FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

ERRATA

STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-24

Corrections, additions, and revisions to the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-24 are listed below:

Section 101. — TERMS, FORMAT, AND DEFINITIONS

101.04 Definitions. Delete the definition of **(c)** Supplemental agreement under Contract Modification.

Section 102. — BID, AWARD, AND EXECUTION OF CONTRACT

102.02 Preparation of Bids. Add the following:

Follow the requirements of FAR Clauses 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigation and Conditions Affecting the Work. Offerors are urged and expected to inspect the site where the work will be performed.

Section 106. — ACCEPTANCE OF WORK

106.03(b) Production certification. Delete the first sentence of **(3)** and substitute the following:

> Substantiating evidence that the material conforms to the contract quality requirements, including the following:

Section 107. — LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.03 Bulletin Board. Delete Subsections (a) and (f).

Section 108. — PROSECUTION AND PROGRESS

108.01 Commencement, Prosecution, and Completion of Work. Delete the first sentence.

108.04 Determination and Extension of Contract Time. Delete the first sentence.

108.04(c) Time extensions. Add the following:

If a quantity variation described in Subsection 109.06(e) results in an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the CO within 10 days from the beginning of the delay, or within such further period as may be granted by the CO before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the CO will ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the CO, is justified.

Section 109. — MEASUREMENT AND PAYMENT

109.01 Measurement of Work. Delete the sixth paragraph.

109.02(d)(1)*(a) Average end area method.* Delete this Subsection and substitute the following:

(a) Average end area method. Take cross-sections of the original ground. Use design or staked templates to determine end areas. Compute the quantity using the average end areas multiplied by the horizontal distance along a centerline or reference line between the end areas.

109.06(c)(3) Profit. Delete this Subsection and substitute the following:

(3) Profit. Include a reasonable profit, except when precluded by the FAR. Limit profit to 10 percent of the total cost. Due to the limited risk in post-work pricing, a lower profit percentage may be determined by a profit analysis according to FAR 15.404-9 Profit.

109.06(d) Cost or pricing data. Delete the first paragraph and substitute the following:

When the contract modification exceeds the amount indicated in FAR Clause 52214-27 Price Reduction for Defective Cost or Pricing Data – Modifications – Sealed Bidding, FAR Clause 52.215-10 Price Reduction for Defective Certified Cost or Pricing Data, or FAR Clause 52.215-11

Price Reduction for Defective Cost or Pricing Data – Modifications, and the CO has determined that an exception does not apply, submit cost or pricing data according to Subsection 109.06(b) or (c) as applicable and as defined in FAR Subpart 2.1 Definitions, for the Contractor and each major subcontractor. See FAR Subpart 15.4 Contract Pricing and FAR Table 15-1 Instructions for Submitting Cost/Price Proposals When Certified Cost or Pricing Data Are Required for guidance.

109.06 Pricing of Adjustments. Add the following:

(e) Variation in Estimated Quantity. If the quantity of a unit-priced item is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price will be made upon demand of either party. The equitable adjustment will be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity.

Section 204. — EXCAVATION AND EMBANKMENT

204.16(a)(1)*(a)*. Delete this Subsection and substitute the following:

(a) Roadway prism excavation. Use the design volume. The design volume is defined as the bid schedule quantity less any allowance, as shown in the plans. This volume is subject to adjustments resulting from changes to slope stakes according to Subsection 152.05(d);

204.16(c)(1)*(a)*. Delete this Subsection and substitute the following:

(a) Roadway prism embankments. Use the design volume. The design volume is defined as the bid schedule quantity less any allowance, as shown in the plans. This volume is subject to adjustments resulting from changes to slope stakes according to Subsection 152.05(d);

Section 255. — MECHANICALLY-STABILIZED EARTH WALLS

255.04 Wall Erection. Delete the second sentence of footnote (1) in Table 255-1 and substitute the following:

For example, 65 feet wall height multiply 6.5×value.

