMMERCIAL SOURCE MATERIAL
32211	AGGREGATE SURFACE COURSE, GRADING H, COMPACTION METHOD C	CUBIC YARD	70	COMMERCIAL SOURCE MATERIAL
65102	PIT AND QUARRY DEVELOPMENT	LUMP SUM	ALL	INCLUDES TIME, EQUIPMENT, AND LABOR COSTS FOR EXCAVATION OF GOVERNMENT PROVIDED STRUCTURAL FILL.

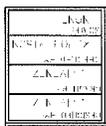
PROJECT #03 - 6350 ROAD (1.80 MILES)

ITEM NO.	DESCRIPTION	PAY UNIT	QTY	NOTES
15101	MOBILIZATION	LUMP SUM	ALL	TEMPORARY TRAFFIC CONTROL, FIRE PROTECTION, WEED PREVENTION, AND EQUIPMENT CLEANING ARE INDIRECT TO THIS PAY ITEM.
30358	ASPHALT PAVEMENT PULVERIZATION, 10 INCH DEPTH	*SQUARE YARD	16,600	
32211	AGGREGATE SURFACE COURSE, GRADING H, COMPACTION METHOD B	CUBIC YARD	500	COMMERCIAL SOURCE MATERIAL
30304	ROAD RECONDITIONING, DITCH	MILE	1.80	

ALL QUANTITIES SHOWN ARE IN-PLACE QUANTITIES. NO MATERIAL EXPANSION FACTORS HAVE BEEN APPLIED.

* - DENOTES A CONTRACT QUANTITY

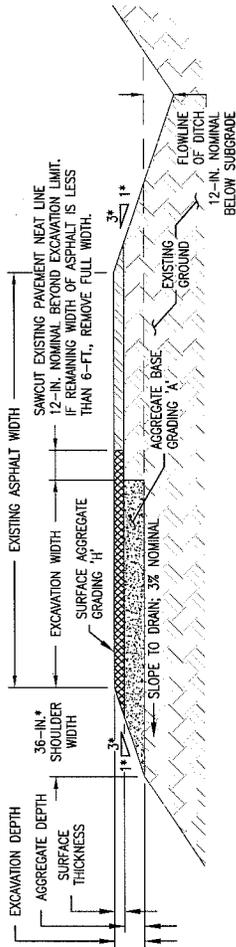
MAXIMUM ALLOWABLE DEVIATIONS FROM PLAN LINES, GRADES, CROSS SECTIONS, AND DIMENSIONS SHALL BE ACCORDING TO CONSTRUCTION TOLERANCE CLASS B AS DEFINED BY "TABLE 204-2 CONSTRUCTION TOLERANCES".



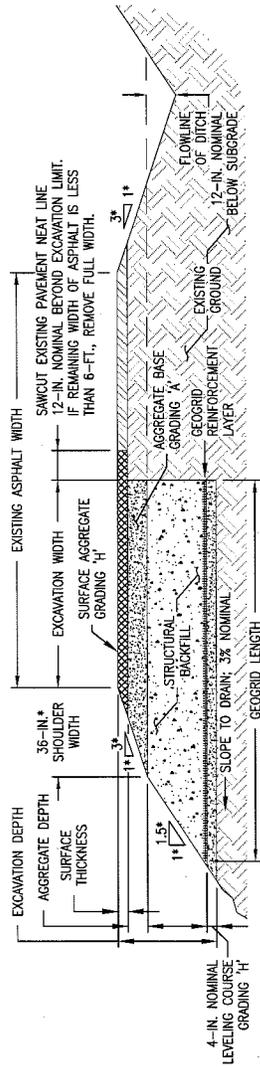
USDA FOREST SERVICE
The Pacific Northwest Region
MT. HOOD NATIONAL FOREST
16400 NE Thompson Hill Dr
Sc 97055

Drum Stewardship Specified Road Reconstruction
ESTIMATE OF QUANTITIES

PROJECT: SHEET TITLE:
SHEET: 3 of 10

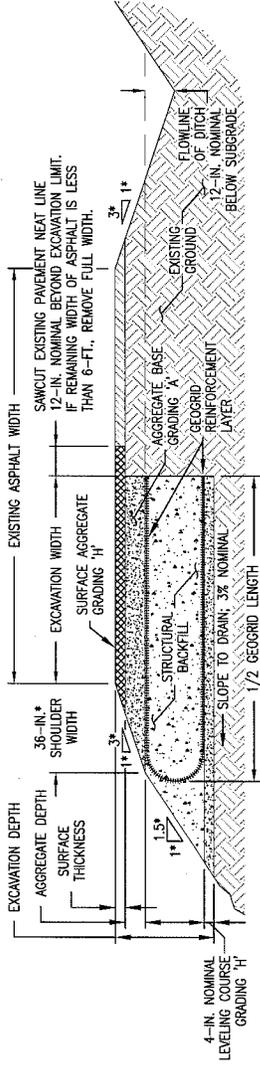


METHOD 'A'
BASE AND SURFACE REPLACEMENT

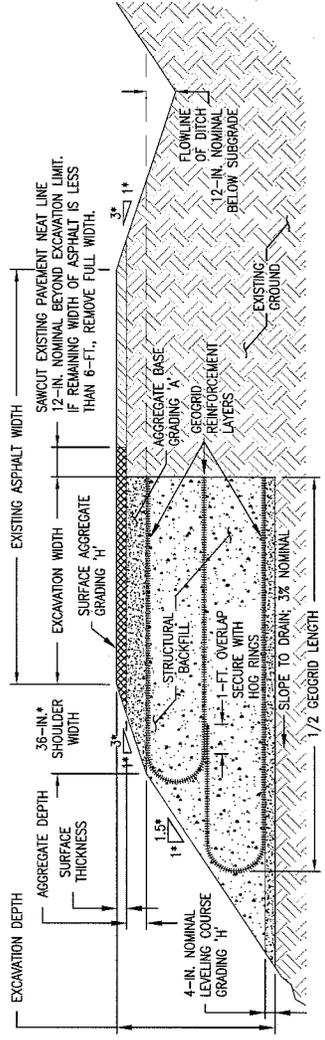


METHOD 'B'
SUBGRADE REPLACEMENT WITH GEOGRID

- NOTES:
1. DRAWINGS ARE NOT TO SCALE
 2. ALL DETAILS ARE TYPICAL DETAILS, AND ARE SECTION VIEW UNLESS OTHERWISE NOTED.
 3. DIMENSIONS ARE GIVEN ON ATTACHED SCHEDULE FOR FULL REPAIRS.
 4. * - DIMENSIONS MARKED WITH AN ASTERISK MAY BE ADJUSTED BY THE CONTRACTING OFFICER (C.O.) TO FIT EXISTING SITE GEOMETRY.
 5. STRUCTURAL BACKFILL MAY CONSIST OF SUITABLE ROADWAY EXCAVATION COMPLYING WITH THE REQUIREMENTS OF SECTION 704.04. ADDITIONAL STRUCTURAL BACKFILL AS NEEDED WILL BE GOVERNMENT PROVIDED MATERIAL OBTAINED FROM RED ROCK QUARRY USING CONTRACTOR PROVIDED EQUIPMENT, LABOR, AND TRANSPORTATION. RED ROCK QUARRY IS APPROXIMATELY 7.4 MILES FROM THE JUNCTION OF NATIONAL FOREST SYSTEM ROAD (NFSR) 63 AND NFSR 6340, AND CAN BE REACHED AS FOLLOWS:
TRAVEL BACK ALONG NFSR 63 NORTHBOUND TOWARDS STATE HIGHWAY 224 APPROXIMATELY 2.12 MILES TO THE JUNCTION WITH NFSR 70. TURN LEFT ONTO NFSR 70 AND TRAVEL FOR 3.30 MILES TO NFSR 7010.
TURN RIGHT ONTO NFSR 7010 AND TRAVEL APPROXIMATELY 1.98 MILES TO RED ROCK QUARRY (ON THE LEFT).
 6. GEOGRID SHALL COMPLY WITH SUPPLEMENTAL SPECIFICATIONS SECTION 714.03, PHYSICAL STRENGTH CATEGORY 4.
 7. GEOTEXTILE FILTER FABRIC SHALL CONFORM WITH THE REQUIREMENTS OF SPECIFICATIONS SECTION 714, TYPE I-D.

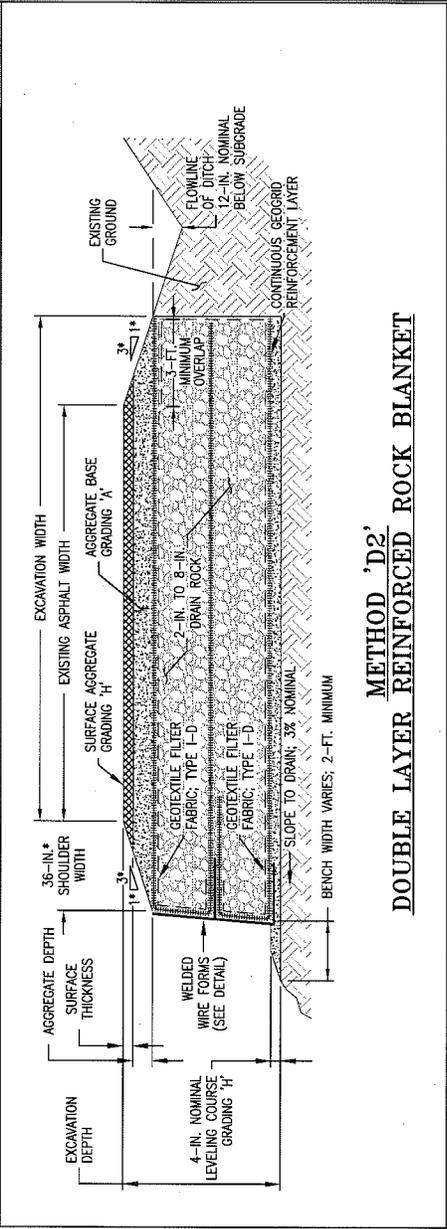
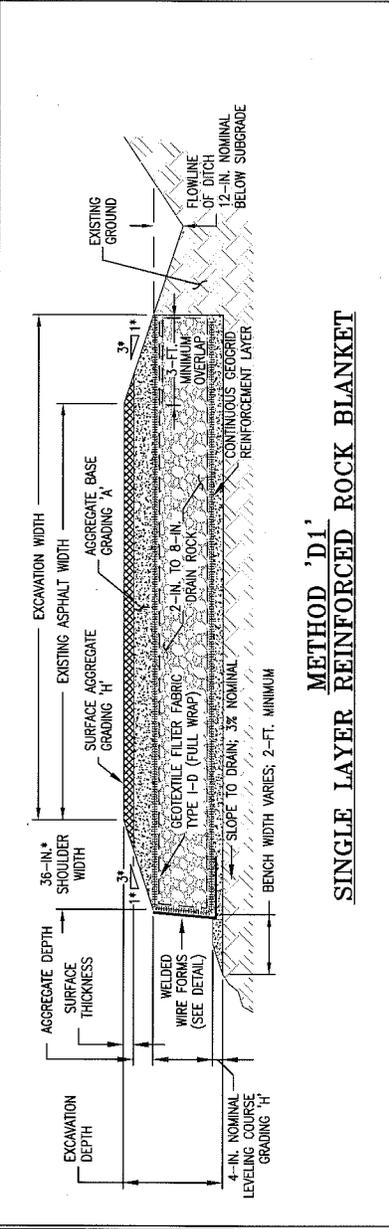


METHOD 'C1'
SINGLE LAYER WRAPPED REINFORCEMENT

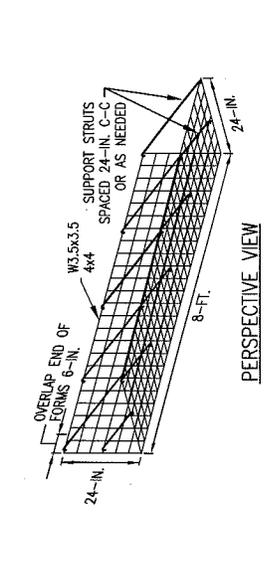
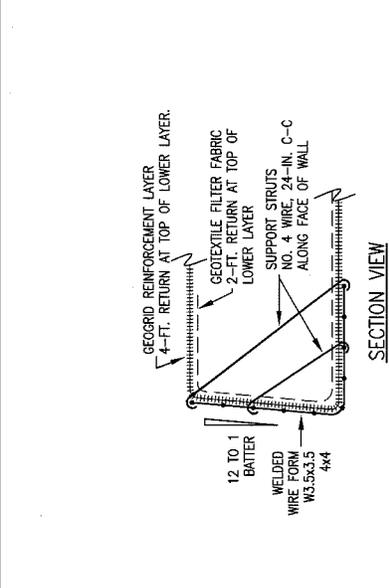


