Table of Contents

Preface

Preface_wo_02_16_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.

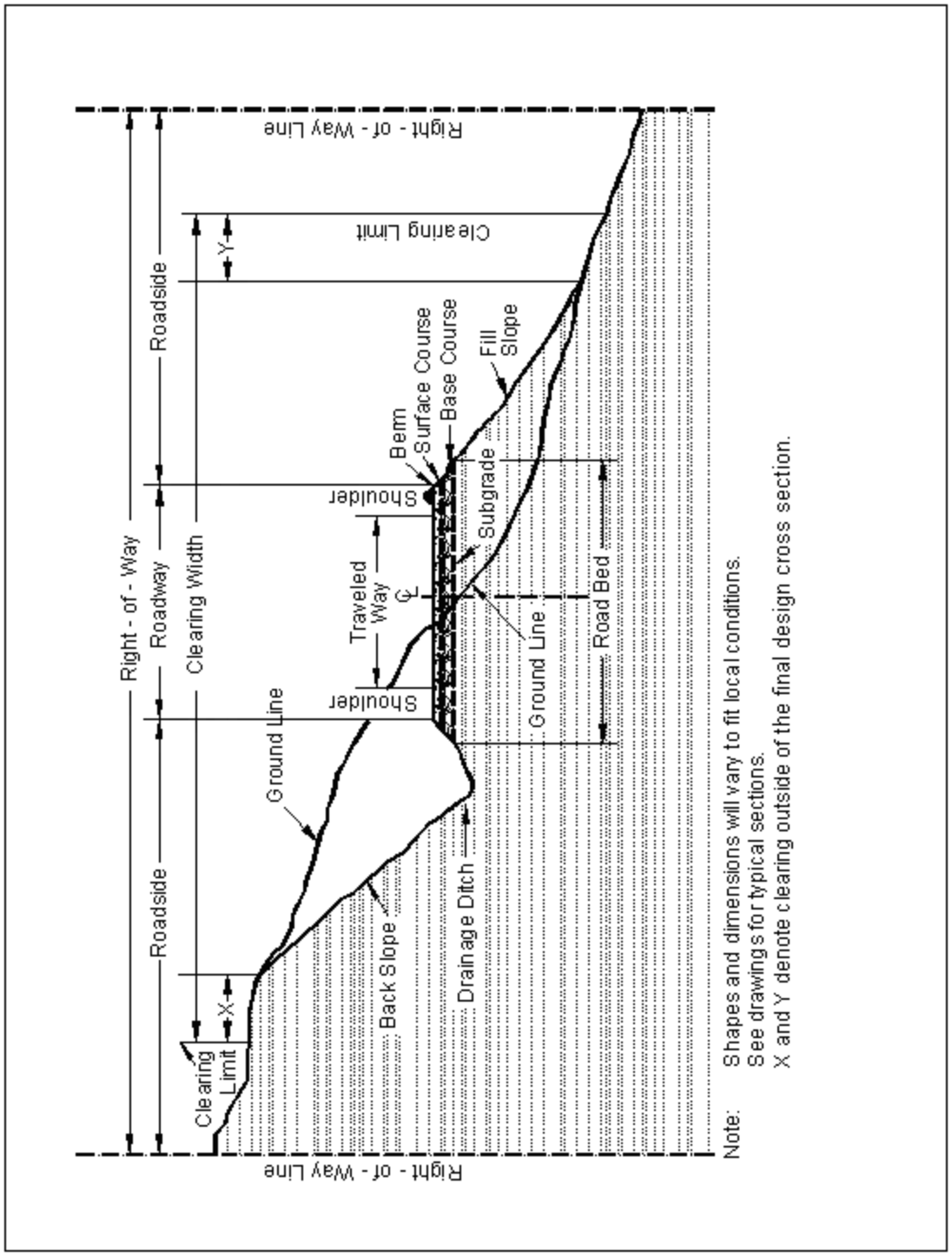
Shop Drawings — (Timber and Stewardship Contracts) Referred to as "Drawings" in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions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

Delete Section 102 in its entirety.

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

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.

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. Delays may not exceed **30** minutes at any one time followed by an open period of no less than **10** 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. In addition to signage immediately at the worksite advance warning signs at each end of the SFSR Road and at the beginning of Lick Creek road outside of McCall and at the beginning of the warm lake highway outside of Cascade will be required.

(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.

During preliminary work no closures will be allowed on 674. Paving operations must not begin before Lick Creek or Johnson creek are open and not before July 11th. If there is a sports fishing opening for Chinook Salmon paving will not be allowed during that period. Otherwise during paving operations 674 may be closed from 0800 until 1700 Monday through Friday with COR approval.

