FOREST SERVICE
SUPPLEMENTAL SPECIFICATIONS

McCalla Larson BMP PROJECT

OCTOBER 15, 2025

STEVENSVILLE RANGER DISTRICT
BITTERROOT NATIONAL FOREST
RAVALLI COUNTY
MONTANA

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Preface

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.

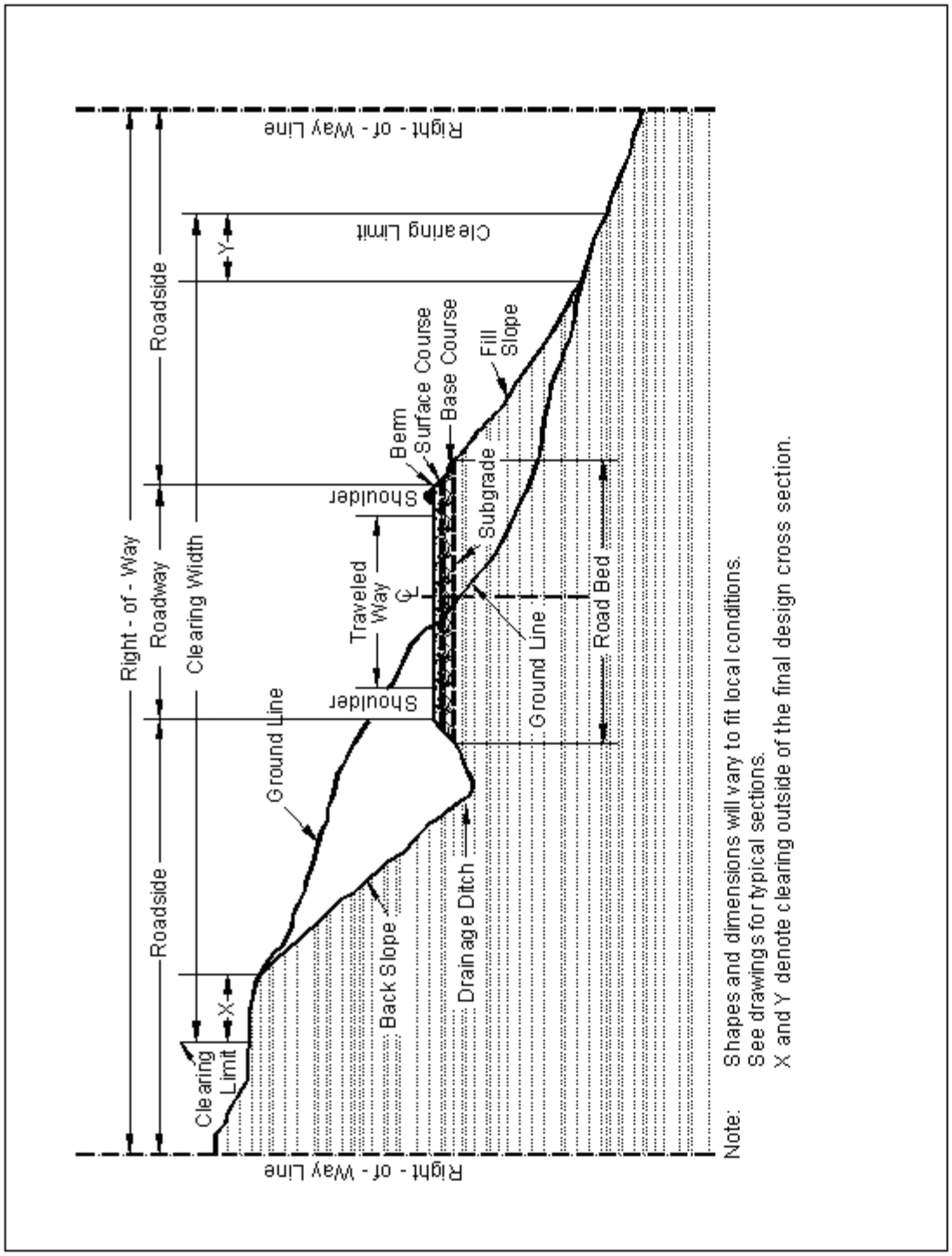
Shop Drawings — (Timber and Stewardship Contracts) Referred to as "Drawings" in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions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

Delete Section 102 in its entirety.