METHOD 'C2'
DOUBLE LAYER WRAPPED REINFORCEMENT

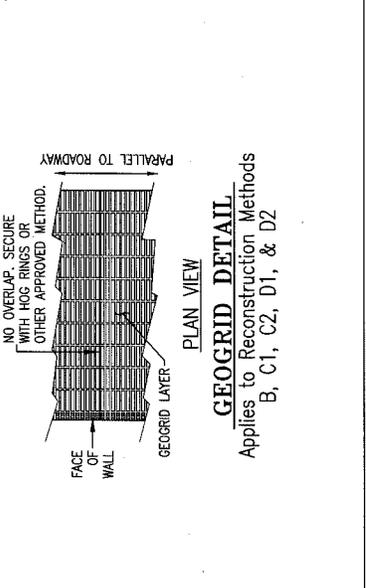
- NOTES:
1. DRAWINGS ARE NOT TO SCALE
 2. ALL DETAILS ARE TYPICAL DETAILS, AND ARE SECTION VIEW UNLESS OTHERWISE NOTED.
 3. DIMENSIONS ARE GIVEN ON ATTACHED SCHEDULE FOR FILL REPAIRS.
 4. * - DIMENSIONS MARKED WITH AN ASTERISK MAY BE ADJUSTED BY THE CONTRACTING OFFICER (C.O.) TO FIT EXISTING SITE GEOMETRY.
 5. STRUCTURAL BACKFILL MAY CONSIST OF SUITABLE ROADWAY EXCAVATION COMPLYING WITH THE REQUIREMENTS OF SECTION 704.04. ADDITIONAL STRUCTURAL BACKFILL AS NEEDED WILL BE GOVERNMENT PROVIDED MATERIAL OBTAINED FROM RED ROCK QUARRY USING CONTRACTOR PROVIDED EQUIPMENT, LABOR, AND TRANSPORTATION. RED ROCK QUARRY IS APPROXIMATELY 7.4 MILES FROM THE JUNCTION OF NATIONAL FOREST SYSTEM ROAD (NFSR) 63 AND NFSR 6340, AND CAN BE REACHED AS FOLLOWS:
 TRAVEL BACK ALONG NFSR 63 NORTHBOUND TOWARDS STATE HIGHWAY 224 APPROXIMATELY 2.12 MILES TO THE JUNCTION WITH NFSR 70. TURN LEFT ONTO NFSR 70 AND TRAVEL FOR 3.30 MILES TO NFSR 7010.
 TURN RIGHT ONTO NFSR 7010 AND TRAVEL APPROXIMATELY 1.98 MILES TO RED ROCK QUARRY (ON THE LEFT).
 6. GEOGRID SHALL COMPLY WITH SUPPLEMENTAL SPECIFICATIONS SECTION 714.03, PHYSICAL STRENGTH CATEGORY 4.
 7. GEOTEXTILE FILTER FABRIC SHALL CONFORM WITH THE REQUIREMENTS OF SPECIFICATIONS SECTION 714, TYPE I-0.



- NOTES:**
1. DRAWINGS ARE NOT TO SCALE.
 2. ALL DETAILS ARE TYPICAL DETAILS, AND ARE SECTION VIEW UNLESS OTHERWISE NOTED.
 3. DIMENSIONS ARE GIVEN ON ATTACHED SCHEDULE FOR FILL REPAIRS.
 4. * - DIMENSIONS MARKED WITH AN ASTERISK MAY BE ADJUSTED BY THE CONTRACTING OFFICER (C.O.) TO FIT EXISTING SITE GEOMETRY.
 5. DRAIN ROCK SHALL BE COMMERCIAL SOURCE MATERIAL COMPLYING WITH THE SPECIFICATIONS FOR CLASS 1 RIPRAP ROCK, SECTION 705.02. ALTERNATIVE MATERIAL MUST BE APPROVED IN WRITING BY THE C.O. PRIOR TO USE IN RECONSTRUCTION WORK.
 6. GEOTEXTILE REINFORCEMENT MUST BE SUPPORTED AT FACE DURING BACKFILLING TO ACHIEVE VERTICAL SLOPE AT FACE.
 7. GEOTEXTILE REINFORCEMENT MUST BE CONTINUOUS AND EXTEND TO THE BACK OF EXCAVATION AT BOTH ENDS.
 8. GEOTEXTILE SHALL COMPLY WITH SUPPLEMENTAL SPECIFICATIONS SECTION 714.03, PHYSICAL STRENGTH CATEGORY 4.
 9. GEOTEXTILE FILTER FABRIC SHALL CONFORM WITH THE REQUIREMENTS OF SPECIFICATIONS SECTION 714, TYPE I-D.



WIRE FORM AND FACING DETAIL
Applies to Reconstruction Methods D1 & D2



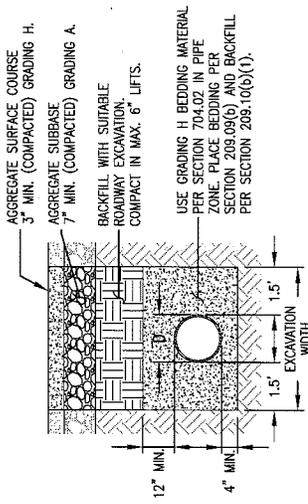
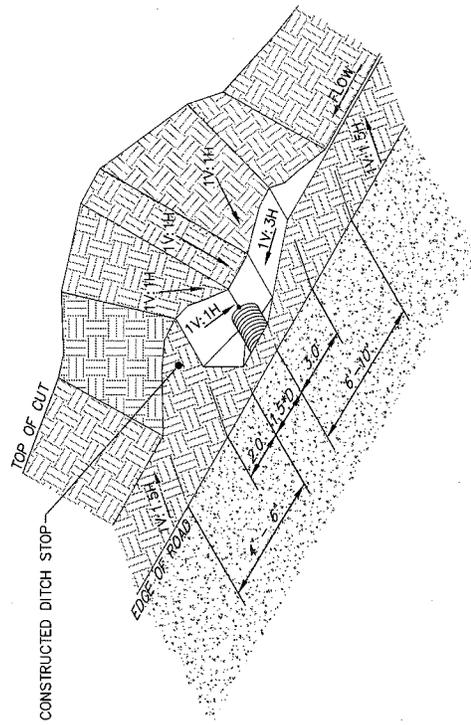
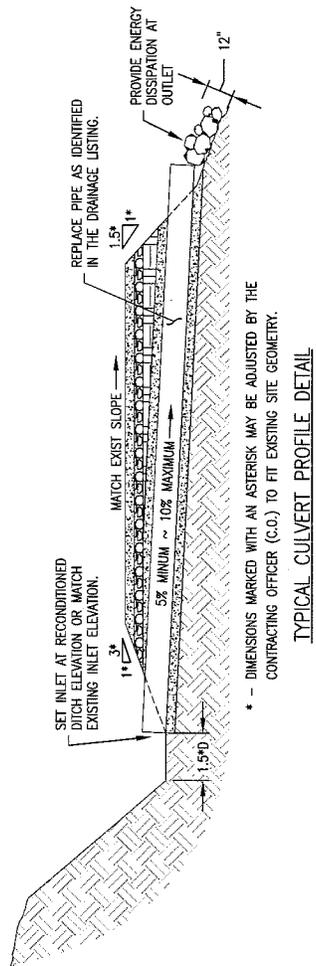
DATE	10/11/11
BY	J. K. ...
CHECKED	J. K. ...
APPROVED	J. K. ...
PROJECT	DRUM STEWARDSHIP SPECIFIED ROAD RECONSTRUCTION
SHEET TITLE	ROAD RECONSTRUCTION TYPICALS: METHOD E
PROJECT	DRUM STEWARDSHIP SPECIFIED ROAD RECONSTRUCTION



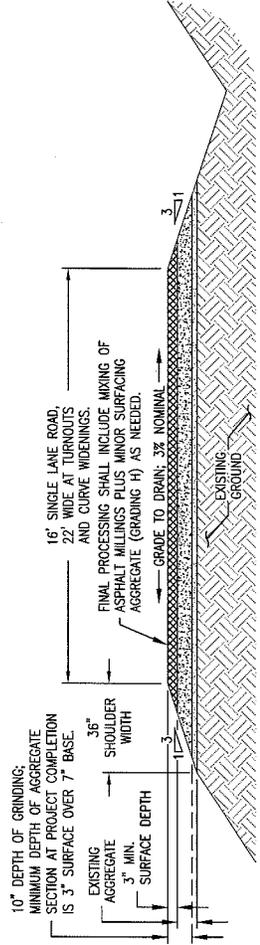
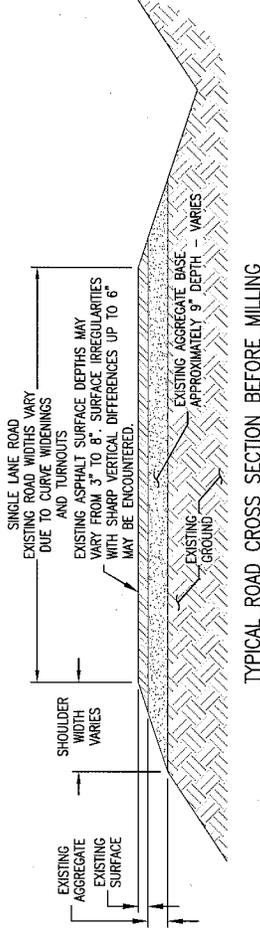
USDA FOREST SERVICE
The Pacific Northwest Region
16400 Champion Way
S8
197055

PROJECT: DRUM STEWARDSHIP SPECIFIED ROAD RECONSTRUCTION
SHEET TITLE: ROAD RECONSTRUCTION TYPICALS: METHOD E

PROJECT: DRUM STEWARDSHIP SPECIFIED ROAD RECONSTRUCTION
SHEET TITLE: ROAD RECONSTRUCTION TYPICALS: METHOD E
PROJECT: DRUM STEWARDSHIP SPECIFIED ROAD RECONSTRUCTION
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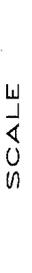
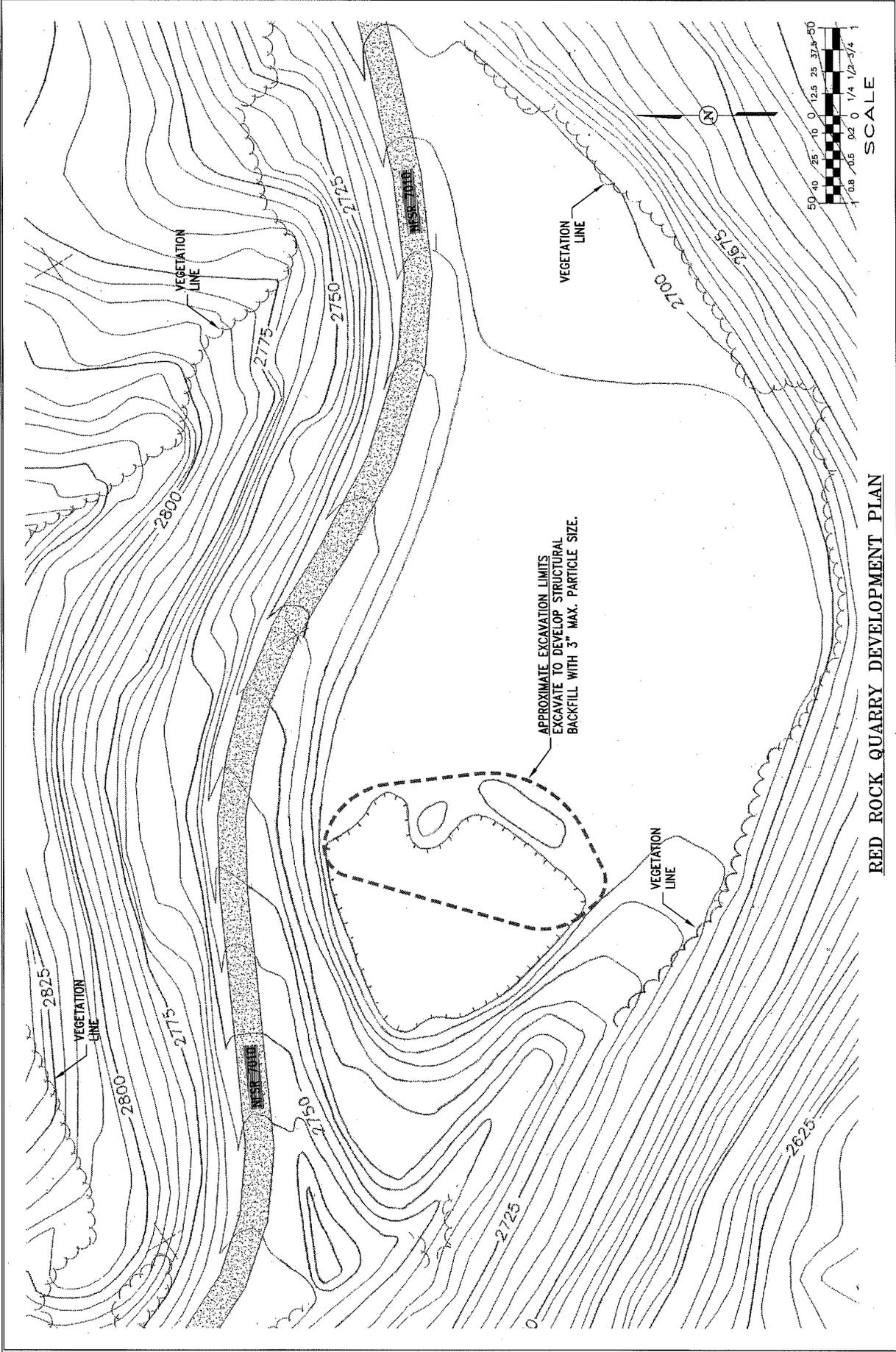