Section 501. — MINOR CONCRETE PAVEMENT

501.03 Composition (Concrete Mix Design). Delete Table 501-1 and substitute the following:

Table 501-1
Composition of Concrete

Maximum Water/ Cementitious Material Ratio	Maximum Slump AASHTO T 119, inch	Minimum Air Content, percent	Maximum Coarse Aggregate Size AASHTO M 43, inch(1)	Minimum 28-Day Compressive Strength AASHTO T 22, pounds per square inch
0.45	4 (fixed form)	5.0	1½	4000

(1) Meet size number gradation and requirements from AASHTO M 43 for coarse aggregates. Blending of standard sizes to optimize gradation is allowed.

Section 552. — STRUCTURAL CONCRETE

552.03(a)(12)*(c) Hydration stabilizing admixtures.* Delete this Subsection and substitute the following:

(c) Hydration stabilizing admixtures. Hydration stabilizing admixtures may be used to extend the allowable delivery time for concrete. Base the dosage on the time needed to delay the initial set of the concrete for delivery and discharge on the job. Include the design discharge time limit shown in Table 552-4.

552.03(a) Structural Concrete. Delete Subsection (17) and substitute the following:

(17) Reserved.

552.03(a) Structural Concrete. Delete Subsection (23) and substitute the following:

(23) Specified design strength and required average strength (f'_{cr}) for the concrete mixture at 28 days as determined by the process described in Section 4 of ACI 301. This process and associated calculations are outlined on Form FHWA 1608. Pending 28-day strength results, a mix design may be approved on the basis that 7-day compressive strength results are at least 85 percent of the required average strength (f'_{cr}) at 28 days;

Section 554. — REINFORCING STEEL

554.08 Placing and Fastening. Delete the fourth sentence of the fourth paragraph and substitute the following:

Place reinforcing steel in deck slabs within +¼ inch of the vertical plan location.

Section 555. —STEEL STRUCTURES

555.16(f)(7)*(b)* Threaded fasteners. Delete the first paragraph and substitute the following:

Use an inspection torque wrench to verify tensioning unless DTI devices are used.

Section 560. — REMOVAL OF CONCRETE BY HYDRODEMOLITION

560.04 General. Delete the third paragraph and substitute the following:

Dispose of wastewater and debris according to Subsection 203.07.

Section 572. —CONCRETE REPAIR

572.03(a) Hydraulic cement concrete. Delete Tables 572-1 and 572-2 and substitute the following:

Table 572-1
Composition of Repair and High Early Strength (HES) Concrete

Class of Concrete[1]	Early Age 48-Hour Design Compressive Strength, AASHTO T 22, pounds per square inch	28-Day Design Compressive Strength, AASHTO T 22, pounds per square inch	Plastic Air Content, percent minimum[2]	Maximum Water/ Cementitious Material Ratio[4]	Slump, inches[3]	Nominal Maximum Size Aggregate, AASHTO M 43
Repair	2000	4500	5.0	0.45	±1 from provided target	#67 or #78
HES	3000	5000	5.0	0.40	±1 from provided target	#67 or #78

(1) Conform to ASTM C1157 for portland cement in concrete.
(2) Measure plastic air content according AASHTO T 152 Method B. Maximum plastic air content is 9 percent.
(3) Conform to the supplier provided target slump. Maximum slump is 8 inches if approved mix design includes a high-range water reducer.
(4) If supplementary cementitious materials are used, conform to Table 552-2 limits.

Table 572-2
Composition of Very High Early Strength (VHES) Concrete

Class of Concrete[1]	Early Age 4-Hour Design Compressive Strength, AASHTO T 22, pounds per square inch	28-Day Design Compressive Strength, AASHTO T 22, pounds per square inch	Freeze Thaw Resistance, ASTM C666 Method A (minimum)	Maximum Water/ Cementitious Material Ratio	Slump, inches[3]	Nominal Maximum Size Aggregate, AASHTO M 43
VHES	3000	5000	RDME[2] > 96%	0.42	±1 from provided target	#67 or #78

(1) Conform to ASTM C1600 Class URH or Class VRH for hydraulic cement in concrete.
(2) Relative dynamic modulus of elasticity (RDME) measured according to ASTM C666.
(3) Conform to the supplier provided target slump.

