

Proposal Schedule of Items

Contract ID: C20755

Project(s): STMSH45-001

Contractor: \_\_\_\_\_

SECTION: 0001 BID ITEMS

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0005	202-00090 Removal of Delineator	114.000 EACH	_____	_____	_____	_____
0010	202-00195 Removal of Median Cover	1,024.000 SY	_____	_____	_____	_____
0015	202-00200 Removal of Sidewalk	19.000 SY	_____	_____	_____	_____
0020	202-00203 Removal of Curb and Gutter	1,239.000 LF	_____	_____	_____	_____
0025	202-00240 Removal of Asphalt Mat (Planing)	187,614.000 SY	_____	_____	_____	_____
0030	202-00241 Removal of Asphalt Mat (Planing)(Special)	4,139.000 CY	_____	_____	_____	_____
0035	202-00504 Removal of Expansion Device	59.000 LF	_____	_____	_____	_____
0040	202-00810 Removal of Ground Sign	6.000 EACH	_____	_____	_____	_____
0045	202-01130 Removal of Guardrail Type 3	5,250.000 LF	_____	_____	_____	_____
0050	202-01180 Removal of Median Barrier	915.000 LF	_____	_____	_____	_____
0055	202-01300 Removal of End Anchorage	8.000 EACH	_____	_____	_____	_____
0060	203-00010 Unclassified Excavation (Complete In Place)	19,740.000 CY	_____	_____	_____	_____
0065	203-00060 Embankment Material (Complete In Place)	5,722.000 CY	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0070	203-01500 Blading	160.000 HOUR	_____	_____	_____	_____
0075	203-01510 Backhoe	160.000 HOUR	_____	_____	_____	_____
0080	203-01550 Dozing	160.000 HOUR	_____	_____	_____	_____
0085	203-01594 Combination Loader	160.000 HOUR	_____	_____	_____	_____
0090	203-01597 Potholing	30.000 HOUR	_____	_____	_____	_____
0095	203-02330 Laborer	80.000 HOUR	_____	_____	_____	_____
0100	206-00065 Structure Backfill (Flow-Fill)	15.000 CY	_____	_____	_____	_____
0105	207-00205 Topsoil	8,070.000 CY	_____	_____	_____	_____
0110	208-00002 Erosion Log Type 1 (12 Inch)	5,000.000 LF	_____	_____	_____	_____
0115	208-00020 Silt Fence	5,000.000 LF	_____	_____	_____	_____
0120	208-00035 Aggregate Bag	150.000 LF	_____	_____	_____	_____
0125	208-00041 Rock Check Dam	10.000 EACH	_____	_____	_____	_____
0130	208-00045 Concrete Washout Structure	4.000 EACH	_____	_____	_____	_____
0135	208-00070 Vehicle Tracking Pad	4.000 EACH	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0140	208-00103 Removal and Disposal of Sediment (Labor)	80.000 HOUR	_____	_____	_____	_____
0145	208-00105 Removal and Disposal of Sediment (Equipment)	80.000 HOUR	_____	_____	_____	_____
0150	208-00106 Sweeping (Sediment Removal)	80.000 HOUR	_____	_____	_____	_____
0155	208-00107 Removal of Trash	80.000 HOUR	_____	_____	_____	_____
0160	208-00207 Erosion Control Management	218.000 DAY	_____	_____	_____	_____
0165	210-00473 Reset TV Cameras	4.000 EACH	_____	_____	_____	_____
0170	210-00476 Reset Microwave Vehicle Radar Detector (MVRD)	4.000 EACH	_____	_____	_____	_____
0175	210-00810 Reset Ground Sign	2.000 EACH	_____	_____	_____	_____
0180	210-04020 Modify Inlet	3.000 EACH	_____	_____	_____	_____
0185	212-00006 Seeding (Native)	15.000 ACRE	_____	_____	_____	_____
0190	212-00009 Seeding (Temporary)	15.000 ACRE	_____	_____	_____	_____
0195	212-00032 Soil Conditioning	15.000 ACRE	_____	_____	_____	_____
0200	213-00012 Spray-on Mulch Blanket	30.000 ACRE	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0205	213-00061 Mulch Tackifier	3,000.000 LB	_____	_____	_____	_____
0210	304-06008 Aggregate Base Course (Class 6) (Special)	13,540.000 CY	_____	_____	_____	_____
0215	310-00608 Full Depth Reclamation of Hot Mix Asphalt Pavement (0-8")	168,437.000 SY	_____	_____	_____	_____
0220	403-00720 Hot Mix Asphalt (Patching) (Asphalt)	472.000 TON	_____	_____	_____	_____
0225	403-33871 Hot Mix Asphalt (Grading S) (100) (PG 76-28)	2,872.000 TON	_____	_____	_____	_____
0230	403-34841 Hot Mix Asphalt (Grading SX) (100) (PG 64-22)	450.000 TON	_____	_____	_____	_____
0235	411-10255 Emulsified Asphalt (Slow-Setting)	1,899.000 GAL	_____	_____	_____	_____
0240	412-00825 Concrete Pavement (8-1/4 Inch)	127,640.000 SY	_____	_____	_____	_____
0245	412-00835 Concrete Pavement (8-1/4 Inch) (Fast Track)	32,865.000 SY	_____	_____	_____	_____
0250	412-02000 Concrete Safety Edge	52,300.000 LF	_____	_____	_____	_____
0255	503-00018 Drilled Caisson (18 Inch)	18.000 LF	_____	_____	_____	_____
0260	503-00036 Drilled Caisson (36 Inch)	38.000 LF	_____	_____	_____	_____



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			Dollars	Cents	Dollars	Cents
0265	503-00048 Drilled Caisson (48 Inch)	42.000 LF	_____	_____	_____	_____
0270	503-00054 Drilled Caisson (54 Inch)	63.000 LF	_____	_____	_____	_____
0275	509-00001 Structural Steel (Galvanized)	230.000 LB	_____	_____	_____	_____
0280	518-01001 Bridge Expansion Joint (Asphaltic Plug)	160.000 LF	_____	_____	_____	_____
0285	518-01004 Bridge Expansion Device (0-4 Inch)	59.000 LF	_____	_____	_____	_____
0290	518-03000 Sawing and Sealing Bridge Joint	111.000 LF	_____	_____	_____	_____
0295	601-03041 Concrete Class D (Bridge) (Special)	6.000 CY	_____	_____	_____	_____
0300	606-00301 Guardrail Type 3 (6-3 Post Spacing)	3,075.000 LF	_____	_____	_____	_____
0305	606-00350 Guardrail Type 3 (Double) (6-3 Post Spacing)	1,325.000 LF	_____	_____	_____	_____
0310	606-00720 Guardrail Type 7 (Style CC)	90.000 LF	_____	_____	_____	_____
0315	606-01370 Transition Type 3G	7.000 EACH	_____	_____	_____	_____
0320	606-01380 Transition Type 3H	5.000 EACH	_____	_____	_____	_____
0325	606-01460 Median Terminal	4.000 EACH	_____	_____	_____	_____

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0330	606-02005 End Anchorage (Flared)	8.000 EACH	_____	_____	_____	_____
0335	607-11525 Fence (Plastic)	300.000 LF	_____	_____	_____	_____
0340	608-00000 Concrete Sidewalk	19.000 SY	_____	_____	_____	_____
0345	608-00010 Concrete Curb Ramp	46.000 SY	_____	_____	_____	_____
0350	609-20010 Curb Type 2 (Section B)	145.000 LF	_____	_____	_____	_____
0355	609-21011 Curb and Gutter Type 2 (Section I-M)	1,115.000 LF	_____	_____	_____	_____
0360	610-00020 Median Cover Material (Patterned Concrete)	4,250.000 SF	_____	_____	_____	_____
0365	610-00030 Median Cover Material (Concrete)	2,430.000 SF	_____	_____	_____	_____
0370	612-00001 Delineator (Type I)	132.000 EACH	_____	_____	_____	_____
0375	612-00002 Delineator (Type II)	76.000 EACH	_____	_____	_____	_____
0380	612-00003 Delineator (Type III)	38.000 EACH	_____	_____	_____	_____
0385	613-00206 2 Inch Electrical Conduit (Bored)	1,325.000 LF	_____	_____	_____	_____
0390	613-00306 3 Inch Electrical Conduit (Bored)	1,670.000 LF	_____	_____	_____	_____

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Project(s): STMSH45-001

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Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0395	613-01200 2 Inch Electrical Conduit (Plastic)	21.000 LF	_____	_____	_____	_____
0400	613-01300 3 Inch Electrical Conduit (Plastic)	6.000 LF	_____	_____	_____	_____
0405	613-07001 Type One Pull Box	1.000 EACH	_____	_____	_____	_____
0410	613-07003 Type Three Pull Box	7.000 EACH	_____	_____	_____	_____
0415	613-07004 Type Four Pull Box	1.000 EACH	_____	_____	_____	_____
0420	613-13000 Luminaire (LED)	7.000 EACH	_____	_____	_____	_____
0425	614-00011 Sign Panel (Class I)	6.000 SF	_____	_____	_____	_____
0430	614-00012 Sign Panel (Class II)	36.000 SF	_____	_____	_____	_____
0435	614-01573 Steel Sign Support (2-1/2 Inch Round NP-40)(Post & Slipbase)	8.000 EACH	_____	_____	_____	_____
0440	614-70150 Pedestrian Signal Face (16) (Countdown)	4.000 EACH	_____	_____	_____	_____
0445	614-70337 Traffic Signal Face (12-12-12) (Install Only)	16.000 EACH	_____	_____	_____	_____
0450	614-70450 Traffic Signal Face (12-12-12-12)(Install Only)	9.000 EACH	_____	_____	_____	_____
0455	614-72860 Pedestrian Push Button	4.000 EACH	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0460	614-81135 Traffic Signal-Light Pole Steel (1-35 Foot Mast Arm)	1.000 EACH	_____	_____	_____	_____
0465	614-81140 Traffic Signal-Light Pole Steel (1-40 Foot Mast Arm)	1.000 EACH	_____	_____	_____	_____
0470	614-81160 Traffic Signal Light Pole Steel (1-60 Foot Mast Arm)	2.000 EACH	_____	_____	_____	_____
0475	614-81170 Traffic Signal-Light Pole Steel (1-70 Foot Mast Arm)	1.000 EACH	_____	_____	_____	_____
0480	614-81175 Traffic Signal-Light Pole Steel (1-75 Foot Mast Arm)	2.000 EACH	_____	_____	_____	_____
0485	614-84100 Traffic Signal Pedestal Pole Aluminum	3.000 EACH	_____	_____	_____	_____
0490	620-00002 Field Office (Class 2)	1.000 EACH	_____	_____	_____	_____
0495	620-00012 Field Laboratory (Class 2)	1.000 EACH	_____	_____	_____	_____
0500	620-00020 Sanitary Facility	2.000 EACH	_____	_____	_____	_____
0505	625-00000 Construction Surveying	1.000 L S	_____	_____	_____	_____
0510	626-00000 Mobilization	1.000 L S	_____	_____	_____	_____
0515	626-01103 Public Information Services (Tier III)	1.000 L S	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0520	627-00009 Modified Epoxy Pavement Marking(Inlaid)	488.000 GAL	_____	_____	_____	_____
0525	627-00011 Pavement Marking Paint (Waterborne)	1,464.000 GAL	_____	_____	_____	_____
0530	627-30405 Preformed Thermoplastic Pavement Marking (Word-Symbol)	1,406.000 SF	_____	_____	_____	_____
0535	627-30410 Preformed Thermoplastic Pavement Marking (Xwalk-Stop Line)	27,425.000 SF	_____	_____	_____	_____
0540	630-00000 Flagging	1,600.000 HOUR	_____	_____	_____	_____
0545	630-00007 Traffic Control Inspection	140.000 DAY	_____	_____	_____	_____
0550	630-00012 Traffic Control Management	80.000 DAY	_____	_____	_____	_____
0555	630-80002 Flashing Beacon (Solar)	40.000 EACH	_____	_____	_____	_____
0560	630-80338 Barricade (Type 3 M-D) (Temporary)	40.000 EACH	_____	_____	_____	_____
0565	630-80341 Construction Traffic Sign (Panel Size A)	108.000 EACH	_____	_____	_____	_____
0570	630-80342 Construction Traffic Sign (Panel Size B)	162.000 EACH	_____	_____	_____	_____
0575	630-80343 Construction Traffic Sign (Panel Size C)	8.000 EACH	_____	_____	_____	_____
0580	630-80344 Construction Traffic Sign (Special)	300.000 SF	_____	_____	_____	_____

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			Dollars	Cents	Dollars	Cents
0585	630-80355 Portable Message Sign Panel	2.000 EACH	_____	_____	_____	_____
0590	630-80358 Advance Warning Flashing or Sequencing Arrow Panel (C Type)	4.000 EACH	_____	_____	_____	_____
0595	630-80360 Drum Channelizing Device	200.000 EACH	_____	_____	_____	_____
0600	630-80363 Drum Channelizing Device (With Light) (Flashing)	30.000 EACH	_____	_____	_____	_____
0605	630-80370 Concrete Barrier (Temporary)	2,000.000 LF	_____	_____	_____	_____
0610	630-80380 Traffic Cone	200.000 EACH	_____	_____	_____	_____
0615	630-80384 Tubular Marker	250.000 EACH	_____	_____	_____	_____
0620	630-80391 Channelizing Device (Fixed)	100.000 EACH	_____	_____	_____	_____
0625	630-85010 Impact Attenuator (Temporary)	4.000 EACH	_____	_____	_____	_____
0630	630-85040 Impact Attenuator (Truck Mounted Attenuator) (Temporary)	2.000 EACH	_____	_____	_____	_____
0635	630-86800 Traffic Signal (Temporary)	1.000 L S	_____	_____	_____	_____
<b>Section: 0001</b>			<b>Total:</b>		_____	
			<b>Total Bid:</b>		_____	

I hereby certify that I have the authority to submit this bid

**Signature**

**Agency**

**Date**

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COLORADO  
 DEPARTMENT OF TRANSPORTATION  
 SPECIAL PROVISIONS  
 SH 45 Rehabilitation Project

The 2011 Standard Specifications for Road and Bridge Construction controls construction of this project. The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

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SPECIAL PROVISIONS  
SH 45 Rehabilitation Project

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 DEPARTMENT OF TRANSPORTATION  
 SPECIAL PROVISIONS  
 SH 45 Rehabilitation Project  
 STANDARD SPECIAL PROVISIONS

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 DEPARTMENT OF TRANSPORTATION  
 SPECIAL PROVISIONS  
 SH 45 Concrete Overlay  
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Revision of Section 401 and 412 – Safety Edge	(May 2, 2013)	2
Revision of Section 412 – Portland Cement Concrete Pavement Finishing	(February 3, 2011)	1
Revision of Sections 412, 601, and 711 - Liquid Membrane-Forming Compounds for Curing Concrete	(May 5, 2011)	1
Revision of Sections 412 and 705 – Preformed Compression Seals	(February 3, 2011)	2
Revision of Section 518 - Bridge Expansion Device	(October 31, 2013)	1
Revision of Section 601 – Class B, BZ, D, DT, and P Concrete	(February 18, 2016)	2
Revision of Section 601 – Class H and HT Bridge Deck Concrete	(May 16, 2013)	4
Revision of Section 601 – Concrete Batching	(February 3, 2011)	1
Revision of Section 601 – Concrete Finishing	(February 3, 2011)	1
Revision of Section 601 – Concrete Slump Acceptance	(October 29, 2015)	1
Revision of Section 601 – Structural Concrete Strength Acceptance	(April 30, 2015)	1
Revision of Sections 601 and 701 – Cements and Pozzolans	(November 6, 2014)	4
Revision of Section 612 – Delineators	(February 3, 2011)	1
Revision of Section 612 – Flexible Delineators	(July 19, 2012)	1
Revision of Sections 613 and 715 – LED Roadway Luminaire	(January 30, 2014)	5
Revision of Section 614 – Accessible Pedestrian Signal	(November 1, 2012)	3
Revision of Section 614 – Pedestrian Push Button Assembly	(July 19, 2012)	1
Revision of Sections 614 and 713– Sign Panel Sheeting	(August 11, 2016)	2
Revision of Section 625 – Construction Surveying	(February 18, 2016)	1
Revision of Section 627 – Preformed Plastic Pavement Marking	(May 12, 2016)	2
Revision of Section 627 and 713 – Modified Epoxy Pavement Marking	(May 12, 2016)	2
Revision of Sections 630 and 713 – Retroreflective Sheeting	(January 12, 2017)	2
Revision of Section 702 – Bituminous Materials	(March 29, 2016)	11
Revision of Section 703 – Aggregate for Hot Mix Asphalt	(November 1, 2012)	2
Revision of Section 703 – Classification for Aggregate Base Course	(October 20, 2016)	1
Revision of Section 703 – Concrete Aggregate	(July 28, 2011)	1
Revision of Section 709 – Epoxy Coated Reinforcing Bars	(February 18, 2016)	1
Revision of Section 712 – Water for Mixing or Curing Concrete	(February 3, 2011)	1
Revision of Section 713 – Reflectors for Delineators and Median Barrier	(May 2, 2013)	1
Affirmative Action Requirements – Equal Employment Opportunity	(February 3, 2011)	10

COLORADO  
DEPARTMENT OF TRANSPORTATION  
SPECIAL PROVISIONS  
SH 45 Concrete Overlay  
STANDARD SPECIAL PROVISIONS

<b>Name</b>	<b>Date</b>	<b>No. of Pages</b>
Disadvantaged Business Enterprise (DBE) Requirements	(January 20, 2017)	6
FASTER Monthly Employment Report	(May 2, 2013)	1
Minimum Wages, Colorado, U.S. Department of Labor General Decision Number CO170018, Highway Construction for El Paso, Pueblo, and Teller counties.	(January 6, 2017)	6
On the Job Training	(July 29, 2011)	3
Partnering Program	(February 3, 2011)	1
Required Contract Provisions – Federal-Aid Construction Contracts	(October 20, 2016)	14
Special Construction Requirements, Fire Protection Plan	(November 1, 2012)	2

NOTICE TO BIDDERS

The proposal guaranty shall be a certified check, cashier's check, or bid bond in the amount of 5 percent of the Contractor's total bid.

Pursuant to subsections 102.04 and 102.05, it is recommended that bidders on this project review the work site and plan details with an authorized Department representative. Prospective bidders shall contact one of the following listed authorized Department representatives at least 12 hours in advance of the time they wish to go over the project.

Program Engineer:	Ajin Hu, PE	
	Office Phone:	719.546.5430
Resident Engineer:	Dan Dahlke, PE	
	Office Phone:	719.562.5509
	Cell Phone:	719.251.7981
Project Engineer:	Dean Sandoval	
	Office Phone:	719.546.5440
	Cell Phone:	719.251.6978

The above referenced individuals are the only representatives of the Department with authority to provide any information, clarification, or interpretation regarding the plans, specifications, and any other contract documents or requirements.

Questions received from bidders along with CDOT responses will be posted on the CDOT web site listed below as they become available.

<http://www.coloradodot.info/business/bidding/future-bidding-opportunities>

If the bidder has a question or requests clarification that involves the bidder's innovative or proprietary means and methods, phasing, scheduling, or other aspects of construction of the project, the Project Engineer will direct the bidder to contact the Resident Engineer directly to address the question or clarification. The Resident Engineer will keep the bidder's innovation confidential and will not share this information with other bidders.

The Resident Engineer will determine whether questions are innovative or proprietary in nature. If the Resident Engineer determines that a question does not warrant confidentiality, the bidder may withdraw the question. If the bidder withdraws the question, the Resident Engineer will not answer the question and the question will not be documented on the CDOT web site. If the bidder does not withdraw the question, the question will be answered, and both the question and CDOT answer will be posted on the web site. If the Resident Engineer agrees that a question warrants confidentiality, the Resident Engineer will answer the question, and keep both question and answer confidential. CDOT will keep a record of both question and answer in their confidential file.

All questions shall be directed to the CDOT contacts listed above no later than 7:00 A.M. Monday of the week of bid opening. Final questions and answers will be posted no later than Tuesday morning of bid opening week.

Questions and answers shall be used for reference only and shall not be considered part of the Contract.

Disadvantaged Business Enterprise (DBE) Contract Goal

This is a federally-assisted construction project. As described in the CDOT DBE Standard Special Provision, the Bidder shall make good faith efforts to meet the following contract goal:

7 Percent DBE participation.

ON THE JOB TRAINING CONTRACT GOAL

The Department has determined that On the Job Training shall be provided to trainees with the goal of developing full journey workers in the types of trade or classification involved. The contract goal for On the Job Trainees working in an approved training plan in this Contract has been established as follows:

Minimum number of total On the Job Training required 1920 hours

COMMENCEMENT AND COMPLETION OF WORK  
(WORKING DATE)

The Contractor shall commence work under the Contract on or before the 15<sup>th</sup> day following Contract execution or the 30<sup>th</sup> day following the date of award, whichever comes later, unless such time for beginning the work is changed by the Chief Engineer in the "Notice to Proceed." The Contractor shall complete all work within 144 Working Days accordance with the "Notice to Proceed" with work starting no later than March 1, 2016.

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03 shall include the following:

Salient features for this project are:

- (1) Public Information Services
- (2) Traffic Control Plans
- (3) Phasing Plans
- (4) Mobilization
- (5) Advance Warning signs
- (6) Initial Erosion Control
- (7) Survey existing striping
- (8) Construction Surveying
- (9) Temporary Signals
- (10) Concrete Joint Plans
- (11) Removal of Asphalt Mat (Planing)
- (12) Full Depth Reconstruction
- (13) Embankment
- (14) Aggregate Base Course
- (15) Concrete Paving
- (16) Hot Mix Asphalt
- (17) Bridge Joints
- (18) Guardrail
- (19) Final Signing
- (20) Final Striping
- (21) Seeding and Mulching
- (22) Punch List



REVISION OF SECTION 102  
PROJECT PLANS AND OTHER DATA

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Subsection 102.05 shall include the following:

The following information is available at the RE's office located at 902 Erie Ave, Pueblo, Colorado, 81001.

1. Cross Sections
2. Earthwork Quantities for shouldering
3. Soil Report as indicated in the SWMP

After the proposals have been opened, the low responsible bidder may obtain from CDOT's Printing and Visual Communications Center, 4201 East Arkansas Avenue, Denver, Colorado 80222, at no cost: 10 sets of plans and special provisions; and if available for the project, one set of full-size cross sections, one set of full-size major structure plan sheets, and one set of computer output data. If the low bidder has not picked up the plans and other available data by 4:00 p.m. on the second Friday after bid opening, they will be sent to the Resident Engineer in charge of the project. Additional sets of plans and other available data may be purchased on a cash sale basis from CDOT's Visual Communication Center at current reproduction prices. Subcontractors and suppliers may obtain plans and other data from the successful bidder or they may purchase copies on a cash sale basis from the Visual Communication Center at current reproduction prices.

Survey information is available at the Resident Engineer's office for review.

REVISION OF SECTIONS 105, 106, AND 203  
CONFORMITY TO THE CONTRACT OF EMBANKMENT

Sections 105, 106 and 203 of the Standard Specifications are hereby revised for this project as follows:

Subsection 105.03 shall include the following:

Conformity to the contract of embankment construction shall be determined in accordance with the following:

(a) *Quality Control Plan.* The Contractor shall be responsible for Quality Control (QC) for all embankment material on this project. The Contractor shall submit a written Quality Control Plan (QCP), including a methods statement, to the Engineer for acceptance. The QCP shall include but not be limited to the following:

- (1) Maximum lift thickness of eight inches in accordance with subsection 203.06 or as directed.
- (2) Compaction equipment capable of obtaining the specified compaction.
- (3) Water trucks with an adequate distribution system that will apply water evenly.
- (4) List of all inspection and materials testing forms and procedures utilized by the Contractor.
- (5) Adherence to Table 106-4 requiring minimum testing frequency.

The contractor shall submit the QCP at least five working days prior to the start of the work. The Engineer's review of the QCP will not exceed two working days. Work shall not begin until the QCP has been accepted in writing, unless otherwise approved.

(b) *Documentation.* The Contractor shall maintain current records of quality control operation activities, and tests performed. These records shall be in the form shown in the QCP, and shall include as a minimum, the Contractor or subcontractor, the number of personnel working, weather conditions, type of equipment being used, delays and their cause, and deficiencies along with corrective action taken. Such records shall cover both conforming and defective or deficient features. Additional documentation to the Engineer shall include all daily test results, daily inspection reports, daily non-compliance reports, and monthly certification reports. Copies of these records and a statement that work incorporated in the project complies with the Contract shall be submitted to the Engineer prior to payment for the work or upon request. Monthly certification reports shall be stamped with the seal of a Professional Engineer registered in Colorado. Failure to provide the Engineer with the necessary documentation will result in the suspension of payments on embankment until the documentation has been completed and accepted by the Engineer. CDOT Quality Assurance documentation shall not be used as supporting documentation for the Contractors certification.

CDOT or CDOT's certified representative will be responsible for Quality Assurance (QA) and Independent Assurance Testing (IAT).

Subsection 106.02(b) shall include the following:

The Contractor shall notify the Engineer of the embankment material source location a minimum three weeks prior to placement of embankment so the department can begin sampling.

Subsection 106.03 shall include the following:

Testing of embankment construction shall conform to the following:

REVISION OF SECTIONS 105, 106, AND 203  
 CONFORMITY TO THE CONTRACT OF EMBANKMENT

The supervisor responsible for the direct supervision for the process control sampling and testing shall be identified in the QCP and be qualified according to the requirements of CP-10 (Note: this will require a PE or a NICET Level III certification).

The technicians taking samples and performing tests must be qualified according to requirements of CP 10 (Note: this will require WAQTC qualification). **A process control technician shall be required to be on-site full time whenever earthwork activities are taking place.**

The project verification sampling and testing procedures shown in the CDOT Field Materials Manual under the frequency guide schedule for minimum materials sampling, testing and inspection shall be used for the elements shown in Table 106-4.

**Table 106-4  
 EXCAVATION AND EMBANKMENT TESTING SCHEDULE**

<b>Minimum Testing Frequency Contractor's Process Control</b>	<b>Element</b>	<b>Minimum Testing Frequency CDOT verification Testing</b>
None Required	Soil Survey (Classification)	See CDOT Field Materials Manual for Frequency
1 per soil type	Moisture – Density Curve	1 per soil type
1 per 500 cubic yards or fraction thereof.	In-Place Density	1 per 1,000 cubic yards or fraction thereof.
1 per 100 cubic yards or fraction thereof.	In-Place Density when within 100 ft. of Bridge Approach(s).	1 per 250 cubic yards or fraction thereof.
1 per 5,000 cubic yards or fraction thereof.	1 Point Check	1 per 10,000 cubic yards or fraction thereof.

Qualifications for testing and personnel are contained in Section 203, Chapter 200 of the CDOT Field Materials Manual, CP-10, CP 13, CP 15, and CP 80, and the CDOT Inspectors Checklist.

Subsection 203.02 (c) shall include the following:

Embankment material containing significantly more than optimum moisture that would become stable if dried shall not be considered unsuitable material.

Delete the 7<sup>th</sup> Paragraph of Section 203.06 and replace with the following:

Within the project embankment limits, all sod and other vegetable and other organic matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches, and compacted to the specified embankment density prior to placing new embankment materials.

Subsection 203.12 shall include the following:

The Contractor's Process Control efforts will not be measured and paid for separately but shall be included in the work.

1  
REVISION OF SECTIONS 105 AND 608  
DETECTABLE WARNINGS

Sections 105 and 608 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.03 shall include the following:

When corrective work is required for curb ramps, the Contractor shall submit a method statement in writing outlining the work to be performed. Corrective work for curb ramps shall not be performed until written approval has been received from the Engineer. All corrective work for curb ramps shall be at the Contractor's expense.

Subsection 608.01 shall include the following:

This work includes the installation of detectable warnings on concrete curb ramps as shown on the plans.

Subsection 608.02 shall include the following:

Detectable warnings on curb ramps shall be truncated domes of the dimensions shown on the plans. Domes shall be prefabricated by the manufacturer as a pattern on embeddable surface plates, concrete pavers, or masonry pavers.

Plates and pavers shall meet all Americans with Disabilities Act (ADA) requirements for truncated domes, and when installed, shall be capable of producing the pattern of domes shown on the plans.

Pavers shall meet the requirements of ASTM C 902 or ASTM C 936.

Plates used shall be one of the products approved for use as detectable warnings listed on CDOT's Approved Products List.

The domes and their underlying surface shall have a discernible contrast of color from the adjacent surface. The contrasting colors shall not be black and white.

The paver contrast shall be achieved by adding pigment during the fabrication of the paver. Prior to the start of work, the Contractor shall submit appropriate documentation from the manufacturer verifying that the contrast has been met, along with a sample paver, to the Engineer for approval.

When plates are used, prior to the start of work, the Contractor shall submit appropriate documentation from the manufacturer verifying that the contrast has been met, along with a sample plate, to the Engineer for approval.

Bedding and joint sand for pavers shall be free of deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust shall not be used. Sand for bedding material shall conform to ASTM C 33. Sand that is to be placed between joints shall conform to ASTM C 144.

Subsection 608.03 shall include the following:

2  
REVISION OF SECTIONS 105 AND 608  
DETECTABLE WARNINGS

(g) *Detectable Warnings for curbs ramps.*

1. Pavers. Pre-fabricated pavers for detectable warnings shall be brought to the site in steel banded, plastic banded or plastic wrapped cubes capable of being transported by a fork lift or clamp lift. Pavers shall be carefully removed and stacked in a manner which results in the least amount of damage. All pavers that are damaged during transport or delivery will be rejected and shall be replaced at the Contractor's expense. Minor cracks or chipping due to transport and handling that do not interfere with the structural integrity of the paver or the overall pattern of truncated domes will not be deemed as grounds for rejection.

The Contractor shall spread the bedding sand evenly in the area shown on the plans and shall screed the sand to an appropriate embedment depth as shown on the plans or as directed by the Engineer. Sufficient sand shall be placed to stay ahead of laid pavers

Pavers shall be placed in a running bond pattern. Pavers shall be installed such that the base of the truncated dome is at the same elevation as the adjoining surface, allowing for a smooth transition between the curb ramp and the detectable warning.

