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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

101.00_nat_us_07_25_2005

101.01_nat_us_01_22_2009

101.01 Meaning of Terms

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

101.01_nat_us_01_22_2009

Delete all references to the FAR (Federal 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:

Contract Modification

Day

Notice to Proceed

Solicitation

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 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.

Full Bench--Construction or reconstruction consisting of an area where all material is excavated and removed, and where no material is embanked or side cast.

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

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

Noxious Weeds or Weeds—Any exotic plant species established or that may be introduced in the state which may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses and which is designated by the states Department of Agriculture, or by the country's weed management district, or by other appropriate agencies having jurisdiction, or as listed on the current "All States Noxious Weeds list."

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.

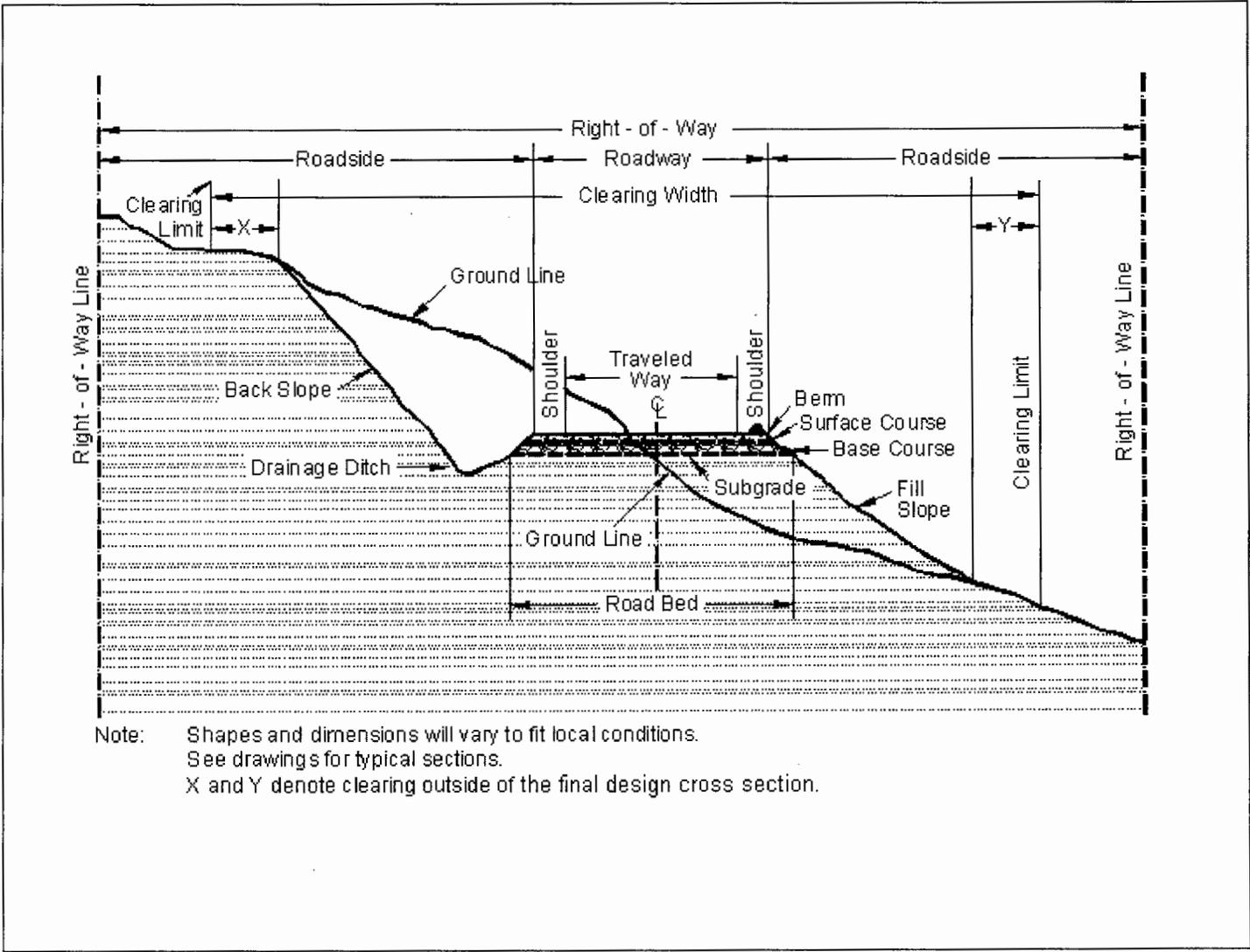
Road Order--An order affecting and controlling traffic on roads under Forest Service jurisdiction. Road Orders are issued by a designated Forest Officer under the authorities of 36 CFR, part 260.

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.

Weed Management District—A weed management district is any area of land identified for the purpose of weed management or control, Such an identified land area may be; but is not limited to one of the following: a project or job site a County, two or more counties, or a National Forest.

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



Note: Shapes and dimensions will vary to fit local conditions.
 See drawings for typical sections.
 X and Y denote clearing outside of the final design cross section.

Figure 101-1—Illustration of road structure terms.

102 - Bid, Award, and Execution of Contract

102.00_nat_us_02_16_2005

Delete Section 102 in its entirety.

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:

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.

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 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”.

107.08_nat_us_03_29_2005

107.08 Sanitation, Health, and Safety

Delete the entire subsection.

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.

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.

151 - Mobilization

151.00_01_us_10_11_2006

Delete Section 151 in its entirety and replace with the following.

Description

151.01 This work consists of moving personnel, equipment, material, and incidentals to the project and performing all work necessary before beginning work at the project site; obtaining of permits, insurance, and bonds. This work also includes washing and treating construction equipment and vehicles necessary for equipment transport to remove seeds, plants, and plant fragments before the equipment is used on Forest Service lands, according to the requirements within.