572.03(b) Polymer resin concrete. Delete Table 572-3 and substitute the following:

Table 572-3
Composition of Polymer Resin Concrete

Class of Concrete	6-Hour Compressive Strength, AASHTO T 22, pounds per square inch	24-Hour Compressive Strength, AASHTO T 22, pounds per square inch	Thermal Compatibility, ASTM C884	ASTM C1202 Rapid Chloride Permeability, Coulombs	Nominal Maximum Size Aggregate, AASHTO M 43
Polymer resin concrete	1000	3500	Pass	<100	#67, #78, or #8

572.03(c) Hydraulic cement repair mortar. Delete this Subsection and substitute the following:

(c) Hydraulic cement repair mortar. Provide a mortar that conforms to the requirements of ASTM C928 R1, R2, or R3 as modified in Table 572-4.

Table 572-4
Hydraulic Cement Repair Mortar

Class of Mortar(1)	24-Hour Compressive Strength, ASTM C109, pounds per square inch	7-Day Compressive Strength, ASTM C109, pounds per square inch	Freeze Thaw Resistance, ASTM C666 Method A (minimum)	Maximum Decrease in Length, ASTM C157 (3) 28-Day
Horizontal	2000	4500	RDME(2) > 95%	0.06%
Vertical & overhead	3000	5000	RDME(2) > 95%	0.07%

(1) Conform to ASTM C1157 or ASTM C1600 hydraulic cement in repair mortar.
(2) Relative dynamic modulus of elasticity (RDME) as measured according to ASTM C666.
(3) Modify curing method of ASTM C157 to the curing method described in ASTM C928 when using rapid hardening cementitious materials.

Submit the manufacturer's product data sheet, mixing requirements, and placement methods.

Section 578. — PRECAST CONCRETE ELEMENTS

578.02 Add the following to the material list:

Precast Reinforced Concrete Box Sections 706.07

578.09 Acceptance. Add the following:

Concrete for precast box culvert elements will be evaluated under Section 552.

Section 628. — TEMPORARY STREAM DIVERSIONS

628.05(d) Bypass pumping diversion. Delete the third sentence and substitute the following:

Place a mesh screen over the intake with a maximum mesh size of $^{3}/_{32}$ inch.

Section 629. — ROLLED EROSION CONTROL PRODUCTS AND CELLULAR CONFINEMENT SYSTEMS

629.06(a)(3) Check slot. Delete this Subsection and substitute the following:

(3) Check slot. Install two rows of fasteners 4 inches apart on 4-inch centers across the top edge of the RECP. Drive fasteners flush with soil surface.

629.06(b) Channel installations. Delete the second paragraph and substitute the following:

Securely fasten RECP to the soil by installing fasteners at a minimum rate of 2 per square yard. Significantly higher anchor rates may be necessary in sandy, loose, or wet soils and in severe applications.

629.07 Cellular Confinement Systems. Delete the first paragraph and substitute the following:

Excavate to the depth of the cellular confinement system and smooth and compact the slope. Install the top of the system flush or lower than the adjacent slope. Expand the geocell down the slope. Connect adjacent geocell sections with fasteners in every other cell.

Section 637. — FACILITIES AND SERVICES

637.03(b) Residential housing. Delete Table 637-2 and substitute the following:

Table 637-2
Minimum Facility Furnishings

Property	Field Office, Each	Residential Housing, Each
Table, wood or like, 96 inches L x 30 inches W x 30 inches H	3	–
File cabinet, 2-drawer, fire-resistant, metal, with lock and keys	1	–
File cabinet, 4-drawer, metal	1	–
Desk, wood or like, 60 inches L x 30 inches W x 30 inches H(1)	2	–
Desk lamp(1)	2	–
Office chair(1)	5	–
Storage cabinet, 72 inches H x 36 inches W x 18 inches D	1	–
Fire extinguisher	1	2
Refrigerator, 18-cubic foot	1	1
Range and oven, standard 36-inch	–	1
Microwave oven, 1.1 cubic foot, 1100 watt	1	1
Kitchen table with 4 chairs, wood or like, 60 inches L x 36 inches W x 30 inches H, minimum	–	1 set
Sofa, 90 inches L x 38 inches W x 34 inches H, minimum	–	1
Coffee table, 36 inches L x 18 inches W x 16 inches H, minimum	–	1
Recliner chair	–	2
End table, 28 inches L x 17 inches W x 20 inches H, minimum	–	3
Table lamp, 26 inches H, minimum	–	3
Queen bed with frame, mattress, and box spring as necessary	–	2
Nightstand, 20 inches L x 20 inches W x 25 inches H, minimum	–	4
Nightstand lamp, 26 inches H, minimum	–	4
Dresser, six-drawer, wood or like	–	2
Television, 40-inch	–	✓
Laundry (washer and dryer)	–	✓
Vacuum cleaner, bagless, 12amp	–	✓

(1) Meet accepted industry standards for ergonomics.

Section 703. — AGGREGATE

703.05(b) Subbase or base course aggregate. Delete Table 703-1 and substitute the following:

Table 703-1
Target Value Ranges for Subbase, Base, and Surface Course Gradation

Sieve size	Percent by Mass Passing Designated Sieve (AASHTO T 27 & T 11)							
	Grading Designation[1]							
	Subbase		Base				Surface	
	A	B	C	D	E	F	G	H
2½ in	100	–	–	–	–	–	–	–
2 in	97 to 100	100	100	–	–	–	–	–
1½ in	–	97 to 100	–	–	–	–	–	–
1 in	65 to 79	–	80 to 100	100	100	–	100	–
¾ in	–	–	64 to 94	86 to 100	86 to 100	100	–	100
½ in	45 to 59	–	–	–	–	–	70 to 80	–
⅜ in	–	–	40 to 69	51 to 82	51 to 82	62 to 90	–	–
No. 4	28 to 42	40 to 60	31 to 54	36 to 64	36 to 64	36 to 74	40 to 50	41 to 71
No. 10	–	–	–	–	–	–	25 to 40	–
No. 40	9 to 17	–	–	12 to 26	12 to 26	12 to 26	15 to 25	12 to 28
No. 200	4.0 to 8.0	4.0 to 12.0	4.0 to 7.0	4.0 to 7.0	10 max[2]	4.0 to 7.0	8.0 to 14.0	9.0 to 16.0

(1) Contractor specified target values. See Table 703-2 for allowable deviations.
(2) Statistical procedures do not apply.

703.07 Asphalt Concrete Aggregate. Delete this Subsection and substitute the following:

703.07 Asphalt Concrete Aggregate. Provide hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming to the following:

(a) Los Angeles abrasion, AASHTO T 96	35 percent maximum
(b) Soundness of aggregate using sodium sulfate, AASHTO T 104 (5 cycles):	
(1) Coarse aggregate	12 percent loss maximum
(2) Fine aggregate	12 percent loss maximum
(c) Fractured faces, AASHTO T 335 (one or more)	90 percent minimum
(d) Fine aggregate angularity, AASHTO T 304, Method A	40.0 percent minimum
(e) Flat and elongated particles, ASTM D4791 (1:5 ratio, plus ⅜-inch sieve, calculated by mass, weighted average)	10 percent maximum
(f) Sand equivalent, AASHTO T 176, Alternative Method No. 2, Reference Method	45 minimum
(g) Gradation.	See Table 703-3

For the surface course, do not use aggregates known to polish or carbonate aggregates containing less than 25 percent by mass of insoluble residue when tested according to ASTM D3042.