When cut pavers are required to fill gaps between the pavers and the edge of concrete, the Contractor shall bevel portions of the truncated domes at a 45-degree angle to create a smooth transition between the partial dome and the curb ramp surface. Unless otherwise directed by the Engineer, pavers shall be cut and installed in such a manner that the domes on the cut sections will not significantly impact the overall pattern of the truncated domes.

The Contractor shall use a plate vibrator to embed the pavers into the sand. The size and type of plate vibrator shall be in accordance with manufacturer's recommendations, or as directed by the Engineer. All pavers that are damaged during embedment shall be replaced at the Contractor's expense.

Joint spacing between paver units shall be in accordance with the manufacturer's recommendations, or as approved by the Engineer. Joints shall be filled completely with joint sand. Excess sand shall be removed by sweeping.

2. Plates. Prior to installation of the plates, concrete conforming to subsection 608.02 shall be installed and consolidated as a base for the plates. The concrete shall be placed to a thickness that will allow the base surface of the plates to be at the same elevation as the adjacent concrete. The plates shall be embedded into the plastic concrete in accordance with the manufacturer's specifications.

Subsection 608.05 shall include the following:

Detectable warnings on curb ramps, including sand, pavers, plates, and all other work and materials necessary for fabrication, transport, and installation will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 106  
HOT MIX ASPHALT – CHECK TESTING PROGRAM (LESS THAN 5000 TONS)

Section 106 of the Standard Specifications is hereby revised for this project as follows:

Subsection 106.05 shall include the following:

- (d) *Check Testing Program (CTP)*. Prior to, or in conjunction with, placing the first 500 tons of asphalt pavement, under the direction of the Engineer, a CTP will be conducted between acceptance testing and process control testing programs. The CTP will consist of testing for asphalt content, theoretical maximum specific gravity, HMA 4.75 mm (#4) sieve, HMA 2.36 mm (#8) sieve, HMA 0.075 mm (#200) sieve, in-place density, and joint density in accordance with CP 13. If volumetric verification is required for the project, check testing shall also include testing for air voids and voids in the mineral aggregate. The CTP will be continued until the acceptance and process control tests are within the acceptable limits shown in Table 13-1 of CP 13. For joint density, the initial check test will be a comparison of the seven cores tested by CDOT and the seven cores tested by the Contractor. These are the cores from the compaction test section used for nuclear gauge calibration and test section payment.

During production, a split sample check will be conducted at the frequency shown in Table 106-1. Except for joint density, the split samples will be from an acceptance sample obtained in accordance with subsection 106.05(b). The acceptance test result will be compared to the process control test result obtained by the Contractor using the acceptable limits shown in Table 13-1 of CP 13. For joint density, the comparison sample for testing by the Contractor will be obtained by taking a second core adjacent to the joint density acceptance core. The acceptance test result will be compared to the process control test result obtained by the Contractor using the acceptable limits as shown in Table 13-1 of CP 13 and following the check testing procedure given in CP 13. If production has been suspended and then resumed, the Engineer may order a CTP between process control and acceptance testing persons to assure the test results are within the acceptable limits shown in Table 13-1 of CP 13. Check test results shall not be included in process control testing. The Region Materials Engineer shall be called upon to resolve differences if a CTP shows unresolved differences beyond the values shown in Table 13-1 of CP 13.

1  
REVISION OF SECTION 107  
PERFORMANCE OF SAFETY CRITICAL WORK

Section 107 of the Standard Specifications is hereby revised as follows:

Add subsection 107.061 immediately following subsection 107.06 as follows:

**107.061 Performance of Safety Critical Work.** The following work elements are considered safety critical work for this project:

- (1) Excavation and embankment adjacent to the roadway, especially if it requires shoring

The Contractor shall submit, for record purposes only, an initial detailed construction plan that addresses safe construction of each of the safety critical elements. When the specifications already require an erection plan, a bridge removal plan, or a removal of portion of bridge plan, it shall be included as a part of this plan. The detailed construction plan shall be submitted two weeks prior to the safety critical element conference described below. The construction plan shall be stamped "Approved for Construction" and signed by the Contractor. The construction plan will not be approved by the Engineer.

The Construction Plan shall include the following:

- (1) Safety Critical Element for which the plan is being prepared and submitted.
- (2) Contractor or subcontractor responsible for the plan preparation and the work.
- (3) Schedule, procedures, equipment, and sequence of operations, that comply with the working hour limitations
- (4) Temporary works required: Falsework, bracing, shoring, etc.
- (5) Additional actions that will be taken to ensure that the work will be performed safely.
- (6) Names and qualifications of workers who will be in responsible charge of the work:
  - A. Years of experience performing similar work
  - B. Training taken in performing similar work
  - C. Certifications earned in performing similar work
- (7) The construction plan shall address how the Contractor will handle contingencies such as:
  - A. Unplanned events (storms, traffic accidents, etc.)
  - B. Structural elements that don't fit or line up
  - C. Work that cannot be completed in time for the roadway to be reopened to traffic
  - D. Replacement of workers who don't perform the work safely
  - E. Equipment failure
  - F. Other potential difficulties inherent in the type of work being performed
- (8) Name and qualifications of Contractor's person designated to determine and notify the Engineer in writing when it is safe to open a route to traffic after it has been closed for safety critical work.
- (9) Erection plan or bridge removal plan when submitted as required elsewhere by the specifications. Plan requirements that overlap with above requirements may be submitted only once

REVISION OF SECTION 107  
PERFORMANCE OF SAFETY CRITICAL WORK

A safety critical element conference shall be held two weeks prior to beginning construction on each safety critical element. The Engineer, the Contractor, the safety critical element subcontractors, and the Contractor's Engineer shall attend the conference. Required pre-erection conferences or bridge removal conferences may be included as a part of this conference.

After the safety critical element conference, and prior to beginning work on the safety critical element, the Contractor shall submit a final construction plan to the Engineer for record purposes only. The final construction plan shall be stamped "Approved for Construction" and signed by the Contractor.

The Contractor shall perform safety critical work only when the Engineer is on the project site. The Contractor's Engineer shall be on site to inspect and provide written approval of safety critical work for which he provided signed and sealed construction details. Unless otherwise directed or approved, the Contractor's Engineer need not be on site during the actual performance of safety critical work, but shall be present to conduct inspection for written approval of the safety critical work.

When ordered by the Engineer, the Contractor shall immediately stop safety critical work that is being performed in an unsafe manner or will result in an unsafe situation for the traveling public. Prior to stopping work, the Contractor shall make the situation safe for work stoppage. The Contractor shall submit an acceptable plan to correct the unsafe process before the Engineer will authorize resumption of the work.

When ordered by the Engineer, the Contractor shall remove workers from the project that are performing the safety critical work in a manner that creates an unsafe situation for the public in accordance with subsection 108.05.

Should an unplanned event occur or the safety critical operation deviate from the submitted plan, the Contractor shall immediately cease operations on the safety critical element, except for performing any work necessary to ensure worksite safety, and provide proper protection of the work and the traveling public. If the Contractor intends to modify the submitted plan, he shall submit a revised plan to the Engineer prior to resuming operations.

All costs associated with the preparation and implementation of each safety critical element construction plan will not be measured and paid for separately, but shall be included in the work.

Nothing in the section shall be construed to relieve the Contractor from ultimate liability for unsafe or negligent acts or to be a waiver of the Colorado Governmental Immunity Act on behalf of the Department.



REVISION OF SECTION 107

OCIP for DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
PROJECT INSURANCE MANUAL (PIM)

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.15 shall include the following:

The Colorado Department of Transportation (CDOT) may, at its election, implement an Owner Controlled Insurance Program (OCIP) for this project. Lines of insurance coverage may include any or all of the following: Workers Compensation, Commercial General and Excess/Umbrella Liability, Contractors Pollution Liability, Builders Risk and/or Professional Liability. CDOT reserves the right to determine who participates in the OCIP and what lines of insurance coverage will be sponsored by CDOT for the project.

Bidders should include the attached Insurance Calculation Worksheet along with their bid. This form will be evaluated by CDOT's broker partner, Lockton for verification of the credits taken.

There are incentives available for contractor participation based on three categories:

1. Responsiveness, accuracy of rates in the OCIP worksheets and productive effort between the RFP and Award (25%).
2. Enrollment of sub-contractors and Reporting and Accuracy (25%).
3. Safety Compliance, Loss Statistics and Loss Experience compared to industry standards (50%).

The incentive will be calculated/pro-rated as \$8,235/\$10M of construction costs.

Questions can be directed to:  
Julie Mileham, Risk Manager  
Julie.mileham@state.co.us  
(303) 757-9491

REVISION OF SECTION 107  
 OCIP FOR DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
 TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
 PROJECT INSURANCE MANUAL (PIM)

**Colorado Department of Transportation (OCIP)  
 Insurance Calculation Worksheet  
 Form OCIP-S(1)**

Your Company Name: \_\_\_\_\_

Your Company was hired by: \_\_\_\_\_

% Self-Performed Work: \_\_\_\_\_ Contract Amount: \$ \_\_\_\_\_

<b>I. Workers' Compensation and Employers Liability</b>						
Labor Classification	WC Class Code	Estimated Man Hours	Estimated Payroll	WC Rate (Per \$100 of Payroll)	Premium	Policy Deductible

Subtotal: \_\_\_\_\_

Note: Deductible program credits do not apply  
 Note: Identify workers' compensation loss rate per \$100 of payroll within the policy deductible

Increased Employer's Liability Factor: x \_\_\_\_\_  
 Experience Modification Factor: x \_\_\_\_\_  
 Other Factors (Identify): x \_\_\_\_\_  
 Surcharge: x \_\_\_\_\_

**Total Workers' Compensation Premium (A): \$ \_\_\_\_\_**

<b>II. Primary General Liability</b>				
Labor Classification	GL Class Code	Estimated Payroll or Contract Value	GL Rate	Premium

Note: Identify General Liability loss rate per \$100/\$1,000 of payroll or receipts within the policy deductible \_\_\_\_\_

**Total General Liability Premium (B): \$ \_\_\_\_\_**

<b>III. Excess/Umbrella Liability*</b>		
Estimated Payroll or Contract Value	Umbrella Rate	Premium

**Total Umbrella Liability Premium (C): \$ \_\_\_\_\_**

\* If Excess/Umbrella Liability premium is flat-charge, develop rate by dividing your excess policy annual premium by estimated annual payroll. Apply this rate to the estimated payroll for this project. If annual rate is not provided a minimum deduct of 15% of the primary General Liability rate will be applied.

**IV. Profit Overhead and Contingency** \_\_\_\_\_ % of Premium (D): \$ \_\_\_\_\_

**V. Total Initial Insurance Deduct** \_\_\_\_\_ **Total Lines of Insurance (A+B+C+D): \$ \_\_\_\_\_**

\_\_\_\_\_  
 Broker/Agency Name Broker Signature Date

**\*Policy rate pages must be submitted with this worksheet.  
 THERE WILL BE NO EXCEPTIONS.**

REVISION OF SECTION 107

OCIP FOR DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
PROJECT INSURANCE MANUAL (PIM)

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 107.15 and replace with the following:

**107.15 Responsibility for Damage Claims, Insurance Types and Coverage Limits, Owner Controlled Insurance Program (OCIP) and Project Insurance Manual (PIM).** The Contractor shall indemnify and save harmless the Department, its officers, and employees, from suits, actions, or claims of any type or character brought because of any and all injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or failure to comply with the provisions of the Contract; or on account of or in consequence of neglect of the Contractor in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of the Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright, unless the design, device, material or process involved is specifically required by the Contract; or from any claims or amounts arising or recovered under the Worker's Compensation Act, or other law, ordinance, order, or decree. The Department may retain as much of any moneys due the Contractor under any Contract as may be determined by the Department to be in the public interest.

(a) The Contractor shall obtain, and maintain at all times during the term of this Contract, insurance in the following kinds and amounts:

(1) Workers' Compensation Insurance as required by state statute, and Employer's Liability Insurance covering all of Contractor's employees acting within the course and scope of their employment.

(i) The Contractor shall provide Workers' Compensation coverage that is in compliance with all Legal Requirements (including C.R.S. § 8-44-101, et seq.) and Employer's Liability with minimum limits of \$1,000,000 by disease each person, \$1,000,000 by disease aggregate, and \$1,000,000 each person by accident.

(ii) Subcontractors shall provide Workers' Compensation coverage that is in compliance with all Legal Requirements (including C.R.S. § 8-44-101, et seq.) and Employer's Liability with minimum limits of \$500,000 by disease each person, \$500,000 by disease aggregate, and \$500,000 each person by accident.

(2) Commercial General Liability Insurance written on ISO occurrence form CG 00 01 07/04 or equivalent, covering premises operations, fire damage, independent Contractors, products and completed operations, blanket contractual liability, personal injury, and advertising liability with minimum limits as follows:

(i) \$1,000,000 each occurrence;

(ii) \$2,000,000 general aggregate;

(iii) \$2,000,000 products and completed operations aggregate; and

(iv) \$50,000 any one fire.

(v) Completed Operations coverage shall be provided for a minimum period of eight years following final acceptance of work. If any aggregate limit is reduced below \$1,000,000 because of claims made or paid, the Contractor shall immediately obtain additional insurance to restore the full aggregate limit and furnish to CDOT a certificate or other document satisfactory to CDOT showing compliance with this provision.

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- (3) Automobile Liability Insurance covering any auto (including owned, hired and non-owned autos) with a minimum limit as follows: \$1,000,000 each accident combined single limit.
  - 1. The policy will include uninsured and underinsured, in compliance with Colorado law.
  - 2. The policy shall be endorsed to include Motor Carrier Act endorsement – Hazardous Materials Cleanup (MCS-90), if applicable.
  
- (4) Professional liability insurance with minimum limits of liability of not less than \$1,000,000 Each Claim and \$1,000,000 Annual Aggregate for both the Contractor or any subcontractors when:
  - (i) Contract items 625 (excluding tunnel surveying), 629, or both are included in the Contract
  - (ii) Plans, specifications, and submittals are required to be signed and sealed by the Contractor’s Professional Engineer, including but not limited to:
    - (A) Shop drawings and working drawings as described in subsection 105.02
    - (B) Mix Designs
    - (C) Contractor performed design work as required by the plans and specifications
    - (D) Change Orders
    - (E) Approved Value Engineering Change Proposals
  - (iii) The Contractor and any included subcontractor shall renew and maintain Professional Liability coverage for the liability exposure associated with Colorado law and the relevant statute of repose and limitations.
  
- (5) The Contractor shall provide Umbrella or Excess Liability Insurance with minimum limits of \$1,000,000 for work under this contract. Minimum limits shall be based upon estimated Construction Values in accordance with the table below. This policy shall become primary (drop down) in the event the primary Liability Policy limits are impaired or exhausted. The Policy shall be written on an Occurrence form and shall be following form of the primary. The Umbrella or Excess which will provide bodily injury, personal injury and property damage liability at least as broad as the primary coverage set forth above, including Employer’s Liability, Commercial General Liability and Commercial Automobile Liability.

Estimated Construction Values	Minimum Umbrella / Excess Liability Limits
Less than \$5,000,000 in CV	\$1,000,000
\$5,000,000 to \$10,000,000	\$2,000,000
\$10,000,000 to \$25,000,000	\$5,000,000
\$25,000,000 to \$75,000,000	\$10,000,000
Over \$75,000,000	Determined by the CDOT Risk Manager

The Contractor shall ensure that their subcontractors provide Umbrella or Excess Liability Insurance with minimum limits of \$1,000,000. This policy shall become primary (drop down) in the event the primary Liability Policy limits are impaired or exhausted. The Policy shall be written on an Occurrence form and shall be following form of the primary. The Umbrella or Excess which will provide bodily injury, personal injury and property damage liability at least as broad as the primary coverage set forth above, including Employer’s Liability, Commercial General Liability and Commercial Automobile Liability.

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- (b) CDOT, and any such entity where there is contractual liability entered in to by CDOT, the Contractor will provide evidence of such insurance, and each shall be named as an Additional Insured on the Commercial General Liability, Automobile Liability and Umbrella / Excess Liability Insurance policies. Completed operations additional insured coverage shall be on endorsements CG 2010 07/04, CG 2037 07/04, or equivalent. Coverage required of the contract will be primary over any insurance or self-insurance program carried by the State of Colorado, except where coverage is sponsored by CDOT for the Contractor.
- (c) Railroad Protective Insurance  
In addition to the above, the Contractor shall furnish evidence to CDOT that, with respect to the operation the Contractor or any of its subcontractors perform, the Contractor has provided for and on behalf of the Railroad Company, and each Railroad Company when more than one is involved, Railroad Protective Public Liability and Property Damage Insurance provided for a combined single limit of Five Million Dollars (\$5,000,000) per occurrence with an aggregate limit of Ten Million Dollars (\$10,000,000) applying separately for each annual period for:
- (i) All damages arising out of bodily injuries to or death of one or more persons.
  - (ii) All damages arising out of injury to or destruction of property.  
Said policy or policies of insurance shall be deemed to comply with the Railroad Protective Insurance requirements if each of said policies contains a properly completed and executed "Railroad Protective Liability Form," copies of which are available from CDOT's Agreements Engineer, Colorado Department of Transportation, 4201 E. Arkansas Ave., Denver, CO, 80222. All required policy or policies of insurance shall be submitted to the Project Director for transmittal to the Railroad Company's Insurance Department.
- The Railroad Protective Insurance shall be carried until all Work required to be performed under the terms of the Contract is satisfactorily completed as evidenced by the formal acceptance of CDOT. The Railroad Company shall be furnished with the original of each policy carried on its behalf.
- (d) Each insurance policy shall include provisions preventing cancellation or non-renewal without at least 30 days prior notice to Contractor. The Contractor shall forward to the Engineer any such notice received within seven days of the Contractor's receipt of such notice.
- (e) The Contractor shall require all insurance policies in any way related to the contract and secured and maintained by the Contractor to include clauses stating that each carrier shall waive all rights of recovery, under subrogation or otherwise, against CDOT, its agencies, institutions, organizations, officers, agents, employees and volunteers.
- (f) All policies evidencing the insurance lines of coverage required hereunder shall be issued by insurance companies satisfactory to CDOT.  
A.M. Best Rating  
All insurance companies providing policies obtained to satisfy the insurance requirements must have an A.M. Best rating of A-, VII or better.

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- (g) The Contractor shall provide certificates showing insurance coverage required by this contract to CDOT prior to execution of the contract. No later than 15 days prior to the expiration date of any such coverage, the Contractor shall deliver CDOT certificates of insurance evidencing renewals thereof. At any time during the term of this contract, CDOT may request in writing, and the Contractor shall thereupon within ten (10) days supply to CDOT, evidence satisfactory to CDOT of compliance with the provisions of this section.
- (h) Notwithstanding subsection 107.15(a), if the Contractor is a “public entity” within the meaning of the Colorado Governmental Immunity Act CRS 24-10-101, et seq., as amended (“Act”), the Contractor shall at all times during the term of this contract maintain only such liability insurance, by commercial policy or self-insurance, as is necessary to meet its liabilities under the Act. Upon request by CDOT, the Contractor shall show proof of such insurance satisfactory to CDOT. Public entity Contractors are not required to name CDOT as an Additional Insured.
- (i) When the Contractor requires a subcontractor to obtain insurance coverage, the types and minimum limits of this coverage may be different than those required, as stated above, for the Contractor, except for the Commercial General Liability and Automobile Liability and the subcontractor shall provide an Additional Insured endorsement for such coverage. Those that qualify as needing Professional Liability Insurance in terms of any design work shall provide such coverage as provided for in (4) above.
- (j) CDOT will provide the following lines of Insurance coverage for this project in a CDOT sponsored Owner Controlled Insurance Program (OCIP):

**INTRODUCTIONS / DEFINITIONS**

**Capitalized terms not otherwise defined in this Exhibit shall have the meanings assigned to them in the Contract.**

**Contractor:** meaning the set forth in the first page of Book 1. Contractor refers to any person or entity awarded a Contract with CDOT to provide construction services for the Project.

**Enrolled Contractor or Subcontractor:** means the Contractor and any other Subcontractors enrolled in the OCIP as outline in the Project Insurance Manual published by the CDOT Project OCIP Administrator.

**Insurance Representative and Project OCIP Administrator:** means the entity or individual designated by CDOT to represent its interest in the OCIP through the coordination of enrollment, claims and other OCIP activities, as well as monitoring for compliance to OCIP policies, procedures and guidelines.

**Owner:** means the Colorado Department of Transportation (CDOT), a body corporate and political subdivision of the State of Colorado.

**Owner Controlled Insurance Program (OCIP):** means an insurance delivery method that includes enrolled Contractors and Subcontractors on the Project in an Owner sponsored insurance program including Workers Compensation, Commercial General and Excess Liability, Contractors Pollution Liability, and Builders Risk Insurance, and such other coverage as the Owner may in writing specifically include in the OCIP.

**Project Site:** means the physical location of Work to be performed on the Project as described in the Contract, as well as areas adjacent to the Work necessary for performance of the Work as included in the OCIP.

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**Subcontractor:** means any Person with whom the Contractor has entered into any Subcontract and any other Person with whom any Subcontractor has further subcontracted any part of the Work, at any tier, performing Work at the Project Site.

**Work:** means all activities required to be performed by Contractor, Project Contractors and their Subcontractors to fulfill their obligations under the Contract.

**OWNER CONTROLLED INSURANCE PROGRAM (OCIP)**

The Project will be subject to an Owner Controlled Insurance Program ("OCIP"). The Colorado Department of Transportation (CDOT) otherwise referred to as the "Owner", acting directly or through its authorized designee will provide coverage for insurance under an OCIP.

Prior to commencement of the Work, Owner, at its sole cost, will secure and thereafter, except as otherwise provided herein, maintain at all times during the performance of this Contract, the insurance specified herein, with Owner, Contractor, Enrolled Project Contractors, and such other persons or interests as Owner may designate as insured parties, with limits not less than those specified below for each coverage.

Owner provided Insurance will apply only to Project Contractors who have completed the enrollment process, complied with the insurance requirements herein, and received notification of enrollment from the Project OCIP Administrator. Owner may require exclusion of any Subcontractor from the OCIP at the Owner's sole discretion. If a Subcontractor should be excluded from the OCIP at the Owner's discretion, then the cost of insurance may be equitably adjusted for their purchase of separate insurance.

(1) Workers' Compensation.

CDOT will procure, pay for, and maintain Workers Compensation insurance in compliance with statutory limits for the Workers' Compensation Laws of the State of Colorado and Employer's Liability limits of not less than:

- \$ 1,000,000 - Each accident for Bodily Injury
- \$ 1,000,000 - Policy limit for Bodily Injury by disease
- \$ 1,000,000 - Each employee for Bodily Injury by disease.

Covered operations at the Project Site for enrolled Project Contractors. Coverage ceases for any employee of the enrolled Project Contractors when they leave the Project Site for unrelated business. Workers Compensation coverage will extend to employees' direct travel between two scheduled Project Sites when the travel is conducted for the sole purpose of executing Work. The Project Site will include adjacent or nearby tracts of land where incidental operations, such as the location of Contractor's trailers, offices, CDOT's team's offices, etc. are performed, related to the Work. The Project site will not include permanent locations of any insured party other than CDOT. The OCIP shall not apply to the operations of Project Contractors at their offices, factories, or warehouses.

The payrolls and losses of participants in this OCIP will be filed with the appropriate Workers Compensation rating bureau and will affect their individual experience modification factor. Claim data will be submitted by the insurance carrier(s) to the National council on the Compensation Insurance (NCCI) in accordance with Colorado Workers Compensation Deductible rules.

CDOT will pay any policy related insurance costs for Workers' Compensation not covered because of deductibles, if any. The Contractor shall be responsible for any related Drug and Alcohol accident / incident testing or other contractual obligations as provided for in the Contract which may be related to the incident and/or injured worker.

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The Contractor shall estimate and report to CDOT the amount of money that would have been in their bid for Workers' Compensation Insurance and Employer's Liability on form OCIP-B. The Contractor shall also show the amount of money remaining in their bid for Workers' Compensation and Employer's Liability insurance for the coverage items not included in the OCIP on form OCIP-B.

(2) Commercial General Liability- add CG 12/07

Policy Limits:

- \$2,000,000 per Occurrence for Bodily Injury and Property Damage
- \$4,000,000 General Aggregate
- \$4,000,000 Completed Operations Aggregate

The Policy limits are shared by all Project Contractors enrolled in the OCIP.

Policy Exclusions – Examples could include, but are not limited to:

**COVERAGE A BODILY INJURY AND PROPERTY DAMAGE LIABILITY**

Exclusions:

- Expected or Intended Injury
- Contractual Liability
- Liquor Liability
- Workers' Compensation and Similar Laws
- Employer's Liability
- Pollution
- Aircraft, Auto or Watercraft
- Mobile Equipment
- War
- Damage to Property – modified or deleted by endorsement
- Damage to Your Product - modified or deleted by endorsement
- Damage to Your Work - modified or deleted by endorsement
- Damage to Impaired Property or Property Not Physically Injured
- Recall of Products, Work or Impaired Property
- Personal and Advertising Injury
- Electronic Data

**COVERAGE B PERSONAL AND ADVERTISING INJURY LIABILITY**

Exclusions:

- Knowing Violation of Rights of Another
- Material Published with Knowledge of Falsity
- Material Published Prior to Policy Period
- Criminal Acts
- Contractual Liability
- Breach of Contract
- Quality or Performance of Goods – Failure to Conform to Statements
- Wrong Description of Prices
- Infringement of Copyright, Patent, Trademark or Trade Secret
- Insured's in Media and Internet Type Businesses
- Electronic Chatrooms or Bulletin Boards
- Distribution of Material in Violation of Statues



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Unauthorized Use of Another's Name or Product  
Pollution-Related  
War

**COVERAGE C MEDICAL PAYMENTS**

Exclusions:

Any Insured  
Hired Person  
Injury on Normally Occupied Premises  
Workers Compensation and Similar Laws  
Athletics Activities  
Products-Completed Operations Hazard  
Coverage A Exclusions

**Additional Policy Endorsements:**

Advertisement Redefined  
Blanket Additional Insured  
Bodily Injury Redefined  
Bodily Injury to Co-Employees Coverage  
Broad Form Named Insured  
Broadened Damage to Premises Rented to You Coverage  
Commercial General Liability Coverage Form (Occurrence Version)  
Common Policy Conditions  
Composite Rate Endorsement  
Coverage Territory Redefined  
Earlier Notice of Cancellation Provided By Us– (60 Days/10 Days for nonpayment)  
Joint and Several Amendment  
Joint Defense Endorsement  
Knowledge of Occurrence  
Mold and Mold Related Construction Defect  
Non-Cumulation of Liability (Same Occurrence)  
Notice of Cancellation to Third Parties (30 Days NOC) Notice of Occurrence Nuclear  
Energy Liability Exclusion  
Per Project and Per Location Combined Aggregate Limits – With Optional Capped  
Limits Endorsement LG 3178 05 05 (Aggregate Limit Cap: \$20,000,000)  
Personal and Advertising Injury Redefined- Definition of Publication  
Personal and Advertising Injury – Occurrence Redefined  
Professional Health Care Services by Employees or Volunteer Workers Coverage  
Reasonable Force  
Repair Work Endorsement-Manuscript  
Unintentional Failure to Disclose  
Waiver of Transfer of Rights of Recovery Against Others to Us– (Any person or  
organization with whom you have agreed in writing to waive any right of recovery prior  
to a loss; Premium: TBD )  
Wrap-Up Insurance Program – Amendment of Coverage (Completed operations extension  
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**Additional Policy Exclusions:**

- Asbestos Exclusion
- Discrimination Exclusion
- Employment Related Practices Exclusion
- Exclusion – Contractors – Professional Liability
- Exclusion – Fungi or Bacteria
- Exclusion – Mold and Mold Related Construction Defect
- Fungi or Bacteria Exclusion
- Lead Exclusion
- Nuclear Energy Liability Exclusion
- Recording and Distribution of Material or Information in Violation of Law Exclusion
- Silica Exclusion
- Total Pollution Exclusion

Standard Insurance Service Office Commercial General Liability Insurance policy or equivalent, including Bodily Injury, Property Damage, Personal Injury and Completed Operations covering operations at the Project Site for Project Contractors shall be provided. An eight-year extension of the Completed Operations Liability coverage for the Colorado Statute of Repose and the Statute of Limitations will begin upon the earlier of expiration of the OCIP policy, Substantial Completion of the Project, or the completion of Work under Contract. This insurance will not extend to products liability coverage for any product manufactured away from the Project Site. The OCIP will be primary and non-contributory as it relates to coverage provided under the OCIP.

Contractor will be responsible for repayment of any deductible for Bodily Injury or Property damage up to \$10,000 per occurrence to the extent loss costs (including allocated loss adjustment expense) payable are attributable to its acts, or the acts of its subcontractors, or any other entity or person for whom it may be responsible, with no increase in the Contract amount.

To the extent losses covered and payable under the OCIP arise out of, or are the responsibility of the Contractor's subcontractors of any tier, Contractor may seek contribution from those subcontractors in an amount equal to the self-insured retention or deductible amount under the subcontractor's own conventional General Liability Insurance Policy in effect at the time of enrollment into the OCIP, but in no case may the Contractor collectively collect more than the per occurrence deductible of \$10,000 for the occurrence which is the contractual responsibility of the Contractor.

The contractor shall estimate and report to CDOT the amount of money that would have been in their bid for Commercial General Liability Insurance on Form OCIP- B. The Contractor shall also show the amount of money remaining in their bid for Commercial General Liability for insuring items not included in the OCIP on Form OCIP- B.

(3) Umbrella or Excess Liability Insurance.

Policy limits:

\$50,000,000	Each Occurrence
\$50,000,000	Aggregate

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Coverage is in excess of the primary Commercial General Liability and Employer's Liability. Such Excess Liability Insurance will be primary and non-contributory as to any other excess insurance the parties hereto may have in force. An eight-year extension (for the Statute of Repose and Limitations) of the Completed Operations Liability coverage is anticipated and will begin upon the earlier of expiration of the Commercial General Liability Policy or Substantial Completion of the Project, or the completion of Work under Contract. This insurance will not extend products liability coverage for any product manufactured away from the Project Site.

