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Preface

Preface_wo_12_20_2022

Delete all but the first paragraph and add the following:

The Forest Service, US Department of Agriculture has adopted FP-14 for construction of National Forest System Roads.

101 - Terms¸ Format¸ and Definitions

101.01_National_11_9_2016

Add the following paragraph to Subsection 101.01:

101.01 Meaning of Terms.

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

101.03_National_11_9_2016

Add the following to Subsection 101.03:

101.03 Abbreviations.

(a) Acronyms.

AGAR — Agriculture Acquisition Regulations

AFPA — American Forest and Paper Association

FSAR — Forest Service Acquisition Regulations

MSHA — Mine Safety and Health Administration

NESC — National Electrical Safety Code

WCLIB — West Coast Lumber Inspection Bureau

(f) Miscellaneous unit abbreviations.

MP	—	milepost	location
ppm	—	parts per million	volume
STA		station	location

101.04_National_1_22_2020

Make the following changes to Subsection 101.04:

101.04 Definitions.

Delete these definitions and replace the following:

Bid Schedule — The Schedule of Items.

Bridge — A structure, including supports, erected over a depression or an obstruction such as water along a road, a trail, or a railway and having a deck for carrying traffic or other loads.

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 — Any structure with a bottom, regardless of fill depth, depth of invert burial, or presence of horizontal driving surface, or any bottomless (natural channel) structure with footings that will not have wheel loads in direct contact with the top of the structure.

Drawings — (Public Works Contracts) Design sheets or fabrication, erection, or construction details submitted to the CO by the Contractor according to FAR Clause 52.236-21 Specifications and Drawings for Construction. Also refers to submissions and submittals.

Notice to Proceed — (Public Works Contracts) Written notice to the Contractor to begin the contract work.

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.

Solicitation—(Public Works Contracts) The complete assembly of documents (whether attached or incorporated by reference) furnished to prospective bidders.

Add the following definitions:

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.

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

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

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

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

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

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

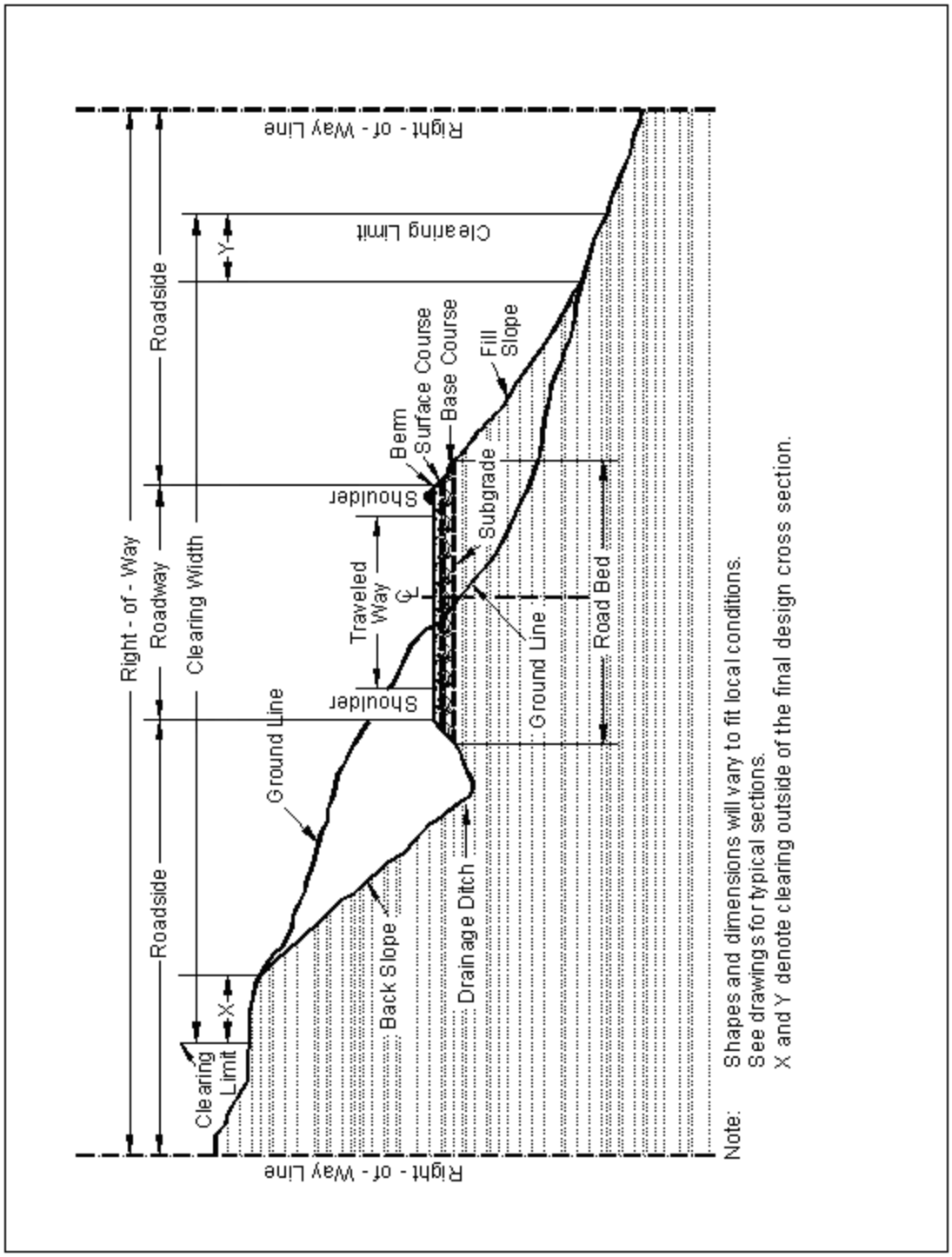
Shop Drawings — (Timber and Stewardship Contracts) Referred to as "Drawings" in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions of the work required by the contract.

Utilization Standards —

The minimum size and percent soundness of trees described in Public Works contract specifications or Timber Sale and IRTC contract provisions to determine merchantable timber.

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

Figure 101-1—Illustration of road structure terms.



102 - Bid¸ Award¸ and Execution of Contract

102.00_National_11_9_2016

<u>Delete Section 102 in its entirety.</u>

Delete Section 102.

103 - Scope of Work

103.00_National_11_9_2016

Delete all of Section 103 except Subsection 103.01 Intent of Contract.

Delete Subsections 103.02, 103.03, 103.04, 103.05.

104 - Control of Work

104.00_National_11_9_2016

Delete Subsections 104.01, 104.02, and 104.04.

Delete Subsections 104.01, 104.02, 104.04.

104.06_National_11_9_2016

Add the following to Subsection 104.06:

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

105.05_National_6_29_2020

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. Place excess material safely at government-approved location, at no additional cost to government.

106 - Acceptance of Work

106.01_National_7_18_2017

Delete Subsection 106.01 and replace with the following:

106.01 Conformity with Contract Requirements.

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

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

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

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

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

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

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

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

Remove, repair, or replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted. Removing, repairing, or replacing work; providing temporary traffic control; and any other related work to accomplish conformity will be 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.