METHOD 'E' - CULVERT REPLACEMENT



METHOD 'F'
ASPHALT PAVEMENT PULVERIZATION

- NOTES:**
1. DRAWINGS ARE NOT TO SCALE
 2. PULVERIZE ASPHALT PAVEMENT ACCORDING TO SUPPLEMENTAL SPECIFICATIONS SECTION 303.06.
 3. ALL ASPHALT SHALL BE MILLED TO A MAXIMUM PARTICLE SIZE OF 1-1/2". IF THIS REQUIREMENT CANNOT BE MET THROUGH MILLING OF ASPHALT WITH A GRINDING MACHINE, THE CONTRACTOR MAY UTILIZE A GRID ROLLING METHOD TO OBTAIN MAXIMUM PARTICLE SIZE. IF THE MAXIMUM PARTICLE SIZE REQUIREMENT STILL CANNOT BE MET BY GRID ROLLING, THE CONTRACTOR WILL NOTIFY THE CONTRACTING OFFICER IMMEDIATELY.
 4. SOME SECTIONS THROUGH PAVEMENT PULVERIZATION AREA MAY CONSIST OF A PAVED SURFACE GREATER THAN 10" DEEP. THESE SECTIONS MAY REQUIRE A SECOND MILLING PASS OR REMOVAL OF SURFACING BY MEANS OF EXCAVATION. IF EXCAVATED, HAIL UNSUITABLE MATERIAL TO A DISPOSAL SITE APPROVED BY THE CONTRACTING OFFICER OR HAUL OFF OF FOREST LAND AND DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL GUIDELINES.
 5. PULVERIZATION IN AREAS WHERE THE DEPTH OF EXISTING ASPHALT IS 8" OR GREATER WILL PRODUCE MATERIAL CONSIDERED TO BE SUITABLE AS BASE MATERIAL ONLY, AND ADDITIONAL SURFACE AGGREGATE WILL BE REQUIRED.
 6. ADDITIONAL SURFACE AGGREGATE (GRADING H) SHALL BE CONTRACTOR PROVIDED COMMERCIAL SOURCE MATERIAL.
 7. AFTER ASPHALT PULVERIZATION IS COMPLETED, THE ROAD MUST BE GRADED TO THE APPROPRIATE DIMENSIONS AS SHOWN, AND THE ROAD SURFACE SHALL BE COMPACTED ACCORDING TO SECTION 204.11, METHOD E.



RED ROCK QUARRY DEVELOPMENT PLAN

Drum Stewardship Specified Road Reconstruction

FP-03 SPECIFICATIONS LIST

U.S. Forest Service
Clackamas River Ranger District
Mt. Hood National Forest
Clackamas County, Oregon

All specifications not included in the specifications listing, but referenced by listed specifications, are applicable to this contract. The Supplemental Specifications shown on the specifications list are physically attached. Section 100 through 149 of the Standard specifications and all other Standard or Supplemental specifications shown in the specification listing are applicable to this contract.

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101.03	Abbreviations	6/16/2006
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101.04	Definitions	3/11/2007
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105.05	Use of Material Found in Work	5/12/2004
106	Acceptance of Work	FP-03
106.01	Conformity with Contract Requirements	7/31/2007
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107.05	Responsibility for Damage Claims	5/11/2004
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108	Prosecution and Progress	FP-03

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109	Measurement and Payment	FP-03
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109.02	Measurement Terms and Definitions	6/16/2006
152	Construction Survey and Staking	FP-03
152.00	Construction Survey and Staking	8/5/2005
155	Schedules for Contracts	FP-03
155.00	Delete	5/11/2004
156	Public Traffic	FP-03
156.03	Accommodating Traffic During Work	2/24/2005
156.04	Maintaining Roadways During Work	2/24/2005
156.08	Traffic and Safety Supervisor	2/24/2005
157	Soil Erosion Control	FP-03
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170	Develop Water Supply and Watering	FP-03
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703	Aggregate	FP-03
703.05	Subbase, Base, Surface Course, and Screened Aggregate	8/14/2009
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703.07	Correction to Table 703-2	3/2/2005
703.10(e)	Flakiness Index	4/11/2011
703.10(i)	Adherent Coating	4/11/2011
714	Geotextile and Geocomposite Drain Material	FP-03
714.01	Tables 714-1, 714-2, 714-3, and 714-4	5/31/2012
714.03	Geogrids	2/25/2005
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Preface

Preface_wo_03_15_2004_m

Delete all but the first paragraph and add the following:

The Forest Service, US Department of Agriculture has adopted FP-03 for construction of National Forest System Roads.

101 - Terms, Format, and Definitions

101.01_nat_us_01_22_2009

101.01 Meaning of Terms

Delete all references to the TAR (Transportation Acquisition Regulations) in the specifications.

101.03_nat_us_06_16_2006

101.03 Abbreviations.

Add the following to (a) Acronyms:

AFPA	American Forest and Paper Association
MSHA	Mine Safety and Health Administration
NIST	<u>National Institute of Standards and Technology</u>
NESC	National Electrical Safety Code
WCLIB	West Coast Lumber Inspection Bureau

Add the following to (b) SI symbols:

mp	Milepost
ppm	Part Per Million

101.04_nat_us_03_29_2007

101.04 Definitions.

Delete the following definitions and substitute the following:

Bid Schedule--The Schedule of Items.

Bridge--No definition.

Contractor--The individual or legal entity contracting with the Government for performance of prescribed work. In a timber sale contract, the contractor is the "purchaser".

Culvert--No definition.

Right-of-Way--A general term denoting (1) the privilege to pass over land in some particular line (including easement, lease, permit, or license to occupy, use, or traverse public or private

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lands), or (2) Real property necessary for the project, including roadway, buffer areas, access, and drainage areas.

Add the following:

Adjustment in Contract Price--“Equitable adjustment,” as used in the Federal Acquisition Regulations, or “construction cost adjustment,” as used in the Timber Sale Contract, as applicable.

Change--“Change” means “change order” as used in the Federal Acquisition Regulations, or “design change” as used in the Timber Sale Contract.

Design Quantity--“Design quantity” is a Forest Service method of measurement from the FS-96 *Forest Service Specifications for the Construction of Roads and Bridges*. Under these FP specifications this term is replaced by the term “Contract Quantities”.

Forest Service--The United States of America, acting through the Forest Service, U.S. Department of Agriculture.

Neat Line--A line defining the proposed or specified limits of an excavation or structure.

Pioneer Road--Temporary construction access built along the route of the project.

Purchaser--The individual, partnership, joint venture, or corporation contracting with the Government under the terms of a Timber Sale Contract and acting independently or through agents, employees, or subcontractors.

Protected Streamcourse--A drainage shown on the plans or timber sale area map that requires designated mitigation measures.

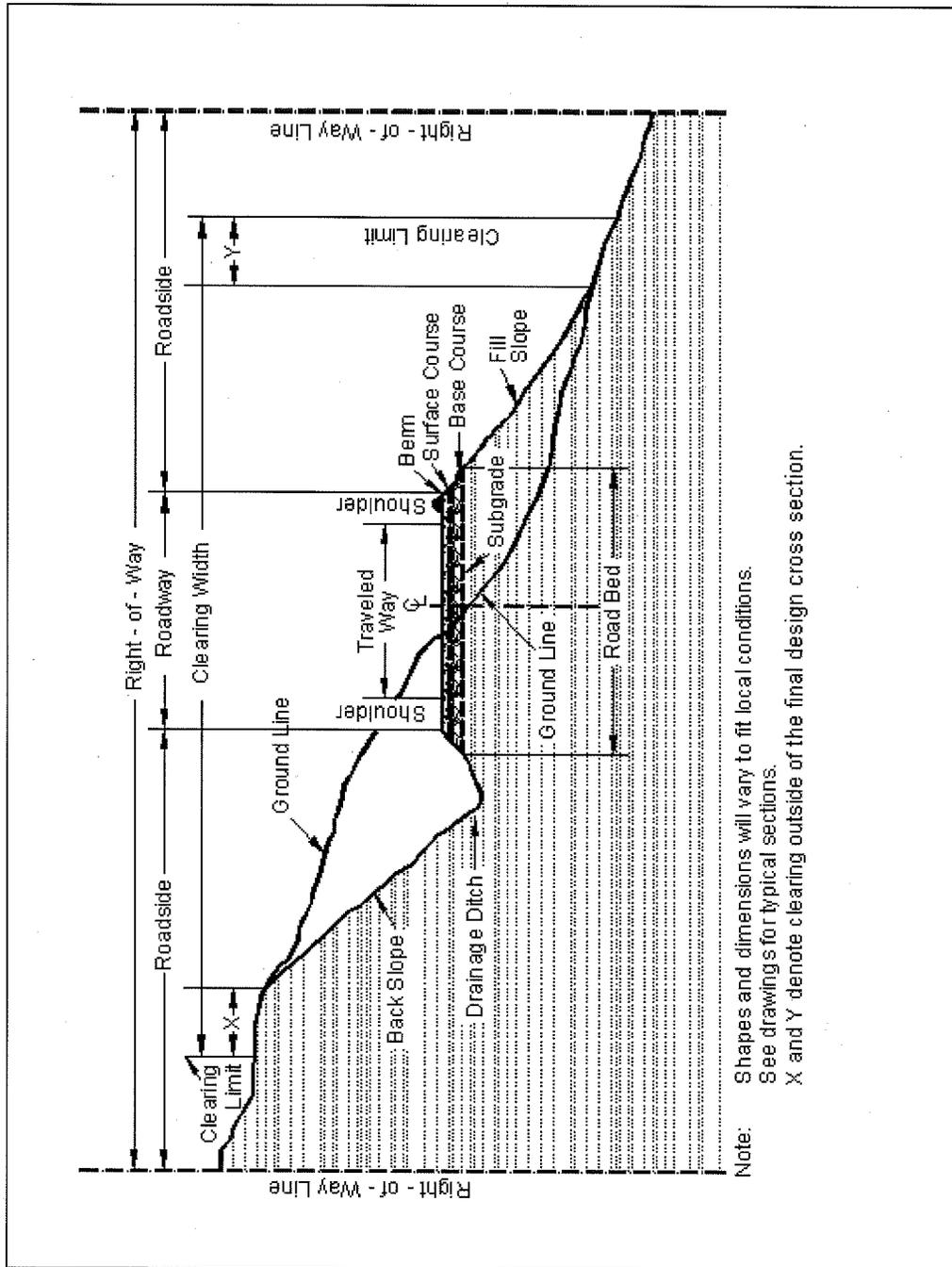
Road Order--An order affecting and controlling traffic on roads under Forest Service jurisdiction. Road Orders are issued by a designated Forest Officer under the authorities of 36 CFR, part 260.

Schedule of Items--A schedule in the contract that contains a listing and description of construction items, quantities, units of measure, unit price, and amount.

Utilization Standards--The minimum size and percent soundness of trees described in the specifications to determine merchantable timber.

Add Figure 101-1—Illustration of road structure terms:

Figure 101-1—Illustration of road structure terms.



102 - Bid, Award, and Execution of Contract

102.00_nat_us_02_16_2005

102 Bid, Award, and Execution of Contract

Delete Section 102 in its entirety.

103 - Scope of Work

103.00_nat_us_02_16_2005

Deletions

Delete all but subsection 103.01 Intent of Contract.

104 - Control of Work

104.00_nat_us_06_16_2006

Deletions

Delete Sections 104.01, 104.02, and 104.04.

104.06_nat_us_02_17_2005

Add the following subsection:

104.06 Use of Roads by Contractor

The Contractor is authorized to use roads under the jurisdiction of the Forest Service for all activities necessary to complete this contract, subject to the limitations and authorizations designated in the Road Order(s) or described in the contract, when such use will not damage the roads or national forest resources, and when traffic can be accommodated safely.

105 - Control of Material

105.02_nat_us_01_18_2007

105.02 Material Sources.

105.02(a) Government-provided sources.

Add the following:

Comply with the requirements of 30 CFR 56, subparts B and H. Use all suitable material for aggregate regardless of size unless otherwise designated. When required, re-establish vegetation in disturbed areas according to section 625.

105.05_nat_us_05_12_2004

105.05 Use of Material Found in the Work.

Delete 105.05 (a) and (b) and the last sentence of the second paragraph and substitute the following:

Materials produced or processed from Government lands in excess of the quantities required for performance of this contract are the property of the Government. The Government is not obligated to make reimbursement for the cost of producing these materials.

106 - Acceptance of Work

106.01_nat_us_07_31_2007

106.01 Conformity with Contract Requirements.

Delete Subsection 106.01 and substitute the following:

Follow the requirements of FAR Clause 52.246-12 Inspection of Construction.

References to standard test methods of AASHTO, ASTM, GSA, and other recognized standard authorities refer to the methods in effect on the date of solicitation for bids.

Perform all work to the lines, grades, cross-sections, dimensions, and processes or material requirements shown on the plans or specified in the contract.

Incorporate manufactured materials into the work according to the manufacturer's recommendations or to these specifications, whichever is more strict.