These limits may be satisfied in various combinations with an Umbrella or Excess policy.

The contractor shall estimate and report to CDOT the amount of money that would have been in their bid for Excess Liability Insurance on Form OCIP- B. The Contractor shall also show the amount of money remaining in their bid for Excess Liability for insuring items not included in the OCIP on Form OCIP-B.

(4) Builders Risk Insurance.

CDOT will procure, pay for, and maintain a builder's risk insurance policy, including coverage for in-transit and off-site storage, to protect the interests of the Insured's, including CDOT, Project Contractors and its subcontractors, against the risk of loss or damage to the Work during construction at the Project Site. Such policy will include a waiver of subrogation in favor of CDOT, CDOT's Engineer, Construction Manager, Contractors, and subcontractors.

Coverage will include all materials, supplies and equipment that are intended for specific installation in the Project while such materials, supplies and equipment are located at the Project Site, in transit or while temporarily located away from the Project Site for the purpose of storage at the risk of one of the insured parties, as agreed upon by the CDOT in writing in advance of such transit or storage.

POLICY COVERAGE FORM AND EXCLUSIONS [EXAMPLES]:

Commercial Inland Marine – Builders Risk Coverage Form

Endorsements:

- Extra Expense Endorsement
- Elite Property Enhancement: Builders Risk – sub limits apply
- Builders Risk Warranties

Exclusions:

- Government Action
- Nuclear Hazard
- War and Military Action
- Ordinance or Law
- Water – modified or deleted by endorsement
- Mold Exclusion
- Workmanship – Omission in, or faulty, inadequate or defective
- 

Policy Coverage Extensions (sub limits may apply):

- Fire Department Service Charges
- Valuable Papers and Records
- Trees, Shrubs and Plants

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- Debris Removal
- Pollutant Clean Up and Removal
- Flood
- Earth Movement

This insurance will not include any coverage for tools or clothing of workers or any tools, equipment, protective fencing, scaffolding, and equipment owned, rented or used by Contractor and used in the performance of the Work, or work performed at off-site fabrication facilities. Contractor shall waive any such rights of recovery from CDOT and/or the OCIP Policies.

Contractor shall be responsible for repayment of any deductible for Property Damage up to \$25,000 per occurrence to the extent loss costs (including allocated loss adjustment expense) payable are attributable to its acts, or the acts of its subcontractors, or any other entity or person for whom it may be responsible, with no increase in the Contract amount. Contractor may not seek contribution of this deductible from its subcontractors.

NOTE: The Builders Risk policy terms vary from policy to policy, and such insurance provided by the CDOT will be subject to such limits of liability, exclusions and deductibles as CDOT may negotiate in its discretion. Contractor is advised to consult the terms of the policy to ascertain its terms.

The Contractor shall not include in their bid amount insurance premiums for the primary coverage provided by CDOT for Builder's Risk Insurance as CDOT is providing this coverage.

(5) Contractor's Pollution Liability.

CDOT will procure, pay for and maintain Contractor's Pollution Liability insurance in the following limits:

\$ 25,000,000	Per Claim
\$ 25,000,000	Aggregate

Claims Expenses (including Defense Costs) within limits.

Coverage will include Bodily Injury or Property Damage from a pollution event as defined within the policy form resulting from covered operations or completed operations of the Work performed at the Project Site.

Contractor shall be responsible for repayment of any deductible associated with the activities of the Contractor or their subcontractors up to \$25,000 per occurrence to the extent loss costs (including allocated loss adjustment expense) payable are attributable to its acts, or the acts of its Project Contractors and subcontractors, or any other entity or person for whom it may be responsible, with no increase in the Contract amount.

The Contractor shall not be included in their bid amount insurance premiums for the primary coverage provided by CDOT for Contractor's Pollution Liability Insurance as CDOT is providing this coverage. .

(6) The OCIP and other insurance Contractor Obligations

- (i) CDOT provided Insurance shall not apply to vendors, manufacturers, suppliers, material dealers, haulers and/or independent haulers, and others who merely transport, pick up, deliver or carry materials, personnel, parts or equipment, or any other items or persons to or from the Project Site.

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- Subcontractors providing on site hauling services with dedicated payroll will be considered eligible for enrollment at CDOT's discretion.
- (ii) The cost of the OCIP Insurance specified herein to be obtained by CDOT will be paid for by CDOT, and CDOT shall receive and pay, as the case may be, all adjustments in such costs, whether by way of dividends or audits, or otherwise. CDOT shall execute such instruments of assignment as may be necessary to permit CDOT to receive such adjustments and shall cause all Contractors covered by such insurance to do the same.
  - (iii) Contractor shall utilize the CDOT shall utilize the Insurance Worksheet Summary, Form OCIP- B and the submitted Insurance Calculation Worksheet(s), OCIP – S(1) removing from their bid amounts of insurance as provided for in Section 2. The Contractor will submit a Gross Bid amount less the reduction of bid amount(s) as provided for herein, and will thus provide a Net Bid Amount after insurance. CDOT reserves the right to verify the reasonable amount of the insurance as provided for on the Insurance Worksheet Summary, and will further review such documentation with the enrollment of the Contractor and their subcontractors prior to enrollment for work on the Project. In the event CDOT's estimate of total insurance cost differs from the total provided on the worksheet by more than 15% CDOT and the Contractor shall work to determine the cause of the difference and make appropriate modification to the CAP (contract amount) prior to the award and start of work on the project.
  - (iv) The furnishing of insurance by CDOT shall in no way relieve, limit, or be construed to relieve Contractor or subcontractors of any responsibility or obligation whatsoever otherwise imposed by the Contract. CDOT assumes no obligation to provide insurance other than that specified herein. However, CDOT reserves the right to furnish additional insurance coverage of various types and limits.
  - (v) The Contractor shall furnish a copy of this Revision of Section 107 for Design Bid Build Projects to all subcontractors of every tier.
  - (vi) Prior to commencement of operations at the Project Site, each Contractor shall complete a Contractor / subcontractor Application for enrollment into the OCIP and shall furnish and cause each of its subcontractors to furnish to the CDOT or its Insurance Representative estimates for the total construction values, and estimated WC Payrolls in connection with the Work. The Insurance Representative may request, and the Project Contractor shall comply with such request for copies of rate pages from their Workers Compensation, General and Excess Liability policies, or other insurance related information deemed necessary to effect and maintain coverage, and/or to assure CDOT that the Contractor and their subcontractors have complied with CDOT's bid instructions to have the insurance amount removed from their bid, including any markup thereon.
  - (vii) Failure to comply with any of the above items will be considered noncompliance with the Contract and may result in remedial action, including withholding of payment, and/or removal of Contractor and/or subcontractor from the Project Site.
  - (viii) Liability policies required of the Contractor and their subcontractors in this Revision of Section 107 shall, where prudently feasible, shall name CDOT and the Contractor and their, elected and appointed officials, directors, officers, employees, agents, representatives, and any additional entities as CDOT or Contractor may request, as Additional Insured. The Additional Insured Endorsement, equivalent to ISO form CG2010 (07/04) and CG2037 (07/04) edition(s), shall state that the coverage provided to the Additional Insured is primary and non-contributory with respect to any other insurance available to the Additional Insured. Contractor is

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responsible to ensure to the best of its ability that those entering the Project Site location have evidence of, or hold, the appropriate insurance or that those visitors are escorted while at the Project. Exceptions may be granted where mutually agreed to in advance between CDOT and the Contractor.

- (ix) All policies of insurance required in this Revision of Section 107 shall be endorsed to provide that the insurance company shall provide written notice to CDOT at least 30 days prior to the effective date of any cancellation of such policies.
- (x) All policies of insurance, as allowed by statute, that are in any way related to the Work, including those that are secured and maintained by consultants and subcontractors, shall include clauses providing that each underwriter shall waive all its rights of recovery under subrogation or otherwise, against CDOT, their Representative(s), Contractor and subcontractors.
- (xi) Parties covered in this Revision of Section 107 shall cause to be furnished to CDOT and Contractor, or their Insurance Representative, certificates of insurance evidencing all insurance as required by this Contract. As and when CDOT or Contractor may direct, copies of the actual insurance policies or renewals or replacements thereof shall be submitted to CDOT or Contractor. All copies of policies, if any, and certificates of insurance submitted to CDOT shall be in form and content acceptable to CDOT or Contractor.
- (xii) Nothing contained herein shall relieve Contractor, or its subcontractors of their obligations to exercise due care when performing any Work on the Project or to complete such Work in strict compliance with the Contract.
- (xiii) By enrolling in the OCIP, the Contractor acknowledges that (A) the limits of OCIP provided insurance are shared by all insured parties under the OCIP for the Project, (B) CDOT and their affiliates of every tier disclaim any responsibility whatsoever for the availability, adequacy or exhaustion of the limits of the OCIP, the present or future solvency of any OCIP insurers, or any claims or disputes by, between, or among CDOT and any Contractor and any subcontractor, or any tier, and any of the OCIP insurance carriers.
- (xiv) Any type of insurance or increase in limits not described herein which Contractor requires for its own protection or as a result of any applicable law shall be its own responsibility and expense.
- (k) The Contractor and subcontractors are required to carry insurance coverages and limits listed below outside the OCIP which must be the same limits listed in (a) for the Contractor and for the subcontractor.
- Workers' Compensation - Off-site work and exposures
  - Employer Liability - Off-site work and exposures
  - Commercial General Liability - Off-site work and exposures
  - Automobile Liability – at all times
  - Umbrella or Excess Liability - As coverage in excess of the lines of insurance above

All other insurance in Section (a) shall continue to be carried as required.

- (l) CDOT will provide a Project Insurance Manual (PIM) that gives further detail on insurance and how to enroll in the OCIP. The PIM is hereby included in the Contract by reference.

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(m) General Additional Safety Requirements

The Contractors and subcontractors shall within their own site specific Safety Requirements or Manuals, ensure compliance has been met with the following Safety Requirements, which are incorporated in the Contract Documents.

The Contractor shall take all necessary precautions to protect the safety and health of the Project Site and is ultimately responsible to establish and maintain a written Contractor Safety Program (CSP) for the Work. The Contractor shall establish administrative and technical means for the mitigation of risk, response to incidents, and recovery/restoration to normal operations at the Project Site. The Program shall include development of a site safety culture which supports, "best practices" for accident prevention, job specific hazard recognition and planning, training, reporting, management oversight, and implementation.

All costs, penalties, and expenses of complying with the requirements of these Safety Requirements shall be included as part of the cost of the Contract. The Contractor shall notify CDOT promptly, in writing, if a charge of non-compliance has been filed against the Contractor, or any subcontractor, in connection with its performance of the Work.

The developed CSP shall apply in all phases of the Work. The objective of the program is to eliminate or control accident risks to personnel, associated management, subcontractors, equipment, facilities, general public, and environment. Required activities include hazard identification & analysis, planning, management, dedicated resources, auditing conformance, training, communicating results and documentation.

Additionally, clear and open partnering and communications relative to the safety program between the Contractor, subcontractors and CDOT's Representatives is a key component in effectively implementing and assuring conformance.

The Contractor is solely responsible for health and safety and shall perform the Work in a safe and environmentally acceptable manner; this includes all of its subcontractors.

(1) Safety Criteria

Notice of Correction of other unsafe conditions will be conveyed in writing within 24 hours after receiving written notice from CDOT or CDOT's Safety Representative of unsafe work. Lost time and lost productivity associated with this or any safety violation will be at the sole cost of the Contractor or the subcontractor without additional compensation.

(2) Contractor Site Safety Management

Each subcontractor is required to name an individual on its payroll as a Safety Representative (SR). These SRs are not required to be full-time safety representatives. The subcontractors are required to name an individual(s) who has the experience, ability and authorization to act on the subcontractor's behalf in matters of safety on the Project.

If at any time any subcontractor is performing one or more contracts and has fifty (50) or more employees on site for a period of 2) consecutive workdays, including cumulative workdays under multiple contracts ("high employment"), such subcontractor Shall have a full-time qualified safety representative on the job site to ensure the safety of its operations during the period of such high employment.

REVISION OF SECTION 107

OCIP FOR DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
PROJECT INSURANCE MANUAL (PIM)

The Contractor and subcontractors are required to participate in the project's "Return to Work" program. Contractors and subcontractors shall return injured workers back to work at pre-injury wages as soon as possible through light or modified work tasks, which meet medical department's work restrictions.

The Contractor shall administer any job-site safety recognition incentive program developed for the site in an effort to maintain a safety-conscious workforce at the site.

(3) OCIP Required Contractor Site Safety Requirements:

- (i) The Contractors Safety Program shall conform to all aspects of this Section and be consistent with the requirements herein and the CDOT Required Contractor's Safety Management Plan.
- (ii) The Contractor shall conduct a project/site safety orientation for all Contractor & subcontractor employees prior to their working on the Project Site; including orientation for all full time project oversight and management personnel. Upon completion of the orientation, a uniquely project identifiable hard-hat decal shall be provided to each worker.

The safety orientation (at a minimum) shall include the following:

- (A) A description of the extent and nature of the Project.
  - (B) A description of any hazards that can typically be expected during the course of work, and means and methods for avoiding or protecting oneself.
  - (C) Required work practices, job conduct, and injury reporting procedures.
  - (D) Any other general information to acquaint the employee with special work and safety requirements at the Site.
- (iii) The Contractors and subcontractors shall be prohibited from use and possession of alcoholic beverages, drugs (other than prescription), carrying weapons or ammunition onto the site, or using or carrying weapons while performing work on the Project's behalf, or attending Project sponsored activities. Contractor, at its own expense, shall adopt a policy of a drug free work site on the Project, which at a minimum shall include pre-job site and post-accident drug testing. Contractor, at its discretion, may include "for cause" and "random" testing if consistent best practices are applied.

The Contractor shall require all workers to demonstrate a negative drug test before attending a Project Safety Orientation, and performing any work on a CDOT OCIP Sponsored Project. Previous drug test results from an accredited facility done within forty-five (45) days will be acceptable. Any employee who has not worked on a CDOT OCIP Sponsored Project during the last 12 months must retest and go through a new Project Safety Orientation as provided by the Contractor.

- (iv) Current crane certification for each crane is required and must be on file at the jobsite.
- (v) The Contractors safety enforcement activities shall be documented and/or logged and provided to the CDOT's Safety Representative upon request (without any personnel privacy sensitive information) and this information shall be on file at the jobsite.



REVISION OF SECTION 107  
OCIP FOR DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
PROJECT INSURANCE MANUAL (PIM)

- (v) Include Personal Protective Equipment (PPE) requirements and policy.
  - (A) 100 percent fall protection at working surfaces above 6ft without review and authorization from OCIP Safety Manager
  - (B) 100 percent eye protection with side shields required.
  - (C) 100 percent wearing of heavy-duty work boots/shoes required.
  - (D) 100 percent wearing of hardhats required.
  - (E) 100 percent wearing of shirt & long pants (no shorts).
  - (F) 100 percent wearing of high visibility vest or clothing.
  - (G) Hearing protection as required.

(4) OCIP Required Reporting

- (i) Accident Reporting. The Contractor shall provide timely verbal notification and a written report to CDOT's Representative, and CDOT's Safety Representative of any and all accidents/incidents whatsoever arising out of or in connection with the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage; and or had a serious potential for same. Verbal notification to the CDOT shall be immediate and under no circumstance shall notification exceed one hour from time of occurrence. Verbal notification shall include date and time, location, brief description, extent of property damage, and extent of injuries. A preliminary written accident report shall be furnished to the CDOT's Representative and CDOT's Safety Representative within 24 hours of the occurrence; final is due within 10 working days.
- (ii) Monthly Accident/Incident Summary Reports. The Contractor shall provide a written Monthly Accident/Incident Safety Performance Summary Report for losses under their Contract to the CDOT within seven Days of the last day of the month. The report shall include the following minimum information:
  - (A) A summary, current year for all accidents/incidents – all Project Contractors / subcontractors.
  - (B) Summary of lost time for the Project to date, including total number of lost days and number of lost days accidents.
  - (C) Summary of accident data by Contractor and subcontractor.
  - (D) Summary of Property Damage, including Utility Damage incidents.
  - (E) Status update of any project required corrective actions.

(5) OCIP REQUIRED CONTRACTOR SAFETY MANAGEMENT PLANS / DOCUMENTS

- (i) Job Task Hazard Analysis Program.

REVISION OF SECTION 107

OCIP FOR DESIGN BID BUILD PROJECTS - RESPONSIBILITY FOR DAMAGE CLAIMS, INSURANCE  
TYPES AND COVERAGE LIMITS, OWNER CONTROLLED INSURANCE PROGRAM (OCIP) AND  
PROJECT INSURANCE MANUAL (PIM)

All work activities shall have a written job/task/activity Hazard Analysis (HA) associated with it appropriate for the hazards, scope, and/or complexity of the work. At a minimum this HA will cover the steps, hazards, and mitigation, required to perform the work safely.

(ii) Project Hazard Communication Plan

(iii) Project Utility Management Plan, locates, accidental damage prevention, and incident reporting/correcting, policies, procedures, and practices.

The Contractor shall have an adequate utility locate, protect, and emergency response program. Any utility strike will be reported to CDOT immediately, investigation and lessons learned follow-up reporting performed, and related program performance measures provided. In addition, no corrections and/or repairs will be re-covered or otherwise made inaccessible until CDOT's Representative or designee has had the opportunity to review.

(iv) Project Water Intrusion Prevention and Mitigation Program

(v) Project Emergency Response Plan

(vi) Project Security Plan

Special consideration and concern shall be given to the storage/protection of highly valuable (i.e., copper), finished product and/or critical materials/equipment to be protected from theft and/or vandalism.

REVISION OF SECTION 108  
SPECIALTY ITEMS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.01 shall include the following:

The following items are designated as "Specialty Items" for this project:

**Specialty Items**

- (1) Aggregate Base Coarse (Special) to be used as the base under the Full Depth Reclamation of Hot mix asphalt. Item to include stockpiling and placing.
- (2) Embankment Material (CIP).

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REVISION OF SECTION 108  
PROSECUTION AND PROGRESS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.08 shall include the following:

This project contains specific restrictions for working daytime and/or night time. See the project Phasing listed below and the project special provision, Traffic Control Plan – General, for additional information.

No lane closures will be allowed during daylight hours between 7:00 am and 7:00 pm. All detour work and traffic shifts shall be performed at night. Removal of Asphalt Mat (Planing) and Hot Mix Asphalt overlay at the project approaches, including construction of Concrete Pavement transitions, shall be performed at night between the hours of 7:00 pm and 7:00 am.

The Contractor shall establish daily working hours per the following;

- Monday through Friday, between the hours of 7:00 am and 7:00 pm, for daytime work identified in the Phasing listed below.
- Sunday through Thursday for night time work, between the hours of 7:00 pm and 7:00 am, for night time work identified in the Phasing listed below.

Phasing

- Phase 1
  - Transition approaches at Sta. 197+00 to Sta. 200+66 and Sta. 23+00 to Sta. 26+00. Shift all traffic to NB SH-45 between Sta. 26+00 to Sta. 197+00. Night time work.
  - Construct SB SH-45 between Sta. 26+00 to 197+00, except for intersections. Daytime work.
  - Phase 1A
    - Construct intersections. Night work.
- Phase 2
  - Transition approaches at Sta. 197+00 to Sta. 200+66 and Sta. 23+00 to Sta. 26+00. Shift all traffic to SB SH-45 between Sta. 26+00 to Sta. 197+00. Night time work.
  - Construct NB SH-45 between Sta.26+00 to 197+00, except for intersections. Daytime work.
  - Phase 2A
    - Construct intersections. Night work.
- Phase 3
  - Shift traffic to final alignments for both directions of travel. Night work.
- Phase 4
  - Construct SB SH-45 transition at Sta. 197+00 to Sta. 200+66. Night work.
  - Construct NB SH-45 transition at Sta. 197+00 to Sta. 200+66. Night work.
- Phase 5
  - Construct SB SH-45 transition at Sta. 8+15 to Sta. 39+07. Night work.
  - Construct NB SH-45 transition at Sta. 8+15 to Sta. 39+07. Night work.

REVISION OF SECTION 108  
PROSECUTION AND PROGRESS

The Contractor shall submit phasing plans, with the proposed working hours, to the Engineer for approval along with his Progress Schedule (see Revision of Section 108-Project Schedule); all work performed by the Contractor or any of the Contractor's agents shall be accomplished within these pre-established working hours. Neither the Contractor nor any of the Contractor's agents shall work during times outside of the daily working hours established without written approval by the Engineer. Requests for changes in working hours shall be submitted to the Engineer in writing at least 48 hours before the proposed change in working hours would take effect. Working hours and lane closures outside of these times will not be allowed unless it is necessary due to weather restrictions or to comply with safety requirements or as specified by the plans and specifications and approved by the Engineer.

REVISION OF SECTION 202  
RECLAIMED ASPHALT PAVEMENT MILLINGS

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.09 shall include the following:

The Contractor shall take possession of all of the Reclaimed Asphalt Pavement (RAP) millings removed from the existing asphalt mat on this project. All remaining RAP millings, if any, may be used in the project as allowed in the Contract or as approved by the Engineer. Otherwise, they shall become the property of the Contractor and shall be disposed at his expense outside the project limits.

Subsection 202.12 shall include the following:

Unless otherwise specified in the Contract, the disposal and hauling of the RAP millings to other locations or its use on the project or at other locations will not be measured and paid for separately, but shall be included in the work.

1  
REVISION OF SECTION 202  
REMOVAL OF ASPHALT MAT (PLANING)

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 202.09, and replace it with the following:

**202.09 Removal of Asphalt Mat (Planing).** Prior to beginning planing operations, the Contractor shall submit a planing plan and a Quality Control Plan (QCP) for approval by the Engineer. The planing plan shall include at a minimum:

- (1) The number, types and sizes of planers to be used.
- (2) The width and location of each planing pass.
- (3) The number and types of brooms to be used and their locations with respect to the planers.
- (4) The proposed method for planing and wedging around existing structures such as manholes, valve boxes, and inlets.
- (5) The longitudinal and transverse typical sections for tie-ins at the end of the day.
- (6) If requested by the Engineer, a plan sheet showing the milling passes.

The QCP shall include as a minimum:

- (1) The schedule for replacing the cutting teeth.
- (2) The daily preventive maintenance schedule and checklist.
- (3) Proposed use of automatic grade controls.
- (4) The surface testing schedule for smoothness.
- (5) The process for filling distressed areas.
- (6) The schedule for testing macrotexture of the milled surface.
- (7) Corrective procedures if the milled surface does not meet the minimum macrotexture specification.
- (8) Corrective procedures if the milled surface does not meet the minimum transverse or longitudinal surface finish when measured with a 10 foot straightedge.

The Contractor shall not start the planing operation until the hot mix asphalt (HMA) mix design has been approved and a Form 43 has been signed by the Engineer.

The existing pavement from STA 8+15.00 to 34+74.07 shall be milled to the cross-slope as shown on the plans, and shall have a surface finish that does not vary longitudinally or transversely more than 3/8 inch from a 10 foot straightedge. A 10 foot straightedge shall be supplied by the Contractor.

All milled surfaces shall be broomed with a pick-up broom, unless otherwise specified, before being opened to traffic. A sufficient number of brooms shall be used immediately after planing to remove all milled material remaining in the roadway.

If the Contractor fails to adequately clean the roadway, work shall cease until the Engineer has approved the Contractor's revised written proposal to adequately clean the roadway.

The milled surface from STA 8+15.00 to 34+74.07 shall have a macrotexture equal to or less than 0.170 inches for single-lift overlays and 0.215 inches for multiple-lift overlays as tested in accordance with CP 77. Milled surfaces that do not meet these criteria shall require corrective action in accordance with the QCP. The Contractor shall be responsible for testing the macrotexture of the milled surface at the location directed by the Engineer in accordance with CP 77 at a stratified random frequency of one test per 10,000 square yards or a minimum of once per work day.

REVISION OF SECTION 202  
REMOVAL OF ASPHALT MAT (PLANING)

At the completion of each day's work, longitudinal vertical edges greater than 1 inch shall be tapered. No transverse vertical edges will be allowed. Longitudinal milled surface tie-ins to existing pavement shall be tapered to not less than a 3:1 slope, transverse milled surface tie-ins to existing pavement shall be tapered to not less than a 50:1 slope. Transverse tapered joints may be tapered with the planing machine, a temporary asphalt ramp, or other methods approved by the Engineer. No longitudinal joint between the milled and existing surfaces shall fall between 1 to 5 feet of any lane line.

If the transverse joint is tapered with a temporary asphalt ramp, the milled surface at the joint shall be constructed as a butt joint the full depth of the lift of asphalt to be placed on the milled surface. The Contractor shall be responsible for maintaining this asphalt ramp until all corresponding HMA is placed. All work associated with this joint will not be paid for separately, but shall be included in the cost of planing.

If the transverse joint is tapered with a planing machine, a butt joint shall be cut into the taper the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing. All work associated with this joint will not be paid for separately, but shall be included in the cost of planing.

Other approved transverse joint tapers shall be maintained at the expense of the Contractor, and at a minimum shall incorporate a butt joint the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing.

Distressed or irregular areas identified in the planed surface by the Engineer shall be patched.

The roadway shall be left in a safe and usable condition at the end of each work day. The Contractor shall take appropriate measures to ensure that the milled surface does not trap or hold water. All required pavement markings removed by the planing shall be restored before the roadway is opened to traffic.

All milled surfaces to be overlaid with HMA from STA 8+15.00 to 34+74.07 shall be covered with new asphalt within 5 working days. All areas on this project that are not overlaid within the specified working days will be assessed a lane rental fee of \$6,000 per occurrence for each day or fraction thereof and any required surface repairs shall be paid for by the Contractor.

All planing shall be completed full width and parallel to the travel lanes before resurfacing commences unless otherwise directed by the Engineer.

All material generated by the planing operation shall become the property of the Contractor unless otherwise noted in the Contract.

Add subsection 202.091 immediately following subsection 202.09 as follows:

**202.091 Equipment**

Each planer shall conform to the following:

The planer shall have sufficient power, traction and stability to maintain an accurate depth of cut. The propulsion and guidance system of the planer shall be maintained in such condition that the planer may be operated to straight and true lines.



REVISION OF SECTION 202  
REMOVAL OF ASPHALT MAT (PLANING)

The planer shall be capable of operating with automatic grade controls (contact or non-contact) on both sides of the machine using a 30 foot averaging system or other approved grade control systems. The use of such controls shall be described in the Contractor's QCP.

The planer shall be capable of picking up the removed material in a single operation. A self-loading conveyor shall be an integral part of the planer. Windrows will not be allowed.

Subsection 202.12 shall include the following:

Macrotecture testing, macrotecture corrective actions, planers, brooms and all other work necessary to complete the item from STA 8+15.00 to 34+74.07 will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 202  
REMOVAL OF ASPHALT MAT (PLANING)(BRIDGE)

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.02 shall include the following:

The removal of the asphalt mat overlay shall be performed in a safe manner.

Removal of hazardous material shall be in accordance with Section 250.

The Contractor shall take all steps to avoid contaminating state waters, in accordance with subsection 107.25.

Subsection 202.09 shall include the following:

This work consists of removal of the existing asphalt mat overlay from the existing bridge deck to within 1-inch of the existing concrete bridge deck as shown in the bridge plans or as directed. Care shall be exercised to avoid damage to the existing waterproofing membrane. Small width rotomills (1-foot head) and low impact tools shall be used in confined areas. Damage to the existing waterproofing membrane or concrete surfaces shall be repaired at the direction of the Engineer by the Contractor without compensation or time extension.

Subsection 202.11 shall include the following:

Removal of Asphalt Mat (Planing)(Special) will be measured by the area in square yards, completed to the required depth and accepted.

Subsection 202.12 shall include the following:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Removal of Asphalt Mat (Planing)(Special)	Square Yard

Payment will be full compensation for all labor and materials required to complete the work, including but not limited to equipment, debris handling and disposal, handling and disposal of all hazardous materials, disposal of non-salvable materials and cleaning the roadway.

Contractor to verify depth of asphalt on the bridge deck before milling. This will not be paid for separately and will be included in the work.

REVISION OF SECTION 202  
REMOVAL OF EXPANSION DEVICE

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work shall consist of removing existing bridge expansion devices at locations shown on the plans in accordance with the applicable portions of Section 202 of the Standard Specifications or as amended by these Special Provisions and in conformity with the plans or as directed by the engineer. The work shall include saw cutting, removal of concrete, removal of reinforcing steel, removal of expansion device, removal of adjacent asphalt pavement, necessary excavation, straightening of existing reinforcing steel to remain, sandblasting, and disposal of removed materials.

Subsection 202.08 shall include the following:

Removal operations shall be coordinated with stage construction shown on the plans, indicated in the Contract or, as approved by the Engineer.

The methods and equipment used for the concrete removal must be submitted to and approved by the Engineer before work begins. The Contractor shall take all steps necessary to avoid damage to all reinforcing steel designated to remain in place. Any reinforcing bars damaged by the Contractor's operation shall be repaired or replaced at the Contractor's expense with no allowance for contract time extension. All removed material shall be collected and properly disposed of.

Following the removal of the concrete, all exposed reinforcing steel that is to remain in place, shall be straightened as required and thoroughly cleaned to sound metal by sandblasting. Epoxy coated reinforcing in sound condition shall not be sandblasted to sound metal. Exposed concrete surfaces within the removal limits shall be sandblasted to remove all fractured or loose particles in order to promote good bond with the new concrete. The surface of the concrete shall be saturated surface dry prior to placing new concrete.

Subsection 202.11 shall include the following:

Expansion devices removed shall be measured by the linear foot between concrete bridge rails and parallel to the expansion joint. Saw cutting and disposal of removed material will not be measured separately but will be included with the work.

Subsection 202.12 shall include the following:

Payment shall be made at the contract unit price per linear foot for the accepted quantity removed.

Payment will be made under:

**Pay Item**

Removal of Expansion Device

**Pay Unit**

Linear Foot

Payment will be full compensation for all labor, equipment, materials and incidentals required to complete the work.

REVISION OF SECTION 203  
EMBANKMENT MATERIAL

Section 203 of the Standard Specifications is hereby revised for this project as follows:

In subsection 203.03(a), first paragraph, after the second sentence add the following:

Embankment material shall classify as AASHTO A-4(2) or better when tested in accordance with AASHTO M145.