106.02_National_11_9_2016

Delete Subsection 106.02 and replace with the following:

106.02 Visual Inspection.

Acceptance is based on visual inspection of the work for compliance with the specific contract requirements. Use prevailing industry standards in the absence of specific contract requirements or tolerances.

107 - Legal Relations and Responsibility to the Public

107.05_National_7_18_2017

Delete Subsection 107.05.

Delete Subsection 107.05.

108 - Prosecution and Progress

108.00_National_11_9_2016

Delete Section 108 in its entirety.

Delete Section 108.

109 - Measurement and Payment

109.00_National_11_9_2016

Delete Subsections 109.06, 109.07, 109.08, and 109.09:

Delete Subsections 109.06, 109.07, 109.08, 109.09.

109.01_National_2_22_2019

Delete the third paragraph and Table 109-1 of Subsection 109.01 and replace with the following:

109.01 Measurement of Work.

Take measurements as described in Subsection 109.02 unless otherwise modified by the Measurement Subsection of the section controlling the work being performed. Table 109-1 indicates the accuracy required for quantities of the various pay units used in the Schedule of Items. Use this guide to determine the decimal placement in the final payment.

Table 109-1

Decimal Accuracy of Quantities for Final Payment

Pay Item	Level of Precision
Linear Foot	1
Exception--Timber, Steel, and concrete Piles	0.1
Station	0.1
Mile	0.01
Square Foot	0.1
Square Yard	0.1
Each	1
Acre	0.01
Gallon	1
M-Gals.	0.1
Cubic Yard	1
Exception--Structure Excavation; Sheathing Materials; Bedding, Bed Course, and Backfill Materials; Gabions;	0.1
Exception--Concrete; Masonry	0.01
Pound	1
Ton	0.1
Exception--Calcium Chloride; Sodium Chloride; Hydrated Lime; Bituminous Materials; Pavements; Bed Course Materials	0.01
Hour	0.1
MFBM	0.01
Station Yard	1
Cubic Yard Mile	1
Ton Mile	1

Add the following sentence to Subsection 109.02(b):

109.02 Measurement Terms and Definitions.

(b) Contract quantity.

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

Section 152. — CONSTRUCTION SURVEY AND STAKING

Description

152.01 This work consists of performing surveying, staking, calculating, and recording data for the control of work. See FAR Clause 52.236-17 Layout of Work.

Construction Requirements

152.02 Qualifications. Provide technically qualified survey crews experienced in road construction survey and staking. Provide personnel capable of performing in a timely and accurate manner.

152.03 Submittals**.** Submit the following at the preconstruction conference:

(a) Contractor quality control plan. Comply with Section 153 and describe procedures for checking, mechanical calibration, and maintenance of both survey and construction equipment. Include the frequency and types of checks performed.

Include a price breakdown by individual tasks when construction survey and staking is paid by the lump sum for use in making progress payments and price adjustments.

152.04 General. Conform to the following:

(a) Personnel. Provide a crew supervisor on the project whenever surveying and staking is in progress.

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

(a) Material. Furnish acceptable tools and supplies of the type and quality suitable for road survey work. Furnish stakes and hubs of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible and durable markings.

Include staking activities in the construction schedule required under Section 155. Include the dates and sequence of each staking activity.

The Government will set horizontal control points, vertical control points, and will provide data for use in establishing control for completion of each element of the work.

Data relating to horizontal and vertical alignment, theoretical slope stake catch points, and other design data will be furnished. Reformatting and additional calculations may be required for the convenient use of the Government-furnished data. Provide immediate notification of apparent errors in the initial staking or in the Government-furnished data.

Submit as-staked data and corrections made to the Government-furnished survey data. Submit survey and measurement data at least weekly.

Discuss and coordinate the following with the CO before surveying or staking:

(1) Surveying and staking methods;

(2) Stake marking;

(3) Grade control for courses of material;

(4) Referencing;

(5) Structure control;

(6) Field staking data;

(7) Localization of the GPS systems to the Government-established control points; and

(8) Other procedures and controls necessary for the work.

Do not start work until staking or three-dimensional (3D) verification data for the affected work has been approved.

Preserve initial reference and control points. Notify the CO of missing control points or stakes at least 10 days before beginning construction. The Government will reestablish control points missing before the beginning of construction.

Acceptance of the construction staking does not relieve the Contractor of responsibility for correcting errors discovered during the work and for bearing additional costs associated with the error.

Maintain legibility of stake markings for the duration of the project or until notified in writing the stakes are no longer needed. Replace stakes if necessary to ensure markings are maintained.

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

Survey and Staking Requirements. Perform survey, staking, recording of data, and calculations as necessary to construct the project from the initial layout to final completion. Survey and set stakes to the tolerances in Table 152-1. Reset stakes, refine 3D data, or both as many times as necessary to construct the work.

(c) Control points. Relocate initial horizontal and vertical control points in conflict with construction to areas that will not be disturbed by construction operations.

(d) Centerline establishment. Establish or reestablish centerline at roadway design cross-section locations and as necessary to construct the work. Reestablish the centerline when construction survey and staking work does not meet the tolerances.

(e) Original ground topographic verification. Use an approved method to regenerate cross-section data in areas where theoretical and actual ground elevations do not match. Reduce cross-sections to horizontal and vertical distances from centerline. Retake cross-section 10 feet (3 meters) beyond catch points to verify existing ground topography.

(f) Slope and references stakes. Perform the following:

(1) **Conventional survey methods**. When specified verify and set slope stakes on both sides of centerline at the theoretical catch point. Set the slope stake at the actual intersection of the design roadway slope with the natural ground-line. Set reference stakes outside the clearing limits. Include reference points and slope-stake information on the reference stakes. Establish slope stakes in the field as the actual point of intersection of the design roadway slope with the natural ground-line when theoretical catch point information is not available.

(g) Clearing and grubbing limits. Set clearing and grubbing limits on both sides of centerline based on the actual slope-stake locations.

(h) Culverts. Verify and set culvert locations at the inlet, outlet, and inlet basin points according to the plans. Perform the following if culvert design does not fit field conditions:

a) Survey and record the ground profile along the culvert centerline;

b) Determine the slope catch points at the inlet and outlet;

c) Set reference points and record information necessary to determine culvert length

(i) Bridges. Set adequate horizontal and vertical control and reference points for bridge substructure and superstructure components. Establish and reference the bridge chord, bridge tangent, or control lines as specified on the bridge plans. Also establish and reference the centerline of each pier, bent, and abutment.

(j) Retaining walls and reinforced soil slopes. Survey and record profile measurements along the face of the proposed wall or reinforced soil slope at 5 feet (1.5 meters) and 10 feet (3 meters) in front of the wall or slope face. Take cross-sections every 25 feet (8 meters) along the length of the wall or reinforced soil slope and at major breaks in terrain within the limits designated by the CO. Measure and record points every 25 feet (8 meters) and at major breaks in terrain for each cross-section. Set additional references and control points to perform the work.

(k) Borrow and waste sites. When Specified perform field work necessary for initial layout and measurement of the borrow or waste site. Establish site limits and clearing limits. Measure both original and final ground conditions and submit cross-sections as directed by the CO.