Delete Section 102.

103 - Scope of Work

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

Add the following to Subsection 105.02(a):

105.02(a) Government-provided sources.

Government-provided sources for this project are identified as follows:

(1) Government-provided mandatory sources.

Pay Item	Description	Material source number or name
N/A	Waste site	Within 5 mile of work site

(2) Government-provided optional sources for this project are identified as follows:

Pay Item	Description	Material source number or name

Add the following to Subsection 105.02c:

105.02(c) Contractor-located sources.

All material (e.g., soil, gravel, sand, borrow, aggregate, etc.) transported onto National Forest System land or incorporated into the work shall be weed-free. The Contracting Officer may request written documentation of methods used to determine the weed-free status of any and all materials furnished by the contractor. Contractor-provided expertise and methods to establish weed-free status must be appropriate for the weeds of concern in the local area. The following applies to this contract:

Weeds specific to this project: **Montana Noxious Weed List** *As of: June 21,2019*

PRIORITY 1A These weeds are not present or have a very limited presence in Montana. Management criteria will require eradication if detected, education, and prevention:	(a) Yellow starthistle (b) Dyer's woad (c) Common reed (d) Medusahead
PRIORITY 1B These weeds have limited presence in Montana. Management criteria will require eradication or containment and education:	(a) Knotweed complex (b) Purple loosestrife (c) Rush skeletonweed (d) Scotch broom (e) Blueweed

PRIORITY 2A These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts:	(a) Tansy ragwort (b) Meadow hawkweed complex (c) Orange hawkweed (d) Tall buttercup (e) Perennial pepperweed (f) Yellowflag iris (g) Eurasian watermilfoil (h) Flowering rush (i) Common buckthorn (j) Ventenata	
PRIORITY 2B These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts:	(a) Canada thistle (b) Field bindweed (c) Leafy spurge (d) Whitetop (e) Russian knapweed (f) Spotted knapweed (g) Diffuse knapweed (h) Dalmatian toadflax	(h) Dalmatian toadflax (i) St. Johnswort (j) Sulfur cinquefoil (k) Common tansy (l) Oxeye daisy (m) Houndstongue (n) Yellow toadflax (o) Saltcedar (p) Curlyleaf pondweed (q) Hoary alyssum
PRIORITY 3 Regulated Plants: (NOT MONTANA LISTED NOXIOUS WEEDS) These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education and prevention to minimize the spread of the regulated plant.	(a) Cheatgrass (b) Hydrilla (c) Russian olive (d) Brazilian waterweed (e) Parrot feather watermilfoil	

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.

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

Delete Subsection 107.05.

Delete Subsection 107.05.

108 - Prosecution and Progress

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.

153 - Contractor Quality Control

153.10_Regional_5_31_2018

Add the following Subsection:

153.04 (2) (a) Submittal Log

At a minimum the contractor shall provide project submittals as shown on the Submittal Log below. Submittal requirements are listed in the Standard Specifications, Supplemental Specifications, and Plans.

Submittal Log					
Log No.	**Indirect payment to Pay Item(s)**	**Description of Submittal**	**Type of Submittal**	**Requirement found in Specification No. /Drawings**	**Additional Specification References**
1	151	Weed Free Material Source Certification (as applicable)	Material Certification	FSSS 105.02(c)	105.02(c)
2	151	Hazardous Spill Plan	Plan	FSSS 107.10	
3	151	Contractor Quality Control Plan	Plan	153.02	
4	151	Traffic Control Plan	Plan	FSSS 156.03	
5	151	Soil Erosion and Pollution Control Plan	Plan	157.04	
7	302	Aggregate Gradations and Quality	Test Results	302, FSSS 302	FSSS 703

155 - Schedules for Construction Contracts

155.00_National_11_9_2016

Delete Section 155 in its entirety.

Delete Section 155.