Plan dimensions and contract specification values are the values to be strived for and complied with as the design values from which any deviations are allowed. Perform work and provide material that is uniform in character and reasonably close to the prescribed value or within the specified tolerance range. The purpose of a tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons.

When standard manufactured items are specified (such as fence, wire, plates, rolled shapes, pipe conduits, etc., that are identified by gauge, unit mass, section dimensions, etc.), the identification will be considered to be nominal masses or dimensions. Unless specific contract tolerances are noted, established manufacturing tolerances will be accepted.

The Government may inspect, sample, or test all work at any time before final acceptance of the project. When the Government tests work, copies of test reports are furnished to the Contractor upon request. Government tests may or may not be performed at the work site. If Contractor testing and inspection is verified by the Government, the Contractor's results may be used by the Government to evaluate work for acceptance. Do not rely on the availability of Government test results for process control.

Acceptable work conforming to the contract will be paid for at the contract unit bid price. Four methods of determining conformity and accepting work are described in Subsections 106.02 to 106.05 inclusive. The primary method of acceptance is specified in each Section of work. However, work may be rejected at any time it is found by any of the methods not to comply with the contract.

Remove and replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted, at no cost to the Government.

(a) Disputing Government test results. **If the accuracy of Government test results is disputed, promptly inform the CO. If the dispute is unresolved after reasonable steps are taken to resolve the dispute, further evaluation may be obtained by written request. Include a narrative describing the dispute and a proposed resolution protocol that addresses the following:**

- (1) Sampling method;
- (2) Number of samples;
- (3) Sample transport;
- (4) Test procedures;
- (5) Testing laboratories;
- (6) Reporting;
- (7) Estimated time and costs; and
- (8) Validation process.

If the evaluation requires additional sampling or testing be performed, mutually agree with the Government on witnessing procedures and on sampling and testing by a third party laboratory. Use a third party laboratory accredited by the AASHTO accreditation program. Provide proof of the laboratory's accreditation for the test procedures to be used. Do not use the same laboratory that produced the disputed Government test results or that produced the test results used as a basis for the dispute.

The CO will review the proposed resolution protocol and may modify it before final approval and execution.

The Government will use the approved resolution protocol test results to determine the validity of the disputed testing. If the Government test results are validated, the Contractor will be responsible for all costs associated with developing and performing the resolution protocol. If the Government test results are not validated, the Government will be responsible for all costs associated with developing and performing the resolution protocol. If the validity of the Government test results cannot be determined, the Contractor and Government will equally share all costs associated with developing and carrying out the resolution protocol.

(b) **Alternatives to removing and replacing non-conforming work.** As an alternative to removal and replacement, the Contractor may submit a written request to:

- (1) Have the work accepted at a reduced price; or
- (2) Be given permission to perform corrective measures to bring the work into conformity.

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The request must contain supporting rationale and documentation. Include references or data justifying the proposal based on an evaluation of test results, effect on service life, value of material or work, quality, aesthetics, and other tangible engineering basis. The CO will determine disposition of the nonconforming work.

106.07_nat_us_05_11_2004

106.07 Delete

Delete subsection 106.07.

107 - Legal Relations and Responsibility to the Public

107.05_nat_us_05_11_2004

107.05 Responsibility for Damage Claims.

Delete the entire subsection.

107.06_nat_us_06_16_2006

107.06 Contractor's Responsibility for Work.

Delete the following from the first paragraph.

"except as provided in Subsection 106.07".

107.09_nat_us_06_16_2006

107.09 Legal Relationship of the Parties.

Delete the entire subsection.

107.10_nat_us_06_16_2006

107.10 Environmental Protection.

Add the following:

Design and locate equipment repair shops, stationary refueling sites, or other facilities to minimize the potential and impacts of hazardous material spills on Government land.

Before beginning any work, submit a Hazardous Spill Plan. List actions to be taken in the event of a spill. Incorporate preventive measures to be taken, such as the location of mobile refueling facilities, storage and handling of hazardous materials, and similar information. Immediately notify the CO of all hazardous material spills. Provide a written narrative report form no later than 24 hours after the initial report and include the following:

- Description of the item spilled (including identity, quantity, manifest number, and other identifying information).
- Whether amount spilled is EPA or state reportable, and if so whether it was reported, and to whom.
- Exact time and location of spill including a description of the area involved.
- Containment procedures.
- Summary of any communications the Contractor had with news media, Federal, state and local regulatory agencies and officials, or Forest Service officials.
- Description of clean-up procedures employed or to be employed at the site including final disposition and disposal location of spill residue.

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When available provide copies of all spill related clean up and closure documentation and correspondence from regulatory agencies.

The Contractor is solely responsible for all spills or leaks that occur during the performance of this contract. Clean up spills or leaks to the satisfaction of the CO and in a manner that complies with Federal, state, and local laws and regulations.

108 - Prosecution and Progress

108.00_nat_us_02_16_2005

108 Delete.

Delete Section 108 in its entirety.

109 - Measurement and Payment

109.00_nat_us_02_17_2005

109 Deletions

Delete the following entire subsections:

109.06 Pricing of Adjustments.

109.07 Eliminated Work.

109.08 Progress Payments.

109.09 Final Payment.

109.02_nat_us_06_16_2006

109.02 Measurement Terms and Definitions.

(b) Contract quantity.

Add the following:

Contract quantities will be adjusted only when there are errors in the original design of 15% or more.

Change the following:

“(b) Cubic yard” to “(c) Cubic yard”.

Add the following definition:

(p) Thousand Board Feet (Mbf). 1,000 board feet based on nominal widths, thickness, and extreme usable length of each piece of lumber or timber actually incorporated in the job. For glued laminated timber, 1,000 board feet based on actual width, thickness, and length of each piece actually incorporated in the job.

152 - Construction Survey and Staking

152.00_nat_us_08_05_2005

Description

152.01(c) Material.

Add the following:

Use required stake dimensions and materials. Pre-paint the top 2 inches of all stakes and lath, or mark them with plastic flagging. Use designated colors for paint or flagging. Mark all stakes with a stake pencil that leaves a legible imprint, or with waterproof ink.

Do not use aerosol spray paints.

Use moisture-resistant paper for survey notes. Keep notes in books with covers that will protect the contents and retain the pages in numerical sequence.

Construction Requirements

152.02 General.

Delete the first two sentences.

Add the following:

When indicated on the plans, a preliminary survey line has been established on the ground. The project location line is established by offsets from this preliminary line.

Delete second sentence in second paragraph and replace with the following:

Reestablish missing reference, control lines, or stakes as necessary to control subsequent construction staking operations

152.03 Survey and Staking Requirements.

(b) Roadway cross-sections.

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Replace the first two sentences with the following:

Take roadway cross-sections normal to centerline. When the centerline curve radius is less than or equal to 200 feet, take cross-sections at a maximum centerline spacing of 25 feet. When the centerline curve radius is greater than 200 feet take cross-sections at a maximum centerline spacing of 80 feet.

c) Slope Stakes & References:

Replace section with the following:

Slope stakes and references. When required, locate slope stakes on designated portions of the road. Locate the slope stake catch points and use them to establish clearing limits and slope stake references.

Mark slope stakes with the station, the amount of cut or fill, the horizontal distance to centerline, and the slope ratios.

Place slope reference stakes at least 10 feet outside the clearing limit and mark with the offset distance to the slope stake. Place sight stakes when required.

Prior to clearing and grubbing operations, move the slope stake outside the clearing limit to the slope reference stake. After clearing and grubbing and before excavation, reset the slope stakes in their original position.

Use the designated method to establish the slope stake catchpoint.

- **Method I**—Computed Method. Use the template information shown in the plans or other Government-provided data to calculate the actual location of the catchpoint. The slope stake “catchpoint distance” provided may be used as a trial location to initiate slope staking. Recatch slope stakes on any section that does not match the staking report within the tolerances established in Table 152-2.
- **Method II**—Catchpoint Measurement Method. Determine the location of slope stake catchpoints by measuring the catchpoint distances shown in the plans or other Government-provided data.

(d) Clearing and grubbing limits.

Add the following:

Establish clearing limits on each side of the location line by measuring the required horizontal or slope distances shown in the stake notes. Mark the clearing limits with flagging or tags on trees to be left standing, or on lath. Make markings intervisible, and no more than 90 feet apart.

After establishing clearing limits, move the location line stake outside the clearing limits for station identification purposes, and mark it with horizontal distance to location line

(e) Centerline reestablishment.

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Replace with the following:

Reestablish centerline from instrument control points. The maximum spacing between centerline points is 25 feet when the centerline curve radius is less than or equal to 200 feet. When the centerline curve radius is greater than 200 feet, the maximum distance between centerline points is 80 feet.

(g) Culverts.

Replace subsection with the following:

Set culvert reference stakes at all culvert locations. Set a culvert reference stake on the centerline of the culvert 10 feet from each end or beyond the clearing limit, whichever is greater. Record the following on culvert reference stakes:

- (1) Diameter, actual field measured length, and type of culvert.
- (2) The vertical and horizontal distance from the reference stake to the invert at the ends of the culvert.
- (3) Station of actual point where culvert intersects centerline.

When required, stake headwall for culverts by setting a hub with a guard stake on each side of the culvert on line with the face of the headwall. Perform this work after clearing is completed.

152.03 (l) Miscellaneous Survey and Staking.

Add the following:

- (11) Cattleguards
- (12) Drain Dips
- (13) Erosion Control Measures

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Replace Table 152-1 with the following two tables:

Table 152-1 Tolerances for reestablishing P-line, traverse, and elevations.

Precision Class	Minimum Position Closure	Angular Accuracy (\pm)	L-Line Tangent Control Points ^a (\pm)	Vertical Closure ^b (\pm)
A (Bridges)	1/10,000	2 sets, direct/reverse 10 second rejection limit	N/A	0.02 ft or 0.02ft/1000ft ^c
B	1/5,000	2 sets, direct/reverse 20 second rejection limit	0.1 ft	0.02 ft or 0.02ft/1000ft ^c
C	1/1,000	1 set, direct/reverse 1 minute rejection limit	0.2 ft	0.5ft/1000ft ^c
D	1/300	Foresight and backsight; 15 minute rejection limit ^c	0.4 ft	1.0ft/1000ft ^c
E	1/100	Foresight and backsight; 30 minute rejection limit ^c	0.8 ft	1.0ft/1000ft ^c

a. Accuracy of offset measurement.

b. Determine vertical closures at intervals not to exceed 2000 ft as measured along centerline.

c. Use greater value.

Table 152-2 Cross section and slope stake tolerances.

Item	Tolerances				
	A	B	C	D	E
Allowable deviation of cross-section line projection from a true perpendicular to tangents, a true bisector of angle points, or a true radius of curves	(±)2°	(±)3°	(±)3°	(±)5°	(±)5°
Take cross-sections topography measurements so that variations in ground from a straight line connecting the cross-section points will not exceed	0.5 ft	1.0 ft	2.0 ft	2.0 ft	3.0 ft
Horizontal and vertical accuracy for cross-sections, in feet or percentage of horizontal distance measured from traverse line, whichever is greater.	0.1 ft or 0.4%	0.15 ft or 0.6%	0.2 ft or 1.0%	0.2 ft or 1.0%	0.3 ft or 1.0%
Horizontal and vertical accuracy for slope stake, slope stake references, and clearing limits. In feet or percentage of horizontal distance measured from centerline or reference stake, whichever is greater.					
Slope reference stakes and slope stakes.	0.1 ft or 0.4%	0.15 ft or 0.6%	0.2 ft or 1.0%	0.2 ft or 1.0%	0.3 ft or 1.0%
Clearing limits	1.0 ft	1.0 ft	1.0 ft	1.5 ft	2.5 ft

155 - Schedules for Construction Contracts

155.00_nat_us_05_11_2004

155 Delete.

Delete Section 155 in its entirety.

156 - Public Traffic

156.03_nat_us_02_24_2005

156.03 Accommodating Traffic During Work.

Delete the following from the last paragraph:

according to Subsection 106.07(b)

156.04_nat_us_02_24_2005

156.04 Maintaining Roadways During Work

(a) Add the following:

Do not construct detours outside of the clearing limits or use alternate route detours without the approval of the CO.

156.08_nat_us_02_24_2005

156.08 Traffic and Safety Supervisor.

Delete this subsection in its entirety.

157 - Soil Erosion Control

157.03_nat_us_02_24_2005

157.03 General

Delete the entire subsection and replace with the following:

Prior to the start of construction, submit a written plan that provides permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction. Do not begin work until the necessary controls for that particular phase of work have been implemented. Do not modify the type, size, or location of any control. An alternate erosion control plan with all necessary permits may be submitted 30 days before intended use.

Incorporate all permanent erosion control features into the project at the earliest practicable time, as outlined in the approved plan.

When erosion control measures are not functioning as intended, immediately take corrective action.

170 - Develop Water Supply and Watering

170.00_0618_us_03_26_2007

Description

170.01 This work consists of developing an acceptable water supply, furnishing, hauling, and applying water.

Materials

170.02 Conform to the following subsection.

Water	725.01.
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Construction Requirements

170.03 Development of Supply & Access. Develop water supplies and access to the water supplies as required. Use designated water sources or other approved water sources. Before using non-designated water sources, obtain all necessary permissions, water rights, and permits.