REVISION OF SECTION 209  
WATERING AND DUST PALLIATIVES

Section 209 of the Standard Specifications is hereby revised for this project as follows:

Subsection 209.05 shall include the following:

The contractor shall be responsible for controlling vehicle and equipment speeds within the project site to keep dust to a minimum. If excessive dust is being generated by construction traffic, the Contractor shall immediately take corrective measures.

In Subsection 209.08, delete paragraphs one, two, and three and replace with the following:

Water required for all work covered under the contract will not be measured and paid for separately but shall be included in the work. The source of this water is the Contractor's responsibility. Water may not be taken from on-site ditches, creeks, or their tributaries.

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REVISION OF SECTION 217  
HERBICIDE TREATMENT

Section 217 of the Standard Specifications is hereby revised for this project as follows:

The Contractor is advised that several species of noxious weeds were identified within the project area in a survey done in the summer of 2013 (June and July). The Contractor shall implement actions identified in the Environmental Plan Sheets. The Contractor shall have an environmental specialist or botanist familiar with the noxious weed requirements of the State of Colorado (Colorado Noxious Weed Act 35-5.5-115, C.R.S.: 1996 Supp.) and certified by the State, to conduct noxious weed spraying and maintenance per the attached Table.

Subsection 217.02 is hereby revised for the project as follows:

Subsection 217.02 is hereby revised for the project as follows (Continued):

Herbicide shall not be applied when raining or rain is imminent in the area; around desirable plants when temperatures are expected to be above 85 degrees Fahrenheit; when wind may cause spray to drift onto desirable plants; when areas are directly adjacent to water or desirable plants.

Noxious weeds control should be in accordance with the following:

Saltcedar/Tamarisk - All areas infested with Saltcedar/tamarisk shall be treated with Triclopyr - Garlon 4 by either the basal bark method or cut stump method. Treatment is to be as directed by the Engineer and according to manufacturer's recommendations.

Subsection 217.03 is hereby revised to include the following:

Herbicide shall be applied to all areas infested with noxious weeds not less than 2 months prior to native seeding and not less than 2 weeks prior to the start of topsoil or suitable material on site salvaging operation begins. The Engineer may request several mobilizations of herbicide applications. Applications may be required in the beginning of the project, prior to securing on site topsoil, and throughout construction for applications requiring post-seeding treatments.

All equipment will be thoroughly cleaned before entering and exiting the project area. Any equipment used in a noxious weed area shall be thoroughly cleaned prior to moving to another site or leaving the project. Wash water shall be contained in a bermed contained site and shall not be allowed to enter into a storm drain. Failure to do so will be deemed a violation of the Environmental Plan Sheets.

All herbicides shall be applied by commercial pesticide applicators licensed by the Colorado Department of Agriculture as qualified applicators. The Contractor shall furnish documentation of such licensing prior to herbicide application. Herbicide mixing and application shall be done in accordance with instructions on the registered product label. The Engineer shall be furnished such label information prior to mixing and application. The Contractor shall notify the Engineer at least 24 hours prior to each herbicide application and shall indicate the time and location application will begin. Application will not be allowed on Saturdays, Sundays, or holidays unless otherwise approved by the Engineer. All noxious weed treatments will be coordinated with the Pueblo County Weed Supervisor.

Herbicides shall not be applied when weather conditions, including wind conditions, are unsuitable for such work. Herbicides shall not be applied when soil is extremely dry.

REVISION OF SECTION 217  
HERBICIDE TREATMENT

Herbicide application method shall be such that plant growth outside the designated treatment areas (see Environmental Plan Sheet) will not be damaged. Herbicides will be applied by hand with spot-sprayers, wicks, and/or sponges to avoid off-target application. Broadcast herbicide spraying will only be approved through written consent of the project engineer and will be applied when weather conditions (including wind) are suitable for such work. All damage caused by improper herbicide application shall be repaired at the Contractor's expense.

Pre-treat all noxious weed populations in areas where disturbance is planned. Imported topsoil will be minimized during construction, and if necessary pre-treated with herbicides. Noxious weeds observed in and near the construction area at the start of construction will be treated with herbicides or physically removed to prevent seeds blowing into disturbed areas during construction.

All plant and mulch materials used on the site must be inspected and regulated by the Weed Free Forage Act, Title 35, Article 27.5 Colorado Revised Statutes (CRS). Certified weed-free mulch will be used for reclamation, and all seed mixes and nursery materials used for reclamation will be free of noxious weed seeds, roots, and rhizomes. All mulches, erosion bales, and erosion logs used at the site will be certified weed-free. During construction and reclamation/reseeding all areas disturbed by construction and adjacent undisturbed vegetation should be monitored for noxious weeds in the spring, mid-summer, and fall, or as long as construction activities are active. Monitoring personnel should be familiar with identification of the noxious weed species and native species that may resemble them.

All weed control actions should be recorded, including the date, personnel, methods used, areas of application, and result of any follow-up surveys with noxious weed monitoring results also recorded and kept on file. Saltcedar/Tamarisk - For saltcedar/tamarisk, herbicide shall be applied while the plant is actively growing and translocating nutrients, preferably after the plant has bloomed and prior to dormancy. Herbicide shall not be applied in the spring, under any circumstance. All saltcedar/tamarisk on the project shall be treated at the beginning of the project. Any saltcedar/tamarisk that has survived or re-sprouted 3 months after treatment shall be sprayed again. Sprouts shall be 4-8' in length prior to application. To insure all stumps or stems are covered with herbicide, an oil-soluble dye shall be added to the chemical mixture, which allows the applicator to see the amount of coverage.

Basal bark application:

Garlon 4: Mix Garlon 4 at 25% volume/volume (v/v) +75% volume/volume oil carrier. Use a hand-held spray bottle or backpack sprayer with a low volume solid cone or flat fan nozzle to apply the mixture to the lower 12-15" of the stems. Spray to completely wet the entire circumference of the stem, but not to the point of run-off.

**BASIS OF PAYMENT**

Subsection 217.03 shall include the following:

Payment will be made under:

Herbicide treatment will not be measured and paid for separately, but shall be included in the work of Concrete Median Cover Material.

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REVISION OF SECTION 240  
PROTECTION OF MIGRATORY BIRDS  
BIOLOGICAL WORK PERFORMED BY A CDOT BIOLOGIST

Section 240 is hereby added to the Standard Specifications for this project as follows:

**DESCRIPTION**

**240.01** This work consists of protecting migratory birds during construction.

**MATERIALS AND CONSTRUCTION REQUIREMENTS**

**240.02** The Contractor shall schedule clearing and grubbing operations and work on structures to avoid taking (pursue, hunt, take, capture or kill; attempt to take, capture, kill or possess) migratory birds protected by the Migratory Bird Treaty Act (MBTA).

(a) *Vegetation Removal.* When possible, vegetation shall be cleared prior to the time active nests are present. Vegetation removal activities shall be timed to avoid the migratory bird breeding season which begins on April 1 and runs to August 31. All areas scheduled for clearing and grubbing between April 1 and August 31 shall first be surveyed within the work limits by a CDOT biologist for active migratory bird nests. The CDOT biologist will also survey for active migratory bird nests within 50 feet outside of the work limits. Project personnel shall enter areas outside CDOT right of way only if a Form 730, *Permission to Enter Property*, has been signed by the property owner. The Contractor shall avoid all active migratory bird nests. The Contractor shall avoid the area within 50 feet of the active nests or the area within the distance recommended by the biologist until all nests within that area have become inactive. Inactive nest removal and other necessary measures shall be incorporated into the work as follows:

1. *Tree and Shrub Removal or Trimming.* Tree and shrub removal or trimming shall occur before April 1 or after August 31 if possible. If tree and shrub removal or trimming will occur between April 1 and August 31, a survey for active nests will be conducted by the CDOT biologist within the seven days immediately prior to the beginning of work in each area or phase of tree and shrub removal or trimming. The Contractor shall notify the Engineer at least ten working days in advance of the need for the CDOT biologist to perform the survey.

If an active nest containing eggs or young birds is found, the tree or shrub containing the active nest shall remain undisturbed and protected until the nest becomes inactive. The nest shall be protected by placing fence (plastic) a minimum distance of 50 feet from each nest to be undisturbed. This buffer dimension may be changed if determined appropriate by the CDOT biologist and approved by the Engineer. Work shall not proceed within the fenced buffer area until the young have fledged or the nests have become inactive.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is satisfactorily repaired at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.



SECTION 240  
PROTECTION OF MIGRATORY BIRDS  
BIOLOGICAL WORK PERFORMED BY A CDOT BIOLOGIST

2. *Grasses and Other Vegetation Management.* Due to the potential for encountering ground nesting birds' habitat, if work occurs between April 1 and August 31, the area shall be surveyed by the CDOT biologist within the seven days immediately prior to ground disturbing activities. The Contractor shall notify the Engineer at least ten working days in advance of the need for the CDOT biologist to perform the survey.

The undisturbed ground cover to 50 feet beyond the planned disturbance, or to the right of way line, whichever is less, shall be maintained at a height of 6 inches or less beginning April 1 and continuing until August 31 or until the end of ground disturbance work, whichever comes first.

If birds establish a nest within the survey area, an appropriate buffer of 50 feet will be established around the nest by the CDOT biologist. This buffer dimension may be changed if determined appropriate by the CDOT biologist and approved by the Engineer. The Contractor shall install fence (plastic) at the perimeter of the buffer. Work shall not proceed within the buffer until the young have fledged or the nests have become inactive.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is satisfactorily repaired at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

- (b) *Work on structures.* The Contractor shall prosecute work on structures in a manner that does not result in a taking of migratory birds protected by the Migratory Bird Treaty Act (MBTA). The Contractor shall not prosecute the work on structures during the primary breeding season, April 1 through August 31, unless the contractor takes the following actions:

- (1) The Contractor shall remove existing nests prior to April 1. If the Contract is not awarded prior to April 1 and CDOT has removed existing nests, then the monitoring of nest building shall become the Contractor's responsibility upon the Notice to Proceed.
- (2) During the time that the birds are trying to build or occupy their nests, between April 1 and August 31, the Contractor shall monitor the structures at least once every three days for any nesting activity.
- (3) If birds have started to build any nests, the nests shall be removed before they are completed. Water shall not be used to remove the nests if nests are located within 50 feet of any surface waters.
- (4) Installation of netting may be used to prevent nest building. The netting shall be monitored and repaired or replaced as needed. Netting shall consist of a mesh with openings that are ¾ inch by ¾ inch or less.

If an active nest becomes established, i.e., there are eggs or young in the nest, all work that could result in abandonment or destruction of the nest shall be avoided until the young have fledged or the nest is unoccupied as determined by the CDOT Biologist and approved by the Engineer. The Contractor shall prevent construction activity from displacing birds after they have laid their eggs and before the young have fledged.

If the project continues into the following spring, this cycle shall be repeated. When work on the structure is complete, the Contractor shall remove and properly dispose of netting used on the structure.

3  
SECTION 240  
PROTECTION OF MIGRATORY BIRDS  
BIOLOGICAL WORK PERFORMED BY A CDOT BIOLOGIST

- (c) *Taking of a Migratory Bird.* The taking of a migratory bird shall be reported to the Engineer. The Contractor shall be responsible for all penalties levied by the U. S. Fish and Wildlife Service (USFWS) for the taking of a migratory bird.

**METHOD OF MEASUREMENT**

- (d) **240.03** Removal of nests and netting will not be measured.

**BASIS OF PAYMENT**

- (e) **240.04** Removal of nests and netting will not be paid for separately, but shall be included in the cost of work.

REVISION OF SECTION 304  
AGGREGATE BASE COURSE (SPECIAL)

Section 304 of the Standard Specifications is hereby revised for this project as follows:

Subsection 304.01 shall include the following:

This work consists of the removal and stockpiling of the processed material from the Full Depth Reclamation (FDR) process on this project at the locations as shown in the plans, while additional unclassified excavation is conducted, and replacing and compacting the processed material after the unclassified excavation has been completed. Care shall be exercised to during the removal and stockpiling process to ensure the processed FDR material is not mixed or contaminated with the underlying subgrade materials below the processed FDR depth.

Subsection 304.02 shall include the following:

For FDR material used as Aggregate Base Course (Special), the gradation requirements shall be as follows:

Passing 1-1/2 inch Sieve - 99%

Delete Subsection 304.04 and replace with the following:

**304.04 Placing.** Aggregate Base Course (Special) shall consist of material from the existing roadway that has gone through the FDR process and meeting the above gradation requirements. As this material will be removed and stockpiled while unclassified excavation of subgrade soil is conducted, and then replaced; the addition of water necessary for compaction purposes may be added during the materials replacement and final compaction process. Water shall be added to bring the moisture content of the materials to within 2 percent of the optimum moisture as determined in accordance with AASHTO T-180 Method D. The Aggregate Base Course (Special) shall be placed at the locations shown in the plans.

Following placement, the Aggregate Base Course (Special) shall then be bladed, shaped, wetted or dried, and compacted, and tested as outlined in Section 310.02 of the specifications as amended for this project.

The Contractor shall address all removal, stockpiling, placement, shaping and compaction processes for the Aggregate Base Course (Special) in the method statement for this work. The method statement shall describe in detail how contamination of the processed materials will be prevented during the removal, stockpiling and placement operations.

Subsection 304.07 shall include the following:

Aggregate Base Course (Special) will be paid as the actual number of Cubic Yards of material placed per the project plans.

Subsection 304.08 shall include the following:

Payment will be made under:

**Pay Item**

**Pay Unit**

Aggregate Base Course (Special)

Cubic Yards

Processing, hauling, placing, blading, shaping, wetting or drying, compaction and process control testing of the Aggregate Base Course (Special) will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 304  
TICKET COLLECTION FOR HOT MIX ASPHALT

Section 403 of the Standard Specifications is hereby revised for this project as follows:

Subsection 403.05 shall include the following:

The Contractor shall collect the scale ticket on each load when it is delivered to the project site, and ensure that the information required in subsection 109.01 is shown on each ticket:

The scale tickets shall be available on site for CDOT personnel to inspect.

Each day the Contractor shall provide to the Engineer envelopes, which contain the previous day's signed tickets and the following:

1. On each envelope: Project number, date of paving, type of material, beginning and ending station, daily total and cumulative total.
2. One of the following:
  - A. Two adding machine tape tabulations of the weight tickets with corresponding totals run and signed by different persons,
  - B. One signed adding machine tape tabulation of the weight tickets that has been checked and signed by a second person,
  - C. Signed check tape of computer scale tickets that have a cumulative total. These scale tickets must be consecutive and without voids adjustments.
3. A listing of any overweight loads on the envelope, including ticket numbers and amount over legal limit.
4. A comparison of the actual yield for each day's placement to the theoretical yield. Theoretical yield shall be based on the actual area paved, the planned thickness, and the actual density of the mixture being placed. Any variance greater than +/- 2.5% shall be indicated on the envelope and a written explanation included.

The Contractor shall provide a vehicle identification sheet that contains the following information for each vehicle:

- (1) Vehicle number
- (2) Length
- (3) Tare weight
- (3) Number of axles
- (4) Distance between extreme axles
- (5) All other information required to determine legal weight.
- (6) Legal weight limit.

If the Contractor fails to provide the Engineer with the required information on a daily basis, paving will not be allowed to resume unless approved by the Engineer.

REVISION OF SECTION 310  
FULL DEPTH RECLAMATION OF HOT MIX ASPHALT PAVEMENT

Section 310 is hereby added to the Standard Specifications as follows:

**DESCRIPTION**

**310.01** This work will be specified as a total processed depth up to 8 inches, depths between 8 -12 inches and depths 12 -16 inches as appropriate. This work consists of cutting of the existing asphalt mat, pulverizing the existing asphalt mat shoulders, mixing the pulverized asphalt mat with the existing subgrade, existing base course, or combination thereof, to the specified depth, grading and compacting the mixed material, in accordance with and at locations as shown in the Contract.

**CONSTRUCTION REQUIREMENTS**

**310.02** The Contractor shall be responsible for Process Control (PC) for the full depth reclamation material on this project. The Contractor shall submit a written Process Control plan, including method statements for each phase of the operation, to the Engineer for acceptance. The PC plan shall be submitted at the time of the pre-construction conference. The Process control plan shall include, but not be limited to the following:

- (1) Maximum lift thickness of eight inches. The plan shall detail how the Contractor will establish 8 inch maximum lifts, ie. how material will be graded/worked prior to compaction to limit the loose lift of material to no more than 8 inches in thickness. Or, if the Contractor intends to compact layers over 8 inches in loose lift thickness, the plan shall detail what equipment/methods will be utilized to achieve compaction in the lower portion of the lift and how it will be verified.
- (2) Compaction equipment to be used (at a minimum, 1 sheepsfoot or pad foot roller shall be provided with each reclaimer utilized.)
- (3) Water supply methodology to be used when reclaiming materials to ensure adequate moisture is introduced through the full depth of the reclaimed material to achieve the specified compaction.
- (4) List of all inspection and materials testing forms and procedures utilized by the Contractor.
- (5) Frequency and type of minimum PC testing that will be conducted. At a minimum, PC density testing shall be conducted based on a random schedule of 1/2000 square yards of reclaimed material up to 8 inches in depth, and 1/2000 square yards of reclaimed materials 8 inches and greater in depth.

The contractor shall also develop a written method to maintain the centerline geometry, profile elevations, and cross slope of the existing roadway. The plan shall be submitted to the Engineer for approval a minimum of two weeks prior to starting work.

The existing asphalt mat shall be cut at neat lines as shown in the plans by the use of a cutting wheel attached to a blade or by another approved method. The existing asphalt mat shall be pulverized, and mixed with the existing subgrade, base course, or combination thereof to a specified depth or as directed by the Engineer, with a self-propelled rotary type mixing machine. Existing asphalt mat thicknesses and core information will be available upon request. The mixing machine shall make as many passes as required to uniformly mix the asphalt, subgrade, existing base course, or combination thereof to the required thickness. Mixing of the different materials shall create a homogenous mixture. The particle size of the pulverized asphalt mat shall be a minimum of 99 percent passing the 37.5 mm (1-1/2 inch) sieve. When the addition of water is necessary for initial compaction purposes, unless otherwise approved by the Engineer, it shall be added through the mixing machine with the capability to uniformly distribute water through the mixed materials to within 2 percent of the optimum moisture as determined in accordance with AASHTO T-180 Method D.

REVISION OF SECTION 310  
FULL DEPTH RECLAMATION OF HOT MIX ASPHALT PAVEMENT

When proper mixing has been accomplished, the mixture shall then be bladed, shaped, wetted or dried, and rolled/compacted to meet a minimum of 95 percent of the maximum dry density determined in accordance with AASHTO T-180 Method D. The following requirements apply to both process control testing, and owner acceptance testing:

A moisture density relation curve shall be developed from on-site reclaimed materials and shall include a classification in accordance with AASHTO M-145. In-place density shall be determined using Colorado Procedure (CP) 80 except that the wet density from the gauge will be recorded and the dry density calculated in accordance with Section 8.4.3 of CP 80. At each in-place density location, a sample of the reclaimed material shall be taken in accordance with Section 8.3.5 of CP 80. This sample shall be used to conduct a 1-point determination of the material being tested and shall be plotted on the moisture density curve. A moisture density relation curve is valid and will be used when the plotted 1-point data is within 2.0 lbs/ft<sup>3</sup> at the specimen's moisture content. If the plot of the 1-point data is not within 2.0 lbs/ft<sup>3</sup> at the sample specimens moisture content, a new moisture density relation curve shall be developed and utilized for determining the percent compaction of the density determination. For each moisture density relation curve developed, a classification shall be performed. For all testing conducted on the reclaimed materials (moisture density relation curves, and in place density determination, moisture contents shall be determined in accordance with AASHTO T 265.

Percent compaction will be measured for the top 8-inch lift of reclaimed materials, and if appropriate for any lift below the top 8-inch lift. In-place density testing, percent compaction, and materials acceptance will apply to each lift of 8 inches or less that is reclaimed and placed on the project. Owner Acceptance Testing will be based on a random schedule of 1/4000 square yards of reclaimed material up to 8 inches and 1/4000 square yards of reclaimed material 8 inches and greater in depth. Process control testing shall be the responsibility of the Contractor and shall be based on a random schedule of 1/2000 square yards of reclaimed material up to 8 inches and 1/2000 square yards of reclaimed material 8 inches and greater in depth. If Owner Acceptance testing yields compaction test results below the specified percent compaction, the Contractor shall rework the entire area (4000 square yards) of the surface represented by failing density test. If allowed by the Engineer, in lieu of reworking the entire 4000 square yard area represented by the failing test, additional process control testing may be conducted to further delineate the area of failing compaction. The additional process control testing shall be conducted at 1/500 square yards working outward from the initial failing test location and shall continue until two successive passing PC compaction tests are found in each direction.

Grading equipment used to establish the final surface elevations shall have automatic controls for transverse slope. The transverse slope controls shall be capable of maintaining the final surface within 0.1 percent of the specified slope. Variations from the subgrade plane shall not be more than ¼ inch. The work shall be maintained and tested for conformance to these requirements immediately prior to placing additional pavement layers. An application of diluted emulsified asphalt may be required before placement of the bottom layer of hot bituminous pavement.

The maximum length of exposed processed asphalt mat shall be no greater than four miles unless approved by the Engineer. The maximum time a portion of the roadway will be unpaved is ten working days unless approved by the Engineer. The exposed longitudinal joint between the existing asphalt mat and the processed mat shall not remain in place for more than one day unless approved by the Engineer or when additional aggregate base course is imported. When additional aggregate base course is imported and placed before processing begins, the full width of the roadway shall be completed daily. Longitudinal joint construction and maintenance shall conform to subsection 401.16.

REVISION OF SECTION 310  
FULL DEPTH RECLAMATION OF HOT MIX ASPHALT PAVEMENT

**METHOD OF MEASUREMENT**

**310.03** Full Depth Reclamation of Hot Mix Asphalt Pavement will be measured by the square yard of roadway treated, completed and accepted.

**BASIS OF PAYMENT**

**310.04** The accepted quantities of Full Depth Reclamation of Hot Mix Asphalt Pavement will be paid for at the contract unit price per square yard for Full Depth Reclamation of Hot Mix Asphalt Pavement.

**Pay Item**

**Pay Unit**

Full Depth Reclamation of Hot Mix Asphalt Pavement (0-8 Inches)      Square Yard

Payment for Full Depth Reclamation of Hot Mix Asphalt Pavement will be full compensation for all work necessary to complete the item including: cutting of the existing asphalt mat, pulverizing the existing asphalt mat, mixing the pulverized asphalt mat into existing subgrade or base course, wetting and compacting the mixed pulverized asphalt mat and subgrade and/or base course, process control testing, blading, shaping, haul, and water. All additional equipment or labor to process and compact any lift below 8 inches will be included in the bid item Full Depth Reclamation of Hot Mix Asphalt Pavement 8-12 inches.

REVISION OF SECTION 401  
HOT MIX ASPHALT COMPACTION  
(STEEL WHEEL ROLLER)

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, first paragraph, delete the second sentence and replace with the following:

Steel wheel rollers will be required on this project.



1  
 REVISION OF SECTION 403  
 HOT MIX ASPHALT

Section 403 of the Standard Specifications is hereby revised for this project as follows:

Subsection 403.02 shall include the following:

The design mix for hot mix asphalt shall conform to the following:

<b>Table 403-1</b>						
<b>Property</b>	<b>Test Method</b>	<b>Value For Grading</b>				
				SX(100)		Patching
Air Voids, percent at: N (design)	CPL 5115			3.5 – 4.5		3.5 – 4.5
Lab Compaction (Revolutions): N (design)	CPL 5115			100		100
Stability, minimum	CPL 5106			30		30
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36 mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces, % minimum*	CP 45			60		60
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B			80		80
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B			205 (30)		205 (30)
Grade of Asphalt Cement, Top Layer				PG 76-28		
Grade of Asphalt Cement, Layers below Top						PG 58-28
Voids in the Mineral Aggregate (VMA) % minimum	CP 48			See Table 403-2		See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2			65-75		65-75
Dust to Asphalt Ratio Fine Gradation Coarse Gradation	CP 50			0.6 – 1.2 0.8 – 1.6		0.6 - 1.2 0.8 – 1.6
Note: AI MS-2 = Asphalt Institute Manual Series 2 Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems. Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen. Gradations for mixes with a nominal maximum aggregate size of 3/4" to 3/8" are considered a coarse gradation if they pass below the maximum density line at the #8 screen. Gradations for mixes with a nominal maximum aggregate size of #4 or smaller are considered a coarse gradation if they pass below the maximum density line at the #16 screen. *Fractured face requirements for SF may be waived by RME depending on project conditions.						

2  
 REVISION OF SECTION 403  
 HOT MIX ASPHALT

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum. CDOT will establish the production asphalt cement and volumetric targets based on the Contractor’s mix design and the relationships shown between the hot mix asphalt mixture volumetric properties and asphalt cement contents on the Form 429. CDOT may select a different AC content other than the one shown at optimum on the Contractor’s mix design in order to establish the production targets as contained on the Form 43. Historically, Air Voids adjustments typically result in asphalt cement increases from 0.1 to 0.5 percent. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

**Table 403-2**

<b>Nominal Maximum Size*, mm (inches)</b>	<b>Minimum Voids in the Mineral Aggregate (VMA)</b>			
	<b>***Design Air Voids **</b>			
	<b>3.5%</b>	<b>4.0%</b>	<b>4.5%</b>	<b>5.0%</b>
37.5 (1½)	11.6	11.7	11.8	N/A
25.0 (1)	12.6	12.7	12.8	
19.0 (¾)	13.6	13.7	13.8	
12.5 (½)	14.6	14.7	14.8	
9.5 (¾)	15.6	15.7	15.8	
4.75 (No. 4)	16.6	16.7	16.8	16.9
	* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%. ** Interpolate specified VMA values for design air voids between those listed. *** Extrapolate specified VMA values for production air voids beyond those listed.			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved prior to beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

CDOT approved Warm Mix Asphalt (WMA) may be allowed on this project in accordance with CP 59. Unique requirements for WMA design, production and acceptance testing as documented during CDOT WMA approval shall be submitted and approved prior to creation of the Form 43 and before any WMA production on the project. Delays to the project due to WMA submittal and review will be considered within the Contractor’s control and will be non-excusable.

3  
REVISION OF SECTION 403  
HOT MIX ASPHALT

Hot mix asphalt for patching shall conform to the gradation requirements for Hot Mix Asphalt (Grading SX).

A minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all hot mix asphalt.

Acceptance samples shall be taken at the location specified in either Method B or C of CP 41.

Subsection 403.03 shall include the following:

The Contractor shall construct the work such that all roadway pavement placed prior to the time paving operations end for the year, shall be completed to the full thickness required by the plans. The Contractor's Progress Schedule shall show the methods to be used to comply with this requirement.

Delete subsection 403.05 and replace with the following:

**403.05** The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton for the bituminous mixture.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Hot Mix Asphalt (Grading SX) (100) (PG 76-28)	Ton
Hot Mix Asphalt (Patching) (Asphalt)	Ton

Aggregate, asphalt recycling agent, asphalt cement, additives, hydrated lime, and all other work and materials necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid. When the pay item includes the PG binder grade, any change to the submitted mix design optimum asphalt cement content to establish production targets on the Form 43 will not be measured and paid for separately, but shall be included in the work. No additional compensation will be considered or paid for any additional asphalt cement, plant modifications and additional personnel required to produce the HMA as a result in a change to the mix design asphalt cement content.

Historically, typical asphalt cement increases reflected on the Form 43 are from 0.1 to 0.5 percent. However, the Contractor should anticipate the AC increases typical of his mixes. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

When the pay item does not include the PG binder grade, asphalt cement will be measured and paid for in accordance with Section 411. Asphalt cement used in Hot Mix Asphalt (Patching) will not be measured and paid for separately, but shall be included in the work.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 518  
SAWING AND SEALING BRIDGE JOINT

Section 518 of the Standard Specifications is hereby revised for this project as follows:

**DESCRIPTION**

Subsection 518.01 shall include the following:

This work consists of sawing and sealing a bridge joint of the size and type, located at the abutments of K-18-EV as shown on the plans.

**MATERIALS**

Subsection 518.02 shall include the following:

The materials shall conform to the requirements set forth in Subsection 702.07, of the Standard Specifications.

**CONSTRUCTION REQUIREMENTS**

Subsection 518.07 shall include the following:

Sawing and sealing the pavement joint at the abutments of designated structures shall be completed full width and coincident with the existing pavement crack at that location. The location of the existing pavement crack at the abutment shall be recorded and marked in a location that will not be disturbed by pavement milling or other construction operations. Upon Completion of the finished paving, the joint location shall be established, saw cut made, cleaned using a hot compressed air lance, and sealed. Joint construction shall be in accordance with the details shown in the plans. Joint preparation prior to sealing, and the sealing operation, shall be in accordance with the manufacturers recommendations.

**METHOD OF MEASUREMENT**

Subsection 518.12 shall include the following:

Sawing and Sealing Bridge Joints will be measured by the number of linear feet constructed and accepted.

**BASIS OF PAYMENT**

Subsection 518.13 shall include the following:

The accepted quantities of sawing and sealing bridge joints will be paid for at the contract price per linear foot. The contract price shall include all work, equipment, material, and all other items necessary, to complete this item.

Payment will be made under:

**Pay Item**

Sawing and Sealing Bridge Joint

**Pay Unit**

Linear Foot

1  
 REVISION OF SECTION 601  
 CONCRETE CLASS D (Bridge) (Special)

Section 601 of the Standard Specifications is hereby revised for this project as follows:

**DESCRIPTION**

Subsection 601.01 shall include the following:

This work consists of furnishing and placing Class D (Bridge) (Special) concrete deck for structure P-18-AD. It shall be in accordance with these specifications and in conformity with the lines, grades and dimensions as shown on the plans or established.

Subsection 601.02 shall include the following:

**a) Classification**

Concrete Class D (Bridge) (Special) shall conform to the following:

Concrete Class	Required 28 Day Field Compressive Strength (psi)	Required 6 Hour Field Compressive Strength (psi)	Minimum Cement (lb./cy)	Air Content % Range	Maximum Water Cement Ratio
D (Bridge) (Special)	4500	2500	615	5-8	0.44

Alternative times to the 6-hour compressive strength will be allowed as approved by the Engineer provided Lane Closure Policies are not violated.