Table 156-1
Temporary Road Closures

Road Number	From Terminus	To Terminus	Maximum Consecutive Days of Closure	Minimum Consecutive Days Open
50674	**0 (warm lake hwy)**	**30.9 (East Fork of South Fork)**	**5**	**2**

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.

403 – ASPHALT CONCRETE

Delete Section 403 in its entirety and replace with the following.

Section 403. — ASPHALT CONCRETE

Description

403.01 This work consists of constructing asphalt concrete pavement using a hot or warm mix asphalt(HMA or WMA).

Asphalt concrete type is designated as Type I or Type II according to Subsection 403.02.

Construction Requirements

403.02 Composition of Mix (JMF). Conform to current state department of transportation material specifications for asphalt concrete.

(a) Type I. Submit a state department of transportation JMF approved within the past 12 months for approval at least 30 days before production. For each proposed JMF, submit a production certification conforming to state department of transportation specifications and conforming todesign parameter (a), (b), or (c) for the type of mix submitted and conforming to design parameter (d) in Table 403-1.

Table 403-1
Asphalt Concrete Mix Requirements

Design Parameters	Specification
(a) Volumetric hot asphalt concrete pavement (AASHTO M 323, AASHTO R 35, and AASHTO T 312)	
Gyratory compaction level	7, 75, 115
Volumetric properties at 0.3 to 3 million ESAL's (AASHTO M 323)	See Table 401-1
(b) Hveem (AASHTO T 246 and AASHTO T 247)	
Stabilometer, minimum	35
Percent air voids [(1)]	3.0 – 5.0
(c) Marshall (AASHTO T 245)	
Stability, pounds (kilonewtons), minimum	1500 (6.67)
Flow, 0.01 inches (0.25 millimeters)	8 – 16
Percent air voids [(1)]	3.0 – 5.0
Compaction, number of blows each end of test specimen	50

(d) Moisture susceptibility (AASHTO T 283)	
Tensile strength ratio, minimum	0.80

(1) The percent of air voids are based on AASHTO T 166, AASHTO T 209 and AASHTO T 269.

(b) Type II. Provide a mix composed of crushed stone or gravel and asphalt binder mixed in an approved plant. Use an aggregate gradation and asphalt binder of a quality conforming to those normally used locally by either Federal, state or local agencies for the type of work being constructed.

Submit the strength, quality, and gradation specifications for the asphalt concrete mix. Include copies of laboratory test reports that demonstrate aggregate, asphalt binder, additive, and mix properties meet Federal, state or local government agency specifications.

For both Type I and Type II, submit the maximum specific gravity (density) of the mix as determined byAASHTO T 209.

403.03 Production Start-Up Procedures. See Subsection 153.04(b).

403.04 Mixing Plant. See Subsection 401.04.

403.05 Surface Preparation. See Subsection 401.06.

403.06 Weather Limitations. See Subsection 401.07.

403.07 Hauling. See Subsection 401.11.

403.08 Placing and Finishing. Do not use mixes produced from different plants unless the mixes are produced according to the same JMF, use material from the same sources, and are approved.

Place HMA at a temperature conforming to Table 401-2. Place WMA at temperatures conforming to Subsection 401.03. Measure temperature of the asphalt concrete mix in the hauling vehicle just before dumping into the spreader or measure it in the windrow immediately before pickup.

(a) Asphalt concrete for roadway construction. Place the mix with a paver conforming to Subsection 401.05. Control horizontal alignment using a reference line. Automatically control the grade and slope from reference lines, a ski and slope control device, or dual skis. Use skis having a minimum length of 20 feet (6 meters).

In areas where mechanical spreading and finishing is impractical; place and finish the asphalt concrete mix according to Subsection 403.08(b).

Offset the longitudinal joint according to Subsection 401.13.

(b) Asphalt concrete for non-roadway uses. Spread and finish each course by hand raking, screeding, or by other approved methods.

403.09 Compacting. Thoroughly and uniformly compact the asphalt surface by rolling. In places inaccessible to rollers, use alternate equipment approved by the CO. Do not cause cracking, shoving or undue displacement.

Monitor the compaction process with nuclear density gauges calibrate according to the ASTM D2950 calibration section within 6 months before use. Check the standard and reference on each day of use according to the ASTM D2950 standardization and reference check sections.

Compact to at least 91.0 percent of the maximum specific gravity (density) determined in Subsection 403.02.

No individual compaction test result shall have a density less than 89 percent of maximum specific gravity and the average of all the compaction tests results shall be greater than 91.0 percent of the maximum specific gravity.

Continue compaction until surface marks are eliminated and cracks are sealed.