170.04 Equipment.

(a) Water tanks. Provide mobile watering equipment with watertight tanks of known capacity. Provide for positive control of water application from the driver's position.

(b) Juvenile fish protection. All draft hoses being used to withdraw water from any live flowing stream or pond will utilize one of the following methods of screening.

(1) Perforated plate: Screen opening shall not exceed 3/32 or 0.0938-inches.

(2) Profile bar screen: The narrowest dimension in the screen openings shall not exceed 0.0689-inches in the narrowest direction.

(3) Woven wire screen: Screen openings shall not exceed 3/32 or 0.0938-inches in the narrow direction.

All methods shall be cleaned frequently with either wire brushing, flushing or other acceptable method.

170.05 Application. Apply water uniformly without ponding or washing.

170.06 Acceptance. Developing water supplies and watering will be evaluated under Subsections 106.02 and 106.04.

Measurement and Payment

170.07 See Subsection 109.05.

Do not measure develop water supply and watering for payment.

203 - Removal of Structures and Obstructions

203.01_nat_us_02_25_2005

203.01 Description.

Delete and replace with the following:

This work consists of disposing of construction slash and debris, salvaging, removing, and disposing of buildings, fences, structures, pavements, culverts, utilities, curbs, sidewalks, and other obstructions.

203.04_nat_us_02_18_2005

203.04 Removing Material.

Replace the fourth and fifth paragraphs with the following:

Where part of an existing culvert is removed, remove the entire culvert upstream from the removal. The remaining downstream culvert may be left in place if no portion of the culvert is within 12 inches of the subgrade, embankment slope, or new culvert or structure; and the culvert ends are sealed with concrete.

Remove structures and obstructions in the roadbed to 12 inches below subgrade elevation.

Remove structures and obstructions outside the roadbed to 12 inches below finished ground or to the natural stream bottom.

203.05_0618_us_03_26_2007

203.05 Disposing of Material.

Add the following:

(e) Windrowing Construction Slash. Place construction slash outside the roadway in neat, compacted windrows approximately parallel to and along the toeline of embankment slopes. Do not permit the top of the windrows to extend above subgrade. Use construction equipment to matt down all material in a windrow to form a compact and uniform pile. Construct breaks of at least 15 feet at least every 200 feet in a windrow. Do not place windrows against trees. Obtain approval for pioneer roads. A pioneer road may be constructed to provide an area for placement of windrows, provided the excavated material is kept within the clearing limits and does not adversely affect the road construction.

(f(1)) Scattering method outside clearing limits. Scatter construction slash outside the clearing limits without damaging trees. Limb all logs. Place logs and stumps away from trees, positioned so they will not roll, and are not on top of one another. Limb and scatter other construction slash to reduce slash concentrations.

(f(2)): Scattering method inside clearing limits. Scatter pieces of wood less than 3 inches in diameter and 3 feet in length within the clearing limits. Do not place construction slash in lakes, meadows, streams, or streambeds. Immediately remove construction slash that interferes with drainage structures.

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(g) Chipping or Grinding. Use an approved chipping machine to grind slash and stumps greater than 3 inches in diameter and longer than 3 feet. Deposit chips or ground woody material on embankment slopes or outside the roadway to a loose depth less than 6 inches. Minor amounts of chips or ground woody material may be permitted within the roadway if they are thoroughly mixed with soil and do not form a layer.

(h) Debris Mat. Use tree limbs, tops, cull logs, split stumps, wood chunks, and other debris to form a mat upon which construction equipment is operated. Place stumps upside down and blend stumps into the mat.

(i) Decking Firewood Material. Remove brush from decks. Limb and deck logs that do not meet Utilization Standards according to Subsection 201.04 as directed by the CO. Cut logs to lengths less than 30 feet. Ensure that logs stacks are stable and free of brush and soil.

(j) Removal to designated locations. Remove construction slash to designated locations.

(k) Piling. Pile construction slash in designated areas. Place and construct piles so that if the piles are burned, the burning will not damage remaining trees. Keep piles free of dirt from stumps. Cut unmerchantable logs into lengths of less than 20 feet.

(l) Placing Slash on Embankment Slopes. Place construction slash on completed embankment slopes to reduce soil erosion. Place construction slash as flat as practicable on the completed slope. Do not place slash closer than 2 feet below subgrade. Priority for use of available slash is for: (1) through fills; (2) insides of curves; and (3) ditch relief outlets.

(m) Hydrological Sensitive Placement. Where required use this method in combination with other designated methods to dispose of material to reduce erosion and to aid in re-vegetation:

1. Place windrow segments on contours, wrap in type I geotextile.
2. Place logs as log erosion barriers on contours. Place logs so that 80% of their length is on the ground surface.
3. Scatter slash on bare or disturbed areas within or outside the clearing limits as directed.
4. Scatter chips or ground woody material on bare or disturbed areas within or outside the clearing limits as directed.

Place stumps in swales or on sites to form planting pockets. Place windrow segments on contours, wrap in type I geotextile.

203.05_0618_us_03_26_2007

203.05 Disposing of Material

(a) Remove from project.

Delete the last two sentences

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203.08_nat_us_02_24_2005

203.08 Payment

Add the following:

Disposal of construction slash will be compensated under the designated pay item in Section 201.

204 - Excavation and Embankment

204.00_nat_us_03_26_2009

Replace Section 204 in its entirety with the following:

Description

204.01 This work consists of excavating material and constructing embankments. This includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material.

204.02 Definitions.

(a) **Excavation.** Excavation consists of the following:

(1) **Roadway excavation.** All material excavated from within the right-of-way or easement areas, except subexcavation covered in (2) below and structure excavation covered in Sections 208 and 209. Roadway excavation includes all material encountered regardless of its nature or characteristics.

(2) **Subexcavation.** Material excavated from below subgrade elevation in cut sections or from below the original groundline in embankment sections. Subexcavation does not include the work required by Subsections 204.05, 204.06(b), and 204.06(c).

(3) **Borrow excavation.** Material used for embankment construction that is obtained from outside the roadway prism. Borrow excavation includes unclassified borrow, select borrow, and select topping.

(b) **Embankment construction.** Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:

- (1) Preparing foundation for embankment;
- (2) Constructing roadway embankments;
- (3) Benching for side-hill embankments;
- (4) Constructing dikes, ramps, mounds, and berms; and
- (5) Backfilling subexcavated areas, holes, pits, and other depressions.

(c) **Conserved topsoil.** Excavated material conserved from the roadway excavation and embankment foundation areas that is suitable for growth of grass, cover crops, or native vegetation.

(d) **Waste.** Excess and unsuitable roadway excavation and subexcavation that cannot be used.

Material

204.03 Conform to the following Subsections:

Backfill material	704.03
Select borrow	704.07
Select topping	704.08
Topping	704.05
Unclassified borrow	704.06
Water	725.01

Construction Requirements

204.04 Preparation for Roadway Excavation and Embankment Construction. Clear the area of vegetation and obstructions according to Sections 201 and 203.

204.05 Reserved.

204.06 Roadway Excavation. Excavate as follows:

(a) General. Do not disturb material and vegetation outside the construction limits. Incorporate only suitable material into embankments. Replace any shortage of suitable material caused by premature disposal of roadway excavation. Dispose of unsuitable or excess excavation material according to Subsection 204.14.

At the end of each day's operations, shape to drain and compact the work area to a uniform cross-section. Eliminate all ruts and low spots that could hold water.

Retrieve material deposited outside of the clearing limits as directed by the CO. Place unsuitable material in designated areas.

(b) Rock cuts. Blast rock according to Section 205. Excavate rock cuts to 6 inches below subgrade within the roadbed limits. Backfill to subgrade with topping or with other suitable material. Compact the material according to Subsection 204.11

(c) Earth cuts. Scarify earth cuts to 6 inches below subgrade within the roadbed limits. Compact the scarified material according to Subsection 204.11.

(d) Pioneer Roads. Road pioneering, slash disposal, and grubbing of stumps may proceed concurrently with excavation. Conduct excavation and placement operations so material to be treated under Section 201 will not be incorporated into the roadway unless specified in the slash treatment method. Maintain drainage during pioneering operations.

Remove snow and ice in advance of the work and deposit beyond the roadway limits in a manner that will not waste material or generate sediment. Do not incorporate snow and ice into embankments. Place snow or ice in a manner to prevent resource damage.

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204.07 Subexcavation. Excavate material to the limits designated by the CO. Take cross-sections according to Section 152. Prevent unsuitable material from becoming mixed with the backfill. Dispose of unsuitable material according to Subsection 204.14. Backfill the subexcavation with topping, or other suitable material. Compact the material according to Subsection 204.11.

204.08 Borrow Excavation. Use all suitable roadway excavation in embankment construction. Do not use borrow excavation when it results in excess roadway excavation. Deduct excess borrow excavation from the appropriate borrow excavation quantity.

Obtain borrow source acceptance according to Subsection 105.02. Develop and restore borrow sources according to Subsection 105.03. Do not excavate beyond the established limits. When applicable, shape the borrow source to permit accurate measurements when excavation is complete.

204.09 Preparing Foundation for Embankment Construction. Prepare foundation for embankment construction as follows:

(a) **Embankment less than 4 feet high over natural ground.** When designated, remove topsoil and break up the ground surface to a minimum depth of 6 inches by plowing or scarifying. Compact the ground surface according to Subsection 204.11.

(b) **Embankments over an existing asphalt, concrete, or gravel road surface.** Scarify gravel roads to a minimum depth of 6 inches. Scarify or pulverize asphalt and concrete roads to 6 inches below the pavement. Reduce all particles to a maximum size of 6 inches and produce a uniform material. Compact the surface according to Subsection 204.11.

(c) **Embankment across ground not capable of supporting equipment.** Dump successive loads of embankment material in a uniformly distributed layer to construct the lower portion of the embankment. Limit the layer thickness to the minimum depth necessary to support the equipment.

(d) **Embankment on an existing slope steeper than 1V:3H.** Cut horizontal benches in the existing slope to a sufficient width to accommodate placement and compaction operations and equipment. Bench the slope as the embankment is placed and compacted in layers. Begin each bench at the intersection of the original ground and the vertical cut of the previous bench.

204.10 Embankment Construction. Incorporate only suitable roadway excavation material into the embankment. When the supply of suitable roadway excavation is exhausted, furnish unclassified borrow to complete the embankment. Obtain written approval before beginning construction of embankments over 6 feet high at subgrade centerline. Construct embankments as follows:

(a) **General.** At the end of each day's operations, shape to drain and compact the embankment surface to a uniform cross-section. Eliminate all ruts and low spots that could hold water.

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During all stages of construction, route and distribute hauling and leveling equipment over the width and length of each layer of material.

Compact embankment side slopes flatter than 1V:1.75H with a tamping type roller or by walking with a dozer. For slopes 1V:1.75H or steeper, compact the slopes as construction of the embankment progresses.

Where placing embankment on one side of abutments, wing walls, piers, or culvert headwalls, compact the material using methods that prevent excessive pressure against the structure.

Where placing embankment material on both sides of a concrete wall or box structure, conduct operations so compacted embankment material is at the same elevation on both sides of the structure.

Where structural pilings are placed in embankment locations, limit the maximum particle size to 4 inches.

(b) Embankment within the roadway prism. Place embankment material in horizontal layers not exceeding 12 inches in compacted thickness. Incorporate oversize boulders or rock fragments into the 12-inch layers by reducing them in size or placing them individually as required by (c) below. Compact each layer according to Subsection 204.11 before placing the next layer.

Material composed predominately of boulders or rock fragments too large for 12-inch layers may be placed in layers up to 24 inches thick. Incorporate oversize boulders or rock fragments into the 24-inch layer by reducing them in size or placing them individually according to (c) below. Place sufficient earth and smaller rocks to fill the voids. Compact each layer according to Subsection 204.11 before placing the next layer.

(c) Individual rock fragments and boulders. Place individual rock fragments and boulders greater than 24 inches in diameter as follows:

- (1) Reduce rock to less than 48 inches in the largest dimension.
- (2) Distribute rock within the embankment to prevent nesting.
- (3) Place layers of embankment material around each rock to a depth not greater than that permitted by (b) above. Fill all the voids between rocks.
- (4) Compact each layer according to Subsection 204.11 before placing the next layer.

(d) Embankment outside of roadway prism. Where placing embankment outside the staked roadway prism, place material in horizontal layers not exceeding 24 inches in compacted thickness. Compact each layer according to Subsection 204.11.

204.11 Compaction. Compact the embankment using one of the following methods as specified:

(a) Compaction A. Use AASHTO T 27 to determine the amount of material retained on a Number 4 sieve. If there is more than 80 percent retained on the No. 4 sieve use procedure (1).

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If there is 50 to 80 percent retained on the No. 4 sieve use procedure (2). If there is less than 50 percent retained on the No. 4 sieve use procedure (3).

(1) Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet per second and vibratory rollers at speeds less than 3 feet per second. Compact each layer of material full width with one of the following and until there is no visible evidence of further consolidation.

(a) Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds impact per vibration and a minimum frequency of 1000 vibrations per minute.

(b) Eight roller passes of a 20-ton compression-type roller.