(l) Permanent monuments and markers. Perform survey and staking work necessary to establish permanent monuments and markers as described in Section 621 or reestablish monuments as described in Subsection 107.02.

(m) Miscellaneous survey and staking. Survey and stake other work (such as guardrail, curb and gutter, turf establishment, utilities, and excavation limits for structures) to the proper location and required tolerances. Propose staking increments for approval by the CO when not specified.

Table 152-1
Construction Survey and Staking Tolerances [1]

Mapping grade GPS		
Staking Phase	**Horizontal**	**Vertical**
Centerline Establishment	10 feet	NA
Distance from Centerline stake to slope stake or reference stake.	±1.0 feet	NA
Distance from Centerline to clear flag/stake	±2.0 feet	NA

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

Survey notes will be evaluated under Subsection 106.02.

Measurement

152.06 Measure the Section 152 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

Do not measure re-establishing missing control points or stakes after construction operations have begun.

Payment

152.07 The accepted quantities will be paid at the contract price per unit of measurement 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 pay items will be prorated based on the progress of the work under this Section.

153 - Contractor Quality Control

153.02_National_10_26_2022

Delete Subsection 153.02 and replace with the following:

153.02 Qualifications.

Submit the following for approval with the quality control plan:

(a) Quality control manager (QCM). Furnish a QCM who has at least 2 years' experience in construction, inspector, quality control and material testing on construction projects of similar type and scope.

(b) Testers. Provide testers with at least one year experience in the type of sampling and testing required, and with one of the following for the type of sampling and testing performed:

(1) NICET Level II certification in highway material or equivalent state or industry certification;

(2) Certification by a regional certification program (such as Western Alliance for Quality Transportation Construction (WAQTC), Northeast Transportation Technician Certification Program (NETTCP), Southeast Task Force for Technician Training and Qualification (STFTTQ), or Multi Regional Training and Certification (M-TRAC)); or

(3) At least one year employment by an AASHTO accredited laboratory performing equivalent sampling and testing.

153.03_National_10_26_2022

Add the following paragraph to the end of Subsection 153.03(b):

153.03 Quality Control Plan.

(b) Quality Control Procedures.

Submit written proposals for approval of alternate AASHTO or State approved test methods. Alternate methods may be allowed based on documented equivalence to the specified method.

153.07_National_10_26_2022

Delete Subsection 153.07 and replace with the following:

153.07 Records and control charts.

Maintain complete testing and inspection records by pay item number and make them accessible to the CO.

155 - Schedules for Construction Contracts

155.00_National_11_9_2016

Delete Section 155 in its entirety.

Delete Section 155.

201 - Clearing and Grubbing

201.03_Regional_1_24_2022

Delete the last sentence in the second paragraph of Subsection 201.03.

201.03 General.

Delete paragraph (c) and (d) of Subsection 201.04 and replace with the following:

201.04 Clearing.

3. (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; and
4.
5. (d) Trim tree branches that extend over the road surface and shoulders to attain a clear height of **14 feet.** If required, remove other branches to present a balanced appearance. Trim according to accepted tree surgery practices. Treat wounds with tree wound dressing.

201.06_National_2_22_2018

Delete the first sentence of Subsection 201.06 and replace the following:

201.06 Disposal.

Merchantable timber is Government property. Deck merchantable timber on Forest Service property. Build log decks to facilitate later removal by typical logging practices.

Utilization standards for determining merchantable timber are listed below. Fall and buck merchantable material into whole tree length.

1. **Minimum Utilization Standards**				
Species	**Maximum Stump Height (inches)**	**Length (feet)**	**Diameter[1] (inches)**	**% Net Scale[2]**
All	12”	8’	5.6”	33

[1] measured at inside bark at small end
[2] in % gross scale

202 - Additional Clearing and Grubbing

202.04_Regional_1_24_2022

Delete the Subsection 202.01 and replace the following:

202.01 This work consists of clearing and grubbing within clearing limits as designated in the plans. This work also includes scalloping clearing lines, clearing vistas, thinning vegetation, special clearing and grubbing and the removal of individual trees and stumps designated in the plans that may be outside the clearing limits.

Add the following to Subsection 202.04:

202.04 Selective Clearing.

(a) Roadside Clearing. Cut all brush and small trees, 6 inches in diameter or less at the point of cut, inside the roadside clearing limits and outside the roadway no higher than 12 inches above ground level. If rocks or other obstructions are encountered, cut no higher than 6 inches above the obstruction. Limb live trees with a diameter larger than 6 inches to a height of 14 feet above the road surface.

Add the following to Subsection 202.06:

202.06 Special Clearing and Grubbing.

(a) Roadway and Roadside Clearing and Grubbing. Clear Within the roadside clearing limits. Grub the roadway and horizontally 2 feet beyond each shoulder. Dispose of merchantable timber according to Subsection 201.06

203 - Removal of Structures and Obstructions

203.05_National_1_24_2022

Add the following to Subsection 203.05:

203.05 Disposing of Material.

(e) Windrowing Construction Slash. Place construction slash outside the roadway in neat, compacted windrows approximately parallel to and along the toe line of embankment slopes. Do not permit the top of the windrows to extend above subgrade. Use construction equipment to matt down all material in a windrow to form a compact and uniform pile. Construct breaks of at least 15 feet at least every 200 feet in a windrow. Do not place windrows against trees.

(f) Scattering. Scatter construction slash in designated areas 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. When scattering for erosion control, place construction slash as flat as practicable on the completed slope.

(g) Chipping. Use an approved chipping machine to chip slash longer than 3 feet. Deposit chips 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. Remove brush from designated log deck areas. Limb and top logs.

Logs not meeting the Utilization Standards described in Subsection 201.04(c) shall be cut to lengths less than **<number>** feet and decked in designated log deck location.

Merchantable timber not associated with an existing timber sale shall be cut to length meeting the Utilization Standards described in Subsection 201.04(c).

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.

(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.

204 - Excavation and Embankment

Delete Section 204 in its entirety and replace with the following.

Section 204. — EXCAVATION AND EMBANKMENT

Description

204.01 This work consists of excavating material and constructing embankments. This work also 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. Material excavated from within the right-of-way or easement areas, except subexcavation covered in Subsection 204.02(a)(2) 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 ground-line in embankment sections. Subexcavation excludes the work required by Subsection 204.05 or 204.06.

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

Topping	704.05
Unclassified borrow	704.06
Water	725.01(c)

Construction Requirements

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

Road pioneering, slash disposal, and grubbing of stumps may proceed concurrently with excavation and embankment. Maintain drainage during pioneering operations.

204.05 Conserved Topsoil. When designated, conserve topsoil from roadway excavation and embankment foundation areas. Stockpile conserved topsoil in low windrows immediately beyond the rounding limits of cut and embankment slopes or in other approved locations. Separate conserved topsoil from other excavated material. When designated, place conserved topsoil on completed slopes according to Section 624.

204.06 Roadway Excavation. Excavate as follows:

(a) Rock cuts. Blast rock according to Section 205. Excavate rock cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Backfill to subgrade with topping or other suitable material. Compact the material according to Subsection 204.11.

(b) Earth cuts. Scarify earth cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Compact the scarified material according to Subsection 204.11.

(c) Pioneer Roads. 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.