Of the total aggregate, a minimum of 50% AASHTO M 43 size No. 8 coarse aggregate is required.

**MATERIALS**

Subsection 601.03 shall include the following:

Type III cement will be permitted for Concrete Class D (Bridge) (Special).

**CONSTRUCTION REQUIREMENTS**

Subsection 601.05 shall include the following:

The laboratory trial mix must produce an average 72-hour or less compressive strength of at least 2500 psi.

REVISION OF SECTION 601  
CONCRETE CLASS D (Bridge) (Special)

For Concrete Class D (Bridge) (Special) the Contractor shall develop maturity relationships in accordance with CP 69.

The development of the maturity relationship and maturity determination of the test slab is part of the trial mix and shall thus be documented in the Concrete Mix Design Report.

The Contractor shall provide a multi-channel maturity meter and all necessary wire and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meter and wire. Placement shall be as directed by the Engineer.

Subsection 601.12(m) shall include the following:

Portions of the deck patched with Concrete Class D (Bridge) (Special) shall not be opened to traffic until the maturity value of the concrete, determined by the Contractor in accordance with CP 69, indicates a compressive strength of at least 2500 psi has been achieved.

Subsection 601.16 shall include the following:

Concrete Class D (Bridge) (Special) shall be cured until the maturity value of the concrete, determined by the Contractor in accordance with CP 69, indicates a compressive strength of at least 2500 psi has been achieved. The curing compound shall conform to AASHTO M 148, Type 2, applied at a rate of 1 gallon per 100 square feet. The curing compound shall be applied as a fine spray within 10 minutes of discontinuing the finishing operation. Before and during application the curing compound shall be kept thoroughly mixed.

Curing blankets with a minimum R-value of 0.5 shall be provided, in addition to the curing compound, and shall be placed as soon as they can be placed without marring the surface. When the ambient temperature is below 50 degrees F, the Contractor shall maintain the concrete temperature above 50 degree F during the curing period. It shall be the Contractor's responsibility to determine the necessity for undertaking protective measures.

**METHOD OF MEASUREMENT**

Subsection 601.19 shall be replaced by the following:

Concrete Class D (Bridge) (Special) will be measured and paid for as the measured quantity placed and accepted by the Engineer.

**BASIS OF PAYMENT**

Subsection 601.20 shall include the following:

Payment for Concrete Class D (Bridge) (Special) will be full compensation for all work, materials, tools, equipment, and incidentals required to replace removed concrete from the deck. Furnishing and calibrating and use of maturity meters, wire, and other appurtenances including molding, curing and breaking of cylinders for calibration and placement of slab will not be measured and paid for separately, but shall be included in the work.

Payment will be made under:

**Pay Item**

**Pay Unit**

Concrete Class D (Bridge) (Special)

Cubic Yard

REVISION OF SECTION 601  
CLASS E CONCRETE

Subsection 601.02, sixth paragraph, shall contain the following:

Class E Concrete shall achieve 3000 psi within 12 hours of placement.

**METHOD OF MEASUREMENT**

Subsection 601.19 shall include the following:

Concrete Class E will be measured and paid for as the measured quantity placed and accepted by the Engineer.

**BASIS OF PAYMENT**

Subsection 601.20 shall include the following:

Payment for Concrete Class E will be full compensation for all work, materials, tools, equipment, and incidentals required to replace removed concrete from the deck. Furnishing and calibrating and use of maturity meters, wire, and other appurtenances including molding, curing and breaking of cylinders for calibration and placement of slab will not be measured and paid for separately, but shall be included in the work.

Payment will be made under:

**Pay Item**

**Pay Unit**

Concrete Pavement (8 1/4 inch)(Fast Track)

Square Yard

REVISION OF SECTION 613  
WIRING

Section 613 of the Standard Specifications is hereby revised for this project as follows:

Subsection 613.08 shall include the following:

A continuous 21-conductor shall be run from the controller cabinet to the hand hole of each signal pole, no splices shall be allowed. A 7-conductor shall be run for each signal head from each head to the hand hole of the pole base. A 10-conductor shall be run from the farthest signal head on the mast arm to the hand hole of the pole base. A 3-conductor shall be run for all pedestrian heads from the head to the hand hole of the pole base. All pedestrian push buttons shall be wired continuously from the button to the controller cabinet with a 2-conductor wire. A 3-conductor 10 gauge wire shall be run from the controller cabinet to interconnected advance flashing beacons. Contractor shall wire according to CDOT color code.

Electric service for the controller cabinet and Luminaire service shall be ground mount pedestal with a meter and 240 volt (minimum 100 amps) service panel. There shall be a dedicated 240V/50A circuit wired directly to the luminaires and a dedicated 120V/50A service wired to the signal cabinet. Contractor shall coordinate with the electric company to provide the signal electric service. Contractor shall furnish and install the wire and conduit from the controller to the appropriate power pole, with meter and weather head or any necessary appurtenances and the utility company shall connect to Transformer. The controller cabinet shall be supplied with a dedicated 120V/50A circuit. Luminaires shall be wired with a dedicated 240V/50A circuit from the pedestal.

Subsection 613.09 shall include the following:

The flasher unit for interconnected flashing beacons shall be housed in a suitable enclosure on the beacon pipe or the device may be contained within the signal head itself.

Subsection 613.11 shall include the following:

The work shall include the dismantling and removal of existing wires for components of existing signal poles and cabinet and components connected to the signal poles and cabinet. The work shall include the dismantling and removal or modification of the existing electric service, phone service, wire, conduit, weather head, and meter.

The work shall include all necessary equipment, materials, or personnel to assemble the proposed signal components and cabinet components to achieve a fully functional traffic control system.

All signal cable shall be continuous from connections made in the hand hole compartment of the signal pole base to the terminal compartment in the controller cabinet. For interconnected flashing beacons, cable shall be continuous from the cabinet to the flasher enclosure. Splicing shall not be permitted unless specifically approved by the Engineer.

Subsection 613.12 shall include the following:

All labor, materials, equipment, and permits necessary for the wiring of proposed or removal of electric and phone service(s), signal heads, signal poles, pedestrian heads, pedestrian push buttons, pedestrian poles, controller cabinets, video cameras, telemetry, and luminaires are part of the wiring item and will not be measured and paid for separately.



REVISION OF SECTION 613 and 715  
ELECTRICAL CONDUIT & PULL BOXES

Section 613 of the Standard Specifications is hereby revised for this project as follows:

Subsection 613.01 shall include the following:

This work includes furnishing and installing (HDPE) High Density Polyurethane, PVC electrical conduit, or metallic electrical conduit.

Subsection 613.02 shall include the following:

All materials furnished assembled, fabricated, or installed under this item shall be new, corrosion resistant and in accordance with this contract.

All Conduits shall be schedule 80 or equivalent and shall be fully compatible with signal wiring and fiber optic cable. Pipe connections shall be made with manufacturer approved fittings and/or butt fusing.

HDPE conduit shall be certified by the manufacturer as meeting ASTM D3350.

PVC conduit shall be certified by the manufacturer as meeting ANSI/UL 6 and 651. The manufacturer shall be ISO 9000 compliant.

Transitions between polyurethane to metallic to PVC, if applicable, shall be made with manufacturer's approved couplers.

Delete the twenty-first paragraph of Subsection 613.07 and replace with the following:

Electrical Conduit shall be metallic when installed at building, VMS, or structure penetrations.

Electrical Conduit (Bored) shall be HDPE and installed using a trenchless technology of either jacked conduit or directional boring. Partial or unsuccessful bores shall be filled with a preapproved cement grout. Surface damage due to boring processes or procedures between bore pits or splice pits shall be repaired to original condition.

Electrical Conduit (Plastic) shall be PVC or HDPE and installed by direct burial methods such as plowing, open trenching, or other excavation methods. When PVC is used, expansion fittings shall be installed at 100-ft. intervals. Surface damage due to direct burial methods between pull boxes shall be repaired to original condition.

Each individual conduit shall be equipped with a pull rope or tape of 1250 pounds tensile strength and be of a design to prevent cutting or burning of conduit walls during cable installation.

One conduit per bundle shall have a copper tracer wire of at least 12-gauge in a single conduit. In trenches containing multiple conduits, the tracer wire shall not be installed in the same conduit as the fiber.

The installation of conduit shall be performed in such a manner as to avoid unnecessary damage to streets, sidewalks, utilities, landscaping, and sprinkler systems. Excavations and conduit installation shall be performed in a continuous operation. All trenches shall be backfilled by the end work day. The material from trenching operations shall be placed in a location that will not cause damage or obstruction to vehicular or pedestrian traffic or interfere with surface drainage.

REVISION OF SECTION 613 and 715  
ELECTRICAL CONDUIT & PULL BOXES

Conduit installed under existing concrete or asphalt surfaces, particularly roadways shall be bored or jacked. Conduit installed under or near wetlands shall be bored. No open cutting in these locations will be allowed unless otherwise approved by the Engineer.

The Contractor shall take all necessary precautions to avoid heaving any existing asphalt/concrete mat or over-excavating a trench, whether caused by equipment directly or by dislodging rocks and boulders. Any such heaving or over-excavation shall be repaired or replaced at the Contractor's expense. The Contractor shall bear the cost of backfilling all over-excavated areas with the appropriate backfill material as approved by the project engineer.

The Contractor shall restore all surface materials to their preconstruction condition, including but not limited to pavement, sidewalks, sprinkler systems, landscaping, shrubs, sod, or native vegetation that is disturbed by the conduit installation operation. All repairs shall be included in the cost of the conduit.

If the Contractor is unable to bore the conduit at the lengths shown on the plans from access point to access point, all splice couplings and associated work to splice conduit shall be included in the cost of this item. The coupling technology shall allow the conduit to be connected, form a watertight, airtight seal, and meet NEC standards. Breaking force between segments shall exceed 250 pounds of force. No metal fittings shall be allowed. No elevation difference between the conduit run and the splice location will be allowed. Conduit splices shall be kept to a minimum and all locations shall be approved by the project engineer. Additional pull boxes shall not be substituted for splices.

Conduit plugs shall be supplied and installed in all conduit ends as soon as the conduit is installed. Conduit shall be plugged at all termination points such as pull boxes, manholes, controller cabinets, and node buildings. Conduits containing cable shall be plugged with durable and reusable split type plugs, fabricated without metallic parts, and allow easy removal and reinstallation around in-place cables. Split type plugs shall provide a water and air-tight seal of at least 50 psi and shall be installable by hand without using special tools and without damaging the cable. All plugs shall be correctly sized to fit the conduit being plugged. Empty conduits shall be sealed with removable type duct plugs that provide a watertight barrier, foams are not acceptable.

All conduits shall use sweeps to elevate the buried conduits to within 4 inches of the bottom of the pull box or manhole, as shown in project details. The sweeps shall be terminated within the pull boxes and manholes to allow for easy installation and removal of the conduit plugs. The sweeps shall be set above the ground surface within the pull box at a height that does not interfere with the coiling of the fiber optic cable.

All conduit runs containing fiber optic cable shall have a limited number of bends. The sum of the individual conduit bends on a single conduit run between two pull boxes shall not exceed 360. The preferred limit is 270. No individual bend shall be greater than 90. All conduit bends shall have a minimum acceptable radius. The minimum radius for 90 bends is 48 inches, and the minimum radius for all other bends is 24 inches.

The Contractor shall place pull or splice boxes at conduit ends, at all wiring splices, at all conduit angle points, and at all other locations shown on the plans.

Excavations for placement of pull boxes or conduit splices shall be back filled with class 6 aggregate base course. Compaction for class 6 material shall be in accordance with AASHTO T-99. All excess and demolition materials shall become the property of the contractor and shall be disposed of in compliance with all applicable laws.

REVISION OF SECTION 613 and 715  
ELECTRICAL CONDUIT & PULL BOXES

Pull boxes installed in non-surfaced areas shall have a concrete apron 12 inch wide by 6 inch deep. Pull boxes shall not be installed above the grade of the apron. Concrete apron shall have a 1% slope away from the top of pull box. All concrete aprons shall be Class B and shall be in accordance with Section 601.

Pull boxes installed adjacent to traveled ways shall have a special concrete footing extending 6 inches around the outside and 3 inches around inside of the pull box bottom. Depth of footing shall be at least 3½ inches. Pull boxes shall be grounded with a 5 foot x 5/8 inch copper ground rod.

A minimum of 18 inches of 3/8 inch gravel shall be installed as a base for the pull box to aide in drainage. The gravel shall be free of dirt and debris and spread evenly to facilitate a level base for the pull box. The Contractor shall ensure that sufficient compacting is made prior to the installation of gravel to help alleviate future settling.

Wire mesh shall be installed in a manor to completely surround fiber optic pull boxes. The wire mesh shall be installed prior to the installation of the pull box above the bed of gravel and extending one foot past the outer edges of the concrete apron. The wire mesh shall be gently cut to allow only the entrance of the conduit at the bottom of the box. Any openings cut in the wire mesh larger than the diameter of the conduit shall be remedied by the installation of additional wire mesh to obtain a completely sealed pull box enclosure.

If new conduits are installed in existing pull boxes, manholes or cabinet bases the Contractor shall carefully excavate around the pull box or manhole and install the new conduit as shown in the plans. The Contractor shall not damage the existing pull box, manhole or their contents. If the existing pull box, lid, or the concrete collars are cracked or damaged during conduit installation, the Contractor shall restore the damaged section to preconstruction condition at no additional cost.

Section 613.11 shall include the following:

Pull boxes will be measured as each complete in place.

Section 613.12 shall include the following:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
_2_ Inch Electrical Conduit (Bored)	Linear Foot
_3_ Inch Electrical Conduit (Bored)	Linear Foot
_2_ Inch Electrical Conduit (Plastic)	Linear Foot
_3_ Inch Electrical Conduit (Plastic)	Linear Foot
Pull Box Type _1_	Each
Pull Box Type _3_	Each
Pull Box Type _4_	Each

The following items will not be measured and paid for separately, but shall be included in the work:

- (8) Partial or unsuccessful bores and any work necessary to abandonment
- (9) Restoring the ground to original grade and condition, including topsoil, seeding, mulching, mulch tackifier, soil retention blanket, sod, or turf reinforcement mat
- (10) The disposal of excess and demolition materials
- (11) Material required for pull box installations including gravel bedding, grounding rod, or concrete apron.

REVISION OF SECTION 613 and 715  
ELECTRICAL CONDUIT & PULL BOXES

Section 715 of the Standard Specifications is hereby revised for this project as follows:

Subsection 715.06 shall include the following:

Pull boxes and splice boxes shall be made of fiberglass reinforced polymer concrete. Pull boxes shall have pre-formed knockouts located in the short ends of the box to allow entry of the conduit.

The Contractor shall submit test results documenting the minimum lateral pressure capacity of 1200 pounds per square foot distributed can be accommodated over the sidewall of the box. The Contractor shall submit test results documenting the minimum vertical load capacity of 18000 lbs over 10 inches x 10 inches square over both the side wall and cover.

Pull boxes shall have a detachable cover with a skid-resistant surface and have the words "TRAFFIC" cast into the surface for traffic signal boxes or "CDOT COMM" cast into the surface for communication boxes. Painting of words shall not be accepted. The cover shall be attached to the pull box body by means of 3/8 inch lag head stainless steel hex head bolts and shall have two (2) lift slots to aid in the removal of the lid.

Each fiber optic pull box shall have a locator disk manufactured into the lid that operates at the frequency of 101.4 kHz for communication line locating. The locator disk shall be compatible with a Dynatel cable locator.

Wire mesh shall be installed in a manor to completely surround the box. The wire mesh shall meet the material standard ANSI/ASTM A555-79 and made of T-304 stainless steel, 0.025 inch wire diameter minimum and shall have a spacing of 12 mesh per inch.

Pull boxes shall be verified by a 3rd Party Nationally Recognized Independent Testing Laboratory as meeting all test provisions of ANSI/SCTE 77 2007 Specification for Underground Enclosure Integrity, Tier 22 rating. Pull boxes shall be UL listed. Certification documents shall be submitted with material submittals.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

**DESCRIPTION**

This work consists of the construction of an accessible pedestrian signal at locations as shown on the plans.

**MATERIALS**

The Accessible Pedestrian Signal (APS) shall be an audible-tactile pedestrian signal system and shall consist of all electronic control equipment, mounting hardware, push buttons and signs designed to provide both a pushbutton with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions.

The APS shall meet the following requirements:

- (1) 2009 Manual of Uniform Traffic Control Devices (MUTCD), Chapter 4E – Pedestrian Control Features.
- (2) NEMA TS 2 Section 2.1 requirements for Temperature and Humidity, Transient Voltage Protection and Mechanical Shock and Vibration.
- (3) IEC 61000-4-4; 4-5 Transient Suppression requirements.
- (4) FCC Title 47, Part 15, Class A, Electronic Noise requirements.

The APS pushbutton enclosure shall meet the NEMA 250 – Type 4X enclosure requirement.

Upon installation the APS shall have the following functional requirements:

(a) *APS functional requirements.* The APS shall have the following functional features:

- (1) The APS shall be programmable and adjustable. Programming and adjustments shall be made using a laptop computer or vendor supplied programmer. No additional hardware or equipment shall be required. The APS shall be fully compatible with the three latest versions of the Windows operating platform. The programmable features shall be:
  - A. Push-button locator tone
  - B. Walk and Wait audible message
  - C. Audible push-button informational message
  - D. Audible crossing beacon
  - E. Vibrating tactile arrow
  - F. Independent minimum and maximum volume limits for the Locator Tone, Walk and Audible Beacons features.
- (2) All audible features shall emanate from the pedestrian pushbutton housing. The APS shall utilize digital audio technology, having a minimum 12-bit sample at a 16k Hz sample rate. Total harmonic distortion shall be less than 3 percent at 75 decibels. The APS shall provide independent ambient sound adjustment for the Locator Tone feature. The APS shall allow for Locator Tone volume to be set below the ambient noise level. The system shall have, at a minimum, three programmable locator tones. All sound levels shall adjust automatically utilizing an internally mounted, interval ambient sensing microphone, in accordance with the MUTCD.
- (3) The APS shall monitor the Walk condition for conflict operation. As a standalone unit, the APS shall disable the Walk functionality should a conflict be detected.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

- (4) The APS system shall log cumulative call data. The data shall be date and time stamped, and shall be accessible via laptop.
- (5) The system shall have a programmable Extended Push Activation feature with the ability to extend the Walk time and provide an informational audible message. Activation shall be programmable from one to six seconds.
- (6) The system shall provide a programmable audible Wait message when the button is pushed. The message shall only annunciate once per actuation.

*(b) Power Control Unit (PCU):*

- (1) The PCU shall be mounted in the pedestrian signal head and shall be powered by the activation of Walk or Don't Walk using 120 Volts Alternating Current (VAC).
- (2) The PCU shall utilize separate power inputs for Walk and Don't Walk. The PCU shall not require more than four wires from the PCU to the corresponding push button.
- (3) The voltage at the push button shall not exceed 24 VAC.

*(c) Push Button Assembly (PBA):*

- (1) The PBA shall be a single assembly containing an ADA compliant, vibro-tactile, directional arrow button, weatherproof audible speaker and informational sign with optional placard braille messages. The PBA shall housing shall not incorporate any plastic or polycarbonate parts.
- (2) The PBA tactile arrow shall be 2 inches in length and shall be field adjustable to two directions.
- (3) The pushbutton shall utilize Piezo switch technology rated at greater than twenty million operations. Vibro-tactile operation shall pulse at 20 Hz with a minimum 0.003-inch displacement against a 2 pound applied force.
- (4) The PBA assembly shall be capable of mounting on a curved or flat surface utilizing either machine screws or bolts or banding type mounting hardware. The PBA shall accommodate mounting to a minimum 2-inch diameter pole.

**CONSTRUCTION REQUIREMENTS**

Prior to start of the installation of the APS, The Contractor shall submit a sample unit for testing. Installation of the APS shall not begin until written approval of the sample has been received from the Engineer. If the unit fails to pass testing, the Contractor shall repair or replace the subsequent units at his expense.

A field test of a single APS shall be performed in the presence of the Engineer. All repairs or replacements required to ensure a fully operational system shall be at the Contractor's expense.

The APS shall be installed in accordance with manufacturer's recommendations.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

**METHOD OF MEASUREMENT**

The Accessible Pedestrian Signal (APS) will be measured as the actual number that are installed and accepted.

**BASIS OF PAYMENT**

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Pedestrian Signal Face (16) Countdown	Each

Payment will be full compensation for all work, materials and equipment required to install a fully operational APS in accordance with these specifications.

The sample APS will not be measured and paid for separately, but shall be included in the work.

Testing will not be measured and paid for separately, but shall be included in the work.

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REVISION OF SECTION 614  
TEST FIBER OPTIC CABLE

Section 614 of the Standard specifications is hereby revised for this project as follows:

Subsection 614.01 shall include the following:

Test fiber optic cable shall include an OTDR on reel test and on all fiber optic cable strands installed on the project by the Contractor. In addition, an optical power meter test shall be conducted on fiber strands from all device locations to the regeneration node buildings.

Subsection 614.08 shall include the following:

Test Fiber Optic Cable. For this project this work shall consist of the testing of either multimode or Single Mode fiber optic cable as shown and tabulated in the plans. The testing procedures involve an OTDR test and an Optical Power Meter Test.

Guidelines for fiber optic cable testing include:

- (1) Test jumpers and patch cords must be of the same fiber core size and connector type as the cable system:  
Multimode fiber 62.5/125  $\mu\text{m}$   
Single Mode fiber 8.3/125  $\mu\text{m}$
- (2) The light source and OTDR must operate within the range of 850 $\pm$ 30 nm or 1300 $\pm$ 20 nm for multimode testing in accordance with ANSI/EIA/TIA-526-14.
- (3) The light source and OTDR must operate with the range of 1310 $\pm$ 10 nm or 1550 $\pm$ 20 nm for Single Mode testing in accordance with ANSI/EIA/TIA-526-7.
- (4) The power meter and the light source must be set to the same wavelength during testing.
- (5) The power meter must be calibrated and traceable to the National Institute of Standards and Technology (NIST).
- (6) All system connectors, adapters and jumpers must be cleaned as per manufacturer's instructions before measurements are taken.

(a) Fiber Optic Cable Testing Equipment. The following is required to perform fiber optic cable tests:

- (1) An OTDR
- (2) A test reel, if necessary
- (3) A light source at the appropriate wavelength
- (4) Optical Power Measurement Equipment
- (5) Test Jumpers as specified below

#### Multimode Fiber Testing

CPR Test Jumper-1 shall be 1-5 meters long with connector's compatible with the light source and power meter and have the same fiber construction as the link segment being tested.



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REVISION OF SECTION 614  
TEST FIBER OPTIC CABLE

CPR Test Jumper-2 shall be 1-5 meters long with connectors compatible with the light source and power meter. Test Jumper-2 shall contain Class IV a single-mode fiber for tests on 1300 nm light sources and from which is single-mode at 850 nm for tests on 850 nm light sources.

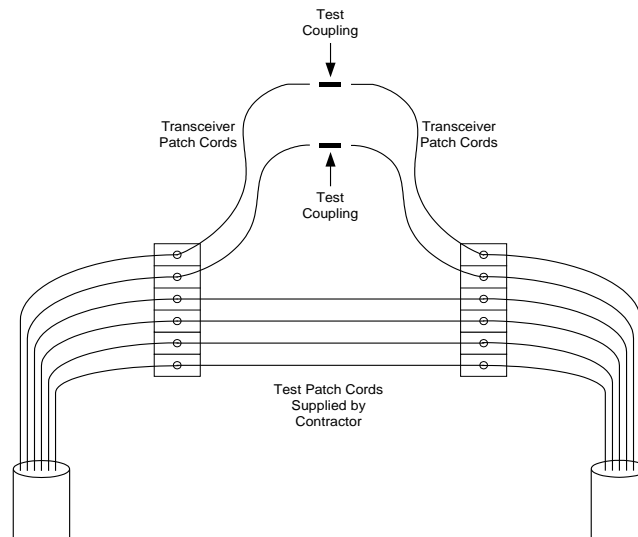
Single Mode Fiber Testing

CPR Test Jumper-1 and Test Jumper-2 shall be 1-5 meters long with connector's compatible with the light source and power meter and have the same fiber construction as the link segment being tested.

(b) Optical Fiber Cable Testing with OTDR. The Contractor shall perform an OTDR test of all fibers in all tubes on the reel prior to installation of the fiber. The test results shall be supplied to the Engineer prior to installation of the cable.

If the fiber is specified as "Install Only", the Contractor shall test the fiber on the reel and provide the test results to the Engineer prior to accepting the cable. After installation, if there are unused portions of cable remaining on the reel, the Engineer may request the Contractor or other qualified technician to perform a reel test. The Contractor shall provide the Engineer the test results prior to delivering the cable to the Engineer. Any cable damaged while in the Contractor's possession shall be replaced at the Contractor's expense.

All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of a bi-directional end-to-end OTDR trace performed per TIA/EIA-455-61. The system margin loss measurements shall be provided at 850 and 1300 nm for multimode fibers and 1310 and 1550 for Single Mode fibers. If the Plans require installation of a fiber optic patch panel, the Contractor shall supply patch cords to patch all terminated fibers through the panel for all fiber testing. If patch cords are specified in the Plans for final equipment installation, these patch cords shall be connected using a test coupling for the end-to-end test.



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TEST FIBER OPTIC CABLE

OTDR readings will be used to ensure proper installation and to troubleshoot faults. OTDR signature traces will be used for documentation and maintenance. An OTDR provides an indirect estimate of the loss of the cable plant; generally, more accurate or reliable values will be obtained by using an Optical Power Meter. For fibers that are identified in the Plans to be left un-terminated, an OTDR shall be used to test end-to-end attenuation.

Loss numbers for the installed link shall be calculated by taking the sum of the bi-directional measurements and dividing that sum by two.

The Contractor shall use an OTDR that is capable of storing traces electronically and shall save each final trace.

To ensure the traces identify the end points of the fiber under test and the fiber designation, the Contractor shall use a test reel, if required, to eliminate the "dead zone" at the start of the trace so that the start of the fiber under test can be identified on the trace. Indicate the length of the test reel for all test results.

If the fiber designation is not indicated on the trace itself, the Contractor shall provide a cross-reference table between the stored trace file name and the fiber designation.

In compliance with EIA/TIA-455-61 "Measurement of Fiber or Cable Attenuation Using an OTDR" the Contractor shall record the following information during the test procedure:

- (1) Names of personnel conducting the test.
- (2) Type of test equipment used (manufacturer, model, serial number, calibration date).
- (3) Date test is being performed.
- (4) Optical source wavelength and spectral width.
- (5) Fiber identification.
- (6) End point locations.
- (7) Launch conditions
- (8) Method of calculation for the attenuation or attenuation coefficient.
- (9) Acceptable link attenuation.

(c) Optic Fiber Cable Testing with Optical Power Meter. The Contractor shall conduct an Optical Power Meter Test for each fiber installed.

Multimode segments shall be tested in one direction at both the 850 nm and the 1300 nm wavelength.

Single Mode segments shall be tested in one direction at both the 1310 nm and 1550 nm wavelength.

In compliance with TIA/EIA-526-14A "Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant" and TIA/EIA-526-7 "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant," the following information shall be recorded during the test procedure:

- (1) Names of personnel conducting the test.
- (2) Type of test equipment used (manufacturer, model, serial number, calibration date).
- (3) Date test is being performed.
- (4) Optical source wavelength, spectral width, and for multimode, the coupled power ratio (CPR).
- (5) Fiber identification.

REVISION OF SECTION 614  
 TEST FIBER OPTIC CABLE

- (6) End point locations.
- (7) Test direction.
- (8) Reference power measurement (when not using a power meter with a Relative Power Measurement Mode).
- (9) Measured attenuation of the link segment.
- (10) Acceptable link attenuation.

The minor attenuation differences due to test direction are on par with the accuracy and repeatability of the test method. Lateral segments within a building are limited to 90 meters. Therefore, attenuation differences caused by wavelength are insignificant, and as a result, single wavelength testing is sufficient.

(d) Acceptable Attenuation Values. Acceptable attenuation values shall be calculated for each fiber tested. These values represent the maximum acceptable test values.

1) Multimode Fiber. The general attenuation equation for any multimode link segment is as follows:

$$\text{Acceptable Link Attn.} = \text{Cable Attn.} + \text{Connection Attn.} + \text{Splice Attn.} + \text{CPR Adj.}$$

62.5 μm Multi-mode Attenuation Coefficients:

Cable Attn. = Cable Length (km) x (3.40 dB/km @ 850 nm or 1.00 dB/km @ 1300 nm)

Connection Attn. (ST or SC connectors) = (No. of Connections x 0.39 dB) + 0.42 db.

Connection Attn. (LC connectors) = (No. of Connections x 0.14 dB) + 0.24 db.

Splice Attn. (Mechanical or Fusion) = Splices x 0.30 db.

CPR Adj. = See table below.

*A connection is defined as the joint made by mating two fibers terminated with re-mateable connectors (e.g. ST, SC, LC).*

<b>Multi-mode Light Source CPR Adjustment</b>					
	Cat. 1 Overfilled	Cat. 2	Cat. 3	Cat. 4	Cat. 5 Underfilled
Links with ST or SC Connections	+0.50	0.00	-0.25	-0.50	-0.75
Links with LC Connections	+0.25	0.00	-0.10	-0.20	-0.30

The Coupled Power Ratio of a light source is a measure of the modal power distribution launched into a multimode fiber. A light source that launches a higher percentage of its power into the higher order modes of a multimode fiber produces a more over-filled condition and is classified as a lower category than a light source that launches more of its power into just the lower order modes producing an under-filled condition. Under-filled conditions result in lower link attenuation, while over-filled conditions produce higher attenuation. Therefore, adjusting the acceptable link attenuation equation to compensate for a light source's launch characteristics increases the accuracy of the test procedure.