(c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches as follows:

- For each additional 6 inches or fraction thereof, increase the number of roller passes in (a) above by four passes.
- For each additional 6 inches or fraction thereof, increase the number of roller passes in (b) and (c) above, by eight passes.

(2) Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 sieve. Multiply this number by the percentage of material passing a No. 4 sieve, and add 2 percent to determine the optimum moisture content of the material. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type rollers at speeds less than 6 feet per second and vibratory rollers at speeds less than 3 feet per second. Compact each layer of material full width according to (1) above.

(3) Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 180, method D. For other material classifications, determine the optimum moisture content and maximum density according to AASHTO T 99, method C.

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

(b) **Compaction B.** Place material by end dumping to the minimum depth needed for operation of spreading equipment. Adjust the moisture content of the material to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Operate compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes.

(c) **Compaction C.** Place material by end dumping to the minimum depth needed for operation of spreading equipment. Level and smooth each embankment layer before placing the next layers. Operate hauling and spreading equipment uniformly over the full width of each layer. Construct a solid embankment with adequate compaction by working smaller rock and fines in with the larger rocks to fill the voids, and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.

204.12 Ditches. Slope, grade, and shape ditches. Remove all projecting roots, stumps, rock, or similar matter. Maintain all ditches in an open condition and free from leaves, sticks, and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place all excavated material on the downhill side so the bottom of the ditch is approximately 18 inches below the crest of the loose material. Clean the ditch using a hand shovel, ditcher, or other suitable method. Shape to provide drainage without overflow.

204.13 Sloping, Shaping, and Finishing. Complete slopes, ditches, culverts, riprap, and other underground minor structures before placing aggregate courses. Slope, shape, and finish as follows:

(a) **Sloping.** Leave all earth slopes with uniform roughened surfaces, except as described in (b) below, with no noticeable break as viewed from the road. Except in solid rock, round tops and bottoms of all slopes including the slopes of drainage ditches. Round material overlaying solid rock to the extent practical. Scale all rock slopes. Slope rounding is not required on tolerance class D though M roads.

If a slide or slipout occurs on a cut or embankment slope, remove or replace the material, and repair or restore all damage to the work. Bench or key the slope to stabilize the slide. Reshape the cut or embankment slope to an acceptable condition.

(b) **Stepped slopes.** Where required by the contract, construct steps on slopes of 1½V:1H to 1V:2H. Construct the steps approximately 18 inches high. Blend the steps into natural ground at the end of the cut. If the slope contains nonrippable rock outcrops, blend steps into the rock. Remove loose material found in transitional area. Except for removing large rocks that may fall, scaling stepped slopes is not required.

(c) **Shaping.** Shape the subgrade to a smooth surface and to the cross-section required. Shape slopes to gradually transition into slope adjustments without noticeable breaks. At the ends of

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cuts and at intersections of cuts and embankments, adjust slopes in the horizontal and vertical planes to blend into each other or into the natural ground.

(d) Finishing. Finish the roadbed to be smooth and uniform, and shaped to conform to the typical sections. Remove unsuitable material from the roadbed and replace it with suitable material. Finish roadbeds to the tolerance class shown in table 204-2. Ensure that the subgrade is visibly moist during shaping and dressing. Scarify to 6 inches below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material. Maintain proper ditch drainage.

For surfaced roads, remove all material larger than 6 inches from the top 6 inches of the roadbed.

For unsurfaced roads, use one of the following methods to finish the roadbed:

- (1) Method A.** Remove all material larger than 6 inches from the top 6 inches of the roadbed and replace with suitable material.
- (2) Method B.** Use a vibratory grid roller or approved equal with a minimum weight of 10 tons. Roll at least 5 full-width passes or until there is no visible evidence of further consolidation.
- (3) Method C.** For roads designated as Construction Tolerance Class K, L, or M, finish the roadbed by spreading the excavation. Eliminate rock berms.

204.14 Disposal of Unsuitable or Excess Material. Dispose of unsuitable or excess material at designated sites or legally off of the project.

When there is a pay item for waste, shape and compact the waste material in its final location. Do not mix clearing or other material not subject to payment with the waste material.

204.15 Acceptance. See Table 204-1 for sampling and testing requirements.

Material for embankment and conserved topsoil will be evaluated under Subsections 106.02 and 106.04.

Excavation and embankment construction will be evaluated under Subsections 106.02 and 106.04.

Clearing and removal of obstructions will be evaluated under Sections 201 and 203.

Measurement

204.16 Measure the Section 204 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

(a) Roadway excavation. Measure roadway excavation in its original position as follows:

- (1)** Include the following volumes in roadway excavation:

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- (a) Roadway prism excavation;
- (b) Rock material excavated and removed from below subgrade in cut sections;
- (c) Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule;
- (d) Ditches, except furrow ditches measured under a separate bid item;
- (e) Topsoil;
- (f) Borrow material used in the work when a pay item for borrow is not shown in the bid schedule;
- (g) Loose scattered rocks removed and placed as required within the roadway;
- (h) Conserved material taken from stockpiles and used in Section 204 work; and
- (i) Slide and slipout material not attributable to the Contractor's method of operation.

(2) Do not include the following in roadway excavation:

- (a) Overburden and other spoil material from borrow sources;
- (b) Overbreakage from the backslope in rock excavation;
- (c) Water or other liquid material;
- (d) Material used for purposes other than required;
- (e) Roadbed material scarified in place and not removed;
- (f) Material excavated when stepping cut slopes;
- (g) Material excavated when rounding cut slopes;
- (h) Preparing foundations for embankment construction;
- (i) Material excavated when benching for embankments;
- (j) Slide or slipout material attributable to the Contractor's method of operation;
- (k) Conserved material taken from stockpiles constructed at the option of the Contractor; and
- (l) Material excavated outside the established slope limits.

(3) When both roadway excavation and embankment construction pay items are shown in the bid schedule, measure the following as roadway excavation only:

- (a) Unsuitable material below subgrade in cuts and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule;
- (b) Slide and slipout material not attributable to the Contractor's method of operations; and
- (c) Drainage ditches, channel changes, and diversion ditches.

(b) Unclassified borrow, select borrow, and select topping. When measuring by the cubic yard measure in its original position. If borrow excavation is measured by the cubic yard in place, take initial cross-sections of the ground surface after stripping overburden. Upon completion of excavation and after the borrow source waste material is returned to the source, retake cross-sections before replacing the overburden.

Do not measure borrow excavation used in place of excess roadway excavation.

(c) Embankment construction. Measure embankment construction in its final position. Do not make deductions from the embankment construction quantity for the volume of minor structures.

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(1) Include the following volumes in embankment construction:

- (a) Roadway embankments;
- (b) Material used to backfill subexcavated areas, holes, pits, and other depressions;
- (c) Material used to restore obliterated roadbeds to original contours; and
- (d) Material used for dikes, ramps, mounds, and berms.

(2) Do not include the following in embankment construction:

- (a) Preparing foundations for embankment construction;
- (b) Adjustments for subsidence or settlement of the embankment or of the foundation on which the embankment is placed; and
- (c) Material used to round fill slopes.

(d) Rounding cut slopes. Measure rounding cut slopes horizontally along the centerline of the roadway if a pay item for slope rounding is included in the bid schedule. If a pay item for slope rounding is not included in the bid schedule slope rounding will be considered subsidiary to excavation.

(e) Waste. Measure waste by the cubic yard in its final position. Take initial cross-sections of the ground surface after stripping over burden. Upon completion of the waste placement, retake cross-sections before replacing overburden.

(f) Slope scaling. Measure slope scaling by the cubic yard in the hauling vehicle.

Payment

204.17 The accepted quantities will be paid at the contract price per unit of measurement for the Section 204 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Table 204-1
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Topping (704.05) & unclassified borrow (704.06)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type	Processed material before incorporating in work	Yes, when requested	Before using in work
		Moisture-density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per	“	“	“
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 6000 yd ² but not less than 1 per layer	In-place	—	Before placing next layer
Select borrow (704.07 & Select topping (704.08)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type but not less than 1 for each day of production	Processed material before incorporating	Yes, when requested	Before using in work
		Gradation	—	AASHTO T 27	“	“	“	“
		Liquid limit	—	AASHTO T 89	“	“	“	“
		Moisture-density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per	“	“	“
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 6000 yd ² but not less than 1 per layer	In-place	—	Before placing next layer

(1) Minimum of 5 points per proctor

Table 204-1 (continued)
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Earth embankment (204.11, Compaction A)	Measured and tested for conformance (106.04)	Classification	—	AASHTO M 145	1 per soil type	Source of Material	Yes, when requested	Before using in work
		Moisture-density	—	AASHTO T 180, method D ⁽¹⁾ or T 99, method C ⁽¹⁾	1 per soil type but not less than 1 per 13,000 yd ³	"	"	"
		Compaction	—	AASHTO T 310 or other approved procedures	1 per 3500 yd ² but not less than 1 per layer	In-place	—	Before placing next layer
Top of subgrade (204.11 Compaction A)	Measured and tested for conformance (106.04)	Compaction	—	AASHTO T 310 or other approved procedures	1 per 2500 yd ²	In-place	—	Before placing next layer

(1) Minimum of 5 points per proctor.

Table 204-2
Construction Tolerances

	Tolerance Class ^(a)												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Roadbed width (ft)	+0.5	+0.5	+1.0	+1.0	+1.0	+1.0	+1.5	+1.0	+2.0	+2.0	+2.0	+2.0	+2.0
Subgrade elevation (ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±2.0	±3.0	±2.0	±3.0	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope ^(b))	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

(a) Maximum allowable deviation from construction stakes and drawings.

(b) Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

(c) Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

209 - Structure Excavation and Backfill

209.00_nat_us_03_24_2008

Section 209A. — STRUCTURE EXCAVATION AND BACKFILL FOR SELECTED MINOR STRUCTURES

Description

209A.01 This work consists of excavating, preparing foundations, backfilling, and subsequent removal of safety features for the construction of selected structures with or without a geogrid reinforcing mesh and welded wire facing.

Material

209A.02 Conform to the following Subsections:

Crushed Aggregate	703.06
Backfill Material	704.03
Structural backfill	704.04
Geotextile type I-D	714.01
Geogrids, Category 1, 2, 3, 4, 5 or 6	714.03
Welded wire form	720.01(b)

Construction Requirements

209A.03 Preparation for Structure Excavation. Clear the area of vegetation and obstructions according to Sections 201 and 203.

209A.04 General. Excavate trenches or foundation pits to a width and length that allows room for work. When excavation is complete obtain written approval of the foundation. Ensure the foundation is firm with uniform density throughout its length and width. Foundation grade is the elevation at the bottom of any bedding for installing the structure.

Where necessary to blast rock, blast according to Section 205.

Follow OSHA safety regulations (29 CFR, Part 1926, Subpart P, Excavation) for sloping the sides of excavations, using shoring and bracing, and for using other safety features. When sides of excavations are sloped for safety considerations, provide one copy of the design that demonstrates conformity with OSHA regulations. Where support systems, shield systems, or other protective systems are to be used, design the shoring according to Section 562 and submit working drawings and construction details according to Subsection 104.03.

Remove safety features when no longer necessary. Remove shoring and bracing to at least 2 feet below the surface of the finished ground.

Saw cut or mill existing pavements or concrete structures adjacent to the area to be excavated that are designated to remain.

Drum Stewardship

Do not deposit excavated material in or near a waterway. Do not stockpile excavated material or allow equipment closer than 2 feet from the edge of the excavation.

Dispose of unsuitable or excess material at designated sites or legally off the project. If approved, suitable excavated material may be used as backfill material or structural backfill.

Remove all water as necessary to perform work.

Survey minor structures according to Subsection 152.03 (e) and (i), and verify the limits of the structure. Survey and establish controls within ± 0.16 feet. Grade the foundation for a width equal to the length of the bottom geogrid layer.

209A.05 Foundation Preparation. Excavate any unsuitable material below foundation grade, and replace it with backfill material. Place backfill material in horizontal layers that, when compacted, do not exceed 6 inches in depth. Compact each layer according to Subsection 210.07.

Compact the foundation prior to placing backfill in Subsection 210.06

209A.06 Backfill. Place leveling course with crushed aggregate on the foundation grade when required. Backfill with structural backfill material. Place backfill in horizontal layers that do not exceed 6 inches in compacted thickness. Compact each layer according to Subsection 210.07.

Bring structural backfill up evenly on all sides of the structure as appropriate. Extend each layer to the limits of the excavation or to natural ground.

Ensure when placing the geotextile or geogrid layers that there are no voids below the layer. When placing geotextiles overlap the geotextile a minimum of one foot. When placing geogrid no overlap is required but ensure no gap between adjoining sheets is larger than one-inch. Do not operate equipment directly on top of or damage the welded wire form facing, geotextile, or geogrid elements. Place the geotextile and geogrid smooth and free of wrinkles or folds. Correct all damaged, misaligned, or distorted structure elements. Repair all damage to galvanized coating before installation.

Do not deviate from the design batter of the welded wire form by more than 1 inch per 10 feet of structure height.

209A.07 Compacting. Determine optimum moisture content and maximum density according to AASHTO T 99, method C. Adjust the moisture content of the backfill material to a moisture content suitable for compaction.

Compact material placed in all layers to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures.