(d) Drainage Feature. Drainage feature includes construction of all ditches, minor channel changes, drainage dips, catch basins, surface water deflectors, and other minor drainage structures. Compact the material according to Subsection 204.11. Excavate on a uniform grade between control points.

Do not disturb material and vegetation outside the construction limits. Retrieve material deposited outside the construction limits. Dispose of unsuitable or excess excavation material according to Subsection 204.14. Replace shortage of suitable material caused by premature disposal of roadway excavation.

Shape to drain and compact the work area to a uniform cross-section at the end of each day's operations.

204.07 Subexcavation. Excavate material to the required limits. Dispose of unsuitable material according to Subsection 204.14. Take cross-sections according to Section 152. Backfill subexcavated area with suitable material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness and compact according to Subsection 204.11. Prevent unsuitable material from mixing with suitable backfill material.

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

Obtain borrow source approval according to Subsection 105.02. Develop and restore borrow sources according to Subsections 105.03 and 105.06. 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 over natural ground. Remove topsoil and break up the ground surface to a minimum depth of 6 inches (150 millimeters) 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 (150 millimeters). Scarify or pulverize asphalt and concrete roads to 6 inches (150 millimeters) below the pavement. Reduce particles to a maximum size of 6 inches (150 millimeters) 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 steps in the existing slope to a sufficient width to accommodate placement and compaction operations and equipment. Step the slope as the embankment is placed and compacted in layers. Begin each step at the intersection of the original ground and the vertical cut of the previous step.

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 (2 meters) 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 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 with a tamping foot roller, by walking with a dozer, or by over-building the fill and then removing excess material to the final slope line. For slopes 1V:1¾H or steeper, compact the slopes as embankment construction progresses.

(b) Embankment within the roadway prism. Place embankment material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness. Incorporate oversize boulders or rock fragments into the 12-inch (300-millimeter) layers by reducing them in size or placing them individually as required 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 (300-millimeter) layers may be placed in layers up to 24 inches (600 millimeters) thick. Incorporate oversize boulders or rock fragments into the 24-inch (600-millimeter) layer by reducing them in size or placing individual rock fragments and boulders greater than 24 inches (600 millimeters) in diameter as follows:

(1) Reduce rock to less than 48 inches (1200 millimeters) 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 above. Fill voids between rocks; and

(4) Compact each layer according to Subsection 204.11(a) before placing the next layer.

(c) Embankment outside of roadway prism. When placing embankment outside the staked roadway prism, place material in horizontal layers not exceeding 24 inches (600 millimeters) 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) Placement Method 1. Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve. 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 (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) 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 (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;

(b) Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or

(c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(a), by four passes; or

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(b) and (c), by eight passes.

(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. 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 AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet(1 meter) per second. Compact each layer of material full width according to Subsection 204.11(a)(1).

(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve. 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 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) Placement Method 2. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate roller 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. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

(1) Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

(2) Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

(3) Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

(4) Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

(c) Placement Method 3. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

(d) Placement Method 4. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer.

(e) Placement Method 5. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by ½ width of bucket.

(f) Placement Method 6. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes.

204.12 Drainage Features. Slope, grade, and shape all drainage features. Remove projecting roots, stumps, rock, or similar matter. Maintain all drainage features in an open condition and without sticks, and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place excavated material on the downhill side so the bottom of the ditch is approximately 18 inches (450 millimeters) below the crest of the loose material. Clean the ditch using a hand shovel or other suitable method. Shape to provide drainage without overflow.

204.13 Sloping, Shaping, and Finishing. Complete subgrade, slopes, drainage features, culverts, riprap, and other underground minor structures before placing aggregate courses. Slope, shape, and finish to the designated tolerance class as defined in Table 204-2 as follows:

(a) Sloping. Leave earth slopes with uniform roughened surfaces, except as described in Subsection 204.13(b), with no noticeable break as viewed from the road. Except in solid rock, round tops and bottoms of slopes including the slopes of drainage ditches. Round material overlaying solid rock to the extent practical. Scale rock slopes. Slope rounding is not required on tolerance class D through M roads.

If a slide or slipout occurs on a cut or embankment slope, remove or replace the material and repair or restore 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, construct steps on slopes of 1⅓V:1H to 1V:2H. Construct the steps approximately 18 inches (450 millimeters) high. Blend the steps into natural ground at the end of the cut. If the slope contains non-rippable 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. Ensure that the subgrade is visibly moist during shaping and dressing; smooth and uniform, and shaped to conform to the typical sections. Remove material larger than 6 inches (150 millimeters) from the top 6 inches (150 millimeters) of the roadbed. Remove unsuitable material from the roadbed, and replace it with suitable material. Scarify to 6 inches (150 millimeters) below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material.

Maintain proper ditch drainage.

204.14 Disposal of Unsuitable or Excess Material. Dispose of unsuitable or excess material at designated sites or according to Subsection 203.05(a)

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, testing, and acceptance 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.

Subexcavation will be evaluated under Subsections 106.02 and 106.04.

Measurement

204.16 Measure the Section 204 pay 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 listed in the bid schedule;

(d) Ditches, except furrow ditches measured under a separate pay item;

(e) Conserved topsoil;

(f) Borrow material used in the work when a pay item for borrow is not listed in the bid schedule;

(g) Loose scattered rocks removed and placed as required within the roadway;

(h) Conserved material taken from pre-existing stockpiles and used in Section 204 work, except topsoil measured under 624; 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;

(l) Material excavated outside the established slope limits; and

(m) Road pioneering for the convenience of the Contractor.

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

(a) Unsuitable material below subgrade in cuts and unsuitable material beneath embankment areas when a pay item for subexcavation is not listed 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, and topping. When measuring by the cubic yard (cubic meter) measure in its original position. If borrow excavation is measured by the cubic yard (cubic meter) 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 until suitable roadway excavation is depleted.

(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. If a pay item for slope rounding is included in the bid schedule measure rounding cut slopes horizontally along the centerline of the roadway. If a pay item is not included for slope rounding is not included in the bid schedule payment will be considered indirect to roadway excavation.

(e) Waste. Measure waste by the cubic yard (cubic meter) 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 (cubic meter) in the hauling vehicle.

(g) Subexcavation. Measure subexcavation by the cubic yard (cubic meter) in its original position.

(h) Drainage features. Measurement includes all excavation, embankment, shaping, and grading necessary for a completed drainage feature.