Construction Requirements

Wash the sides, tops, and undercarriages of all construction equipment. Remove all seeds, plants, plant fragments, dirt, and debris from the construction equipment. Only equipment inspected by the Forest Service will be allowed to operate within the project area. All subsequent move-ins of equipment to the project area will be treated in the same manner as the initial move-in. This requirement does not apply to cars, pickup trucks, and other vehicles that regularly travel between the construction site and areas off the National Forest.

Equipment will be considered free of soil, seed, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment, components or the need for specialized inspection tools is not required.

Notify the CO in writing at least 72 hours before moving any construction equipment onto the national forest. Notification will include an agreed upon location where the equipment will be available for inspection by the Forest Service. Inspection will be required after every cleaning.

Use methods of cleaning and locations for cleaning approved by the CO.

For work at a commercial washing facility, use an approved facility.

New infestations of noxious weeds of concern to Forest Service and identified by either Contractor or Forest Service, in the Project Area or on the haul route, will be promptly reported to the other party. Contractor and Forest Service will agree on treatment methods to reduce or stop the spread of noxious weeds when new infestations are found. A current list of noxious weeds of concern to Forest Service is available at each Forest Service office.

Measurement

151.02 Clean equipment prior to moving onto this project. The initial cleaning will not be included in the measurement for payment. Payment for cleaning will only be made if subsequent cleanings are ordered by the CO. Measurement shall be on an "each" basis, meaning one complete cleaning of all equipment required for this contract. Subsequent cleanings necessitated by the Contractor's actions but not directed by the CO will not be included in the measurement for payment.

Measure mobilization according to Subsection 109.02.

Payment

151.03 The accepted quantity, measured as provided in Subsection 109.02, will be paid at the contract price per unit of measurement for the Section 151 pay item shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Progress payments for mobilization lump sum will be paid as follows:

- (a) If applicable, bond premiums will be reimbursed according to FAR Clause 52.232-5 Payments Under Fixed-Price Construction Contracts, after receipt of the evidence of payment.
- (b) When 5 percent of the original contract amount is earned from other bid items, 50 percent of the mobilization item, or 5 percent of the original contract amount, whichever is less, will be paid.
- (c) When 10 percent of the original contract amount is earned from other bid items, 100 percent of the mobilization item, or 10 percent of the original contract amount, whichever is less, will be paid.
- (d) Any portion of the mobilization item in excess of 10 percent of the original contract amount will be paid after final acceptance.

Include all costs associated with the initial cleaning of equipment in the unit bid price for Mobilization. Cleaning for subsequent move-ins will not be paid for unless after a suspension ordered by the CO.

152 - Construction Survey and Staking

152.00_Ipnf

Delete Section 152 in its entirety and replace with the following.

Description

152.01 This work consists of furnishing qualified personnel and necessary equipment and material to survey, stake, calculate, and record data for the control of work. See FAR Clause 52.236-17 Layout of Work.

Personnel, equipment, and material shall conform to the following:

(a) Personnel. Furnish technically qualified survey crews experienced in highway construction survey and staking. Provide personnel capable of performing in a timely and accurate manner. An acceptable crew supervisor shall be on the project whenever surveying/staking is in progress.

Unless otherwise approved by the CO, conduct construction staking under the direct supervision of a Registered Professional Engineer or State Licensed Land Surveyor.

(b) Equipment. Furnish survey instruments and supporting equipment capable of achieving the specified tolerances.

(c) Material. Furnish acceptable tools, supplies, and stakes of the type and quality normally used in highway survey work and suitable for the intended use. Furnish stakes and hubs of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible markings.

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

Do not use aerosol spray paints in the field. Provide for the safe storage use and clean-up of paint when on National Forest System Lands. Immediately report all spills to the CO, clean-up and disposal of spills and painting waste shall be in accordance with Federal state and local requirements.

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. When required, at the conclusion of each road segment, the registered engineer shall affix the state authorized seal and sign all field books and drawings and attest in writing to the satisfactory completion of the project.

152.02 General. 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. Data relating to horizontal and vertical alignment, theoretical slope stake catch points, and other design data will be furnished. Before beginning construction, notify the CO of any missing initial reference lines, control points, or stakes. Reestablish missing reference, control lines, or stakes as necessary to control subsequent construction staking operations

Perform additional calculations for convenient use of Government-furnished data. Provide immediate notification of apparent errors in the initial staking or in the furnished data.

Preserve all initial reference and control points. After beginning construction, replace all destroyed or disturbed initial reference or control points necessary to the work.

Before surveying or staking, discuss and coordinate the following with the CO:

- (a) Surveying and staking methods;
- (b) Stake marking;
- (c) Grade control for courses of material;
- (d) Referencing;
- (e) Structure control; and
- (f) Any other procedures and controls necessary for the work.

Survey and establish controls within the tolerances shown in Table 152-1.

Prepare field notes in an approved format. Furnish all survey notes at least weekly. All field notes and supporting documentation become the property of the Government upon completion of the work.

Start work only after staking for the affected work is accepted.

The construction survey and staking work may be spot-checked for accuracy, and unacceptable portions of work may be rejected. Resurvey rejected work, and correct work that is not within the tolerances specified in Table 152-1. Acceptance of the construction staking does not relieve the Contractor of responsibility for correcting errors discovered during the work and for bearing all additional costs associated with the error.

Remove and dispose of all flagging, lath, stakes, and other staking material after the project is complete.

152.03 Survey and Staking Requirements. Perform all survey, staking, recording of data, and calculations as necessary to construct the project from the initial layout to final completion. Reset stakes as many times as necessary to construct the work.

(a) **Control points.** Relocate initial horizontal and vertical control points in conflict with construction to areas that will not be disturbed by construction operations. Furnish the coordinates and elevations for the relocated points before the initial points are disturbed.