Do not apply density requirements as measured by AASHTO T 310 to material that is incapable of being tested or compacted to maximum values determined by AASHTO T 99. For these materials, fill the voids around the rock in each layer with earth or other fine material. Compact each layer, full width, until there is no visible evidence of further consolidation, with a vibratory steel wheeled roller with a mass of at least 8 tons.

Drum Stewardship

In places not accessible to the rollers compact with alternative equipment to obtain the required compaction requirements.

209A.08 Acceptance. See Table 210-1 for sampling and testing requirements.

Clearing and removal of obstructions will be evaluated under Sections 201 and 203.

Survey work will be evaluated under Subsection 106.02 and 106.04.

Material for the backfill material and structural backfill will be evaluated under Subsections 106.02 and 106.04.

Structure excavation and backfill work will be evaluated under Subsections 106.02 and 106.04.

Shoring and bracing will be evaluated under Subsections 106.02 and 106.04.

Welded wire forms, geotextiles, and geogrids will be evaluated under Subsection 106.02 and 106.03.

Placement of welded wire forms, geotextiles, and geogrids will be evaluated under Subsection 106.02 and 106.04.

Measurement

209A.09 Measure the Section 210 items listed in the bid schedule according to Subsection 109.02 and the following.

Measure structural excavation by the cubic yard in its original position according to Subsections 204.16 (a) (1) and (2). Do not include the following volumes in structure excavation:

- (a) Any material included within the staked limits of the excavation, such as contiguous channel changes and ditches, for which measurement is covered under other sections; or
- (b) Material rehandled, except when the contract specifically requires excavation after embankment placement.

Measure backfill material and structural backfill by the cubic yard in place for the volume placed according to Subsection 204.16 (c).

Measure geotextile by the horizontal and vertical dimensions.

Payment

209A.10 The accepted quantities measured as provided in Subsection 109.02 and above, will be paid at the contract price per unit of measurement for the Section 210 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment for structure excavation, shoring, and bracing will be full compensation for excavation to a depth of 6 feet below the lowest elevation shown on the plans for each minor structure. When

Drum Stewardship

the excavation exceeds 6 feet, either the Contractor or the CO may request an equitable price adjustment for the depth in excess of 6 feet.

209.10_0616_us_02_27_2006

209.10 Backfill.

(a) General.

Add the following:

Replace any pipe that is distorted by more than 5 percent of nominal dimensions, or that is ruptured or broken.

Do not place or backfill pipe that meets any of the following conditions until the excavation and foundation have been approved in writing by the CO:

- Embankment height greater than 6 feet at subgrade centerline.
- Installation in a protected streamcourse.
- Round pipe with a diameter of 48 inches or greater.
- Pipe arches with a span of 50 inches or greater.
- Any box culvert of structure other than pipe culverts.

(b) Pipe culverts.

(1) Pipe culverts with compacted backfill.

Add the following:

Excavate an area on each side of the pipe as needed to effectively achieve compaction requirements. Backfill without damaging or displacing the pipe. Complete backfilling of the trench with suitable material.

209.11_nat_us_02_24_2005

Drum Stewardship

209.11 Compacting.

Delete the subsection and add the following:

Compact backfill. Adjust the moisture content of the backfill material to a moisture content suitable for compaction. Compact each layer using appropriate compaction equipment until visual displacement ceases. For compaction away from the arch, use a vibratory steel wheeled roller with a mass of at least 8 tons. Compact backfill near the arch with a minimum of two passes with mechanical tamper (wacker-packer type, or approved equal).

209.12 Acceptance

Add the following:

Sampling and testing is not required.

Table 209-1 Sampling and Testing Requirements

Add the following:

(2) Compaction methods (A) and (B) do not require AASHTO T-99 or T-310 test methods for foundation fill.

210 – Structure Excavation and Backfill for Selected Minor Structures

210.00_nat_us_06_18_2013

Section 210. — STRUCTURE EXCAVATION AND BACKFILL FOR SELECTED MINOR STRUCTURES

Description

210.01 Description

This work consists of excavating, preparing foundations, backfilling, and subsequent removal of safety features for the construction of selected structures with or without a geogrid reinforcing mesh and welded wire facing.

Material

210.02 Material

Conform to the following Subsections:

Crushed aggregate	703.06
Backfill material	704.03
Structural backfill	704.04
Geotextile type I-D	714.01
Geogrids, Category 1, 2, 3, 4, 5 or 6	714.03
Welded wire form	720.01(b)

Construction Requirements

210.03 Preparation for Structure Excavation

Clear the area of vegetation and obstructions according to Sections 201 and 203.

210.04 General

Excavate trenches or foundation pits to a width and length that allows room for work. When excavation is complete obtain written approval of the foundation. Ensure the foundation is firm with uniform density throughout its length and width. Foundation grade is the elevation at the bottom of any bedding for installing the structure.

Where necessary to blast rock, blast according to Section 205.

Follow OSHA safety regulations (29 CFR, Part 1926, Subpart P, Excavation) for sloping the sides of excavations, using shoring and bracing, and for using other safety features. When sides of excavations are sloped for safety considerations, provide one copy of the design that demonstrates conformity with OSHA regulations. Where support systems, shield systems, or other protective systems are to be used, design the shoring according to Section 562 and submit working drawings and construction details according to Subsection 104.03.

Drum Stewardship

Remove safety features when no longer necessary. Remove shoring and bracing to at least 2 feet below the surface of the finished ground.

Saw cut or mill existing pavements or concrete structures adjacent to the area to be excavated that are designated to remain.

Do not deposit excavated material in or near a waterway. Do not stockpile excavated material or allow equipment closer than 2 feet from the edge of the excavation.

Dispose of unsuitable or excess material at designated sites or legally off the project. If approved, suitable excavated material may be used as backfill material or structural backfill.

Remove all water as necessary to perform work.

Survey minor structures according to Subsection 152.03 (e) and (i), and verify the limits of the structure. Survey and establish controls within ± 0.16 feet. Grade the foundation for a width equal to the length of the bottom geogrid layer.

210.05 Foundation Preparation

Excavate any unsuitable material below foundation grade, and replace it with backfill material. Place backfill material in horizontal layers that, when compacted, do not exceed 6 inches in depth. Compact each layer according to Subsection 210.07.

Compact the foundation prior to placing backfill in Subsection 210.06

210.06 Backfill

Place leveling course with crushed aggregate on the foundation grade when required. Backfill with structural backfill material. Place backfill in horizontal layers that do not exceed 6 inches in compacted thickness. Compact each layer according to Subsection 210.07.

Bring structural backfill up evenly on all sides of the structure as appropriate. Extend each layer to the limits of the excavation or to natural ground.

Ensure when placing the geotextile or geogrid layers that there are no voids below the layer. When placing geotextiles overlap the geotextile a minimum of one foot. When placing geogrid no overlap is required but ensure no gap between adjoining sheets is larger than one-inch. Do not operate equipment directly on top of or damage the welded wire form facing, geotextile, or geogrid elements. Place the geotextile and geogrid smooth and free of wrinkles or folds. Correct all damaged, misaligned, or distorted structure elements. Repair all damage to galvanized coating before installation.

Do not deviate from the design batter of the welded wire form by more than 1 inch per 10 feet of structure height.

210.07 Compacting

Adjust the moisture content of the backfill material to a moisture content suitable for compaction.

Drum Stewardship

Compact each layer, full width, until there is no visible evidence of further consolidation, with a vibratory steel wheeled roller with a mass of at least 8 tons.

In places not accessible to the rollers compact with alternative equipment, approved by the CO, to obtain the required compaction requirements.

210.08 Acceptance

Clearing and removal of obstructions will be evaluated under Sections 201 and 203.

Survey work will be evaluated under Subsection 106.02 and 106.04.

Material for backfill material and structural backfill will be evaluated under Subsections 106.02 and 106.04.

Structure excavation and backfill work will be evaluated under Subsections 106.02 and 106.04.

Shoring and bracing will be evaluated under Subsections 106.02 and 106.04.

Welded wire forms, geotextiles, and geogrids will be evaluated under Subsection 106.02 and 106.03.

Placement of welded wire forms, geotextiles, and geogrids will be evaluated under Subsection 106.02 and 106.04.

Measurement

210.09 Measurement

Measure the Section 210 items listed in the bid schedule according to Subsection 109.02 and the following.

Measure structural backfill by the cubic yard in place for the volume placed according to Subsection 204.16 (c).

Measure geogrid by the horizontal and vertical dimensions.

Payment

210.10 Payment

The accepted quantities measured as provided in Subsection 109.02 and above, will be paid at the contract price per unit of measurement for the Section 210 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment for structure excavation, shoring, and bracing will be full compensation for excavation to a depth of 6 feet below the lowest elevation shown on the plans for each minor structure. When

Drum Stewardship

the excavation exceeds 6 feet, either the Contractor or the CO may request an equitable price adjustment for the depth in excess of 6 feet.

303 - Road Reconditioning

303.01_nat_us_03_02_2005

303.01 Work.

Delete and add the following:

This work consists of reconditioning ditches, shoulders, roadbeds, cattleguards, asphalt surfaces, and aggregate surfaces.

303.06_nat_us_08_05_2008

303.06 Aggregate Surface Reconditioning.

Delete and replace with the following:

303.06 Asphalt and Aggregate Surface Reconditioning.

Repair soft and unstable areas to the full depth of the aggregate surface and according to Subsection 204.07. Scarify to the depth of the aggregate surface or to a depth of 6 inches, whichever is less, and remove surface irregularities. Reshape, finish, and compact the entire aggregate surface according to Subsection 301.05, Subsection 321.05, or Subsection 322.05 as applicable.

For asphalt surfaces, clean the existing surface of all loose material, dirt, or other deleterious substances by approved methods. Remove and dispose of unsuitable material that shows evidence of distress, excess asphalt material, or settlement in the roadbed. Patch the areas with approved material that conforms to and is compatible with the adjacent pavement structure. Perform the patch work according to Section 301, 404, 430, or other sections as applicable for the layer or courses being repaired. Clean and seal cracks in the existing asphalt surface according to Subsection 414.05. Correct surface irregularities exceeding 6 inches in depth with a specified aggregate. Place and compact the aggregate according to Subsections 301.04 and 301.05. Prelevel other dips, depressions, sags, excessive or nonexistent crown, or other surface irregularities with asphalt concrete according to Section 404. Spread and compact the asphalt concrete in layers parallel to the grade line not to exceed 2 inches in compacted depth.

303.08_0618_us_03_26_2007

303.08 Pulverizing.

Delete and add the following:

Scarify and pulverize the full depth of existing bituminous surfacing, plus an additional 2 inch penetration into the existing base aggregate as designated. Pulverize until the material is reduced

Drum Stewardship

to a maximum size of 1 1/2 inches. Incorporate the bituminous material and base aggregate into the traveled way and shoulders. Compact the material as specified in Subsection 204.11 (a) (1). Finish the surface according to Subsection 301.06.

303.10_0618_us_03_26_2007

303.10 Measurement

Remove and replace the first sentence in the third paragraph with the following:

Measure roadbed reconditioning, aggregate surface reconditioning, roadway reconditioning, and pulverizing by the mile, by the foot, by the station or by the square yard.

322 - Minor Aggregate Courses

322.00_nat_us_10_14_2011

Description

322.01 This work consists of constructing one or more courses of aggregate on a prepared surface. Work includes producing aggregate by grid rolling, screening, or crushing methods, or placing pit-run or Government-furnished aggregate.

Surface aggregate grading is designated as shown in Table 703-3.

Subbase and base aggregate grading is designated as shown in Table 703-2.

Screened aggregate grading is designated as shown in Table 703-16.

Material

322.02 Conform to the following Subsections:

Aggregate	703.05
Water	725.01

Construction Requirements

322.03 General. Prepare the surface on which the aggregate course is placed according to Section 204 or 303 as applicable.

Request approval of the roadbed in writing before placing aggregate.

Develop, haul, and apply water in accordance to Section 170.

Submit target values within the gradation ranges shown in Table 703-2 or 703-3 for the required grading. After reviewing the proposed target values the CO will determine the final values for the gradation and notify the Contractor in writing.

No quality requirements or gradation other than maximum size will be required for pit run and grid-rolled material. For grid rolling, use all suitable material that can be reduced to maximum size.

Drum Stewardship

After processing on the road, remove all oversize material from the road and dispose of it as directed by the CO.

If the aggregate is produced and stockpiled before placement, handle and stockpiled according to Section 320. Establish stockpile sites at approved locations.

322.04 Mixing and Spreading. Mix the aggregate and adjust the moisture content to obtain a uniform mixture with a moisture content suitable for the specified compaction method. Spread and shape the mixture on the prepared surface in a uniform layer with no segregation of size, and to a loose depth that will provide the required compacted thickness.

Do not place in layers exceeding 6 inches in compacted thickness for aggregate base and surface courses or twice the maximum particle size for screened aggregate. When more than one layer is necessary, compact each layer according to Subsection 322.05 before placing the next layer. Route hauling and leveling equipment uniformly over the full width.

When placing aggregate over geotextile, place aggregate in a single lift to the full depth specified.

322.05 Compacting. Compact each layer full width. Roll from the sides to the center, parallel to the centerline of the road. Along curbs, headers, walls, and all places not accessible to the roller, compact the material with approved tampers or compactors.