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, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Source								
Topping (704.05)	Measured and tested for conformance (106.04 & 105)	Classification[1]	–	AASHTO M 145	1 per soil type and source of material	Processed material	Yes	Before using in work
Unclassified borrow (704.06)	"	"	–	"	"	"	"	"
Production								
Topping (704.05) and (204.11(a))	Measured and tested for conformance (106.04)	Moisture-density	–	T 99, Method C[2]	1 per soil type, but not less than 1 per each 13,000 yd^3 (10,000 m^3)	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd^2 (3000 m^2), but not less than 3 per layer	In-place	No	Before placement of next layer
Unclassified borrow (704.06) and (204.11(a))	"	Moisture-density	–	T 99, Method C[2]	1 per soil type, but not less than 1 per each 13,000 yd^3 (10,000 m^3)	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd^2 (3000 m^2), but not less than 3 per layer	In-place	No	Before placement of next layer
Production (continued)								

Table 204-1
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Earth embankment (204.11(a))	Measured and tested for conformance (106.04)	Classification	–	AASHTO M 145	1 per soil type	Source of material	Yes	Before using in work
		Moisture-density	–	T 99, Method C(2)	1 per soil type, but not less than 1 per each 13,000 yd^3 (10,000 m^3)	"	"	"
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd^2 (3000 m^2), but not less than 3 per layer	In-place	No	Before placement of next layer
Top of subgrade (204.11(a))	"	Density	–	AASHTO T 310 or other approved procedures	1 per 2500 yd^2 (2000 m^2), but not less than 3 per layer	In-place	No	Before placement of next layer
Finished Product								
Roadbed (204.13)	Measured and tested for conformance (106.04)	Final line & grade	–	Field measured	Determined by the CO	Determined by the CO	No	Before placement of next layer

(1) Not required when using Government-provided source.
(2) Minimum 5 points per proctor.

Table 204-2
Construction Tolerances

Location Description	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	±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	±5.0 (c)
Slopes, excavation, and embankment (% slope[b])	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±5	±5

(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 50 feet, and no vertical curves with a curve length of less than 50 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 60 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 12 percent in 100 feet of length.

205 - Rock Blasting

205.00_National_1_24_2022

Add the following to Subsection 205.03:

205.03 Regulations

(e) Forest Service. For projects in National Forest Service lands, comply with Forest Service Manual (FSM) 6745, *Explosives and Blasting Materials*.

Add the following to Subsection 205.06:

205.06 Preblast condition survey and vibration monitoring and control.

Limit blasting induced vibrations in saturated soils or on steep slopes as designated or as directed by the CO.

Notify the owners of nearby utilities at least 24 hours before blasting.

Add the following to Subsection 205.07:

205.07 Test Blasting.

Test blast at all new sources, when rock type changes, and when blast layout changes due to slope or other changes.

Add the following to the bulleted list in the eighth paragraph of Subsection 205.08:

205.08 Blasting.

- Precipitation exceeds 1 inch in any 24 hour period.
- Precipitation exceeds 3 inches in any 96 hour period.
- Precipitation exceeds 4 inches in any 144 hour period.
- A landslide occurs within 300 feet of a blast site under any precipitation conditions.

209 - Structure Excavation and Backfill

209.01_Regional_11_17_2022

209.01 This work consists of excavating material for the construction of structures, except those specifically designated under Section 208. This work also includes preserving channels, shoring and bracing, sealing foundations, dewatering, preparing foundations, bedding, and backfilling.

Material

209.02 Conform to the following Sections and Subsections:

Backfill material	704.03
Bedding material	704.02
Foundation fill	704.01
Lean concrete backfill	614
Structural concrete, Class S (Seal)	552
Unclassified borrow	704.06

Construction Requirements

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

Excavate trenches or foundation pits according to Subsection 208.03. Excavate to foundation grade without disturbing the trench or foundation surface. Foundation grade is the elevation at the bottom of the bedding for installing the structure.

209.04 Channel Preservation. Preserve channels according to Subsection 208.04, except excavate inside separations such as dikes or sandbags.

209.05 Foundation Seal. When foundation seals are necessary, construct a foundation seal according to Subsection 208.06.

209.06 Dewatering. When dewatering is necessary, dewater according to Subsection 208.07.

209.07 Foundation Preparation. Excavate unsuitable material when encountered at foundation grade as directed by the CO.

Where a footing is required to be keyed into undisturbed material, prepare foundation and construct footing according to Subsection 208.08(c).

Backfill and compact with foundation fill according to Subsection 208.08(d).

209.08 Bedding. Place bedding as follows:

> **(a) For box culverts and structures other than pipe culverts.** Construct bedding when specified. Place and grade bedding material in compacted layers not exceeding 6 inches (150 millimeters) in depth. Compact each layer according to Subsection 209.10.

(b) For pipe culverts. Level the foundation. Place uncompacted bedding material over the foundation in a layer of uniform thickness. Lay a 4-inch (100-millimeter) thickness of bedding for pipes with diameters of 12 to 54 inches (300 to 1350 millimeters). Lay a 6-inch (150-millimeter) thickness of bedding for pipe with diameters larger than 54 inches (1350 millimeters). Recess the bedding to receive the joints for pipes with belled joints. Place the culvert on the uncompacted bedding layer and backfill according to Subsection 209.09(b).

(c) For pipe culverts less than 96 inches in diameter. Unless otherwise shown on the plans provide material for bedding consisting of selected 3 inch minus mineral soil that is readily compactible and free of frozen lumps, chunks of highly plastic clay (with a PI greater than 10), or other objectionable material. Bed the pipe according to subsection 209.08(b). Material for bedding shall be evaluated according to Subsection 106.02.

209.09 Backfill. Backfill as follows:

(a) **General.** Place backfill layers evenly on all sides of the structure. Extend each layer to the limits of the excavation or natural ground.

Place backfill material in compacted layers not exceeding 6 inches (150 millimeters) in depth.

Do not place backfill material against concrete until 80 percent of the design strength is achieved.

Compact each layer according to Subsection 209.10.

Backfill without damaging or displacing the culvert or structural plate structure. Replace any pipe that is distorted by more than 5 percent of nominal dimensions, or that is ruptured or broken.

(b) Pipe culverts. Backfill according to one of the following:

(1) Pipe culverts. Place and compact backfill material in evenly balanced layers on each side of the pipe to a height of 24" inches (300 millimeters) above the top of the pipe culvert. Complete backfilling to the top of the trench. Place and compact backfill material in the trench in layers not exceeding 6 inches (150 millimeters) in depth according to Subsection 209.10.

(2) Pipe culverts with lean concrete backfill. Place and anchor pipe to prevent floating and movement. Backfill using lean concrete according to Section 614.

(3) Pipe culverts less than 96 inches in diameter. Unless otherwise shown on the plans provide material for backfill consisting of selected 3 inch minus mineral soil that is readily compactible and free of frozen lumps, chunks of highly plastic clay (with a PI greater than 10), or other objectionable material. Backfill according to subsection 209.09(b)(1). Material for backfill shall be evaluated according to Subsection 106.02.

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 10 feet at subgrade centerline.
- Installation in a protected stream course.

- Round pipe with a diameter of 48 inches or greater.
- Pipe arches with a span of 50 inches or greater.
- Any box culvert or structure other than pipe culverts.

(c) Structural plate structures. Place and compact backfill material to a height of 12 inches (300 millimeters) above the top of the structural plate structure. When applicable, complete backfilling and compacting according to Subsection 204.10.

(d) Repair existing pavement areas. See Subsection 418.04.

209.10 Compacting. Compact the embankment using one of the following methods as specified.

(a) Compaction Method 1. Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve. 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 (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) 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 (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;

(b) Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or

(c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(a), by four passes; or

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(b) and (c), by eight passes.

(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve. Classify the material according to AASHTO M 145. 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 AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet(1 meter) per second. Compact each layer of material full width according to Subsection 209.10(a)(1).