(b) **Roadway cross-sections.** 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. When the centerline curve radius is greater than 500 feet, take cross-sections at a maximum centerline spacing of 50 feet. Take additional cross-sections at significant breaks in topography and at changes in the typical section. Along each cross-section, measure and record points at breaks in topography, but no further apart than 20 feet. Measure and record points to at least the anticipated slope stake

and reference locations. Reduce all cross-section distances to horizontal distances from centerline.

(c) Slope Stakes and References. 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.

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. Establish clearing limits on each side of the designed centerline by measuring the horizontal distance shown in the plans or other Government-provided data and verify the minimum clearing limit distances shown on the typical section sheet of the plans or other Government-provided data.
- **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. Establish clearing limits on each side of the designed centerline by measuring the horizontal distance shown in the plans or other Government-provided data and verify the minimum clearing limit distances shown on the typical section sheet of the plans or other Government-provided data.
- **Method III—Clearing Limit and Slope Stake Combined—Cut side(s) and Through Fills Method.** Establish clearing limits on each side of the designed centerline by measuring the slope distance shown in the plans or other Government-provided data and verify the minimum clearing limit distances shown on the typical section sheet of the plans or other Government-provided data. Mark this point by firmly setting a lath in the ground for cut side(s) and through fills. Mark the clearing limit on the fill side in a cut/fill section with a flag. Set the stakes/flag on lines approximate right angles to tangents and normal to the central bearing of intersecting tangents. Mark the clearing stake on the cut side(s) or on both sides in thru fill areas as agreed upon by the CO. Minimum information marked on the clearing stake shall include: The designed cut or fill to ditch grade at the slope stake point if there is a ditch or to shoulder grade if there is no ditch; the horizontal distance from the catch point to centerline; whether cut or fill is to ditch grade or shoulder grade; the slope ratio; the width “W” from inside shoulder to outside shoulder; the station; the

diameter and length of culvert if section is a culvert section. Replace any clearing lath damaged or destroyed during clearing operations before starting excavation.

After each section has been slope staked, establish reference stakes for slope stake information a minimum of 10 feet slope distance outside the clearing limits. Mark this stake with the slope distance from the reference stake to the clearing stake and the information shown on the clearing stake.

- **Method IV—Clearing Limit and Slope Stake Combined—Both Sides.** The requirements for this method shall be the same as **Method III** except that clearing stakes and reference stake shall be established on both sides of the designed centerline at **all** sections.
- **Method V—Clearing Limit and Slope Stake Combined—Cut side(s) and Through Fills and Layer Placed fills Method.** Establish clearing limits on each side of the designed centerline by measuring the slope distance shown in the plans or other Government-provided data and verify the minimum clearing limit distances shown on the typical section sheet of the plans. This point shall be marked by firmly setting a lath in the ground for cut side(s) and through fills and layer placed fills. The clearing limit on the fill side in cut/fill sections shall be marked with a flag. The stakes/flag shall be set on lines at approximate right angles to tangents and normal to the central bearing of intersecting tangents. Mark the clearing stake on the cut side(s) or on both sides in thru fill and layer placed fill areas as agreed upon by the CO. Minimum information marked on the clearing stake shall include: The designed cut or fill to ditch grade at the slope stake point if there is a ditch or to shoulder grade if there is no ditch; the horizontal distance from the catch point to centerline; whether cut or fill is to ditch grade or shoulder grade; the slope ratio; the width “W” from inside shoulder to outside shoulder; the station; the diameter and length of culvert if section is a culvert section. Replace any clearing lath damaged or destroyed during clearing operations before starting excavation.
- In areas designated on the plans for layer placement of fills, determine the location of the fill slope stake(s) catchpoint by measuring the slope distance information shown in the plans or other Government-provided data. Mark this location with a fill slope stake(s) which contains the following minimum information: the designed fill to shoulder grade, the horizontal distance from the catch point to centerline, the slope ratio, and the station. Upon establishment of the reference stake(s) as set forth below mark the fill slope stake(s) with the slope distance from the reference stake to the designed toe of fill and place the fill slope stake alongside the reference stake(s).

After each section has been slope staked, establish reference stakes for slope stake information a minimum of 10 feet slope distance outside the clearing limits. Mark this stake with the slope distance from the reference stake to the clearing stake and the information shown on the clearing stake.

- **Method VI—Establishment of Fill Stakes in Layer Placement Fill Areas.** Mark the toe of fill(s) by firmly setting the fill slope stake(s) in the ground using the slope distance information as marked on the fill slope stake(s) and measured from the reference stake. Fill slope stake(s) where established in Method V above. Establish the fill slope stake(s) after clearing has been completed and prior to embankment

placement. This work need not be performed under the direction a registered Professional Engineer or State Licensed Land Surveyor.

- **Method VII—Clearing Limit and Slope Stake Separate—Cut Sides(s) and Through Fills.** The requirement for this method shall be the same as Method III except that the location of the slope stake catchpoint(s) will be determine by measuring the slope distance shown in the plans or other Government-provided data. The slope stake catchpoint(s) may be marked with “dummy” stake(s). Mark the llope stake on the cut side(s) or on both sides in thru fill as agreed upon by the CO. Minimum information marked on the slope stake(s) shall include: The designed cut or fill to ditch grade at the slope stake point if there is a ditch or to shoulder grade if there is no ditch; the horizontal distance from the catch point to centerline; whether cut or fill is to ditch grade or shoulder grade; the slope ratio; the width “W” from inside shoulder to outside shoulder; the station; the diameter and length of culvert if section is a culvert section. The slope stake(s) may be set back with the reference stake until after clearing operation are complete. In all cases reset the slope stake to the slope stake catch point(s) prior to starting excavation. The slope distance marked on the reference stake shall be the distance from the reference stake to the slope stake catchpoint.
- **Method VIII—Clearing Limit and Slope Stake Separate—Both Sides.** The requirements for this section shall be the same as Method VII, except the slope stakes and reference stakes shall be established on both side of the designed centerline at all sections.