2) Single mode Fiber. The general attenuation equation for any Single Mode link segment is as follows:

$$\text{Acceptable Link Attn.} = \text{Cable Attn.} + \text{Connector Attn.} + \text{Splice Attn.}$$

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 REVISION OF SECTION 614  
 TEST FIBER OPTIC CABLE

*8.3 μm Single-mode Attenuation Coefficients:*

Cable Attn. = Cable Length (km) x (0.34 dB/km @ 1310 nm or 0.25 dB/km @ 1550 nm)

Connection Attn. (ST or SC connectors) = (No. of Connections x 0.39 dB) + 0.42 dB

Connection Attn. (LC connectors) = (No. of Connections x 0.14 dB) + 0.24 dB

Splice Attn. (Mechanical or Fusion) = Splices x 0.30 dB

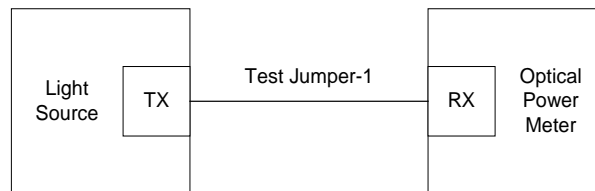
(e) Test Procedures. All fiber testing shall be performed on all fibers in the completed end-to-end system.

(1) Multimode Fiber. The multimode fiber cable test shall be conducted as follows:

Clean the test jumper connectors and the test coupling per manufacturer's instructions.

Follow the test equipment manufacturer's initial adjustment instructions.

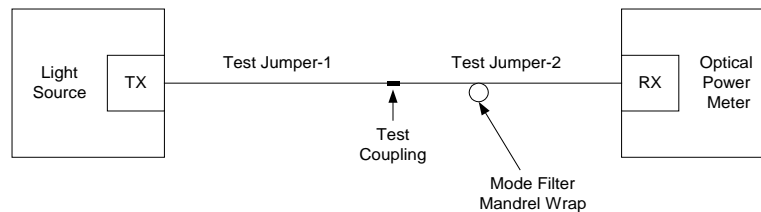
Connect Test Jumper-1 between the light source and the power meter. Avoid placing bends in the jumper that are less than 100 mm (4 inches) in diameter.



If the power meter has a Relative Power Measurement Mode, select it. If it does not, reduce the Reference Power Measurement ( $P_{ref}$ ). If the meter can display power levels in dBm, select this unit of measurement to simplify subsequent calculations.

Disconnect Test Jumper-1 from the power meter. Do NOT disconnect the test jumper from the light source.

Connect Test Jumper-2 between the power meter and Test Jumper-1 using the test coupling. Test Jumper-2 should include a high order mode filter. This can be accomplished by wrapping the jumper three times around a 30 mm (1.2 inches) diameter mandrel.



Record the Power Measurement ( $P_{sum}$ ). If the power meter is in Relative Power Measurement Mode, the meter reading represents the CPR value. If the meter does not have a Relative Power Measurement Mode, perform the following calculation:

If  $P_{sum}$  and  $P_{ref}$  are in the same logarithmic units (dBm, dBu, etc.):

$$CPR (dB) = P_{sum} - P_{ref}$$

If  $P_{sum}$  and  $P_{ref}$  are in watts:

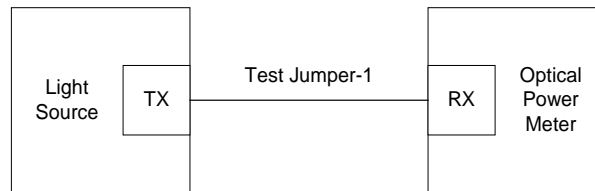
$$CPR (dB) = 10 \times \log_{10} [O_{sum}/P_{ref}]$$

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REVISION OF SECTION 614  
TEST FIBER OPTIC CABLE

(2) Single Mode Fiber. The Single Mode Optical Power Meter fiber test shall be conducted as follows:

Clean the test jumper connectors and the test coupling per manufacturer's instructions.  
Follow the test equipment manufacturer's initial adjustment instructions.

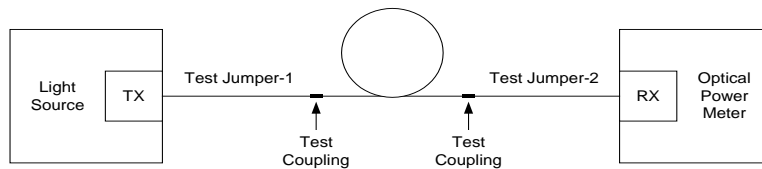
Connect Test Jumper-1 between the light source and the power meter. Avoid placing bends in the jumper that are less than 100 mm (4 inches) in diameter.



If the power meter has a Relative Power Measurement Mode, select it. If it does not, reduce the Reference Power Measurement ( $P_{ref}$ ). If the meter can display power levels in dBm, select this unit of measurement to simplify subsequent calculations.

Disconnect Test Jumper-1 from the power meter. Do NOT disconnect the test jumper from the light source.

Attach Test Jumper-1 to one end of the cable plant to be measured and Test Jumper-2 to the other end.



Record the Power Measurement ( $P_{sum}$ ). If the power meter is in Relative Power Measurement Mode, the meter reading represents the true value. If the meter does not have a Relative Power Measurement Mode, perform the following calculation:

If  $P_{sum}$  and  $P_{ref}$  are in the same logarithmic units (dBm, dBu, etc.):

$$CPR (dB) = P_{sum} - P_{ref}$$

If  $P_{sum}$  and  $P_{ref}$  are in watts:

$$CPR (dB) = 10 \times \log_{10} [P_{sum}/P_{ref}]$$

(f) Test Acceptance. The Contractor shall demonstrate that each Optical Power Test results in acceptable attenuation values.

The Contractor, solely at the Contractor's cost, shall remake any fusion splices that have test results exceeding acceptable attenuation values.

The Contractor, solely at the Contractor's cost, shall retest any fiber links that have been re-spliced.

The Contractor, solely at the Contractor's cost, shall bring any link not meeting the requirements of this specification into compliance.

REVISION OF SECTION 614  
TEST FIBER OPTIC CABLE

(g) Submittals. The Contractor shall submit test results documentation as both a hard copy and electronic copy.

After each reel test, the Contractor shall submit four (4) hard copies of the OTDR trace for every fiber on the reel. After installation, the Contractor shall submit four (4) hard copies of the OTDR trace for every spliced fiber. Hard copy traces shall be organized and bound in logical order in an 8 ½" x 11" 3 ring hard cover binder in addition to other documentation listed in this Special Provision and other splicing documentation listed in the project Special Provision package.

The Contractor shall submit, after approval of the hard copy traces, electronic copies of all traces and appropriate software to allow reading the traces.

The Contractor shall submit four (4) copies of all Optical Power Test results.

The Contractor shall submit four (4) copies of the complete contract Plans, including additional drawings issued as part of any change orders, revisions to the project plans during fiber optic work with any deviations clearly marked in color. Deviations to be noted and shall include but not be limited to the following:

- (1) Fiber Splice location
- (2) Fiber Splice configuration
- (3) Termination layout

Subsection 614.13 shall include the following:

**METHOD OF MEASUREMENT**

Test Fiber Optic Cable will be measured by on reel testing of all fiber strands complete end-to-end OTDR tests and power meter tests on the fiber splices, including labor, materials, document submission necessary to complete the work.

Subsection 614.14 shall include the following:

**BASIS OF PAYMENT**

<u>Pay Item</u>	<u>Pay Unit</u>
Test Fiber Optic Cable	Lump Sum

REVISION OF SECTION 614  
FIBER OPTIC CABLE AS-BUILT DOCUMENTATION

Section 614 of the Standard Specifications is hereby revised for this project as follows:

The Contractor shall submit the Fiber Cable As-Built Documentation Sheet as part of their final submittals on the project. Since numerous fiber cables exist around the state, The Department requires as built information for routine maintenance and repair work when needed. This form is an aide to document that information as it pertains to the installation of fiber optic cable along the project corridor as part of this project.

At each pull box and manhole location information to be provided shall include the cable sequential foot marking measurements stamped on the cable jacket as the cable enters and exits the pull box or manhole, type of splices where they exist, number of lateral cables at the location and documentation of the cable ID at locations of cable end splices. Identification of pull boxes and manholes shall be by manhole numbers as they are shown on the fiber optic splice plan sheets and by mile point of those that are not listed in the plans.

Revised fiber optic splices shall also be provided as marked up copies of the splice diagrams in the plans. If changes are made during the splicing procedures, those changes shall be documented by the Contractors splicers and submitted to the Project Engineer as final as-built drawings.

**METHOD OF MEASUREMENT**

Fiber optic cable as-built documentation shall not be measured or paid for separately but will be considered subsidiary to the Fiber Optic Cable (Single Mode) item and shall include all information labeling.

2  
REVISION OF SECTION 614  
FIBER OPTIC CABLE AS-BUILT DOCUMENTATION

**FIBER OPTIC CABLE AS-INSTALLED DOCUMENTATION SHEET**

TO NEXT PULL BOX or  
MANHOLE

↑

CABLE MEASUREMENT OUT \_\_\_\_\_

PULL BOX LOCATION \_\_\_\_\_

MANHOLE NUMBER \_\_\_\_\_

CABLE ID NUMBER \_\_\_\_\_

CABLE MEASUREMENT IN \_\_\_\_\_

SPLICE POINT      YES \_\_\_ NO \_\_\_  
CABLE END SPLICE YES \_\_\_ NO \_\_\_  
NUMBER OF LATERAL CABLES \_\_\_\_\_

CABLE MEASUREMENT OUT \_\_\_\_\_

PULL BOX LOCATION \_\_\_\_\_

MANHOLE NUMBER \_\_\_\_\_

CABLE ID NUMBER \_\_\_\_\_

CABLE MEASUREMENT IN \_\_\_\_\_

SPLICE POINT      YES \_\_\_ NO \_\_\_  
CABLE END SPLICE YES \_\_\_ NO \_\_\_  
NUMBER OF LATERAL CABLES \_\_\_\_\_

CABLE MEASUREMENT OUT \_\_\_\_\_

PULL BOX LOCATION \_\_\_\_\_

MANHOLE NUMBER \_\_\_\_\_

CABLE ID NUMBER \_\_\_\_\_

FROM PREVIOUS PULL BOX or  
MANHOLE

↓

CABLE MEASUREMENT IN \_\_\_\_\_

SPLICE POINT      YES \_\_\_ NO \_\_\_  
CABLE END SPLICE YES \_\_\_ NO \_\_\_  
NUMBER OF LATERAL CABLES \_\_\_\_\_



REVISION OF SECTION 614  
FIBER OPTIC SPLICE CLOSURE

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

**DESCRIPTION**

Fiber optic splice closure shall be used to enclose fiber splices of both fiber optic backbone and fiber optic lateral cables at locations shown in the plans. The splice closures shall be provided for underground installations.

**MATERIALS**

The fiber optic splice closures shall be furnished by the Contractor.

The splice closures shall be stand-alone, dome type and shall meet the following minimum requirements:

- (a) The closures shall seal, anchor and protect fiber optic cable splices, coarse wavelength division multiplexing single wavelength filters.
- (b) The closures shall have a maximum of six (6) total cable entries.
- (c) The closures shall be suitable for underground applications and shall be watertight and airtight.
- (d) The closures splice trays shall have a hinged design with an upright locking mechanism for all splice trays to provide ease of access for future maintenance to lower trays.
- (e) The closures shall have a gel compression ring type sealing design. A gluing or sealant design for sealing of the closure shall not be accepted.

The closures shall be sized to provide the capacity equal to the total number of strands for all cables entering the closure. All fiber optic cables shall be secured to prevent the ingress of water per the manufacturer's recommendations. All remaining access holes not utilized shall be plugged to prevent water from entering the closure.

**CONSTRUCTION REQUIREMENTS**

All splices shall be performed using the fusion splicing method. The fusion splicer shall be calibrated and certified at least once within the previous year from this project. All certification documentation shall be presented to the Project Engineer prior to start of splicing.

The Contractor shall cut and splice only those fiber strands shown to be spliced on the fiber splice plan sheets. All unused buffer tubes and fiber strands shall remain uncut. After the fiber cable and proposed buffer tube is prepped for splicing, all fiber strands in the buffer tube shall be cleaned of all homogeneous gel. All uncut fiber strands shall be coiled in the tray. Remaining buffer tubes shall be neatly coiled, secured and stored in the storage area within the closure under the splice trays per the manufacturer's recommendations. Buffer tubes proposed for splicing shall be wrapped and secured to the splice tray with ties per the manufacturer's recommendations.

The completed splices shall be secured in the splice tray foam splice chips per manufacturer's recommendations.

Bare fiber strands shall not be taped to the splice tray.

REVISION OF SECTION 614  
FIBER OPTIC SPLICE CLOSURE

If the closure requires re-entry, it shall be conducted per the manufacturer's recommendation for re-entry and resealing. The Contractor shall use caution not to damage the fiber strands, splices, coarse wavelength division multiplexing filters or buffer tubes existing inside. When sealing the closure for a second time, the Contractor shall follow all re-entry requirements of the manufacturer.

The Contractor shall ensure that the fiber optic splice enclosures and associated fiber cable coils fit adequately within the manhole or pull box splice locations specified on the plans.

The optical fibers shall be fusion spliced and shall meet the following minimum requirements:

- (a) Splice loss <0.15 dB
- (b) Reflection <50 dB
- (c) Completed splice shall be stable from -40° F to +185° F (-40° C to +85° C)

The Contractor shall label each individual splice and buffer tube in all splice trays per the Project Detail Sheet included in the project plans. The coarse wavelength division multiplexing single wavelength filter position and its working wavelength shall also be labeled.

The Contractor shall inform the Project Engineer two days before and the morning of proposed splicing locations for that day. While the splicing procedures are occurring and within four (4) hours prior to sealing the closure and installation in the pull box, the Contractor shall again contact the Project Engineer for inspection. In the event that the Project Engineer cannot be on site, a minimum of eight (8) digital pictures shall be taken at varying angles of the interior of the splice closure showing all completed work as stated in this specification and shown on the Project Detail Sheet. These pictures shall include exposed fiber stands, (both spliced and uncut) in all splice trays, coarse wavelength division multiplexing filter storage, fiber tray labeling and remaining buffer tubes showing appropriate coiling. One picture shall also include the complete re-assembly of all interior parts prior to final sealing. Once the closure and fiber coils are installed in the pull box or manhole, two (2) pictures shall be taken showing the final installation of both the closure and the coiled fiber cable attached to the fiber management hardware.

All pictures shall be organized per location and shall be submitted to the Project Engineer along with all final testing result documentation.

**METHOD OF MEASUREMENT**

Fiber Optic Splice Closure will not be measured or paid for separately but will be considered subsidiary to the Fiber Optic Cable (Single-Mode) (12 Strands).

1  
REVISION OF SECTION 627 AND 713  
PREFORMED THERMOPLASTIC PAVEMENT MARKING

Section 627 of the Standard Special Provisions is hereby revised for this project as follows:

Subsection 627.09 shall include the following:

- (a) *Inlaid Preformed Thermoplastic Pavement Marking.* Shall be done for Xwalk and Stop Lines. The grooved width for inlaid preformed thermoplastic pavement marking is called for in the Contract, grooved width shall be the pavement marking width plus 1 inch, with a tolerance of  $\pm \frac{1}{4}$  inch. The dimensions of the Xwalk marking shall 2 ft. x 8 ft. typical. The dimension of the stop bar shall be 2 ft. x length of need. The depth of the grooves shall be 130 mils  $\pm$  5 mils. Groove position shall be a minimum of 2 inches from the edge of the pavement marking to the longitudinal pavement joint. Grinding of existing preformed thermoplastic pavement marking and the inlaying of proposed preformed thermoplastic pavement marking shall not be measured and paid for separately, but shall be included in the work. Word Symbol, Preformed Thermoplastic Pavement marking shall be surface applied.

Grooving shall not be performed on bridge decks.

The preformed thermoplastic pavement marking shall be inlaid on new and existing pavements as shown in the Contract. The material shall be capable of use for patching worn areas of the same type according to the manufacturer's recommendations.

Removal and application of temporary preformed thermoplastic pavement marking associated with wet-cutting of pavement shall be at the Contractor's expense.

An epoxy resin primer shall be applied to all existing surfaces (concrete, asphalt, existing markings, etc.) prior to the application of any new preformed thermoplastic, plastic pavement marking. The epoxy resin primer shall conform to CDOT Standard Specifications subsection 708.07. Primer shall be required for all markings used including markings that manufacture does not require a primer. Primer and application will not be measured and paid for separately, but shall be included in the work.

Surface shall be dry and free of dirt, dust, chemicals, and/or significant oily substances. Application procedures for Portland concrete pavement shall be as described above except a compatible primer sealer shall be applied before application of marking to assure proper adhesion.

The following shall be included in the second and third paragraphs of subsection 627.13:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Preformed Thermoplastic Pavement Marking (Inlaid)	Square Foot
Preformed Plastic Pavement Marking 125 mil (Word-Symbol)	Square Foot

2  
REVISION OF SECTION 627 AND 713  
PREFORMED THERMOPLASTIC PAVEMENT MARKING

Subsection 713.14 shall include the following:

(a) *General.*

Material such as lines, legends, or symbols shall be capable of being affixed to HMA or PCC pavements.

Marking shall be capable of conforming to pavement contours, breaks, and faults etc. by the use of the normal heat of a propane torch. Marking shall be capable of withstanding the actions of traffic at normal pavement temperatures. Marking shall have resealing characteristics such that it is capable of fusing with itself and previously applied thermoplastic pavement markings when heated with the torch.

(b) *Physical Requirements.*

1. Marking shall have a factory applied coated surface of beads in addition to the intermixed beads at the rate of 1 lb. ( $\pm 10\%$ ) per 11 sq. ft. The factory applied coated surface beads shall have the following specifications:

- a) Minimum 80% round
- b) Minimum refractive index of 1.50.
- c) Minimum SiO<sub>2</sub> content of 70%
- d) Maximum iron content of 0.1%
- e) The additional beads shall follow the specifications below in reference to the **Colorado Blend** bead specification

<u>Size Gradation</u>	<u>% Retained</u>
14	0-3%
16	2-10%
18	10-30%
20	30-60%
30	50-80%
35	60-85%
45	95-100%
60	98-100%

(c) *Performance.*

Marking, when applied in accordance with manufactures recommendations shall demonstrate a uniform level of sufficient night time retro-reflection when tested in accordance to ASTM E1710-97. The applied material must have an initial minimum intensity reading of 500 mcd·m<sup>-2</sup>·1x<sup>-1</sup> for white and 300 mcd·m<sup>-2</sup>·1x<sup>-1</sup> for yellow as measured with a retro-reflectometer.

The top surface of the stencils (the same side as the factory applied surface beads) shall have an indicator system for the contractor to properly gauge the correct amount of heat to apply during installation. The indicator system shall have a positive visual indication, such as beads changing color or indents closing together, when the material has reached the correct installation temperature. The indicator system must also provide a positive, visual indication if the material has not reached the correct installation temperature.

1  
REVISION OF SECTION 627 AND 713  
MODIFIED EPOXY PAVEMENT MARKING (INLAID)

Sections 627 and 713 of the Standard Specifications are hereby revised for this project as follows:

In subsection 627.05, delete the seventh paragraph and replace with the following:

Epoxy pavement marking shall be applied to the road surface according to the epoxy manufacturer's recommended methods at the application rate or coverage shown below. Glass beads shall be applied into the epoxy pavement marking by means of a low pressure, gravity drop bead applicator.

Section 627.05 shall include the following:

The surface area receiving marking shall be ground prior to placement of the Modified Epoxy Pavement Marking (Inlaid). This applies to new or existing concrete or asphalt pavements. Grinding of the pavement is required so that Modified Epoxy Pavement Marking (Inlaid) is inlaid into the surface being applied to. The grooved width for inlaid pavement marking shall be a max width of 4 ¼ inch and a min width of 4 inch. The depth of the inlaid grooves shall be 80 mils below the surface of the existing pavement. The Contractor shall set the spacer width between blades such that there is less than a 5 mil rise in the pavement between the blade grooves. The applied epoxy in the inlaid grooved shall have a width of min/max of 4 inch.

The ground surface shall be cleaned with a high pressure air blast to remove loose material prior to placement of the Epoxy Pavement Marking (Inlaid). Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. The Contractor shall prevent traffic from traversing the grooves, and shall re-clean grooves, as necessary, prior to application of the preformed plastic pavement markings.

The Contractor shall not perform more inlaid grinds than can be applied by the pavement marking truck during the same working day or working period. Unless approved by the Engineer.

If a rain event occurs during grinding and marking application, temporary raised flexible pavement markers shall be installed on all channelizing, center, and lane lines. Temporary markers shall also be placed on edge lines where lighted curb or other delineation is not provided as directed by the engineer. The frequency of temporary markers shall be according to Section 6F.79 of MUTCD. Marking application may proceed only when pavement is dry and has had no moisture for a minimum of 24 hours.

Epoxy Pavement Marking shall have uniform mil thickness and bead distribution across the entire width of the 4 inch line. Unless otherwise shown on the plans, typical pavement markings shall conform to the shapes and sizes as shown on Standard Plan S-627-1. Any marking that does not meet specification shall be removed and replaced at the contractor's expense.

In subsection 627.05, delete the last paragraph and replace with the following:

Epoxy pavement marking and beads shall be applied within the following limits:

	<b>Application Rate or Coverage per Gallon of Epoxy Pavement Marking</b>	
	<b>Minimum</b>	<b>Maximum</b>
18 – 20 mil marking	80 sq. ft.	90 sq. ft.
Beads	23 lbs.	

2  
 REVISION OF SECTION 627 AND 713  
 MODIFIED EPOXY PAVEMENT MARKING (INLAID)

Subsection 627.05 shall include the following:

Modified Epoxy Pavement Marking shall conform to subsection 713.17.

Subsection 627.13 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Modified Epoxy Pavement Marking (Inlaid)	Gallon

Delete subsection 713.17 and replace with the following:

**713.17 Modified Epoxy Pavement Marking Material.** Only epoxy pavement marking material that is on the Department's Approved Products List may be used. Batches or lots of approved products will be accepted on the project by Certificate of Compliance (COC) in accordance with subsection 106.12. The COC shall confirm that the material meets all CDOT requirements and is the same material that was preapproved in the product evaluation process.

- (a) *Formulation.* Epoxy pavement marking material shall be a two component, 100 percent solids, material formulated to provide simple volumetric mixing ratio of two volumes of component A and one volume of component B unless otherwise recommended by the material manufacturer.
- (b) *Composition.* The component A of both white and yellow shall be within the following limits:

**Resin / Pigment Components (% by Weight)**

Pigment	WHITE	YELLOW
	:	:
TiO <sub>2</sub> , ASTM D476, Type II	18-25	10-17
Organic Yellow		6-10
Epoxy Resin	75-82	73-84

The pigment for yellow epoxy shall contain no lead or other material such that the cured epoxy could be considered a hazardous waste under EPA or CDPHE regulations. The Contractor shall submit to the Engineer a manufacturer's certification of compliance with this requirement.

- (c) *Epoxide Number.* The epoxy number of the epoxy resin shall be the manufacturers target value  $\pm$  50 as determined by ASTM D 1652 for white and yellow component A on pigment free basis.
- (d) *Amine Number.* The amine number on the curing agent (component B) shall be the manufacturers target value  $\pm$  50 per ASTM D 2071.
- (e) *Toxicity.* Upon heating to application temperature, the material shall not produce fumes which are toxic or injurious to persons or property.
- (f) *Color.* The epoxy material, without drop-on beads, shall correspond following requirements:
  - White – Federal Standard No. 595B-17925. The Yellowness Index (YI) of white shall not exceed 8.0 per ASTM E-313-10 initially.
  - After 72 QUV exposure per ASTM G-154 with a UVA-340 Lamp at an irradiance of 0.89 W/m<sup>2</sup>/nm with alternating cycles of 4 hours U.V @ 140° F, and 4 hours humidity @ 122° F the YI shall not exceed 15 when measured per ASTM E-313.

3  
 REVISION OF SECTION 627 AND 713  
 MODIFIED EPOXY PAVEMENT MARKING (INLAID)

The YI, after 500-hour QUV testing as above, shall not exceed 27.

Yellow – Materials for pavement markings shall meet the initial daytime chromaticity that fall within the box created by the following corner points:

Initial Daytime Chromaticity Coordinates (Corner Points)

	1	2	3	4
x	0.530	0.510	0.455	0.472
y	0.456	0.485	0.444	0.400

After 72-hour QUV exposure per ASTM G-154 with a UVA-340 Lamp at an irradiance of 0.89 W/m<sup>2</sup>/nm with alternating cycles of 4 hours U.V @ 140° F, and 4 hours humidity @ 122° F the Yellow shall fall within the initial chromaticity coordinates stated above.

- (g) *Drying Time.* The epoxy pavement marking material shall have a setting time to a no-tracking condition of not more than 25 minutes at a temperature of 73° F and above.
- (h) *Curing.* The epoxy material shall be capable of fully curing under the constant surface temperature condition of 35° F and above.
- (i) *Adhesion to Concrete.* The catalyzed epoxy pavement marking material, when tested according to ACI Method 503, shall *have* such a high degree of adhesion to the specified (4000 psi minimum) concrete surface that there shall be a 100 percent concrete failure in the performance of this test
- (j) *Hardness.* The epoxy pavement marking materials, when tested according to ASTM D 2240, shall have a minimum Shore D Hardness value of 80. Samples shall be allowed to cure at room temperature, 75 ± 2 °F for a minimum of 72 hours and a maximum of 168 hours prior to performing the indicated test.
- (k) *Abrasion Resistance.* The abrasion resistance shall be evaluated on Taber Abrader with a 1000 gram load and CS-17 wheels. The duration of the test shall be 1000 cycles. The wear index shall be calculated based on ASTM test method C-501 and the wear index for the catalyzed material shall not be more than 60. The tests shall be run on cured samples of material which have been applied at film thickness of 15 ± ½ mils to code S-16 stainless steel plates. The samples shall be allowed to cure at 75 ± 2 °F for a minimum of 72 hours prior to performing the indicated tests.
- (l) *Tensile Strength.* When tested according to ASTM D 638, the epoxy pavement marking materials shall have a tensile strength of not less than 6000 psi. The Type IV Specimens shall be cast in a suitable mold and pulled at the rate of ¼ inch per minute by a suitable dynamic testing machine. The samples shall be allowed to cure at room temperature (75 ± 2 °F) for a minimum of 72 hours and a maximum of 168 hours prior to performing the indicated tests.
- (m) *Compressive Strength.* When tested according to ASTM D 695, the catalyzed epoxy pavement marking materials shall have a compressive strength of not less than 12,000 psi. The cast sample shall be conditioned at room temperature, 75 ± 2 °F, for a minimum of 72 hours and a maximum of 168 hours prior to performing the tests. The rate of compression of these samples shall be no more than ¼ inch per minute.
- (n) *Performance.* Marking, when applied in accordance with manufactures recommendations shall demonstrate a uniform level of sufficient night time retro-reflection when tested in accordance to ASTM E1710-97. The applied material must have an initial minimum intensity reading of 500 mcd·m<sup>-2</sup>· 1x<sup>-1</sup> for white and 300 mcd·m<sup>-2</sup>· 1x<sup>-1</sup> for yellow as measured with a retro-reflectometer.

1  
REVISION OF SECTION 620  
FIELD FACILITIES

Sub Section 620 of the Standard Specifications is hereby revised as follows:

Subsection 620.02 shall include the following:

The field office shall be equipped with a facsimile machine, copy machine, and telephone service and conform to the following:

(1) Electrical Grounding.

Proper grounding is important to protect occupants using computer equipment and phones in the event of electrical storms and also for the protection of the equipment itself.

If the site will have two field trailers, where one Trailer will serve as the office and the other will serve as the lab, the two trailers will set together and share a common electrical ground so computer cabling can be installed without spanning driveways.

(2) Telephones/answering machine & Cabling.

Telephone lines shall be of type full business (1FB). There shall be a total of 4 lines. Of these lines:

- (b) One line will be dedicated for the facsimile machine and is to be located in the office trailer. If DSL is available, this line will also carry the single High Speed DSL line (see High Speed Internet section for more information). When ordering the DSL, specify that it is to be located on the fax 1FB.
- (c) One line will serve the office phone and will be located in the office trailer.
- (d) If a Lab trailer exists, one line will serve the Lab phone and shall be located in the lab.

Order phone lines through the Telco provider's (CenturyTel, etc.) business office to optimize cost efficiencies with regard to basic, local and long distance plans and charges. All phones will be speakerphones. At the discretion of the CDOT project Manager and dependent on the number of phone circuits installed, the type of phones may be of the multi-line type to fully utilize the phone service.

Cabling of phones must be industry standard. Labeling must be completed on all wall jacks, ports, and phones with the actual phone numbers. This cabling is to be performed by the Telco or other certified technicians, past the demark to the wall jacks. The phone wall jacks will be located by the Project Manager.

The Contractor shall be responsible for maintaining all phones and circuits in good operating condition at all times during this project.

(1) High Speed Internet.

Note: The contractor shall contact CDOT Regional Network Analyst (Mike Vencius 719-546-5737) for most recent specifications of required network equipment (see Network Equipment section below) and of high-speed provider restrictions and limitations.

The contractor shall provide the field location with high-speed internet connection and equipment. Important note: High Speed Internet access can be difficult to achieve in rural areas. It is strongly recommended that site selection for the trailer be made with consideration of the availability of High Speed Internet access. If none is available, the CDOT project manager will be notified immediately in case site relocation is necessary.



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REVISION OF SECTION 620  
FIELD FACILITIES

The type of High Speed Connection shall preferably be of DSL type. The throughput shall be a minimum of 1.5 Mbps download /896 Kbps upload or better speed. IP addressing shall be DHCP. If DSL is not available, Cable or wDSL (Wireless DSL) may suffice if above specified throughput speeds are achieved. A UPS (battery Backup) of a minimum rating of 500va (volt amp) needs to be provided to protect the DSL router. As a last resort Aircards for each computer perhaps augmented with a cellular signal booster equipment may suffice.

Note: The satellite type broadband will NOT work for CDOT purposes.

(2) Network Equipment.

If there are multiple trailers or buildings on site the contractor will need to provide the cabling and surge suppression equipment necessary.

The contractor MAY also need to provide additional equipment needed for CDOT network security. Note that this equipment is in addition to the DSL modem provided by the internet provider.