(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve. 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 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 Method 2. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate roller 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. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

(1) Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

(2) Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

(3) Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

(4) Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

(c) Compaction Method 3. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

(d) Compaction Method 4. Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer.

(e) Compaction Method 5. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by ½ width of bucket.

(f) Compaction Method 6. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes

209.11 Acceptance. See Table 209-1 for sampling, testing, and acceptance requirements.

Material for backfill, bedding, and foundation fill will be evaluated under Subsections 106.02 and 106.04, except lean concrete for bedding or backfill will be evaluated according to Section 614.

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

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

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

Seal concrete will be evaluated under Section 552.

Measurement and Payment

209.12 Do not measure structure excavation and backfill for payment. See Subsection 109.05.

Measure foundation fill under Section 208.

Do not measure excavation and concrete for cofferdam seals for payment.

Table 209-1
Sampling, Testing, and Acceptance Requirement

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Source								
Backfill material[1] (704.03)	Measured and tested for conformance (106.04 & 105)	Classification	–	AASHTO M 145	1 per soil type	Source of material	Yes	Before using in work
		Gradation	–	AASHTO T 27 & T 11	"	"	"	"
Bedding material[1] (704.02)	"	"	–	"	"	"	"	"
Foundation fill[1] (704.01)	"	Classification	–	AASHTO M 145	"	"	"	"
		Gradation	–	AASHTO T 27 & T 11	"	"	"	"
Unclassified borrow[1] (704.06)	"	Classification	–	AASHTO M 145	"	"	"	"

Table 209-1 (continued)
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Production								
Backfill material (704.03)	Measured and tested for conformance (106.04)	Moisture-density	–	AASHTOT 99, Method C(2)	1 per soil type	Source of material	Yes	Before usingin work
		Density	–	AASHTO T 310 or other approved procedures	2 per lift	In-place	No	Before placing next layer
Bedding material (704.02)	"	Moisture-density	–	AASHTOT 99, Method C(2)	1 per soil type	Source of material	Yes	Before usingin work
		Density	–	AASHTO T 310 or other approved procedures	2 per lift	In-place	No	Before placing next layer
Foundation fill (704.01)	"	Moisture-density	–	AASHTO T 99, Method C(2)	1 per soil type	Source of material	Yes	Before usingin work
		Density	–	AASHTO T 310 or other approved procedures	2 per lift	In-place	No	Before placing next layer
Unclassified borrow (704.06)	"	Moisture-density	–	AASHTOT 99, Method C(2)	1 per soil type	Source of material	Yes	Before usingin work
		Density	–	AASHTO T 310 or other approved procedures	2 per lift	In-place	No	Before placing next layer

(1) Not required when using Government-provided source.
(2) Minimum of 5 points per proctor.

212 - Linear Grading

212.03_Regional_1_24_2022

Delete the first and second paragraph of Subsection 212.03 and replace with the following:

212.03 Roadway Excavation and Embankment.
Construct the roadbeds according to the requirements of Section 204, except as modified herein.

Adjust the moisture content of embankment material to a moisture content suitable for compaction. Place embankment material in 12-inch layers and compact each layer according to Subsection 204.11. Where compacting with rollers is not practical, use approved mechanical or vibratory compaction equipment.

Delete Subsection 212.04(a) and replace with:

212.04 Grading Tolerance.

(a) Alignment (centerline). Alignment may be shifted a maximum of 10 feet (3 meters) left or right of the planned centerline. Curve radii may be reduced by up to 50 percent. Do not construct curves with radii less than 50 feet. Compound curves are permitted

301 - Untreated Aggregate Courses

301.00_Regional_10_26_2022

Delete section 301 entirely and replace with the following:

301.01 This work consists of constructing one or more courses of aggregate on a prepared surface.

Subbase and base aggregate grading is designated according to Table 703-2. Surface course aggregate grading is designated according to Table 703-3.

Material

301.02 Conform to the following Subsections:

Subbase, base, and surface course aggregate	703.05
Water	725.01(c)

Construction Requirements

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

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 will be required otherwise. After processing on the road, remove all oversize material from the road and dispose as directed by the CO.

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

When provided and specified on plans, develop and use Government furnished sources according to Section 105.

If the aggregate is produced and stockpiled before placement, handle and stockpile according to Section 314.

301.04 Mixing and Spreading. Obtain moisture content in accordance with the compaction method specified. If moisture content is not specified by the compaction method adjust the moisture content to a level suitable for compaction. Mix the aggregate and adjust the moisture content to obtain a uniform mixture. Spread and shape the mixture on the prepared surface in a uniform layer.

Do not place the mixture in a layer exceeding 6 inches (150 millimeters) in compacted thickness. When more than one layer is necessary, compact each layer according to Subsection 301.05

before placing the next layer. Route hauling equipment uniformly over the full width of the surface to minimize rutting or uneven compaction.

301.05 Compacting.

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

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

(a) **Compaction A.** Operating spreading and hauling equipment over the full width of the travelway.
(b) **Compaction B.** Operate rollers and compact as specified in Subsection 204.11(a)(1).
(c) **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).
(d) **Compaction D**. Compact to a density of at least 95 per-cent of the maximum density, as determined by AASHTO T 180, method C or D.

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 Surface Tolerance. Remove irregularities and shape to a uniform surface. Ensure that the thickness and width of the compacted aggregate conform to the dimensions SHOWN ON THE DRAWINGS, and that measurements on the compacted aggregate meet the following criteria:

(a) The maximum variation from the specified thickness is 1 inch.

(b) The compacted thickness is not consistently above or below the specified thickness, and the average thickness of measurements for any one mile of road segment is within ± ¼ inch of the specified thickness.

301.07 Maintenance. Maintain the aggregate course to the correct line, grade, and cross-section by blading, watering, rolling, or combination thereof until placement of the next course. Correct defects according to Subsection 301.06.

301.08 Acceptance. See Table 301-1 for sampling, testing, and acceptance requirements; including the category for quality characteristics.

Aggregate gradation and surface course plasticity index will be evaluated under Subsection 106.05. Other aggregate quality properties will be evaluated under Subsections 106.02 and 106.04.

(a) Aggregate gradation. The upper and lower specification limits are equal to the calculated mean of all test results plus or minus the allowable deviations shown in Tables 703-2 and 703-3, except as follows:

(1) If the calculated mean value for a tested sieve exceeds the maximum gradation value shown in Table 703-2 or 703-3, then the upper specification is equal to the maximum gradation value plus the allowable deviation, and the lower specification is equal to the maximum gradation value minus the allowable deviation.

(2) If the calculated mean value for a tested sieve is less than the minimum gradation value shown in Table 703-2 or 703-3, then the upper specification is equal to the minimum gradation value plus the allowable deviation and the lower specification is equal to the minimum gradation value minus the allowable deviation.

(b) Plasticity index. The upper and lower specification limits for surface courses are shown in Subsection 703.05(b)(3).

Construction of untreated aggregate courses will be evaluated under Subsections 106.02 (Visual Inspection) and 106.04 (Measured or Tested Conformance).

Measurement

301.09 Measure the Section 301 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

When measuring aggregate by the cubic yard (cubic meter), measure in place.

When measuring aggregate by the square yard (square meter), measure the length horizontally along the centerline of the roadway. Measure the width horizontally to include the top of aggregate width, including designed widenings.