(d) Clearing and grubbing limits. Unless otherwise specified under Subsection (c) Slope Stakes and References, set clearing and grubbing limits on both sides of centerline at roadway cross-section locations.

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 70 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. 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.

(f) Grade finishing stakes. Set grade finishing stakes, for grade elevations and horizontal alignment, on centerline and on each shoulder at roadway cross-section locations. Set stakes at the top of subgrade and the top of each aggregate course.

Where turnouts are constructed, set stakes on centerline, on each normal shoulder, and on the shoulder of the turnout. In parking areas, set hubs at the center and along the edges of the parking area. Set stakes in all ditches to be paved.

When the centerline curve radius is less than or equal to 200 feet, the maximum centerline spacing for stakes is 25 feet. When the centerline curve radius is greater than 200 feet the maximum centerline spacing for stakes is 80 feet. The maximum transverse spacing between stakes is 20 feet. Use brushes or guard stakes at each stake.

(g) Culverts. Unless otherwise specified in Subsection (c) Slope Stakes and References, stake culverts to fit field conditions, the final locations may differ from the plans. 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.

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.

(h) Bridges. Set adequate horizontal and vertical control and reference points for all bridge substructure and superstructure components. Establish and reference the bridge chord or the bridge tangent. Also establish and reference the centerline of each pier, bent, and abutment.

(i) Retaining walls. Survey and record profile measurements along the face of the proposed wall and 5 feet in front of the wall face. Every 25 feet along the length of the wall and at all major breaks in terrain take cross-sections within the limits designated by the CO. For each cross-section, measure and record points every 25 feet and at all major breaks in terrain. Set adequate references and horizontal and vertical control points.

(j) Borrow and waste sites. Perform the work essential for initial layout and measurement of the borrow or waste site. Establish a referenced baseline, site limits, and clearing limits. Survey and record initial and final cross-sections.

(k) Permanent monuments and markers. Perform all survey and staking necessary to establish permanent monuments and markers. Set permanent monuments according to Section 621.

(l) Miscellaneous survey and staking. Perform all surveying, staking, and recording of data essential for establishing the layout and control of the following, as applicable:

- (1) Approach roads and trails;
- (2) Curb and gutter;
- (3) Guardrail;
- (4) Parking areas;
- (5) Paved waterways;
- (6) Special ditches;
- (7) Turf establishment;
- (8) Utilities;

(9) Signs, delineators, and object markers; and

(10) Pavement markings.

(11) Cattleguards

(12) Drain Dips

(13) Erosion Control Measures

(m) Field Discrepancies. Immediately notify the CO if a discrepancy is encountered between the plans and field conditions which affect the final road location. Prepare recommendations, in writing, to the CO for adjustments to the design to better fit field conditions. Affix the state authorized seal and sign the recommendation attesting to the adequacy of the adjustment. Ensure that adjustments to the design follow all applicable regulations and are consistent with design standards and criteria. Adjustments shall minimize construction effort, such as clearing and embankment volumes. Gain written approval of the adjusted design from the CO before incorporating such adjustment in the field. Return to the original design as soon as practical.

Table 152-1 Tolerances for reestablishing centerline, 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
D	1/300	Foresight and backsight; 15 minute rejection limit	0.4 ft	1.0ft/1000ft
E	1/100	Foresight and backsight; 30 minute rejection limit	0.8 ft	1.0ft/1000ft

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.	0.1 ft or 0.4% ^a	0.15 ft or 0.6% ^a	0.2 ft or 1.0% ^a	0.2 ft or 1.0% ^a	0.3 ft or 1.0% ^a
Horizontal and vertical accuracy for slope stake and slope stake references, in feet or percentage of horizontal distance measured from centerline or reference stake.	0.1 ft or 0.4% ^a	0.15 ft or 0.6% ^a	0.2 ft or 1.0% ^a	0.2 ft or 1.0% ^a	0.3 ft or 1.0% ^a
Horizontal and vertical accuracy for clearing limits.	1.0 ft	1.0 ft	1.0 ft	1.5 ft	2.5 ft
a. Use greater value.					

152.04 Acceptance. Construction survey and staking will be evaluated under Subsections 106.02 and 106.04.

Measurement

152.05 Measure the Section 152 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

Do not measure resetting stakes.

Payment

152.06 The accepted quantities, as provided above, will be paid at the contract price per unit of measure for the Section 152 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 lump sum items will be prorated based on the total work completed.

153 - Contractor Quality Control

153.04_nat_us_10_24_2007

153.04 Records.

Delete all but the first sentence

155 - Schedules for Construction Contracts

155.00_nat_us_05_11_2004

155 Delete.

Delete Section 155 in its entirety.

156 - Public Traffic

156.00_nat_us_04_17_2007

Delete Section 156 in its entirety and replace with the following:

Description

156.01 This work consists of controlling and protecting public traffic adjacent to and within the project.

Material

156.02 Conform to the MUTCD and the following Sections and Subsections:

Construction sign panels	633
Retro-reflective sheeting	718.01
Temporary concrete barrier	618
Temporary plastic fence	710.11
Temporary traffic control devices	718.22

156.03 General. Unless otherwise provided for in Table 156-1, keep existing roads open to all traffic during road improvement work, and maintain them in a condition that will adequately accommodate traffic. Delays may not exceed 30 minutes at any one time followed by an open period of no less than 30 minutes.

Perform no work that interferes or conflicts with traffic or existing access to the roadway surface until a traffic control plan has been approved. Post construction signs and traffic control devices in conformance with MUTCD. All required signs will be in place and approved prior to beginning work on project.

If the Contractor agrees in writing to allow public traffic to use a new road being constructed prior to completion, it will be considered an existing road for traffic control purposes.