If CDOT computers will reside in more than one trailer, as with a MAT lab, then fiber and transceivers or cat 5e copper cabling with surge suppressors will need to be purchased and installed as per CDOT IT. Contact the CDOT Regional Network Analyst for current specifications for this network equipment. Procuring this equipment may take time, so haste in contacting the CDOT Regional Network Analyst is recommended. It is not unusual for this equipment to take over a month to procure due to back orders. Contact CDOT Regional Network Analyst (Mike Vencius 719-546-5737).

Note: If Cisco network equipment is deemed required by CDOT IT then the current cost of this specialized equipment is approximately \$800.00 to \$1300.00 depending on site requirements. If Cisco equipment is not needed the cost will be determined on whether additional buildings are needed to be connected. The cost here may range from \$100 to \$500. If No Cisco equipment is needed and no additional buildings need to be connected and if the Wifi is available, there may be no additional cost for Network Equipment.

Important Cyber Security issue: At project conclusion, all network equipment will be returned to CDOT Regional Network Analyst for removal of CDOT confidential data and network configuration.

(3) Facsimile Machine:

The Project Engineer must approve this machine. The facsimile machine shall print on plain paper and shall be capable of sending documents of all sizes up to and including 11"x17". It must be able to perform sequential broadcast, polling and delayed transmissions with a minimum ten-page memory. The Contractor shall install and maintain the fax machine in the Engineer's field office. Should the fax machine require repair and be out of service for more than twenty-four hours, a replacement is to be provided and installed by contractor within twenty-four hours. The Contractor shall provide a roll around stand for the fax machine paper and supplies. Contractor will provide and maintain stock of printer paper and toner.

3  
REVISION OF SECTION 620  
FIELD FACILITIES

- (4) Copy Machine. The Contractor shall provide a self-feeding plain paper photo copying machine, which is capable of making at least eight copies per minute. Copier shall also be capable of reproducing copies at standard sizes up to and including 11"x17". The copier shall be capable of reducing 11"x17" plan sheets to 8½"x14" legal size and to 8½"x11" letter size. The Contractor shall maintain all furnished equipment in good working condition and shall provide replacement equipment due to breakage, damage, or theft within five working days. The Contractor shall provide a roll around stand for the copy machine, paper and supplies.
- (5) Computer Printer. The Contractor shall provide and maintain one wide format color printer/scanner capable of printing and scanning documents up to and including 11"x17", compatible with CDOT network computers as approved by the Project Engineer.
- (6) Computer Accessories.

CDOT has restrictions and limitations with regard to the type of equipment permitted to be connected and supported on its computers and network. Due to the constantly changing nature of the computer field, contact the CDOT Regional Network Analyst for latest recommendations and cautions before purchasing any requested equipment such as printers, scanners, cameras, etc.

It is imperative that any accessories be compatible with the CDOT standard computer operation system: **Windows 7 64 bit**. Warning: Many devices will not work on the required 64 bit version, but only on the more common consumer Windows 32 bit version. Make sure the product states Windows 7, 64 bit compatible.

Also, Printers, if requested, may not be networked or shared across networks for example between the CDOT network and non-CDOT computer network. The printer must be directly connected to a CDOT computer and can then be shared for use by other CDOT computers.

Copy/Fax/Scanner/Network Printer units that create PDF files and rely on connectivity across the CDOT IP network violate CDOT cyber security policies and are not permitted to be installed on the CDOT network.

All equipment is to be new with warranties.

Contractor will provide and maintain stock of printer paper and toner for any provided printers, scanners, and fax machines.

The field office shall be established and functional prior to starting any work on the project.

Subsection 620.08 shall include the following:

Payment will under:

<b>Pay Item</b>	<b>Pay Unit</b>
Field Office (Class 2)	Each
Field Laboratory (Class 2)	Each

Maintenance of the Field Office will not be paid for separately, but shall be included in the bid price for Field Office (Class 2) and Field Laboratory (Class 2).

1  
REVISION OF SECTION 626  
PUBLIC INFORMATION SERVICES (TIER III)

Section 626 of the Standard Specifications is hereby revised for this project to include the following:

**DESCRIPTION**

This work consists of providing regular and continuous public information services throughout the duration of the project. Final approval of approach and collateral will be given by the Engineer with review by Regional Communications Manager. Anticipated communications issues on this project include:

- (1) Lane Closures

**CONSTRUCTION REQUIREMENTS**

- (a) *Public Information Manager (PIM)*. The Contractor shall provide a full-time Public Information Manager (PIM) who will be the responsible charge for all activities associated with public information services. As part of the key project staff submittal prior to the Preconstruction Conference, the Contractor shall submit the name, contact information and qualifications of the Public Information Manager (PIM) for this project for approval by the Engineer. The Contractor's PIM shall be a professional, having graduated from an accredited college or university with a bachelor's degree in Public Relations, Communications, or a closely related field of study. In addition, the PIM shall have two years experience in community outreach and partnership development or a comparable field. Related work experience may be substitute for the type of degree. The Engineer, after consulting with the Region Public Relations Manager, will approve the Contractor's PIM prior to the preconstruction conference. The identity of the PIM and the PIM'S qualifications shall be submitted to the Engineer five days in advance of the preconstruction conference. The Engineer will coordinate all aspects of the PIM's work, including all required submittals, with the Regional Communications Manager (RCM).
- (b) *Activities of the PIM*. Throughout the duration of the project, the PIM shall be responsible for the following:
  - (1) *On Call*. The PIM shall be available or on call on every day there is work on the project and shall be available upon the Engineer's request at other than normal working hours.
  - (2) *Project Meetings*. The PIM shall be available, as requested by the Engineer, to participate in weekly project meetings held on-site. At the meetings, PIM will discuss communications issues and develop strategies to provide timely details for upcoming media advisories/press releases, lane closure reports, website updates and information line recordings.
  - (3) *Public Information Line/Communications*. The PIM shall establish a public information office equipped with a telephone, voicemail, computer and email address. The public information office may be located off-site or within the PIM's field office, provided that the telephone line is a local call line. The voicemail greeting for the project information line shall provide an updated message each week, or each day if necessary, concerning the project's completion date and forthcoming activities on the project and allow the recording of a message from the caller. If unable to answer the public information line, the PIM shall check and respond to voicemail messages throughout each day of construction operations and lane closures are being carried out. The PIM shall track inquiries made by citizens and businesses, including names, addresses, phone numbers, and subsequent action taken during construction; these customer

REVISION OF SECTION 626  
PUBLIC INFORMATION SERVICES (TIER III)

inquiries and follow-up action shall be entered into Dialog, a web-based contact and issue tracking database provided by the Department. The system shall provide an automated report to the Engineer and Regional Communications Manager each week. All inquiries and complaints shall be followed up with a return phone call or email from either the PIM and, when necessary, the Engineer or Regional Communications Manager.

- (4) *Photos/Video.* The PIM shall take and submit photos/videos of the project work on regular intervals. A cell phone camera is permitted. Photographs/videos may include traffic control, paving, slope repair, erosion control, bridge deck and rail work, and other key areas of work identified by the Contractor and the Department for use in reports to interested agencies, social media, and flyers. A minimum of two digital photographs/videos shall be submitted each month to the Engineer.
- (5) *Media Relations.* At least one week prior to the project start date, the PIM shall prepare a media release summarizing the project scope, construction phasing, potential traffic and construction, duration of project and summary of project benefits. The PIM shall develop additional media releases and traffic advisories based on major construction milestones such as major traffic shifts, key closures, etc. or as requested by CDOT, using the CDOT template provided by the Department. The media releases and traffic advisories will be submitted for approval in accordance with Table 626-2. CDOT will distribute media releases, traffic advisories and other information.

The PIM shall immediately notify the Engineer of any on-site situations involving the media. Should media call, the PIM will provide only the Regional Communications Manager's contact information. CDOT will address all media inquiries and media requests.

- (6) *Lane Closure Reports.* PIM shall submit a Lane Closure Report each Thursday, for the following week's activities (Saturday through Friday), to the contacts listed on the Report and at the end of this specification. Contact the Engineer or Regional Communications Manager for an electronic copy of this report.
- (7) *Web Page Updates.* The PIM shall work with CDOT to develop internet web page content specifically for this project and provide consistent updates with the latest project information (web page development experience is not necessary as the PIM will simply supply information for the CDOT web page template). It shall contain all appropriate links to/from other sites if applicable, e.g., local city, county, bus service, etc. PIM will ensure the web page is updated at least weekly with pertinent schedule information, new photos, contact information, etc.
- (8) *Project Fliers.* At least 10 working days prior to the start of work, the PIM shall prepare and deliver one flier to each property owner potentially impacted by the highway work zone such as properties with direct access to the highway, nearby businesses, schools, homes, churches or others who rely on regular traffic access in the construction zone. The flier shall be developed using the CDOT template. An email containing the flier shall also be sent to all those known to use the project limits having significant or daily use of the roadway contained within the project corridor. Examples of these are bus services, community centers, schools. Additional fliers may be required, as directed, and may be delivered via

REVISION OF SECTION 626  
 PUBLIC INFORMATION SERVICES (TIER III)

<http://uspseverydoordirectmail.com>, the use of a mailing list from county GIS mapping, or other approved method.

The flier shall provide the anticipated project start and end date, location and description of work, traffic impacts and hours/days of operation, PIM’s project information line, email address, web address, project map (if necessary) and a construction safety message as defined by the department. Flier may also contain contractor logo, if desired. Fliers shall be submitted for approval in accordance with Table 626-2. Final approval is provided by the Engineer. The PIM shall contact the Regional Communications Manager for a flier template which will include CDOT’s logo, project logo, or both.

*Language Assistance for LEP Persons.* CDOT is required to provide access to Limited English Proficient (LEP) persons. LEP persons are individuals for whom English is not their primary language and who have a limited ability to read, write, speak or understand English. Examples of language assistance include, but are not limited to, translation of meeting notices and interpretation services at meetings. At a minimum, the PIM shall work with CDOT to provide interpretation services upon request by an LEP person. Additionally, if the community to which the project flyers shall be distributed has greater than 5 percent LEP persons, the flyers shall be translated. The PIM shall document all measures taken to communicate with LEP persons and record all requests for language assistance.

- (c) *Construction Signing.* In accordance with Section 630, a minimum of one week prior to start of work, the Contractor shall erect signs at both ends of the project limits, with the estimated dates when the project will commence and end. The signs shall include the Contractor’s name and public information contact number.
- (d) *Response Protocol to CDOT and the Public.* The PIM shall conform to Table 626-1 in responding to correspondence from stakeholders and the public:

**Table 626-1  
 RESPONSE PROTOCOL**

TYPE OF COMMUNICATION	TIMING OF RESPONSE
Hotline Calls	Check messages throughout day  Respond same day (initial call) or within 24 hours (including weekends if work is occurring)
Email	Same day (within two business days for high volume situations)
Call from CDOT Staff	As soon as possible
Webpage Inquiries	Same day (within two business days for high volume situations)
Public Meeting Inquires	Within one week of the meeting

REVISION OF SECTION 626  
 PUBLIC INFORMATION SERVICES (TIER III)

(e) *Deliverables Protocol to CDOT.* The PIM shall conform to Table 626-2 in submitting the following for Department review and approval prior to dissemination:

**Table 626-2  
 DELIVERABLES AND SUBMITTAL TIME TO CDOT ENGINEER**

<b>Deliverable</b>	<b>When to be submitted</b>
PIM Name and Credentials	Before Pre-Construction Meeting (along with key staff submittal)
PIM Contact Information	At Pre-Construction Meeting
Emergency Response Telephone Tree (when required in the Contract)	Before works starts
Local Telephone Hotline	Before works starts
Stakeholder Distribution List (if required for non-work zone flyer recipients and emergency service providers)	At Pre-Construction Meeting
Lane Closure Reports	Weekly, on Thursday by noon
Traffic Advisories/Media Releases	48 hours prior to scheduled distribution date
Fliers, posters or other public material	5 Working Days prior to the scheduled distribution date  In cases of rapid response, 48 hours prior to distribution
Photos/Video	Two a month or as requested.

(f) *Deliverable protocols to the public.* The PIM shall conform to Table 626-3 in providing the following information to the public:

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 REVISION OF SECTION 626  
 PUBLIC INFORMATION SERVICES (TIER III)

**Table 626-3  
 DELIVERABLES AND SUBMITTAL TIME TO THE PUBLIC**

<b>Deliverable</b>	<b>When to be published</b>
Full road closures, detours, and major traffic impacts lasting seven days or longer	14 days prior to the beginning of activity in any area of the Project.
Major project activities (such as major lane shifts, bridge demolitions, etc.) lasting seven days or less	7 days prior to the beginning of the activity
Other remaining types of construction Activities in any area of the Project including: <ul style="list-style-type: none"> <li>▪ Night Work</li> <li>▪ Utilities</li> <li>▪ Change of business/residential access</li> </ul>	7 days prior to the beginning of activity in any area of the Project or as determined jointly by teams
Other construction updates (e.g., cancellation of planned closures, additional lane closures, closure removals, major traffic shifts, etc.) that directly impact the public.	As soon as known with at least 24 hours' notice

(g) *Public Information Contact Sheet.* A Public Information Contact Sheet shall be completed by the PIM with the names of contact as appropriate to the project:

**Public Information Services Contact Sheet**

**Owners:**

**Colorado Department of Transportation:**

Resident Engineer: Dan Dahlke  
 902 Erie Avenue  
 Pueblo.CO 81001  
 Office Phone: 719-562-5509  
 Cell Phone: 719-251-7981

**Colorado Department of Transportation:**

Project Engineer: Dean Sandoval  
 902 Erie Avenue  
 Pueblo.CO 81001  
 Office Phone: 719-546-5440  
 Cell Phone: 719-251-6978

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REVISION OF SECTION 626  
PUBLIC INFORMATION SERVICES (TIER III)

**Region Public Relations Manager**

Michelle Peulen  
902 Erie Avenue  
Pueblo, CO, 81001  
Phone: 719-562-5514  
Fax: 719-546-5702

**Colorado Department of Transportation, Colorado Traffic Management Center**

425-C Corporate Circle, Golden, CO 80401  
Phone: (303) 512-5830 Fax: (303) 274-9394

**Other Contacts:**

**Colorado State Patrol**

**METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

The Engineer will monitor the PIM and all public information services. When the Contractor provides acceptable public information services in accordance with these specifications, partial payments for the pay item Provide Public Information Services will be made as the work progresses. Failure to provide acceptable public information services will result in withholding of payment for this item. These partial payments will be made as follows:

Partial payments for public information services will be made once each month as work progresses. The monthly partial payments will be determined by pro-rating the lump sum bid amount by the number of months in the actual construction schedule.

Payment for Public Information Services will be full compensation for all fliers, public information office, meetings, telephone lines, and all other labor and materials required to complete the item, except signs. Signs will be measured and paid for in accordance with Section 630.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Public Information Services (Tier III)	Lump Sum

Payment for Public Information Services will be full compensation for all work, materials and equipment to provide public information throughout the project in accordance with this specification.

Construction Signs will be measured and paid for in accordance with Section 630.



REVISION OF SECTION 630  
IMPACT ATTENUATOR (TEMPORARY)

Section 630 of the Standard Specifications is hereby revised for this project to include the following:

**DESCRIPTION**

This work consists of furnishing, installing, certifying, moving, repairing, maintaining, and removing temporary impact attenuators in accordance with these specifications and in conformity with the lines and details shown on the plans or established.

**MATERIALS**

Each impact attenuator shall be selected from the Crash Cushion and End Treatment Application Chart as listed in the *Safety Selection Guide* on the CDOT Design and Construction Project Support web site. Impact attenuators shall conform to the requirements of the manufacturer and be capable of bi-directional shielding of the objects detailed and located on the plans.

If the posted speed limits of the construction zone are 45 miles per hour or less, the impact attenuator shall comply with the crash test requirements contained in NCHRP Report 350 (only applicable for impact attenuators developed prior to 2011) or MASH (acceptable for all impact attenuators), TL-2. For posted speed limits in the construction zone greater than 45 miles per hour, the attenuator shall meet the requirements of TL-3.

**CONSTRUCTION REQUIREMENTS**

The site shall be prepared to receive the impact attenuator by filling, excavating, smoothing, constructing the paved foundation pad, installing approved transition and anchoring, and all other work necessary for the proper installation of the attenuator.

The impact attenuator shall be fabricated and installed in accordance with the manufacturer's recommendations. The Contractor shall provide a copy of the manufacturer's installation instructions and parts list to the Engineer prior to installation of the device.

Each installation shall be supervised and certified as correct upon completion by a representative of the device manufacturer or by an employee of the Contractor who is a certified installer. The certified installer shall have completed device training and shall be registered with the manufacturer as a certified installer. The Contractor shall submit all appropriate documentation to validate that the certified installer has completed device training and has been registered with the manufacturer as a certified installer.

**METHOD OF MEASUREMENT**

Impact Attenuator (Temporary) will be measured by the number of attenuators shown on the plans, installed, certified, and accepted; or the actual number of authorized 24-hour periods that the attenuator is used.

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REVISION OF SECTION 630  
IMPACT ATTENUATOR (TEMPORARY)

**BASIS OF PAYMENT**

If the pay unit is “day” there will be no incremental payment for the device. If the pay unit is “each” the item will be paid incrementally in accordance with subsection 630.16.

The accepted quantities will be paid for at the contract unit price for the pay item listed below:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Impact Attenuator (Temporary)	Day

Payment will be full compensation for all work and materials required to furnish, install, certify, move, repair, maintain, and remove the impact attenuator. Site preparation, foundation pad, epoxy painting, and all necessary hardware including anchors and transitions will not be paid for separately, but shall be included in the work.

1  
REVISION OF SECTION 630  
PORTABLE MESSAGE SIGN PANEL

Section 630 of the Standard Specifications is hereby revised for this project as follows:

Subsection 630.01 shall include the following:

This work includes furnishing, operating, and maintaining a portable message sign panel.

Add subsection 630.031 immediately following subsection 630.03 as follows:

**630.031 Portable Message Sign Panel.** Portable message sign panel shall be furnished as a device fully self-contained on a portable trailer, capable of being licensed for normal highway travel, and shall include leveling and stabilization jacks. The panel shall display a minimum of three - eight character lines. The panel shall be a dot-matrix type with an LED legend on a flat black background. LED signs shall have a pre-default message that activates before a power failure. The sign shall be solar powered with independent back-up battery power. The sign shall be capable of 360 degrees rotation and shall be able to be elevated to a height of at least five feet above the ground measured at the bottom of the sign. The sign shall be visible from one-half mile under both day and night conditions. The message shall be legible from a minimum of 750 feet. The sign shall automatically adjust its light source to meet the legibility requirements during the hours of darkness. The sign enclosure shall be weather tight and provide a clear polycarbonate front cover.

Solar powered message signs shall be capable of operating continuously for 10 days without any sun. All instrumentation and controls shall be contained in a lockable enclosure. The sign shall be capable of changing and displaying sign messages and other sign features such as flash rates, moving arrows, etc.

Each sign shall also conform to the following:

- (1) In addition to the onboard solar power operation with battery back-up, each sign shall be capable of operating on a hard wire, 100-110 VAC, external power source.
- (2) All electrical wiring, including connectors and switch controls necessary to enable all required sign functions shall be provided with each sign.
- (3) Each sign shall be furnished with an operating and parts manual, wiring diagrams, and trouble-shooting guide.
- (4) The portable message sign shall be capable of maintaining all required operations under Colorado mountain-winter weather conditions.
- (5) Each sign shall be furnished with an attached license plate and mounting bracket.
- (6) Each sign shall be wired with a 7-prong male electric plug for the brake light wiring system.

Subsection 630.13 shall include the following:

The portable message sign panel shall be on the project site at least 14 days prior to the start of active roadway construction. Maintenance, storage, operation, relocation to different sites during the project, and all repairs of portable message sign panels shall be the responsibility of the Contractor.

Subsection 630.15 shall include the following:

Portable message sign panels will be measured by the maximum number of approved units in use on the project at any one time.

2  
REVISION OF SECTION 630  
PORTABLE MESSAGE SIGN PANEL

Subsection 630.16 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Portable Message Sign Panel	Each

**FORCE ACCOUNT ITEMS**

**DESCRIPTION**

This special provision contains the Department's estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

**BASIS OF PAYMENT**

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at \$5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

<b>Force Accounts for 19053 –Bridge Replacement</b>		
<b>Force Account Item</b>	<b>Estimated Quantity</b>	<b>Estimated Amount</b>
F/A Minor Contract Revisions	F.A.	\$ 150,000*
F/A On the Job Training	F.A.	\$3,840
F/A Partnering	F.A.	\$ 9,100
F/A Asphalt Pavement Incentive	F.A.	\$ 5,500
F/A Concrete Pavement Incentive	F.A.	\$140,000
F/A Asphalt Cement Cost Adjustment	F.A.	\$ 5,500
F/A Fuel Cost Adjustment	F.A.	\$ 25,000
F/A Roadway Smoothness	F.A.	\$ 250,000
F/A Erosion Control	F.A.	\$ 3,200*
F/A Adjust Utilities	F.A.	\$20,000*
F/A Stabilization	F.A.	\$100,000*
F/A Repair Structure Repair Work	F.A.	\$200,000*
F/A OCIP (Third Party)	F.A.	\$251,000

TRAFFIC CONTROL PLAN - GENERAL

The key elements of the Contractor's method of handling traffic (MHT) are outlined in subsection 630.10(a).

The components of the TCP for this project are included in the following:

- (1) Subsection 104.04 and Section 630 of the specifications.
- (2) Standard Plan S-630-1, Traffic Controls for Highway Construction, Cases 2, 19, 20, 21, 22, 23, 24, and 25 and Standard Plan S-630-2.
- (3) Schedule of Construction Traffic Control Devices.
- (4) Signing Plans.
- (5) Construction phasing plans
- (6) Detour Details.
- (7) Other: Striping Plans – existing, interim, and final

Unless otherwise approved by the Engineer, the Contractor's equipment shall follow normal and legal traffic movements. The Contractor's ingress and egress of the work area shall be accomplished with as little disruption to traffic as possible. Traffic control devices shall be removed by picking up the devices in a reverse sequence to that used for installation. This may require moving backwards through the work zone. When located behind barrier or at other locations shown on approved traffic control plans, equipment may operate in a direction opposite to adjacent traffic.

CDOT may have entered into operating agreements with one or more law enforcement organizations for cooperative activities. Under such agreements, at the sole discretion of CDOT, law enforcement personnel may enter the work zone for enforcement purposes and may participate in the Contractor's traffic control activities. The responsibility under the Contract for all traffic control resides with the Contractor and any such participation by law enforcement personnel in Contractor traffic control activities will be referenced in either the Special Provisions or General Notes of the plans depending on whether the Contractor is to hire local law enforcement or if CDOT is contracting with Colorado State Patrol for uniformed traffic control. Nothing in this Contract is intended to create an entitlement, on the part of the Contractor, to the services or participation of the law enforcement organization.

Special Traffic Control Plan requirements for this project are as follows:

This project contains specific restrictions for working daytime and/or night time. See project Phasing in the Project Special Provision, Revision of Section 108, Prosecution And Progress, for additional information.

No lane closures will be allowed during daylight hours between 7:00 am and 7:00 pm.

All detour work, transitions, and traffic shifts shall be performed at night between the hours of 7:00 pm and 7:00 am.

All intersection construction shall be performed at night between the hours of 7:00 pm and 7:00 am.

Removal of Asphalt Mat (Planing) and installation of Hot Mix Asphalt, at the project approaches, including Concrete Pavement transitions, shall be performed at night between the hours of 7:00 pm and 7:00 am.

During the construction of this project, traffic shall use the present traveled roadway unless identified on the plans or approved by the Engineer.

TRAFFIC CONTROL PLAN - GENERAL

The Contractor shall not have construction equipment or materials in the lanes open to traffic at any time, unless approved by the Engineer.

During the work, only one lane may be closed to traffic in each direction of travel at any time. The closure(s) shall meet the time restriction requirements listed above unless otherwise approved by the Engineer. Traffic shall not be delayed for more than 10 minutes or as directed by the Engineer.

At least two weeks prior to starting construction, the Contractor shall notify the Engineer of the date the Contractor intends to start construction.

All costs incidental to the foregoing requirements shall be included in the original contract prices for the project.

1  
 UTILITIES

The known utilities within the limits of this project are:

UTILITY	CONTACT/EMAIL	PHONE
Excel Energy	Mike Galli	(719) 549-3644
Century Link	Art Royball	(719) 336-0029
Black Hills Energy		(888) 890-5554
Pueblo Board of Water Works	Scot Burbidge <a href="mailto:sburbidge@pueblowater.org">sburbidge@pueblowater.org</a>	(719) 584-0478
Colorado Department of Transportation (FIBER)	Michael Lopez (Milo) Tony Kerr	(303) 512-5817 (719) 251-4201

The Contractor shall coordinate with the CDOT Project Engineer and any appropriate utility company to facilitate the installation, placement and relocation of all utilities impacted on this project.

The work described in these plans and specifications requires full cooperation between the Contractor and the utility owners in accordance with Subsection 105.11 in conducting their respective operations, so the utility work can be completed with minimum delay to all parties concerned. Also, in accordance with the plans and specifications, and as directed by the Engineer, the Contractor shall keep each utility owner advised of any work being done to its facility, so that each utility owner can coordinate its inspections for final acceptance of the work with the Engineer.

The Contractor shall coordinate the work with the owners of the utilities impacted by the work. Coordination with utility owners includes, but is not limited to, staking construction features, providing and periodically updating an accurate construction schedule which includes all utility work elements, providing written notification of upcoming required utility work elements as the construction schedule indicates, allowing the expected number of working days for utilities to complete necessary relocation work, conducting necessary utility coordination meetings, applying for and obtaining power or communication services in CDOT's name and all other necessary accommodations as directed by the Project Engineer. Surveying and/or staking of utility relocations to be performed by the owner shall be the responsibility of the utility owner.

Prior to excavating or performing any earthwork operations, the Contractor shall positively locate all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule of construction. The Contractor shall modify construction plans to avoid existing underground facilities as needed, and as approved by the Engineer. Please note that UNCC marks only its member's facilities – Other facilities, such as ditches and drainage pipes and CDOT's fiber optic system may exist, and it is the Contractor's responsibility to investigate, locate and avoid such facilities. The Contractor shall pothole all of the listed potential conflicts prior to starting any underground or earth work well in advance of the work so that the utility companies can be given the required notification and to avoid delays to the contractor's work.

The CDOT Contractor shall provide traffic control for any utility work expected to be coordinated with construction, as directed by the CDOT Engineer.



2  
UTILITIES

THE WORK LISTED BELOW SHALL BE PERFORMED BY THE CONTRACTOR:

No utility work by the Contractor is expected. However, if any utility work by the Contractor or a utility company is determined to be necessary during the construction of the project, the following shall apply:

The Contractor shall be responsible for coordinating the adjustment of all utilities on this project. The Contractor shall keep each utility company advised of any work being performed on or around their facilities, so that each utility company can coordinate any needed inspections, including inspections with the Engineer.

The Contractor shall provide written notice to each utility company, with a copy to the Engineer, prior to any work by a utility company that is to be coordinated with project construction. A minimum of two (2) calendar weeks of prior notice is required.

If appropriate, the Contractor shall provide traffic control for any utility work to be coordinated with the project's construction, in accordance with an approved Method of Handling Traffic (MHT). Payment to be made via contract bid item(s).

THE WORK LISTED BELOW WILL BE COMPLETED BY THE UTILITY COMPANIES OR THEIR AGENTS:

No utility work by the Utility Company is expected.

GENERAL:

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavating or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least two (2) business days, not including the actual day of notice, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at phone no. 1-800-922-1987, to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective owner. For CDOT locates, call 303-365-7312. Utility service laterals shall also be located prior to beginning excavation or grading.

The location of utility facilities as shown on the plan and profile sheets and herein described, were obtained from the best available information.

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work.

REVISION OF SECTIONS 101 AND 630  
CONSTRUCTION ZONE TRAFFIC CONTROL

Sections 101 and 630 of the Standard Specifications are hereby revised for this project as follows:

In subsection 101.01 add the following:

MASH Manual for Assessing Safety Hardware

In subsection 630.01, delete the first paragraph and replace with the following:

**630.01** This work consists of furnishing, installing, moving, maintaining, and removing temporary traffic signs, advance warning arrow panels, flashing beacon (portable), barricades, channelizing devices, delineators, temporary traffic signals, mobile pavement marking zones, masking and unmasking existing signs in construction zones, and concrete barriers as required by the Manual on Uniform Traffic Control Devices for Streets and Highways and the Colorado Supplement thereto, in accordance with the Contract. Devices shall comply with the performance criteria contained in NCHRP Report 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices). Devices temporarily not in use shall, as a minimum, be removed from the shoulder area. Moving will include devices removed from the project and later returned to use.

In subsection 630.02, delete the second paragraph, and replace with the following:

Temporary sign support assembly shall be timber, perforated square metal tubing inserted into a larger base post or slip base or perforated metal U-channel with a slip base. The temporary sign support assembly shall conform to NCHRP (only applicable for sign support assemblies developed prior to 2011) or MASH (acceptable for all sign support assemblies), and AASHTO requirements regarding temporary sign supports during construction.

Subsection 630.02 shall include the following:

If a timber post is selected, it shall conform to the requirements of subsection 614.02.

In subsection 630.07(a), delete the first paragraph and replace with the following:

- (a) *Stackable Vertical Panels.* Stackable vertical panels shall comply with the crash test requirements contained in NCHRP Report 350 (only applicable for vertical panels developed prior to 2011) or MASH (acceptable for all vertical panels) and shall meet MUTCD requirements for vertical panels. Vertical panels shall be retroreflectorized with Type IV sheeting, in accordance with subsection 630.02. The stackable vertical panels shall have the following properties:

In subsection 630.07(b), delete the first paragraph and replace with the following:

- (b) *Stackable Tubular Markers.* Stackable tubular markers shall comply with the crash test requirements contained in NCHRP Report 350 (only applicable for stackable tubular markers developed prior to 2011) or MASH (acceptable for all stackable tubular markers) and shall conform to MUTCD requirements for Tubular Markers. The stackable tubular markers shall have the following properties:

In subsection 630.09, delete the second and third paragraphs, and replace with the following:

Work zone devices designated by FHWA as Category I, II, or III, shall comply with the performance criteria contained in NCHRP Report 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices). Devices designated as Category IV, including but not limited to portable or trailer-mounted devices such as flashing arrow panels, temporary traffic signals, area lighting supports, and changeable message signs are not required to meet NCHRP 350 or MASH requirements.