Payment

301.10 The accepted quantities will be paid at the contract price per unit of measurement adjusted according to Subsection 106.05 for the Section 301 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109

Delete Table 301-1 and replace with the following table:

Table 301-1
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Source									
Aggregate quality (703.05(a) (b) (c))	Measured and tested for conformance (106.04 & 105)	LA abrasion (coarse)	-	AASHTO T96	1 per type & source of material	Source of material	Yes	Before using in work	Not required when using Gov't-provided sources
		Soundness using sodium sulfate (coarse & fine)	-	AASHTO T104	"	"	"	"	"
		Fractured faces	-	ASTM D5821	"	"	"	"	"
		Liquid Limit	-	AASHTO 58 & T89 Method A	"	"	"	"	"
Surface course aggregate (703.05(c))	"	Plasticity index	–	AASHTO R 58, T 89, & T 90	"	Crusher belt or after processing	"	"	"

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Source (continued)									
Subbase, base, or surface course aggregate (703.05(b) (c))	Process control (153.03)	Gradation Fractured faces	- -	AASHTO T 11 & T27 ASTM D5821	2 per day per stockpile (minimum) “	Crusher Belt “	No “	24 Hours “	Not required when using a pre-crushed commercial source “
Surface course aggregate (703.05(c))	“	Plasticity index	–	AASHTO R 58, T 89, & T 90	“	Crusher belt or after processing	“	“	“
Production									
Subbase course Grading A & B	Measured and tested for conformance (106.04)	Gradation No. 4 (4.75 mm) No. 200 (75um) Other specified sieves	 II II II	AASHTO T27 & T11	1 per 1000 tons (900 metric tons)	From Windrow, roadbed after processing, or other approved location	Yes	24 hours	-
Base course Grading C, D, & E	Measured and tested for conformance (106.04)	Gradation ¾ inch (9.5 mm) No. 4 (4.75 mm) No. 200 (75um) Other specified sieves	 II II II II	AASHTO T 27 & T 11	1 per 1000 tons (900 metric tons)	From Windrow, roadbed after processing, or other approved location	Yes	24 hours	–

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Production (continued)									
Subbase & base course Grading A, B, C, D, & E	Measured and tested for conformance (106.04)	Liquid limit	-	AASHTO R58 & T89 Method A	1 per 1000 tons (900 metric tons)	From Windrow, roadbed after processing, or other approved location	Yes	24 hours	-
		Moisture-density (max density)	-	AASHTO T180 Method D (1)	1 per type & source of material		"	"	-
		Density	-	AASHTO T310 or other approved procedures	1 per 500 tons (450 metric tons)	In-place after compaction	No	End of shift	-
		Moisture content (in-place)	-	"	"	"	"	"	-

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Production (continued)									
Surface course aggregate	Measured and tested for conformance (106.04)	Gradation		AASHTO T 27 & T 11	per 1000 tons (900 metric tons)	From Windrow, roadbed after processing, or other approved location	Yes	24 hours	-
		All Sieves in the specified gradation	II						
		Plasticity index		AASHTO R 58, T 89, & T 90	"	"	"	"	-
	Measured and tested for conformance (106.04)	Moisture-density (max density)	-	AASHTO 180 Method D (1)	1 per type & source of material	Stockpile or production output	Yes	"	-
		Density	-	AASHTO T310 or other approved procedures	1 per 500 tons (450 metric tons)	In-place after compaction	No	End of shift	-
		Moisture content (in-place)	-	"	"	"	"	"	-
		Fractured faces	-	ASTM D5821	1 per 1000 tons (900 metric tons)	From windrow, roadbed after processing, or other approved location	Yes	24 hours	-
Subbase, base, and surface course	Measured and tested for conformance (106.04)	Surface tolerance & grade	–	Subsection 301.06	2 per 1000 feet of road segment Determined by the CO	Roadbed after processing and compacting	No	Before placement of next layer or as requested	–

(1) Minimum of 5 points per proctor

302 - Minor Crushed Aggregate

302.04_National_1_24_2022

Add the following to Subsection 302.04 and 302.04(a)

302.04 Placing Crushed Aggregate.

Written approval of the surface is required before placing aggregate.

(a) Roadway aggregate.
For pit run or grid-rolled material, furnish material smaller than the maximum size, no gradation will be required otherwise. After processing on the road, remove all oversize material from the road and dispose as directed by the CO.

302.05_National_1_24_2022

Replace the first paragraph of subsection 302.05(a) with the following:

302.05 Compacting and Finishing Crushed Aggregate

(a) **Roadway aggregate.** Unless otherwise specified compact according to method 2. Finish surface according to Subsection 301.06.

303 - Road Reconditioning

303.05_Regional_1_24_2022

Delete Subsection 303.05 and replace with the following:

303.05 Roadbed Reconditioning.
Remove organic, deleterious, and material larger than 6 inches brought to the surface during reconditioning. Scarify potholes, ruts, and areas shown in the plans to a 6-inch depth or the bottom of the pothole, whichever is less. Dispose of waste at designated sites or according to Subsection 204.14. Repair soft and unstable areas according to Subsection 204.07. Remove irregularities and shape to a uniform surface. Perform the work, including mixing or spreading, when the moisture content is suitable for the specified compaction method. Compact the surface according to Subsection 204.11. Shape the surface according to 204.13(c).

Delete Subsection 303.06 and replace with the following:

303.06 Aggregate Surface Reconditioning.
Repair soft and unstable areas to the full aggregate surface depth and according to Subsection 204.07. Scarify potholes, ruts, and areas shown in the plans to a 6-inch depth or the bottom of the pothole, whichever is less. Remove irregularities and shape to a uniform surface. Perform the work, including mixing or spreading, when the moisture content is suitable for the specified compaction method. Compact the surface according to Subsection 204.11. Shape the surface according to 204.13(c).

304 - Full Depth Reclamation

304.00_Regional_1_20_2021

Delete Section 304 entirely and replace with the following:

Description

304.01 This work consists of pulverizing an existing roadbed in-place, mixing this material with water, and shaping and compacting the mix.

Material

304.02 Conform to the following Subsections:

Water	725.01(c)

Construction Requirements

304.03 General. Establish profile and cross slope control. Maintain the existing cross slope or crown if none is established.

Before pulverizing, perform ditch and shoulder reconditioning in accordance with 303.03 and 303.04 respectively. Suitable material generated during reconditioning may be pulverized and incorporated into the roadway.

Protect buried facilities from damage.

304.04 Reserved.

304.05 Pulverizing. Furnish a road reclaimer that is:

(a) Self-propelled;
(b) Specifically manufactured for in-place reclamation;
(c) Capable of reducing the existing material to the required size;

Use the reclaimer to pulverize the existing roadway material, in-place until 100 percent passes the sieve size specified in the schedule of items. Reprocess or remove larger particles and dispose of them at designated sites or according to Subsection 203.05.

304.06 Mixing and Spreading. Add water as necessary to adjust the moisture content of the mixture to meet the compaction method specified. Mix to produce a homogenous full depth mixture. Spread the mixture uniformly across the existing roadbed to provide a final compacted shape according to the established line, grade, and cross-section.