156.04 Temporary Traffic Control. Install and maintain temporary traffic control devices adjacent to and within the project as required by the approved traffic control plan and the MUTCD. Install and maintain traffic control devices as follows:

- (a) Furnish and install traffic control devices before the start of construction operations.
- (b) All detours outside of clearing limits will be approved in writing by the Contracting Officer as part of the traffic control plan.
- (c) Install only those traffic control devices needed for each stage or phase.
- (d) Relocate temporary traffic control devices as necessary.
- (e) Remove devices that no longer apply to the existing conditions.
- (f) Immediately replace any device that is lost, stolen, destroyed, or inoperative.
- (g) Keep temporary traffic control devices clean.
- (h) Remove all temporary traffic control devices upon contract completion or when approved.
- (i) When required, use flaggers certified by the American Traffic Safety Services Association, the National Safety Council, the International Municipal Signal Association, a state agency, or other acceptable organization. Perform the work described under MUTCD Part 6. Use type III, VII, VIII, or IX retroreflective sheeting on flagger paddles. Do not use flags. Flaggers must wear high visibility safety apparel as required by MUTCD 6E.02.

156.05 Temporary Closures. Road segments may be closed as shown in Table 156-1. The maximum consecutive days of closure shall be followed by a minimum number of consecutive days open to traffic as shown. Maintain traffic control devices during closure period(s). Appropriate barricades and signs will be erected and maintained as shown in the traffic control plan or as otherwise designated.

Prior to closing roads during construction, give written notice to the Contracting Officer at least 10 days in advance.

Table 156-1

Temporary Road Closures

Road Number	From Terminus	To Terminus	Maximum Consecutive Days of Closure	Minimum Consecutive Days Open

156.06 Acceptance. Public traffic work will be evaluated under Subsection 106.02.

Measurement and Payment

156.07 Do not measure Public Traffic for payment. Compensation is made as an indirect payment.

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.

157.04 Controls and Limitations on Work.

(d) Delete this subsection and add the following:

(d) Apply temporary turf establishment or other approved measures on disturbed areas within 5 days of completion of cut & fill slopes according to Section 625. Temporary seeding and fertilizing shall be prior to, and in addition to, any permanent seed and fertilizer specified in Section 625.

157.16 TABLE 157.01 Contract erosion control plan

SECTION	DURATION	DESCRIPTION OF WORK	TIMING OF CONSTRUCTION
157	Temporary	<u>Temporary Seeding and Fertilizing</u> Locations shown on the drawings.	Within <u>5</u> days of construction activity or sooner when specified in writing by the Engineer.
157	Temporary	<u>Sediment Basins</u> Locations shown on the drawings.	Prior to pioneer road construction.
204	Permanent	<u>Culvert Catch Basins and Ditch Transitions</u>	Concurrently with culvert installation.
204	Permanent	<u>Inslope/Outslope</u> as shown on drawings.	Continuously as road is roughed to grade.
204	Permanent	<u>Ditches</u>	Within <u>5</u> days of completion of cut & fill slopes.
Incidental to 204	Temporary	<p><u>Waterbars</u> in all areas of disturbed earth.</p> <p>1. In areas not roughed to grade or without completed permanent drainage features: maximum spacing: 100' for road grades over 12% 200' for road grades 6% to 12% 300' for road grades under 6%</p>	Prior to winter shutdown or when construction activity ceases for 15 days or more.
	Permanent	<p>2. In areas where permanent drainage features are completed and no gravel surfacing is specified:</p> <p>Within 20 ft. uphill of all culverts, except in through fill areas.</p> <p>Within 20 ft. uphill of the start of through fills.</p> <p>Approximately halfway between culverts, except in through fill areas as needed to control erosion during periods of winter shutdown.</p> <p>maximum spacing: 100' for road grades over 12% 200' for road grades 6% to 12% 300' for road grades 4 to 6% 1000' for road grades under 4%</p>	Within 5 days of completion of subgrade.
204	Permanent	<u>Drainage Dip</u> Locations shown on the drawings.	Prior to the end of the construction season for all areas roughed to grade.
Incidental to 157	Temporary	<u>Straw Bales/Straw Mulch</u> . As necessary to stabilize eroding areas.	Immediately upon discovery of active erosion.
204	Temporary	<u>Uncompleted Roads</u> . Limit the combined grubbing and grading operations area to 100,000 square feet of exposed soil at one time after September 15.	See description of work. This applies to Roads: 1950C.2 & 1950CB

157.17 TABLE 157.01 Contract erosion control plan (Cont.)

SECTION	DURATION	DESCRIPTION OF WORK	TIMING OF CONSTRUCTION
602	Permanent	<u>Culverts</u> Live Streams	At time of initial crossing of live streams.
		<u>Cross Drains</u>	Within 5 days of completion of cut & fill slopes.
625	Permanent	<u>Seeding</u>	As specified in Section 625
625	Permanent	<u>Mulching</u> Locations shown on the drawings. Application rate: <u>1.5</u> tons of straw mulch per acre.	Immediately after seeding & fertilizing.
650	Permanent	<u>Road Closure Devices</u>	Immediately after excavation and embankment are accomplished at the station designated for the device.

170 - Develop Water Supply and Watering

170.00_nat_us_03_30_2005

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

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

170.07 Measure the Section 170 items listed in the bid schedule according to Subsection 109.02.

Payment

170.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 170 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

201 - Clearing and Grubbing

201.00_nat_us_08_05_2009

201.02 Material:

Delete Tree wound dressing material reference.

201.03 General.

Delete the last sentence.

201.04 Clearing.

Delete the last sentence of (d).

201.01_nat_us_02_18_2005

201.01 Description

Replace with the following

This work consists of clearing and grubbing within clearing limits and other designated areas.

201.04_nat_us_02_22_2005

201.04 Clearing. (c)

Delete paragraph (c) and replace with the following:

(c) In areas outside the excavation, embankment, and slope rounding limits, cut stumps to within 12 inches or one-third of the stump diameter of the ground, whichever is higher, measured on the side adjacent to the highest ground. For timber sales, stump heights will meet the requirements of the Timber Sale contract.