Compact the aggregate using one of the following methods as specified:

Compaction A. Operating spreading and hauling equipment over the full width of the travelway.

Compaction B. Operate rollers and compact as specified in Subsection 204.11(a)(1).

Compaction C. Moisten or dry the aggregate to a uniform moisture content between 5 and 7 percent based on total dry weight of the mixture. Operate rollers and compact as specified in Subsection 204.11(a)(1).

Compaction D. Compact to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.

Compaction E. Removed.

Compaction F. Compact to a density of at least 95 per-cent of the maximum density, as determined by AASHTO T 180, method C or D.

Compaction G. Removed.

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the in place density and moisture content according to AASHTO T 310 or other approved test procedures.

Drum Stewardship

322.06 Construction Tolerance. If grade finishing stakes are required, finish the surface to within ± 0.10 feet from staked line and grade elevation.

If grade finishing stakes are not required, shape the surface to the required template and check the surface with a 10-foot straightedge. Defective areas are surface deviations in excess of 1/2 inch in 10 feet between any two contacts of the straightedge with the surface.

Correct all defective areas by loosening the material, adding or removing material, reshaping, and compacting.

Ensure that the compacted thickness is not consistently above or below the specified thickness. The maximum variation from the compacted specified thickness is 1/2 inch.

Ensure that the compacted width is not consistently above the specified width. The maximum variation from the specified width will not exceed +12 inches at any point.

322.07 Maintenance. Maintain the aggregate course to the correct line, grade, and cross-section by blading, watering, rolling, or any combination thereof until placement of the next course. Correct all defects according to Subsection 322.06.

322.08 Acceptance. See Table 322-1 or Table 322-2 as applicable, for sampling and testing requirements.

Aggregate gradation and surface course plasticity index will be evaluated under Subsection 106.04. If the aggregate is obtained from a Government stockpile then the above characteristics will be evaluated under Subsection 106.02. Other aggregate quality properties will be evaluated under Subsections 106.02 and 106.04. Placement of aggregate courses will be evaluated under Subsections 106.02 and 106.04.

The allowable upper and lower aggregate gradation limits are the Target Value plus or minus the allowable deviations shown in Tables 703-2 and 703-3.

The allowable upper and lower Plasticity index limits for surface courses are stated in 703.05(b).

Preparation of the surface on which the aggregate course is placed will be evaluated under Section 204 or 303 as applicable.

Measurement

322.09 Measure the Section 322 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

Measure square yard width horizontally to include the top of aggregate width including designed widening. Measure the square yard length horizontally along the centerline of the roadway.

Drum Stewardship

If the measurement for aggregate is by cubic yard using contract quantities then measure aggregate by the cubic yard in-place once compacted, otherwise measurement for aggregate by the cubic yard is measured by the cubic yard in the hauling vehicle.

Measure thickness perpendicular to the grade of the travelway.

Measure width perpendicular to the centerline.

Payment

322.10 The accepted quantities will be paid at the contract price per unit of measurement for the Section 322 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Table 322-1
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	
Aggregate source quality 703.05	Measured and tested for conformance (106.04 & 105)	LA abrasion (coarse)	—	AASHTO T 96	1 per type & source of material	Source of material	Yes, when requested	Before using in work	
		Sodium sulfate soundness loss (coarse & fine)	—	AASHTO T 104	“	“	“	“	
		Durability index (coarse & fine)	—	AASHTO T 210	“	“	“	“	“
		Fractured faces	—	ASTM D 5821	“	“	“	“	“
Subbase, Base, and Surface courses	Measured and tested for conformance (106.04)	Sample	—	AASHTO T 2	2 per day	From windrow or roadbed after processing or from approved crusher sampling device	Yes	48 hours	

Table 322-1 (continued)
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	
Subbase, Base, and Surface	Measured and tested for conformance (106.04)	Moisture-density Method D	—	AASHTO T 99 ⁽¹⁾	1 per type and source of material	Source of material	Yes, when requested	Before using in work	
		Moisture-density Method F	—	AASHTO T 180 ⁽¹⁾	"	"	"	"	
		In-place density & moisture content	—	AASHTO T 310 or other approved procedures	"	"	"	"	"
			—	AASHTO T 310 or other approved procedures	3 per day	In-place	—	Before placing next layer	

Table 322-2
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Screened Aggregate	Measured and tested for conformance (106.04)	Sample	—	AASHTO T 2	2 per day	From windrow or roadbed after processing or from approved crusher sampling device	Yes	48 hours

602 - Culverts and Drains

602.03_nat_us_09_06_2005

602.03 General.

Add the following:

Ensure that the final installed alignment of all pipe allows no reverse grades, and does not permit horizontal and vertical alignments to vary from a straight line drawn from center of inlet to center of outlet by more than 2 percent of pipe center length or 1.0 feet, whichever is less.

602.00_01_us_10_12_2006

602.03 General.

Add the following:

Clean and paint damaged coating caused by welding, field cutting, or handling in accordance with AASHTO M 36M and ASTM A 849.

651 - Development of Pits & Quarries

651.00_nat_us_03_02_2005

Description

651.01 This work consists of clearing, grubbing, stripping topsoil, removing overburden, constructing access roads, conducting restoration activities, and performing other incidental work required for pit or quarry development.

Construction Requirements

651.02 General. Submit a plan of operations according to Section 105. Perform all work in accordance with Sections 105, 201, 203, 204, 625, and 635, landscape preservation requirements, and the approved pit and quarry development plan of operations. Perform the work in accordance with MSHA 30 CFR, part 56.

651.03 Acceptance. Developing pits and quarries will be evaluated under Subsections 106.02 and 106.04.

Measurement

651.04 Measure the Section 651 items listed in the bid schedule according to Subsection 109.02.

Payment

651.05 The accepted quantities will be paid at the contract price per unit of measurement for the Section 651 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

703 - Aggregate

703.05_nat_us_08_14_2009

Delete 703.05 and replace with the following:

703.05 Subbase, Base, Surface Course, and Screened Aggregate.

(a) Subbase or base aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-2
(2) Liquid limit, AASHTO T 89	25 max.
(3) Plastic limit, AASHTO T 90	Nonplastic
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	50% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(b) Surface course aggregate. Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-3
(2) Liquid limit, AASHTO T 89	35 max.
(3) Plastic Index, AASHTO T 90	
a) If the percent passing the No. 200 sieve is less than 12%	2 to 9
b) If the percent passing the No. 200 sieve is greater than 12%	Less than 2
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	75% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Do not furnish material that contains asbestos fibers.

Drum Stewardship

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

(c) **Screened aggregate** – Furnish hard, durable particles or fragments of stone, slag, or gravel conforming the following:

- | | |
|--|--------------|
| (1) Gradation | Table 703-16 |
| (2) Plastic Index, AASHTO T 90 | Less than 9 |
| (3) Los Angeles abrasion, AASHTO T 96 | 55% max. |
| (4) Free from organic matter and lumps or balls of clay. | |

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

Delete Table 703-2 and replace with the following:

**Table 703-2
Target Value Ranges for Subbase and Base Gradation
Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)**

Sieve Size	Grading Designation				
	A (Subbase)	B (Subbase)	C (Base)	D (Base)	E (Base)
3 inch	100				
2 inch	65 - 95	100	100		
1½ inch		97 - 100			
1 inch			80 - 100 (6)	100	
¾ inch	40 - 75		64 - 94 (6)	86 - 100 (6)	100
½ inch					
⅜ inch			40 - 69 (6)	51 - 82 (6)	62 - 90 (6)
No. 4	22 - 45	40 - 60 (8)	31 - 54 (6)	36 - 64 (6)	36 - 74 (6)
No. 40	8 - 22			12 - 26 (4)	12 - 26 (4)
No. 200	2 - 10	4.0 - 12.0 (4)	4.0 - 7.0 (3)	4.0 - 7.0 (3)	4.0 - 7.0 (3)

() The value in the parentheses is the allowable deviation (±) from the target values..

Note: Allowable deviations (±) from TV are shown in parentheses. If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 6-12 (4).

Delete Table 703-3 and replace with the following:

**Table 703-3
Target Value Ranges for Surface Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)									
	Grading Designation									
	F	G	H	S	T	U				
1 1/2 inch	100			100						
1 inch	97-100	100		72-92 (6)	100					
3/4 inch	76-89 (6)	97-100	97-100			100				
1/2 inch					71-91 (6)					
3/8 inch	56-68 (6)	70-80 (6)	80-92 (6)	51-71 (6)					71-90 (6)	
No. 4	43-53 (7)	51-63 (7)	58-70 (7)	36-53 (7)	43-60 (7)				50-68 (7)	
No. 8				26-40 (6)	30-46 (6)				34-51 (6)	
No. 16	23-32 (6)	28-39 (6)	28-40 (6)							
No. 40	15-23 (5)	19-27 (5)	16-26 (5)	14-25 (5)	16-28 (5)				19-30 (5)	
No. 200	10.0-16.0 (4)	10.0-16.0 (4)	9.0-14.0 (4)	8.0-15.0 (4)	8.0-15.0 (4)				8.0-15.0 (4)	

() The value in the parentheses is the allowable deviation (\pm) from the target values.
If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

Add Table 703-16:

**Table 703-16
Gradation Requirements for Screened Aggregate**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)						
	Grading Designation						
	L	M	N	O	P	Q	R
6 inch	100	100					
4 inch			100	100			
3 inch					100	100	
2 inch							100
No. 4		15-45		15-45		15-45	

703.05 Subbase, Base, & Surface Course Aggregate (Pit Run).

Add the following to Tables 703-2:

% by Weight Passing Designated Sieve (AASHTO T11 and T-27) Grading Designation							
Sieve Size	L	M	N	O	P	Q	R
6 in.	100	100					
4 in.			100	100			
3 in.					100	100	
2 in.							100
No. 4		15-45		15-45		15-45	

Note: For Grading M, O, and Q the allowable deviations (+/-) from the TV are to the broad band limits.

Table 703-2 Correction

Include the following substitution

In Table 703-2, delete the “436 – 74 (6)” percent by mass passing for grading E (base) No. 4 sieve size and substitute “36 – 74 (6).”

703.10(e) Flakiness Index.

Delete and replace with the following:

Flakiness Index, FLH T 508 30% max.

703.10(i) Adherent Coating.

Add the following:

Adherent coating on the aggregate, FLH T 512 0.5% max.

714 - Geotextile and Geocomposite Drain Material

714.01_0618_us_05_31_2012

Tables 714-1, 714-2, 714-3 and 714-4.

Add the following note to all tables:

(4) Woven slit film will not be allowed.

714.03_nat_us_02_25_2005

Tables 714-1 and 714-4.

Add the following note to both tables:

(4) Woven slit film will not be allowed.

Add the following:

714.03 Geogrids.

Furnish geogrids consisting of polymeric materials such as polypropylene, polyethylene, or polyester formed into a stable network of bars or straps fixed at their junctions such that the bars retain their relative position to each other.

Elevate and protect rolls with a waterproof cover if stored outdoors.

(a) Physical requirements. Furnish geogrid treated to resist ultraviolet degradation, and conforming to the physical strength requirements shown in table 714-7 according to ASTM D 4595 for the specified geogrid category. Strength values shown in table 714-7 represent minimum average roll values and are for the direction of primary reinforcement. Ensure that the aperture size for all geogrids is between $\frac{3}{4}$ to 3 inches.

(b) Evaluation procedures. Geogrids will be evaluated under Subsection 106.03. Furnish a certification and a sample of the geogrid.

Table 714-7—Physical strength requirements for geogrids.

Category	Minimum Ultimate Strength at Breakage (<i>lbs/ft</i>)
1	890
2	1985
3	2875
4	4110
5	5475

Drum Stewardship

6	8215
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714.03_0618_us_03_26_2007

Tables 714-1 and 714-4.

Add the following note to both tables:

(4) Woven slit film will not be allowed.

Add the following:

714.03 Geogrids.

Furnish geogrids consisting of polymeric materials such as polypropylene, polyethylene, or polyester formed into a stable network of bars or straps fixed at their junctions such that the bars retain their relative position to each other.

Elevate and protect rolls with a waterproof cover if stored outdoors.

(a) Physical requirements. Furnish geogrid treated to resist ultraviolet degradation, and conforming to the physical strength requirements shown in table 714-7 according to ASTM D 4595 for the specified geogrid category. Strength values shown in table 714-7 represent minimum average roll values and are for the direction of primary reinforcement. Ensure that the aperture size for all geogrids is between ¾ to 3 inches.

(b) Evaluation procedures. Geogrids will be evaluated under Subsection 106.03. Furnish a certification and a sample of the geogrid.

Table 714-7—Physical strength requirements for geogrids.

Category	Minimum Ultimate Strength at Breakage (<i>lbs/ft</i>)
1	890
2	1985
3	2875
4	4110
5	5475
6	8215
7	9866

718 - Traffic Signing and Marking Material

718.05_nat_us_08_05_2009

718.05 Aluminum Panels

Delete the third paragraph and replace with the following:

Clean, degrease and properly prepare the panels according to methods recommended by the sheeting manufacturer. Conversion coatings will conform to ASTM B-921 or ASTM B-449.