156 - Public Traffic

156.00_National_2_5_2019

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

Section 156. – PUBLIC TRAFFIC

Description

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

Material

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

Permanent Traffic Control	633
Traffic Signing and Marking Material	718
Concrete Barriers and Precast Guardwalls	618
Temporary plastic fence	710.11

Construction Requirements

156.03 General. Accommodate traffic according to MUTCD, approved traffic control plan and this section. Perform work in a manner that ensures safety and convenience of the public. Unless otherwise provided for in Table 156-1, keep existing roads open to all traffic during road improvement work, and maintain them in a condition that will adequately accommodate traffic. During culvert installations, delays may not exceed **4** hours at any one time followed by an open period of no less than **60** minutes. Accommodate public traffic on roads adjacent to and within the project until the project is accepted according to Subsection 106.07(b).

Submit traffic control plan at least 30 days prior to intended use. Perform no work that interferes or conflicts with traffic or existing access to the roadway surface until a traffic control plan has been approved.

Post construction signs and traffic control devices in conformance with MUTCD and Forest Service EM 7100-15. All required signs will be in place and approved prior to beginning work on project.

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

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

(a) Furnish and install traffic control devices before the start of construction operations.

(b) All detours outside of clearing limits will be approved in writing by the Contracting Officer as part of the traffic control plan.

(c) Install only those traffic control devices needed for each stage or phase.

(d) Relocate temporary traffic control devices as necessary.

(e) Remove devices that no longer apply to the existing conditions.

(f) Immediately replace any device that is lost, stolen, destroyed, or inoperative.

(g) Keep temporary traffic control devices clean.

(h) Remove all temporary traffic control devices upon contract completion or when approved.

(i) When required, use flaggers certified by the American Traffic Safety Services Association, the National Safety Council, the International Municipal Signal Association, a state agency, or other acceptable organization. Perform the work described under MUTCD Part 6. Use type III, VII, VIII, or IX retroreflective sheeting on flagger paddles. Do not use flags. Flaggers must wear high visibility safety apparel as required by MUTCD 6E.02.

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

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

Table 156-1
Temporary Road Closures

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

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

Measurement and Payment

156.07 Do not measure Public Traffic for payment. Payment for contract work is provided indirectly. See Subsection 109.05.

157 - Soil Erosion and Sediment Control

Delete Subsection 157.04 and replace with the following:

157.04 General.

Thirty (30) days prior to the start of construction, submit a written plan according to subsection 104.03 with all necessary permits that provides permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction. Do not begin work until the necessary controls for that particular phase of work have been implemented. Do not modify the type, size, or location of any control without approval.

When erosion control measures are not functioning as intended, take corrective action to eliminate or minimize pollutants in storm water discharges from the project.

170 – Develop Water Supply and Watering

Description

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

Materials

170.02 Conform to the following subsection.

Water	725.01.

Construction Requirements

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

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

170.05 Application. Apply water uniformly without ponding or washing.

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

Measurement

170.07 Do not measure water development, hauling and application for payment.

Payment

170.08 Payment for water development, hauling and application will be incidental to Pay Item 30201.

202 – Additional Clearing and Grubbing

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 6 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 12 feet above the road surface.

203 - Removal of Structures and Obstructions

203.04_National_11_2_2016

Make the following changes to Subsection 203.04(b):

203.04 (b) General.

Delete the fifth paragraph of Subsection 203.04(b) and replace with the following:

Remove structures and obstructions in the roadbed to 12 inches (300 millimeters) below subgrade elevation. Remove structures and obstructions outside the roadbed to 12 inches (300 millimeters) below finished ground or to the natural stream bottom.

Delete the seventh paragraph of Subsection 203.04(b) and replace with the following:

When abandoning an existing culvert pipe, remove the upstream and downstream portion of the culvert to within 12 inches (300 millimeters) of the subgrade or embankment slope. Ensure the abandoned pipe is at least 48 inches (1200 millimeters) from a new culvert or structure. Seal the abandoned culvert ends with a tight-fitting plug of concrete at least 6 inches (150 millimeters) thick. Ensure the structure does not entrap water.