201.04 Clearing.

Delete subsection (d) and replace with the following:

(d) Do not cut vegetation less than 3 feet tall and less than 3 inches in diameter, that is within the clearing limits but beyond the roadway and not in a decking area, and that does not interfere with sight distance along the road.

Add the following:

(e) Trim branches of remaining trees or shrubs to give a clear height of 14 feet above the roadbed unless otherwise indicated. Trim tree limbs as near flush with the trunk as practicable.

(f) Remove brush from log decks. Deck logs so that logs are piled parallel to one another; can be removed by standard log loading equipment; will not damage standing trees; will not interfere with drainage, and will not roll. Keep logs in log decks free of brush and soil.

201.04_nat_us_02_18_2005

201.04 Clearing.

Add the following:

When marked in advance, remove dead trees over 6 inches in diameter measured at 12 inches above the ground that lean toward the road and are tall enough to reach the roadbed.

201.05_10_us_07_14_2006

.05 (b)

Delete entire paragraph and replace with the following:

Grub all embankment areas. Undisturbed stumps may be left in place if they protrude less than 6 inches above the original ground and will be covered with more than 2 feet of embankment.

201.06_0203_us_02_12_2010

201.06 Disposal.

Delete the first sentence of this subsection and substitute the following:

Dispose of merchantable timber designated for removal according to the provisions of the timber sale contract.

Unless otherwise agreed to in writing, all merchantable timber cleared under the requirements of this section shall be removed prior to final acceptance.

Merchantable timber on private land within the clearing limits belongs to the landowner. Deck merchantable timber according to 201.04(f) on the landowner's property adjacent to the road in approved locations.

All other Construction slash will be disposed of according to section 203.05

203 - Removal of Structures and Obstructions

203.03_0114_us_08_04_2005

203.03 Salvaging Material

Delete paragraphs two and three and add:

Stockpile salvaged material at a location approved by the CO.

203.05_nat_us_02_18_2005

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. Length of piles shall not exceed 200 feet with breaks of at least 20 feet between piles. Construct other breaks of at least 20 feet where big game trails or migratory routes cross the roadway and breaks of at least 20 feet where cutting unit boundaries marked on the ground intersect the roadway. 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) Scattering. 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.

(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.

203.08_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_10_23_2007

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.

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.

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).

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

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:

- (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.

(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 ²	"	"	"
		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

209 - Structure Excavation and Backfill

209.00_01_us_10_11_2006

209.07 Dewatering

Delete the subsection and add the following:

Submit a Dewatering Plan 5 days prior to beginning excavation.

Construct diversion prior to performing any excavation. Construct diversions using water tight, non-eroding methods. Employ settling basins or other methods so that muddy water is not returned to stream. Install, operate, and remove diversions in a manner that minimizes erosion and sedimentation.

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:

On each side of the pipe, excavate an area at least as wide as the diameter of the pipe. Backfill without damaging or displacing the pipe. Complete backfilling of the trench with suitable material.

209.11 Compacting.

Delete the subsection and add the following:

Compact backfill using designated compaction method A, B, C, or D:

Method A. Ensure that backfill density exceeds the density of the surrounding embankment.

Method B. Adjust the moisture content of the backfill material to a moisture content suitable for compaction. Compact each layer with a minimum of three complete passes or until visual displacement ceases using a mechanical tamper, (wacker-packer type or approved equal). For compaction under sections 252, 254, 255, 257, 258 and 262 compact with a vibratory steel wheeled roller with a mass of at least 8 tons.

Method C. Compact each layer of backfill with a minimum of two passes with mechanical tamper, (wacker-packer type, or approved equal).

Method D. 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.

209.12 Acceptance.

Sampling and Testing Requirements

Add the following:

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

301 - Untreated Aggregate Courses

301.00_nat_us_03_03_2005

301 Title Change.

Change the title to: Section 301 Aggregate Courses

301.01_nat_us_03_03_2005

301.01 Work.

Add the following:

Work includes producing aggregate by pit-run, grid rolling, screening, or crushing methods, or placing Government-furnished aggregate. Work may include additive mineral filler, or binder.

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

301.02_nat_us_05_16_2005

301.02 Material.

Add the following:

Bentonite	725.30
Calcium Chloride Flake	725.02
Lignon Sulfonate	725.20
Magnesium Chloride Brine or Calcium Chloride Liquid	725.02

301.03_nat_us_09_14_2005

301.03 General.

Add the following:

Written approval of the roadbed is required before placing aggregate.

For pit run or grid-rolled material, furnish material smaller than the maximum size. No gradation other than maximum size will be required for pit-run or grid-rolled material. For grid rolling, use all suitable material that can be reduced to maximum size. After processing on the road, remove all oversize material from the road and dispose of it as directed by the CO.

Provide additives or binder, if required, at the proportions specified.

Develop and use Government furnished sources according to Section 105.

If the aggregate is produced and stockpiled before placement, handle and stockpiled according to Section 320. Establish stockpile sites at locations approved. Clear and grub stockpile sites according to Section 201.

301.04_nat_us_03_03_2005

301.04 Mixing and Spreading.

Delete the first sentence of the first paragraph and add the following:

Ensure that aggregate and any required additives, water, mineral filler, and binder are mixed by the specified method except, if crushed aggregate products are being produced and mineral filler, binder, or additives are required, uniformly blend following crushing. Control additive proportions to 0.5 percent dry weight.

(a) Stationary Plant Method. Mix the aggregate with other required materials in an approved mixer. Add water during the mixing operation in the amount necessary to provide the moisture content for compacting to the specified density. After mixing, transport the aggregate to the jobsite while it contains the proper moisture content, and place it on the roadbed or base course using an aggregate spreader.