Table 703–3
Asphalt Concrete Aggregate Gradation

Sieve Size	Nominal Maximum Aggregate Size – Percent Passing[1]									
	Grading Designation[2]									
	1 inch		¾ inch		½ inch		⅜ inch		No. 4	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1½ in	100	–	–	–	–	–	–	–	–	–
1 in	90	100	100	–	–	–	–	–	–	–
¾ in	⁻	90	90	100	100	–	–	–	–	–
½ in	–	–	–	90	90	100	100	–	–	–
⅜ in	–	–	–	–	–	90	90	100	100	–
No. 4	–	–	–	–	–	–	–	90	95	100
No. 8	19	45	23	49	28	58	32	67	70	80
No. 16	–	–	–	–	–	–	–	–	–	–
No. 30	–	–	–	–	–	–	–	–	–	–
No. 50	–	–	–	–	–	–	–	–	–	–
No. 200	1.0	7.0	2.0	8.0	2.0	10.0	2.0	10.0	4.0	10.0

(1) Size, grade and combine the aggregate fractions in mix proportions that result in a composite blend conforming to the specified gradation. Nominal maximum size is one sieve size greater than the first sieve to retain more than 10 percent of the combined aggregate. Test according to AASHTO T 27 and AASHTO T 11

(2) Contractor specified target values. Provide target values for all sieves designated in Table 703-3. See Table 703-2 for allowable deviations.

703.09 Chip Seal Aggregate. Delete Subsection (c) and substitute the following:

(c) Flat and elongated particles, ASTM D4791 (1:3 ratio, plus ⅜-inch sieve, calculated by mass, weighted average) 10 percent maximum

Section 712. — JOINT MATERIAL

712.01 Sealants, Fillers, and Seals. Delete Subsections (h) and (i) and substitute the following:

(h) Pre-compressed foam-supported silicone joint seal. Provide a joint system comprised of the following:

(1) Cellular polyurethane foam impregnated with hydrophobic 100 percent acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone conforming to Table 712-3.

(2) Field-applied epoxy adhesive primer conforming to Table 712-4.

(3) Field-injected silicone sealant bands conforming to Table 712-5.

Table 712-3
Impregnated Foam Requirements

Property	Test Method	Minimum Requirement
Base material	–	Cellular, high density, polyurethane foam
Tensile strength	ASTM D3574	18 psi
UV and moisture resistance	ASTM G155	No changes - 2000 hours, Pass
Density	ASTM D545	4 lb./cu. ft.
Elongation	ASTM D3574	125%
Temperature service range	ASTM C711	-40 to 185 °F

Table 712-4
Epoxy Adhesive Requirements

Property	Test Method	Minimum Requirement
Tensile strength	ASTM D638	3500 psi
Shear strength	ASTM D732	3000 psi
Bond strength	ASTM D882	2500 psi
Compressive strength	ASTM D695	8000 psi

Table 712-5
Silicone Sealant Bands Requirements

Property	Test Method	Requirement
Color	Visual	Black
Movement capability	ASTM C719	±50%
Elongation	ASTM D412	> 600%
Tensile strength	ASTM D412	≥ 100 psi

(i) Reserved.

Section 714. — GEOSYNTHETIC MATERIAL

714.01(d) Paving geotextile. Delete this Subsection and substitute the following:

(d) Paving geotextile. Provide geotextile conforming to AASHTO M 355, Table 1, Type II.

714.01 Geotextile. Add the following:

(e) Subgrade stabilization geotextile. Conform to AASTHO M 288 Table 11, Class 4A.

714.03 Stabilization Geogrid. Delete this Subsection and substitute the following:

714.03 Stabilization Geogrid. Provide biaxial geogrid conforming to AASHTO M 288, Table 11, Class 4C.

714.04 Reinforcement Geotextile and Geogrid. Delete the first paragraph and substitute the following:

Provide reinforcement geotextile and geogrids conforming to AASHTO M 288, Table 8 and 9, and Table 714-2.

714.06 Geosynthetic Reinforce Soil Reinforcement. Delete the first paragraph and substitute the following:

Provide reinforcement geotextile and geogrids conforming to AASHTO M 288, Table 8 and 9, and Table 714-4.