304.07 Compacting. Adjust the moisture content in accordance with the compaction method specified in the schedule of items and compact according to subsection 204.11.

304.08 Surface Tolerance. See Subsection 301.06.

304.09 Maintenance. See Subsection 301.07.

304.10 Acceptance. See Table 304-1 for sampling, testing, and acceptance requirements.

Construction of full depth reclamation will be evaluated under Subsections 106.02 and 106.04.

Measurement

304.11 Measure the Section 304 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

Payment

304.12 The accepted quantities will be paid at the contract price per unit of measurement for the Section 304 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Table 304-1

Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic		Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Production									
Pulverized material									
	Process control (153.03), (106.02) Visual Inspection (106.02)	Moisture content (in-place) Gradation	– –	Various Field Testing Methods	Consistently throughout operation IAW QC Plan "	Behind recalimer before compaction "	– –	Upon completion of test "	Moisture content suitable for compaction specified 100% passing sieve size specified in the pay item
Finished Product									
Finished pulverized material	Visual Inspection (106.02)	Surface tolerance & depth	–	Subsection 301.06	Minimum 8 per mile	Random Completed, compacted, and finished surface	–	Before placement of next layer or as requested	Reclamation depth specified in the pay item

602 - Culverts and Drains

602.03_Regional_1_24_2022

Replace the sixth paragraph of Subsection 602.03 with the following:

602.03 General.

Construct a piping plug when shown in the plans unless the culvert inlet is protected with a full-height headwall, slope paving, or an embankment consisting of AASHTO M 145 classification A-6 or A-7 material. Construct the piping plug with AASHTO M 145 classification A-6, A-7, or other approved material with a permeability not exceeding 0.004 inches (0.1 millimeters) per second.

602.05_National_1_24_2022

Replace the first paragraph of Subsection 602.05 with the following:

602.05 Laying Metal Pipe.

Position the pipe with a longitudinal joint so the joint is opposite the invert. Unless otherwise specified fully join pipe sections to control the infiltration of soil according to AASHTO M 36 or AASHTO M 196. Use one of the following:

Add the following to Subsection 602.05:

> **(c) Standard Connecting bands.** Band corrugation shall match that of the pipe sections being joined or the annular rerolled ends of those pipe sections.

625 - Turf Establishment

625.00_Regional_6_26_2018

Delete Section 625 in its entirety and replace with the following:

Section 625. — TURF ESTABLISHMENT

Description

625.01 This work consists of soil preparation, watering, fertilizing, seeding, and mulching. Seeding and mulching methods are designated as dry or hydraulic.

Material

625.02 Conform to the following Subsections:

Agricultural limestone	713.02
Fertilizer	713.03
Mulch	713.05
Seed	713.04
Tackifiers	713.11
Water	725.01(b)

Construction Requirements

625.03 General. Apply turf establishment to prepared ground or any disturbed area between **April 15** and **October 31.** Apply turf establishment to the areas shown on the plans or worklists within **10** calendar days after completion of ground disturbing activities.

Seeded areas damaged by construction activities shall be reseeded. Do not seed during windy weather or when the ground is excessively wet, frozen, or snow covered.

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

625.04 Preparing Seedbed. Ensure that the surface soil is in a roughened condition favorable for germination and growth.

625.05 Watering. Maintain moisture as follows:

Not Applicable

625.06 Fertilizing. Apply fertilizer by the following methods:

(a) Dry Method. Apply the fertilizer with approved 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. Add the tracer material when designated by the CO.

Apply fertilizer at the rate of **N/A** pounds per acre. Follow manufacture's recommendation for product and site conditions. Use an organic (bio-based), slow-release fertilizer meeting the following chemical analysis:

Nutrient	**Percent**
Nitrogen, N	N/A
Phosphorus, P_2O_5	N/A
Potassium, K	N/A

625.07 Seeding. Apply seed by the following methods:

(a) Dry Method. Apply the seed in a uniform application with approved power- d r i v e n seeders, drills, or other mechanical equipment. Hand-operated seeding methods are satisfactory on areas inaccessible to mechanical equipment; or

(b) Hydraulic Method. Use hydraulic-type equipment capable of providing a uniform application using water as the carrying agent. Add a tracer material consisting of either wood or grass cellulose fiber mulch to the water. Apply the tracer material at a rate of 400 pounds per acre (450 kilograms per hectare) to provide visible evidence of uniform application. Add the seed to the water slurry no more than 30 minutes before application. Seed by hand areas inaccessible to seeding equipment.

Furnish and apply the following kinds and amounts of pure live seed:

Species of Seed	**PLS** lbs/acre	**PLS** Per/lb	**Seeds/ ft²**	**Acceptable Cultivars**
Elymus glaucus Blue wildrye	8	0.308 lb.	25	Arlington or Elkton
Pseudoroegneria spicata Bluebunch wheat grass	4	0.154 lb.	13	Goldar or Anatone
Elymus trachycaulus Slender Wheatgrass	4	0.154 lb.	15	Primar Pryor Or Revene
Bromus marginatus *Mountain Brome*	4	0.154 lb.	6	Bromar or Garnet
Cover Crop of Annual Rye *Lolium multifolrum*	6	0.230 lb.	31	
TOTALS	26 lbs/ acre	1 lb	90 seeds/ ft²	

Government Furnished Seed. Upon receipt of written request, the Government shall supply seed within 5 days excluding weekends and Federal holidays. Amount of seed requested shall be in 50lb increments.

625.08 Mulching.

Mulching:
Mulch material shall be weed free straw and shall be applied at a uniform rate to adequately cover the seed. The weed free straw shall be from a grain crop such as barley straw, wheat straw or oat straw.

Mulch will be applied in a one-step operation with the seed at the rate of 1 Ton per Acre.

625.09 Protecting and Caring for Seeded Areas. Protect and care for seeded areas including watering according to 625.05. Repair or apply supplemental applications of seed, mulch, fertilizer, and water according to 625.05 as many times as needed until turf is established or final acceptance.

625.10 Acceptance. Material for turf establishment will be evaluated under Subsections 106.02 and 106.03.

Placing of turf establishment will be evaluated under Subsections 106.02 and 106.04.

Measurement

625.11 Measure the Section 625 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

When measuring turf establishment and supplemental applications by the acre (hectare), measure on the ground surface.

When measuring water by volume or mass, measure in the hauling vehicle or by metering.

Payment

625.12 The accepted quantities will be paid at the contract price per unit of measurement for the Section 625 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

705 - Rock

705.02_National_1_24_2022

Add the following Class to Table 705-1 in Subsection 705.02:

705.02 Riprap. Table 705-1.

Table 705-1
Gradation Requirements for Riprap(1)

Class	% of Rock Equal or Smaller by Count, DX	Range of Intermediate Dimensions,(2) inches (millimeters)	Range of Rock Mass,(3) pounds (kilograms)
0	100	6 – 8 (150 –200)	17 – 41 (8 – 19)
	85	5 – 6 (150 – 150)	10 – 17 (5 – 8)
	50	2 – 5 (50 – 125)	0.6 – 10 (0.3 – 5)
	15	0 – 2 (0 – 50)	0 – 0.6 (0 – 0.3)