(b) Travel Plant Method. After placing the aggregate for each layer with an aggregate spreader or windrow-sizing device, uniformly mix it with other required materials using a traveling mixing plant. During mixing, add water to provide the necessary moisture content for compacting.

(c) Road Mix Method. After placing the aggregate for each layer, mix it with other required materials at the required moisture content until the mixture is uniform throughout. Mix aggregate, water, and all other materials until a uniform distribution is obtained.

Spread the aggregate in a uniform layer, with no segregation of size, and to a loose depth that will provide the required compacted thickness.

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

Route and distribute hauling and leveling equipment over the width and length of each layer.

301.05_nat_us_05_17_2005

301.05 Compacting

Delete and replace with the following:

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. Compact to a density of at least 96 percent of the maximum density, as determined by the Modified Marshall Hammer Compaction Method (available upon request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

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. Compact to a density of at least 100 percent of the maximum density as determined by the Modified Marshall Hammer Compaction Method (available upon request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

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.

301.06_nat_us_03_03_2005

301.06 Surface Tolerance.

Add the following:

Thickness and Width requirements:

The maximum variation from the compacted specified thickness is ½ inch. The compacted thickness is not consistently above or below the specified thickness and the average thickness of 4 random measurements for any ½ mile of road segment is within + ¼ inch of the specified thickness.

The maximum variation from the specified width will not exceed +12 inches at any point. The compacted width is not consistently above the specified width and the average of any four random measurements along any ½ mile of road segment is within +4 inches of the specified width.

Compensation will not be made for thickness exceeding the specified thickness

Table 301-1: Add the following:

Table 301-1—Acceptance 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 Courses L, M, N, O, P, Q, R	Measured and tested conformance (Subsection 106.04)	Plastic Limit	-	AASHTO T 90	1 per each 1,000 T	From the windrow or roadbed after processing	Yes	4 Hours

Table 301-1—Acceptance 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 Width	Measured and tested conformance (Subsection 106.04)	Width	-	-	4 per each 0.5 mi	Roadbed after processing	-	4 Hours
Aggregate Thickness	Measured and tested conformance (Subsection 106.04)	Thickness	-	-	4 per each 0.5 mi	Roadbed after processing	-	4 Hours
Additive	Measured and tested conformance (Subsection 106.04)	Amount of Additive	-	-	1 per each 1,000 T	From the windrow or roadbed after processing	No	4 Hours

301.08(b) Plasticity Index.

Add the following to the first sentence:

“and under 703.05(c)(1)”.

Table 301-1 Field Density Requirements.

Table 301-1: Delete laboratory and field density requirements for base, subbase, and surfacing and replace with the following:

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Base and Subbase	Measured and tested conformance (Subsection 106.04)	Moisture Density	---					
		Method C	---	AASHTO T 99	1 per type and source of material	Source of material	Yes	Before using in work
		Method C-1	---	R-1 Marshall	"	"	"	"
		Method D	---	AASHTO T 180	"	"	"	"
		Method D-1	---	R-1 Marshall	"	"	"	"
		Compaction	---					
		Method C, C-1, D, D-1	---	AASHTO T 310 or other approved procedures	1 per 500 t	In-place	---	Before placing the next layer
Surfacing	Measured and tested conformance (Subsection 106.04)	Moisture Density						
		Method C-1	---	R-1 Marshall	"	"	"	Before using in work
		Method D	---	AASHTO T 180	"	"	"	"
		Method D-1	---	R-1 Marshall	"	"	"	"
		Compaction						
		Method C, C-1, D, D-1	---	AASHTO T 310 or other approved procedures	1 per 500 t	In-place	---	Before placing the next layer

301.09_nat_us_07_07_2005

301.09 Measurement.

Replace the second paragraph with the following:

Measure aggregate by cubic yard compacted in place when payment is by contract quantities.

301.10_nat_us_03_03_2005

301.10 Payment

Delete the following:

adjusted according to Subsection 106.05

602 - Culverts and Drains

602.00_ipnf_us_10_12_2006

602.03 General

Delete second paragraph and add the following:

The lengths and locations of individual pipe as shown on the plans are approximate. Do not order pipe until culvert locations are designated on the ground and a written list of the correct lengths is approved by the CO.

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.

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.

602.05 Laying Metal Pipe

Add the following:

Dimpled bands shall not be used unless approved in writing by the Contracting officer.

Install helically corrugated lock-seam pipe with the seam at the inlet end placed below the horizontal centerline. This, requirement also applies to the outlet end, when less than 5 feet below subgrade.

625 - Turf Establishment

625.03_ipnf_us_02_25_2005

625.03 General.

Delete subsection and replace with the following:

Apply turf establishment to finished slopes and ditches in accordance with the dates shown in Table 625-1. Do not seed during windy weather or when the ground is excessively wet, frozen, snow covered, extremely dry, cloudy, hard pan, or not friable.

Table 625-1

During the Months marked with an 'X' below:

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
					X			X	X		

Should climatic conditions permit, application may be performed outside the months marked above upon written approval by the Contracting Officer.

Assure that all seed and mulch used in the work conforms to the weed free requirements of Section 713.

625.04 Preparing Seedbed.

Delete entire subsection.

625.05 Watering

Delete entire subsection.

625.06 Fertilizing.

Delete entire section and replace with the following:

Apply fertilizer having a chemical analysis as listed below by the following methods.

(a) Dry Method. Apply the fertilizer with approved power driven seeders, drills, fertilizer spreaders or other mechanical equipment. Hand operated methods are satisfactory on areas inaccessible to mechanical equipment.

(b) Hydraulic method. Use hydraulic-type equipment capable of providing a uniform application using water as the carrying agent. Add fertilizer to the slurry and mix before adding seed.