403.10 Joints, Trimming Edges, and Cleanup. See Subsection 401.15.

403.11 Pavement Straightedge Measurement. Measure the pavement surface using a 10-foot (3-meter) metal straightedge at right angles and parallel to the centerline. Defective areas are deviations between the surface and the bottom of the straightedge in excess of ¼ inches (6 millimeters) measured between two contacts of the straightedge or deviations in excess of ¼ inches (6 millimeters) measured at the end of the straightedge.

Correct defective areas according to Subsection 401.16(g)(1) through (4). Obtain approval for the method of correction.

403.12 Acceptance. See Table 403-2 for sampling, testing, and acceptance requirements.

Asphalt concrete mix properties will be evaluated under Subsection 106.04.
Asphalt binder will be evaluated under Subsection 106.03.

Construction of asphalt concrete work will be evaluated under Subsections 106.02 and 106.04.

Pavement straightedge measurement will be evaluated under Subsection 106.04.

Quality assurance compaction tests must be taken at locations provided by the CO for acceptance.

Measurement

403.13 Measure the Section 403 pay items listed in the bid schedule according to Subsection 109.02.

Payment

403.14 The accepted quantities will be paid at the contract price per unit of measurement for the Section 403 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Table 403-2
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								
Asphalt concrete Type I or II (403.02(a))	Measured and tested for conformance (106.04)	Density	ASTM D2950 (Average of up to 4 measurements per test. Rotate gauge 90 degrees for each measurement.)	10 per day at specified locations	In-place after compacting	Yes	24 hours	–
		Surface tolerance	Straightedge measurement, Subsection 403.11	Continuously, after compaction	Finished pavement surface	No	"	–
		Placement temperature	–	First load and as determined by CO thereafter	Hauling vehicle before dumping, or windrow before pickup	"	Upon completion of measurement	–
	Process control (153.03)	Gradation at the plant	AASHTO T 27 & T 11	Contractor determined	Cold feed or hot bins as applicable	"	24 hours	–
		Moisture content of aggregates	AASHTO T 255	"	Stockpile	"	"	–
		Density	ASTM D2950	1 per 500 feet (150 meters)	In-place after compacting	"	"	–

407 - Chip Seal

407.01_National_7_18_2017

Delete the first sentence of Subsection 407.01 and replace with the following:

407.01 Description.

407.01 This work consists of applying a single, double, or triple course chip seal with emulsified asphalt.

Delete Subsection 407.09 and replace with the following:

407.09 Asphalt Material/Cover Material Application.

A. Apply asphalt material at a rate sufficient to obtain 50 percent chip embedment before the rolling operation, and 70 percent chip embedment after rolling operation.
   1. Adjust application rates throughout the project depending on existing conditions.

B. Apply the asphalt emulsion at a minimum temperature of 145 degrees F.

C. Do not apply asphalt material if any of the following conditions apply:
   1. Material does not meet the required viscosity.
   2. Material does not spray through the distributor in a uniform way and remain in place on the roadway.

D. Place building paper adjacent to the transverse construction joint before starting each spraying operation.
   1. Maintain the control valve to act instantaneously, both at start-up and cut- off.

E. Locate longitudinal joints within 6 inches of the traffic lane line location.
   1. Construct meet lines with no skip or voids between adjacent passes.

2. Do not place a double thickness of cover material.

F. Calibrate the spreader at the beginning of each day and as often as necessary to comply with Table 407.09-1 or approved project application rate.
   1. Maintain a distance of less than 150 ft between the distributor and the chip spreader.
   2. Maintain the chip spreader speed such that chips do not bounce or roll upon application.

Table 407.09-1

Approximate Spread Rates	
Unit Weight lbs/ft³	**Application Rate lbs/yd²**
75 - 80	20.7 to 28
80 - 85	22.1 to 30
85 - 90	23.5 to 32

Delete Subsection 407.15 and replace with the following:

407.15 Payment.

407.15 The accepted quantities will be paid at the contract price per unit of measurement for the Section 407 pay items listed in the bid schedule. See Subsection 109.05.

412 - Asphalt Tack Coat

412.05_National_11_4_2016

Delete Subsection 412.05(b) and replace with the following:

412.05 Weather Limitations.

(b) Ambient air temperature is above 40 °F (5 °C) and rising; and

725.17 REINFORCING FIBERS FOR ASPHALT

Delete Subsection 725.17 and replace with the following:

A. DEFINITIONS

1. Reinforcing Fibers: High tensile strength aramid fiber blend specially formulated to reinforce hot mix asphalt.

2. Fiber reinforced asphalt concrete (FRAC): A mixture of hot or warm mix asphalt and reinforcing fibers that has greater resistance to rutting, thermal cracking, fatigue cracking, and reflective cracking as compared to conventional non-fiber asphalt mixes.