203.05_National_6_21_2018

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 **20** 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 (remove dirt from stumps prior to pilling).

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

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
Production (continued)								
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	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope[(b)])	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

(a) Maximum allowable deviation from construction stakes and drawings.
(b) Maximum allowable deviation from staked slope measured from slope stakes or hinge points.
(c) Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

302 - Minor Crushed Aggregate

Add the following to Subsection 302.04

302.04 Placing Crushed Aggregate

Written approval of the surface is required before placing aggregate.

Add the following to 302.04(a)

(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.

Delete Subsection 302.05 and replace with the following:

(a) Roadway aggregate. Compact roadway aggregate by operating compaction equipment over the total width until visible deformation ceases. A minimum of three completed roller passes shall be made at a moisture content suitable for compaction.

303 - Road Reconditioning

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).

622 - Rental Equipment

622.01_Regional_5_1_2018

Add the following to Subsection 622.01

622.01 Description

Work is to correct minor site discrepancies not noted in the contract documents that occurred between award of contract and implementation of work needed to result in a complete project. Examples of work may include:

a. Excavating and placing embankment,
b. Slide removal,
c. Drainage and roadway repair,
d. Haul and placement of material such as rocks, logs, or debris, or
e. Sign or gate installation

703 - Aggregate

703.05_nat_us_12_07_2006

Delete 703.05 and replace with the following:

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

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

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

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

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

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

(1) Gradation	Table 703-3
(2) Los Angeles abrasion, AASHTO T 96	40% max.
(3) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(4) Durability index (coarse), AASHTO T 210	35 min.
(5) Durability index (fine), AASHTO T 210	35 min.
(6) Fractured faces, ASTM D 5821	75% min.
(7) Free from organic matter and lumps or balls of clay	

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

Do not furnish material that contains asbestos fibers.

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

Replace Table 703-3 with the following:

Table 703-3. Gradation TV ranges for Size Ratio surface courses.

% by Mass Passing Designated Sieve (AASHTO T 27 and T 11)
Grading Designation

Sieve Size	Grading F-SR	Grading F-SR with Bentonite **(b)**	Grading G-SR	Grading G-SR with Bentonite **(b)**
1 ½ in.	100	100		
1 in.	97-100	97-100	100	100
¾ in.	70 - 98	70 - 98	97-100	97-100
½ in.	58 - 88	58 - 88	70 - 98	70 - 98
No. 4	36 - 60	36 - 60	44 - 70	44 - 70
No. 16	25 - 47	25 - 47	30-54	30-54
No. 30	12 - 31	12 - 31	15 - 34	15 - 34
No. 200	7 –20 (a)	6 - 15	7 – 20 (a)	6 - 15

Note: SR and PI are abbreviations for Size Ratio and Plasticity Index.

(a) If the minus No. 40 material in finished product has a PI greater than 0, the percent pass No. 200 range is 6 to 15%.
(b) Bentonite binder shall be mixed at a rate of 2% of the aggregate weight. This percentage may be refined +/- 0.5% during crushing and hauling operations if tests show a benefit.

The gradation shall closely parallel the specification gradation curves. Percent passing ½ inch, No. 4, and No. 30 sieves shall all be in either the upper, middle, or lower portion of the specification band. Size ratios, as defined below, shall be determined for each sieve analysis test. The maximum difference between the ½ inch and No. 4 size ratio, the No 4 and No. 30 size ratio, and the ½ inch and No. 30 size ratio, shall not exceed 0.50.

$$\text{½ inch size ratio} = \frac{\text{(Test \% Pass ½ inch) - (Min \% Pass 1/2 inch)}}{\text{(Max \% Pass 1/2 inch) - (Min \% Pass 1/2 inch)}}$$

$$\text{No.4 size ratio} = \frac{\text{(Test \% Pass No.4) - (Min \% Pass No.4)}}{\text{(Max \% Pass No.4) - (Min \% Pass No.4)}}$$

$$\text{No.30 size ratio} = \frac{\text{(Test \% Pass No.30) - (Min \% Pass No.30)}}{\text{(Max \% Pass No.30) - (Min \% Pass No.30)}}$$