Fertilizer. Do not apply fertilizer within 25 feet of live water unless approved by the Contracting Officer. Apply fertilizer at the rate of 200 pounds per acre. Insure that the fertilizer meets the following chemical analysis:

<u>Nutrient</u>	<u>Percent</u>
Nitrogen, N	<u>16</u>
Phosphorus, P ₂ O ₅	<u>16</u>
Potassium, K	<u>16</u>

625.07 Seeding.

Delete the first sentence and add the following.

Apply seed mix by the following methods.

(a) Dry method. Delete the third sentence.

Add the following after subsection (b).

Seed Mix. Furnish and apply the following kinds and amounts pure live seed:

<u>Kind of Seed</u>	<u>Quantity of Pure Live Seed (Lbs/Acre)</u>
1. Slender Wheat grass "Pryor", Or "Revenue"	<u>3.0</u>
2. Hard Fescue "Durar"	<u>5.0</u>
3. Mountain brome "Bromar"	<u>5.0</u>
4. Annual Rye	<u>4.0</u>
5. "Alsike Clover"	<u>2.0</u>
6. _____	_____
7. _____	_____
Total	<u>19.0</u>

Determine the pounds of seed to be furnished per acre by dividing the pounds of pure live seed required per acre by the product of the percent purity and percent germination.

Example $\frac{5 \text{ lbs. pure live seed/acre}}{0.90 \times 0.85} = \text{_____} . \text{ commercial}$

seed per acre; purity = 90% and germination = 85%

625.08 Mulching.

Delete the entire subsection and replace with the following:

Apply Mulch within 48 hours after seeding by the following methods.

(a) **Dry Method.** Apply mulch with a hand / a spreader utilizing forced air at a rate of 3000 pounds per acre. Anchor the mulch with an approved stabilizing emulsion tackifier at a rate of N/A gallons per acre. Do not mark or deface structure, pavements, utilities, or plant growth with tackifier.

(b) **Hydraulic Method.** Apply mulch in a separate application from the seed using hydraulic-type equipment according to Subsection 625.07(b).

Apply wood fiber or grass straw cellulose fiber mulch at a rate of 3000 pounds per acre.

Apply bonded fiber matrix hydraulic mulch at a minimum rate of 3000 pounds per acre. Apply so no hole in the matrix is greater than 0.04 inches. Apply so that no gaps exist between the matrix and the soil.

Mulch areas inaccessible to mulching equipment by hand. Apply mulch uniformly over the entire disturbed area.

625.09 Protecting and Caring for Seeded Areas

Delete the first sentence and add the following:

Protect and care for seeded areas until final acceptance.

625.11 Measurement.

Delete the entire Subsection and replace with the following:

Measure the Section 625 items listed in the bid schedule according to Subsection 109.02.

703 - Aggregate

703.05_0104_02_07_2005

703.05 Subbase, Base, & Surface Course Aggregate.

Delete the subsection and add the following:

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

- | | |
|---------------------------------------------------------------|-------------|
| (1) Los Angeles abrasion, AASHTO T 96 | 40% max. |
| (2) Sodium sulfate soundness loss (5 cycles),
AASHTO T 104 | 12% max. |
| (3) Durability index (course), AASHTO T 210 | 35 min. |
| (4) Durability index (fine), AASHTO T 210 | 35 min. |
| (5) Fractured faces, ASTM D 5821 | 50% min. |
| (6) Gradation and plasticity index, AASHTO T 90 | Table 703-2 |
| (7) Liquid limit, AASHTO T 89 | 35 max. |
| (8) 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.

Do not furnish material that contains asbestos fibers.

(b) Subbase or base aggregate. Furnish aggregate material conforming to the requirements shown below:

(1) Pit-run aggregate. Furnish native materials consisting of a size and grading that can be taken directly from the source and placed on the road without crushing or screening. Meet the maximum size gradation shown in the bid schedule.

(2) Grid-rolled aggregate. Furnish native materials consisting of a quality that is capable of being broken down on the road by grid-rolling. Meet the maximum size gradation shown in the bid schedule.

Table 703-2

Gradation Requirements for Subbase, Base, and Surface Course Aggregate

Sieve	Percent Passing (AASHTO T 11 and T 27)				
	Grading A	Grading B	Grading C	Grading D	Grading E
3-Inch	100				
2-Inch	65-95	100			
1-1/2-Inch			100		
1-Inch		60-90		100	
¾-Inch	40-75		60-90	70-98	100
½-Inch		44-70			70-98
No. 4	22-45	28-50	30-55	36-60	44-70
No. 8	16-34	20-41	22-43	25-47	30-54
No. 30	8-22	9-26	11-27	12-31	15-34
No. 200	2-10 ^a	3-12 ^a	3-15 ^a	3-15 ^a	3-15 ^a
Sieve	Grading F	Grading G	Grading H	Grading J	Grading K
3-Inch	100				
2-Inch	65-95	100			
1-1/2-Inch			100		
1-Inch		50-85		100	
¾-Inch	28-70		55-90	70-98	100
½-Inch		27-60			65-95
No. 4	10-35	15-40	20-48	25-55	33-60
No. 8				16-40	21-42
No. 30			5-20	6-22	8-24
No. 200	0.10 ^a	0-12 ^a	0-15 ^a	0-15 ^a	0-15

Sieve	Grading L	Grading M	Grading N	Grading O	
6-Inch	100				
4-Inch		100			
3-Inch			100		
2-Inch				100	
1-1/2-Inch					
1-Inch					
¾-Inch					
½-Inch					
No. 4		15-45	15-45		
No. 8					
No. 30					
No. 200					

^a For untreated base used under bituminous materials, Section 401, 402, 403, 404, 405, 408, and 409, the maximum percent passing the Number 200 sieve shall be 8. For surfacing, the minimum percent passing the Number 200 sieve shall be 6.

(1) Plasticity index, AASHTO T 90

- a) If the percent passing the No. 200 sieve is less than 12% 2-9 max.
- b) If the percent passing the No. 200 sieve is greater than 12% 2 max.

718 - Traffic Signing and Marking Material

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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.