B. REFERENCES

1. ASTM D2172, Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

2. "Extraction of Aramid Fibers from Fiber Reinforced Asphalt Concrete – Special Test Method"

C. SUBMITTALS

1. Submit the following as part of the bid package:

   a. Representative fiber product sample.
   b. Fiber product data sheet and certification from the Manufacturer that thefiber product supplied meets the requirements of this specification.
   c. Manufacturer's instructions and general recommendations.

2. Submit a minimum of five unique project examples and references where the reinforcing fiber product was used within 250 miles of the project location.

D. MATERIAL

1. Reinforcing Fiber Properties

   a. Provide a reinforcing fiber blend of Polyolefins and Virgin Aramids thatmeets the requirements in Table 1.

Table 1

Reinforcing Fiber Material Properties			
Property	Test Method	Aramid	Polyolefin
Form	Manufacturer Certification	Monofilament	Serrated
Tensile Strength (psi)	ASTM D7269	400,000	NA
Length (in)	Manufacturer Certification	0.75	0.75

b. FORTA-FI®, provided by Pacific GeoSource, is an acceptable product and meets the required performance and material properties outlined.

c. Non-aramid fiber blends, aramid fiber blends with dosages less than 1pound per ton, or ton equivalencies will not be considered as an acceptable alternative to this specification.

E. DELIVERY, STORAGE, AND HANDLING

1. Deliver fiber-reinforcement in sealed, undamaged containers with labelsintact and legible, indicating material name and lot number.

2. Store materials covered and off the ground. Keep sand and dust out ofboxes and do not allow boxes or fiber to become wet.

F. MIXING AND PRODUCTION

1. Add Reinforcing Fibers at a dosage rate of 1 pound per ton of asphalt. Ton equivalents or dosage rates below 1 pound per ton will not be accepted. Dosage rates greater than 1 pound per ton may be used according to the manufacturer's and/or engineer's recommendations.

2. Have a fiber manufacturer's representative on site during mixing and production. Requirement can be waived if fiber manufacturer and asphalt producer can supply evidence of manufacturer's brand of fiber beingsuccessfully produced a minimum of three times at the asphalt plant.

3. Batch Plant. When a batch plant is used, add fiber to the aggregate in theweigh hopper and increase both dry and wet mixing times. Ensure that thefiber is uniformly distributed before the injection of asphalt into the mixture.

4. Drum Plant:

   a. Inject fibers through the RAP collar using an automatic, metered air blownsystem to promote rapid and complete fiber dispersion. System must automatically record fiber addition data so as to remove human error. Ratethe feeding of fibers with the rate the plant is producing asphalt mix. If there is any evidence of fiber bundles at the discharge chute, increase the mixing time and/or temperature or change the angle of the fiber feederline to increase dry mixing time.

b. Manual feeding of the fibers may be allowed at the discretion of the projectengineer, manufacturer, and producer.

c. Add fibers continuously and in a steady uniform manner. Provide automated proportioning devices and control delivery within ±10% of themass of the fibers required. Perform an equipment calibration to the satisfaction of the fiber manufacturer's representative to show that the fiber is being accurately metered and uniformly distributed into the mix. Include the following with the air blown system:

- Low level & No-flow indicators
- A printout of feed rate status in pounds/minute
- A section of transparent pipe in the fiber supply line for observing consistency of flow or feed.
- Manufacturer's representative's approval of fiber addition system

G. QUALITY CONTROL

1. Aramid Dispersion Visual Test: Collect a 10kg sample of mix from the discharge chute during first 50 tons of production. Visually assess the state ofaramid fibers in the sample according to Reference 2 and rate the sample as"Pass" or "Fail".

   i. "Pass" = All fibers exist in an Individual State and no Undistributed Clipsof fiber are detected.
   ii. "Fail" = One or more Undistributed Clips are detected.

2. If a sample is rated as "Fail", adjust mixing operations to improve fiber dispersion and repeat Step 1 above.

3. If Visual Test results in three consecutive "Fail" ratings, plant mix samples should be sent to a third party laboratory for complete aramid dispersion testing before production is allowed to commence.

4. Use a shovel to inspect FRAC mix in the back of first three trucks and every tenth truck thereafter to confirm adequate blending of the fiber.

5. Remove any observed fiber bundles from placed mixture and adjust operations per the manufacturer's recommendation to eliminate future fiberbundle development and repeat Steps 1 through 3 above to confirm adequatearamid fiber dispersion.

H. PLACEMENT

Follow manufacturer's and engineer's recommendations for placement of FRAC.

I. PAYMENT

Payment shall be based on per ton of asphalt mix.