Except for Category IV devices, the Contractor shall obtain and present to the Engineer the manufacturer's written NCHRP 350 (only applicable for devices developed prior to 2011) or MASH (acceptable for all devices) certification for each work zone device before it is first used on the project.

REVISION OF SECTIONS 101 AND 630  
CONSTRUCTION ZONE TRAFFIC CONTROL

In subsection 630.10(a) (3) (iii), delete the third paragraph, and replace with the following:

Groups 1 and 2 shall each be equipped with a truck-mounted Advance Warning Flashing or Sequencing Arrow Panel (C Type), and a truck mounted impact attenuator. The impact attenuator shall be located on the rearmost vehicle of each group. A separate vehicle for this attenuator may be used. Each truck-mounted impact attenuator shall be certified by the manufacturer to be able to withstand a 62 MPH impact in accordance with NCHRP 350, Test Level 3 (only applicable for truck-mounted impact attenuators developed prior to 2011) or MASH, Test Level 3 (acceptable for all truck-mounted impact attenuators). The cone setting truck and the cone pickup truck shall not be the same vehicle.

In subsection 630.16, delete the 5th paragraph.

REVISION OF SECTION 102  
CONTENTS OF PROPOSAL FORMS

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 102.02 and replace with the following:

**102.02 Contents of Proposal Forms.** The Department will publish bidding opportunities to perspective bidders on the CDOT Business Center web site. The forms on this web site will state the location and description of the contemplated construction and will show the estimate of the various quantities and types of work to be performed or materials to be furnished, and will have a schedule of items for which unit bid prices are invited. The proposal form will state the time in which the project must be completed, the amount of the proposal guaranty, and the date, time and place of the opening of proposals.

All bidders on projects shall submit electronic bids only. Innovative delivery method projects such as Design-Build, CMGC and Best Value, are not subject to this electronic bidding requirement.

The plans, specifications, and other documents designated in the proposal form, will be considered a part of the proposal.

The prospective bidder shall pay the Department the sum stated in the Invitation for Bids for each set of plans.

REVISION OF SECTION 103  
COLORADO RESIDENT BID PREFERENCE

Section 103 of the Standard Specifications is hereby revised for this project as follows:

Subsection 103.01 shall include the following:

- (a) *Colorado Resident Bid Preference.* A resident bidder shall be allowed a preference against a nonresident bidder from a state or foreign country equal to the preference given or required by the state or foreign country in which the nonresident bidder is a resident.

Resident bidder means:

- (1) A person, partnership, corporation, or joint venture which is authorized to transact business in Colorado and which maintains its principal place of business in Colorado: or,
- (2) A person, partnership, corporation, or joint venture which is authorized to transact business in Colorado, which maintains a place of business in Colorado, and which has paid Colorado unemployment compensation taxes in at least seventy-five percent of the eight quarters immediately prior to bidding on a construction contract for a public project.

To determine the resident bid preference status of a bidder, the bidder shall submit a completed Form 604 with the proposal. Failure to submit the residency Form with the proposal will be justification for and may result in the rejection of the proposal and forfeiture of the proposal guaranty.

The proposals will be treated as follows:

- (1) All proposals will be checked for accuracy by the Department.
- (2) The dollar amount of the checked proposal from nonresident bidders will be adjusted by a percentage equal to the percentage preference given or required by the state or foreign country of the bidder's residency. If the state or foreign country does not give or require a residency preference, no adjustment in the proposal dollar amount will be made.
- (3) Adjusted proposals from nonresident bidders will then be compared to proposals from resident bidders, and the bidder with the lowest total will be considered the apparent low bidder.
- (4) Should a nonresident bidder be the apparent low bidder, in accordance with paragraph (3) above, an award will be made on the basis of the original proposal, not the adjusted proposal.
- (5) The Department will proceed with its normal award procedure.

July 29, 2011

REVISION OF SECTION 105  
CONSTRUCTION DRAWINGS

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 105.02(f)

REVISION OF SECTION 105  
CONSTRUCTION SURVEYING

Section 105 of the Standard Specifications is hereby revised for this project as follows:

In subsection 105.13, delete (a) and replace with the following:

- (a) *Contractor Surveying.* When the bid schedule contains pay item 625, Construction Surveying, the Department will provide control points and bench marks as described in the Contract. The Contractor shall furnish and set construction stakes establishing lines and grades in accordance with the provisions of Section 625. The Engineer may order extra surveying which will be paid for at a negotiated rate not to exceed \$150 per hour.

In subsection 105.13 (b), delete the sixth paragraph and replace with the following:

The Contractor shall be held responsible for the preservation of all stakes and marks, and if any are destroyed, disturbed or removed by the Contractor, subcontractors, or suppliers, the cost of replacing them will be charged against the Contractor and will be deducted from the payment for the work at a negotiated rate not to exceed \$150 per hour.

REVISION OF SECTION 105  
CONTRACTOR SUBMITTALS  
TRAFFIC SIGNAL PEDESTAL POLE

Section 105 of the Standard Specifications is hereby revised for this project as follows:

In subsection 105.02, Table 105-1, delete the Section No. 614 item Traffic Signal Pedestal Pole and replace it with the following:

<b>Section No.</b>	<b>Description</b>	<b>Type</b>	<b>Contractor P.E. Seal Required?</b>
614	Traffic Signal Pedestal Pole	Working Drawing	Y



REVISION OF SECTION 105  
DISPUTES AND CLAIMS FOR CONTRACT ACCEPTANCE

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsections 105.22, 105.23 and 105.24 and replace with the following:

105.22 Dispute Resolution. Subsections 105.22, 105.23, and 105.24 detail the process through which the parties (CDOT and the Contractor) agree to resolve any issue that may result in a dispute. The intent of the process is to resolve issues early, efficiently, and as close to the project level as possible. Figure 105-1 in the standard special provisions outlines the process. Specified time frames may be extended by mutual agreement of the Engineer and the Contractor. In these subsections, when a time frame ends on a Saturday, Sunday or holiday, the time frame shall be extended to the next scheduled work day.

An issue is a disagreement concerning contract price, time, interpretation of the Contract, or all three between the parties at the project level regarding or relating to the Contract. Issues include, but are not limited to, any disagreement resulting from a delay, a change order, another written order, or an oral order from the Project Engineer, including any direction, instruction, interpretation, or determination by the Project Engineer, interpretations of the Contract provisions, plans, or specifications or the existence of alleged differing site conditions.

The Contractor shall be barred from any administrative, equitable, or legal remedy for any issue which meets either of the following criteria;

1. The Contractor did not bring the issue to the Project Engineer's attention in writing within 20 days of the Contractor being aware of the issue.
2. The Contractor fails to continually (weekly or otherwise approved by both parties) work with CDOT towards a resolution.

A dispute is an issue in which the Contractor and CDOT have not been able to resolve and of which the Contractor submits a written formal notice of dispute per section (b) below.

A claim is a dispute not resolved at the Resident Engineer level or resolved after a DRB recommendation.

The term "merit" refers to the right of a party to recover on a claim or dispute, irrespective of quantum, based on the substance, elements, and grounds of that claim or dispute. The term "quantum" refers to the quantity or amount of compensation or time deserved when a claim or dispute is found to have merit.

Disputes from subcontractors, material suppliers, or any other entity not party to the Contract shall be submitted through the Contractor. Review of a pass-through dispute does not create privity of Contract between CDOT and the subcontractor.

If CDOT does not respond within the specified timelines, the Contractor may advance the dispute to the next level.

When the Project Engineer is a Consultant Project Engineer, actions, decisions, and determinations specified herein as made by the Project Engineer shall be made by the Resident Engineer.

The dispute resolution process set forth in this subsection shall be exhausted in its entirety prior to initiation of litigation or arbitration. Failure to comply with the requirements set forth in this subsection shall bar either party from any further administrative, equitable, or legal remedy. If a deadline is missed that does not prejudice either party, further relief shall be allowed.

All written notices of dispute shall be submitted within 30 days of date of the Project Engineer's Final Acceptance letter; see subsection 105.21(b).

When a project has a landscape maintenance period, the Project Engineer will grant partial acceptance in accordance with subsection 105.21(a). This partial acceptance will be project acceptance of all the construction work performed prior to this partial acceptance.

All disputes and claims related to the work in which this partial acceptance is granted shall be submitted within 30 days of the Project Engineer's partial acceptance.

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Should the Contractor's dispute use the Total Cost approach for calculating damages, damages will be determined by subtracting the contract amount from the total cost of performance. Should the Contractor's dispute use the Modified Total Cost approach for calculating damages, if the Contractor's bid was unrealistic in part, and/or some of its costs were unreasonable and/or some of its damages were caused by its own errors, those costs and damages will be deducted from the total cost of performance to arrive at the Modified Total Cost. The Total Cost or Modified Total Cost basis for calculating damages shall not be available for any disputes or claims seeking damages where the Contractor could have kept separate cost records at the time the dispute arose as described in subsection 105.22(a).

- (a) *Document Retention.* The Contractor shall keep full and complete records of the costs and additional time incurred for each dispute for a period of at least three years after the date of final payment or until dispute is resolved, whichever is more. The Contractor, subcontractors, and lower tier subcontractors shall provide adequate facilities, acceptable to the Engineer, for an audit during normal business hours. The Contractor shall permit the Engineer or Department auditor to examine and copy those records and all other records required by the Engineer to determine the facts or contentions involved in the dispute. The Contractor shall identify and segregate any documents or information that the Contractor considers particularly sensitive, such as confidential or proprietary information.

Throughout the dispute, the Contractor and the Project Engineer shall keep complete daily records of extra costs and time incurred, in accordance with the following procedures:

1. Daily records shall identify each operation affected, the specific locations where work is affected, and the potential effect to the project's schedule. Such records shall also reflect all labor, material, and equipment applicable to the affected operations.
  2. On the first work day of each week following the date of the written notice of dispute, the Contractor shall provide the Project Engineer with the daily records for the preceding week. If the Contractor's records indicate costs greater than those kept by the Department, the Project Engineer will meet with the Contractor and present his records to the Contractor at the meeting. The Contractor shall notify the Engineer in writing within three work days of any inaccuracies noted in, or disagreements with, the Department's records.
- (b) *Initial Dispute Resolution Process.* To initiate the dispute resolution process the Contractor shall provide a written notice of dispute to the Project Engineer upon the failure of the Parties to resolve the issue through negotiation. Disputes will not be considered unless the Contractor has first complied with specified issue resolution processes such as those specified in subsections 104.02, 106.05, 108.08(a), and 108.08(d).

The Contractor shall supplement the written notice of dispute within 15 days with a written Request for Equitable Adjustment (REA) providing the following:

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- (1) The date of the dispute
- (2) The nature of the circumstances which caused the dispute
- (3) A statement explaining in detail the specific provisions of the Contract and any basis, legal or factual, which support the dispute.
- (4) If any, the estimated quantum, calculated in accordance with methods set forth in subsection 105.24(b)12., of the dispute with supporting documentation
- (5) An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption.

The Contractor shall submit as much information on the quantum and impacts to the Contract time as is reasonably available with the REA and then supplement the REA as additional information becomes available. If the dispute escalates to the DRB process the DRB shall not hear any issue or consider any information that was not contained in the Request for Equitable Adjustment and fully submitted to the Project Engineer and Resident Engineer during the 105.22 process.

- (c) *Project Engineer Review.* Within 15 days after receipt of the REA, the Project Engineer will meet with the Contractor to discuss the merits of the dispute. Within seven days after this meeting, the Project Engineer will issue a written decision on the merits of the dispute.

The Project Engineer will either deny the merits of the dispute or notify the Contractor that the dispute has merit. This determination will include a summary of the relevant facts, Contract provisions supporting the determination, and an evaluation of all scheduling issues that may be involved.

If the dispute is determined to have merit, the Contractor and the Project Engineer will determine the adjustment in payment, schedule, or both within 30 days. When a satisfactory adjustment is determined, it shall be implemented in accordance with subsections 106.05, 108.08, 109.04, 109.05 or 109.10 and the dispute is resolved.

If the Contractor accepts the Project Engineer's denial of the merits of the dispute, the dispute is resolved and no further action will be taken. If the Contractor does not respond in seven days, it will be assumed he has accepted the denial. If the Contractor rejects the Project Engineer's denial of the merits of the dispute or a satisfactory adjustment of payment or schedule cannot be agreed upon within 30 days, the Contractor may further pursue resolution of the dispute by providing written notice to the Resident Engineer within seven days, according to subsection 105.22(d).

- (d) *Resident Engineer Review.* Within seven days after receipt of the Contractor's written notice to the Resident Engineer of unsatisfactory resolution of the dispute, the Project Engineer and Resident Engineer will meet with the Contractor to discuss the dispute. Meetings shall continue weekly for a period of up to 30 days and shall include a Contractor's representative with decision authority above the project level.

If these meetings result in resolution of the dispute, the resolution will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the dispute is resolved.

If these meetings do not result in a resolution or the participants mutually agree that they have reached an impasse, the dispute shall be presented to the Dispute Review Board in accordance with subsection 105.23.

**105.23 Dispute Review Board.** A Dispute Review Board (DRB) is an independent third party that will provide specialized expertise in technical areas and administration of construction contracts. The DRB will assist in and facilitate the timely and equitable resolution of disputes between CDOT and the Contractor in an effort to avoid animosity and construction delays, and to resolve disputes as close to the project level as possible. The DRB shall be established and operate as provided herein and shall serve as an independent and impartial board.

There are two types of DRBs: the "On Demand DRB" and the "Standing DRB". The DRB shall be an "On Demand DRB" unless a "Standing DRB" is specified in the Contract. An On Demand DRB shall be established only when the Project Engineer initiates a DRB review in accordance with subsection 105.23(a). A Standing DRB, when specified in the Contract, shall be established at the beginning of the project.

- (a) *Initiation of Dispute Review Board Review.* When a dispute has not been resolved in accordance with

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subsection 105.22, the Project Engineer will initiate the DRB review process within 5 days after the period described in subsection 105.22(d).

- (b) *Formation of Dispute Review Board.* DRBs will be established in accordance with the following procedures:
1. CDOT, in conjunction with the Colorado Contractors Association, will maintain a statewide list of suggested DRB candidates experienced in construction processes and the interpretation of contract documents and the resolution of construction disputes. The Board members shall be experienced in highway and transportation projects. After December 31, 2013 only individuals who have completed training (currently titled DRB Administration & Practice Training) through the Dispute Resolution Board Foundation or otherwise approved by CDOT can be a DRB member. When a DRB is formed, the parties shall execute the agreement set forth in subsection 105.23(l).
  2. If the dispute has a value of \$250,000 or less, the On Demand DRB shall have one member. The Contractor and CDOT shall select the DRB member and execute the agreement within 30 days of initiating the DRB process. If the parties do not agree on the DRB member, each shall select five candidates. Each party shall numerically rank their list using a scale of one to five with one being their first choice and five being their last choice. If common candidates are listed, but the parties cannot agree, that common candidate with the lowest combined numerical ranking shall be selected. If there is no common candidate, the lists shall be combined and each party shall eliminate three candidates from the list. Each party shall then numerically rank the remaining candidates, with No. 1 being the first choice. The candidate with the lowest combined numerical ranking shall be the DRB member. The CDOT Project Engineer will be responsible for having all parties execute the agreement.
  3. If the dispute has a value over \$250,000, the On Demand DRB shall have three members. The Contractor and CDOT shall each select a member and those two members shall select a third. Once the third member is approved the three members will nominate one of them to be the Chair and execute the agreement within 45 days of initiating the DRB process.
  4. The Standing DRB shall always have three members. The Contractor and CDOT shall each select a member and those two members shall select a third member. Once the third member is approved the three members will nominate one of them to be the Chair.. The Contractor and CDOT shall submit their proposed Standing DRB members within 5 days of execution of the Contract. The third member shall be selected within 15 days of execution of the Contract. Prior to construction starting the parties shall execute the Three Party Agreement. The CDOT Project Engineer will be responsible for having all parties execute the agreement. The Project Engineer will invite the Standing DRB members to the Preconstruction and any Partnering conferences.
  5. DRB members shall not have been involved in the administration of the project under consideration. DRB candidates shall disclose to the parties the following relationships:
    - (1) Prior employment with either party
    - (2) Prior or current financial interests or ties to either party
    - (3) Prior or current professional relationships with either party
    - (4) Anything else that might bring into question the impartiality or independence of the DRB member
    - (5) Prior to agreeing to serve on a DRB, members shall notify all parties of any other CDOT DRB's they are serving or that they will be participating in another DRB.

If either party objects to the selection of a potential DRB member based on the disclosures of the potential member, that potential member shall not be placed on the Board.
  6. There shall be no ex parte communications with the DRB at any time.
  7. The service of a Board member may be terminated only by written agreement of both parties.
  8. If a Board member resigns, is unable to serve, or is terminated, a new Board member shall be selected within four weeks in the same manner as the Board member who was removed was originally selected.

(c) *Additional Responsibilities of the Standing Disputes Review Board*

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1. General. Within 120 days after the establishment of the Board, the Board shall meet at a mutually agreeable location to:
    - (1) Obtain copies of the Contract documents and Contractor's schedules for each of the Board members.
    - (2) Agree on the location of future meetings, which shall be reasonably close to the project site.
    - (3) Establish an address and telephone number for each Board member for the purposes of Board business.
  2. Regular meetings. Regular meetings of the Board shall be held approximately every 120 to 180 days throughout the life of the Contract, except that this schedule may be modified to suit developments on the job as the work progresses. Regular meetings shall be attended by representatives of the Contractor and the Department.
  3. The Board shall establish an agenda for each meeting which will cover all items that the Board considers necessary to keep it abreast of the project such as construction status, schedule, potential problems and solutions, status of past claims and disputes, and potential claims and disputes. Copies of each agenda shall be submitted to the Contractor and the Department at least seven days before the meeting date. Oral or written presentations or both shall be made by the Contractor and the Department as necessary to give the Board all the data the Board requires to perform its functions. The Board will prepare minutes of each meeting, circulate them to all participants for comments and approval, and issue revised minutes before the next meeting. As a part of each regular meeting, a field inspection trip of all active segments of the work at the project site may be made by the Board, the Contractor, and the Department.
  4. Advisory Opinions
    - (1) Advisory opinions are typically used soon after the parties find they have a potential dispute and have conducted preliminary negotiations but before expenditure of additional resources and hardening their positions. Advisory opinions provide quick insight into the DRB's likely assessment of the dispute. This process is quick and may be entirely oral and does not prejudice the opportunity for a DRB hearing.
    - (2) Both parties must agree to seek an advisory opinion and so notify the chairperson. The procedure for requesting and issuing advisory opinions should be discussed with the DRB at the first meeting with the parties.
    - (3) The DRB may or may not issue a written opinion, but if a written advisory opinion is issued, it must be at the specific request of both parties.
    - (4) The opinion is only advisory and does not require an acceptance or rejection by either party. If the dispute is not resolved and a hearing is held, the oral presentations and advisory opinion are completely disregarded and the DRB hearing procedure is followed.
    - (5) Advisory opinions should be limited to merit issues only.
- (d) *Arranging a Dispute Review Board Hearing.* When the Project Engineer initiates the DRB review process, the Project Engineer will:
1. Contact the Contractor and the DRB to coordinate an acceptable hearing date and time. The hearing shall be held at the Resident Engineer's office unless an alternative location is agreed to by both parties. Unless otherwise agreed to by both parties the DRB hearing will be held within 30 days after the DRB agreement is signed by the CDOT Chief Engineer.
  2. Ensure DRB members have copies of all documents previously prepared by the Contractor and CDOT pertaining to the dispute, the DRB request, the Contract documents, and the special provisions at least two weeks before the hearing.
- (e) *Pre-Hearing Submittal:* At least fifteen days prior to the hearing, CDOT and the Contractor shall submit by e-mail to the DRB Chairperson their parties pre-hearing position paper. The DRB Chairperson shall simultaneously distribute by e-mail the pre-hearing position papers to all parties and other DRB members, if any. At the same time, each party shall submit a copy of all its supporting documents to be used at the hearing to all DRB Members and the other party unless the parties have agreed to a common set of

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documents as discussed in #2 below. In this case, CDOT shall submit the common set of documents to the Board and the Contractor. The pre-hearing position paper shall contain the following:

1. A joint statement of the dispute, and the scope of the desired decision. The joint statement shall summarize in a few sentences the nature of the dispute. If the parties are unable to agree on the wording of the joint statement, each party's position paper shall contain both statements, and identify the party authoring each statement. The parties shall agree upon a joint statement at least 20 days prior to the hearing and submit it to the DRB or each party's independent statement shall be submitted to the DRB and the other party at least 20 days prior to the hearing.
2. The basis and justification for the party's position, with reference to specific contract language and other supporting documents for each element of the dispute. To minimize duplication and repetitiveness, the parties may identify a common set of documents that will be referred to by both parties and submit them in a separate package to the DRB. The engineer will provide a hard copy of the project plans and Project and Standard Special Provisions, if necessary, to the DRB. Other standard CDOT documents such as Standard Specifications and M&S Standards are available on the CDOT website.
  - (1) If any party contends that they are not necessary to the proceedings, the DRB shall determine that issue in the first instance. Should the DRB determine that a dispute does not involve a party, that party shall be relieved from participating in the DRB hearing and paying any further DRB costs.
  - (2) When the scope of the hearing includes quantum, the requesting party's position paper shall include full cost details, calculated in accordance with methods set forth in subsection 105.24(b)12. The Scope of the hearing will not include quantum if CDOT has ordered an audit and that audit has not been completed.
3. A list of proposed attendees at the hearing. In the event of any disagreement, the DRB shall make the final determination as to who attends the hearing.
4. A list of any intended experts including their qualifications and a summary of what their presentation will include and an estimate of the length of the presentation.

The number of copies, distribution requirements, and time for submittal shall be established by the DRB and communicated to the parties by the Chairperson.

A pre-hearing phone conference with all DRB members and the parties shall be conducted as soon as a hearing date is established but no later than 10 days prior to the hearing. The DRB Chairperson shall explain the specifics of how the hearing will be conducted including how the two parties will present their information to the DRB (Ex: Each party makes a full presentation of their position or presentations will be made on a "point by point" basis with each party making a presentation only on an individual dispute issue before moving onto to the next issue). If the pre-hearing position papers and documents have been received by the Board prior to the conference call, the DRB Chairperson shall at this conference discuss the estimated hours of review and research activities for this dispute (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB). If the pre-hearing position papers and documents have not been received by the Board prior to the conference call, another conference call will be scheduled during the initial conference call to discuss the estimated hours of review. Compensation for time agreed to in advance by the parties will be made at an agreed rate of \$125 per hour in accordance with subsection 105.23 (k) 2. Compensation for the phone conference time will also be made at an agreed to rate of \$125 per hour in accordance with subsection 105.23 (k) 2. The Engineer shall coordinate the phone conference.

- (f) *Dispute Review Board Hearing.* The DRB shall preside over a hearing. The chairperson shall control the hearing and conduct it as follows:
1. An employee of CDOT presents a brief description of the project and the status of construction on the project.
  2. The party that requested the DRB presents the dispute in detail as supported by previously submitted information and documentation in the pre-hearing position paper. No new information or disputes will be

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heard or addressed by the DRB.

3. The other party presents its position in detail as supported by previously submitted information and documentation in the pre-hearing position paper. No new information or disputes will be heard or addressed by the DRB.
  4. Employees of each party are responsible for leading presentations at the DRB hearing.
  5. Attorneys shall not participate in the hearing unless the DRB specifically addresses an issue to them or unless agreed to by both parties. Should the parties disagree on attorney participation, the DRB shall decide on what, if any, participation will be permitted. Attorneys representing the parties are permitted to attend the hearing, provided their presence has been noted in the pre-hearing submittal.
  6. Either party may use experts. A party intending to offer an outside expert's analysis at the hearing shall disclose such intention in the pre-hearing position paper. The expert's name and a general statement of the area of the dispute that will be covered by his presentation shall be included in the disclosure. The other party may present an outside expert to address or respond to those issues that may be raised by the disclosing party's outside expert.
  7. If both parties approve, the DRB may retain an outside expert. The DRB chairperson shall include the cost of the outside expert in the DRB's regular invoice. CDOT and the Contractor shall equally bear the cost of the services of the outside expert employed by the DRB.
  8. Upon completion of their presentations and rebuttals, both parties and the DRB will be provided the opportunity to exchange questions and answers. All questions shall be directed to the chairperson first. Attendees may respond only when board members request a response.
  9. The DRB shall hear only those disputes identified in the written request for the DRB and the information contained in the pre-hearing submittals. The board shall not hear or address other disputes. If either party attempts to discuss a dispute other than those to be heard by the DRB or attempts to submit new information, the chairperson shall inform such party that the board shall not hear the issue and shall not accept any additional information. The DRB shall not hear any issue or consider any information that was not contained in the Request for Equitable Adjustment and fully submitted to the Project Engineer and Resident Engineer during the 105.22 process.
  10. If either party fails to timely deliver a position paper, the DRB may reschedule the hearing one time. On the final date and time established for the hearing, the DRB shall proceed with the hearing using the information that has been submitted.
  11. If a party fails to appear at the hearing, the DRB shall proceed as if all parties were in attendance.
- (g) *Dispute Review Board Recommendation.* The DRB shall issue a Recommendation in accordance with the following procedures:
1. The DRB shall not make a recommendation on the dispute at the meeting. Prior to the closure of the hearing, the DRB members and the Contractor and CDOT together will discuss the time needed for analysis and review of the dispute and the issuance of the DRB's recommendation. The maximum time shall be 30 days unless otherwise agreed to by both parties. At a minimum, the recommendation shall contain all the elements listed in Rule 35, Form of Award, of the Arbitration Regular Track Provisions listed at the end of subsection 105.24.

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2. After the meeting has been closed, the DRB shall prepare a written Recommendation signed by each member of the DRB. In the case of a three member DRB, where one member dissents that member shall prepare a written dissent and sign it.
3. The chairperson shall transmit the signed Recommendation and any supporting documents to both parties.

- (h) *Clarification and Reconsideration of Recommendation.* Either party may request clarification or reconsideration of a decision within ten days following receipt of the Recommendation. Within ten days after receiving the request, the DRB shall provide written clarification or reconsideration to both parties unless otherwise agreed to by both parties.

Requests for clarification or reconsideration shall be submitted in writing simultaneously to the DRB and to the other party.

The Board shall not accept requests for reconsideration that amount to a renewal of a prior argument or additional argument based on facts available at the time of the hearing. The Board shall not consider any documents or arguments which have not been made a part of the pre-hearing submittal other than clarification and data supporting previously submitted documentation.

Only one request for clarification or reconsideration per dispute from each party will be allowed.

- (i) *Acceptance or Rejection of Recommendation.* CDOT and the Contractor shall submit their written acceptance or rejection of *the* Recommendation, in whole or in part, concurrently to the other party and to the DRB within 14 days after receipt of the Recommendation or following receipt of responses to requests for clarification or reconsideration.

If the parties accept the Recommendation or a discreet part thereof, it will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the dispute is resolved.

If either party rejects the Recommendation in whole or in part, it shall give written explanation to the other party within 14 days after receiving the Recommendation. When the Recommendation is rejected in whole or in part by either party, the other party may either abandon the dispute or pursue a formal claim in accordance with subsection 105.24.

If either party fails to submit its written acceptance or rejection of the Dispute Board's recommendation, according to these specifications, such failure shall constitute that party's acceptance of the Board's recommendation.

- (j) *Admissibility of Recommendation.* Recommendations of a DRB issued in accordance with subsection 105.23 are admissible in subsequent proceedings but shall be prefaced with the following paragraph:

This Recommendation may be taken under consideration with the understanding that:

1. The DRB Recommendation was a proceeding based on presentations by the parties.
2. No fact or expert witnesses presented sworn testimony or were subject to cross-examination.
3. The parties to the DRB were not provided with the right to any discovery, such as production of documents or depositions.
4. There is no record of the DRB hearing other than the Recommendation.

- (k) *Cost and Payments.*

1. General Administrative Costs. The Contractor and the Department shall equally share the entire cost of the following to support the Board's operation:

- (1) Copies of Contract and other relevant documentation
- (2) Meeting space and facilities
- (3) Secretarial Services
- (4) Telephone



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- (5) Mail
  - (6) Reproduction
  - (7) Filing
2. The Department and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,200 per day if time spent on-site per meeting is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$800 per day if time spent on-site per meeting is less than or equal to four hours. The time spent traveling to and from each meeting shall be reimbursed at \$50 per hour if the travel distance is more than 50 miles. The agreed daily and travel time rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel of more than 50 miles and incidentals for each day, or portion thereof that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the Department and Contractor. Time away from the project that has been specifically agreed to in advance by the parties will be compensated at an agreed rate of \$125 per hour. The agreed amount of \$125 per hour shall include all incidentals. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all-inclusive rate per day or rate per hour for an individual project.
  3. Payments to Board Members and General Administrative Costs. Each Board member shall submit an invoice to the Contractor for fees and applicable expenses incurred each month following a month in which the Board members participated in Board functions. Such invoices shall be in the format established by the Contractor and the Department. The Contractor shall submit to the Department copies of all invoices. No markups by the Contractor will be allowed on any DRB costs. The Department will split the cost by authorizing 50 percent payment on the next progress payment. The Contractor shall make all payments in full to Board members within seven calendar days after receiving payment from the Department for this work.

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(I) *Dispute Review Board Three Party Agreement.*

DISPUTE REVIEW BOARD  
THREE PARTY AGREEMENT  
COLORADO PROJECT NO.

THIS THREE PARTY AGREEMENT, made as of the date signed by the Chief Engineer below, by and between: the Colorado Department of Transportation, hereinafter called the "Department"; and

\_\_\_\_\_,  
hereinafter called the "Contractor"; and

\_\_\_\_\_,  
\_\_\_\_\_,

and  
\_\_\_\_\_,  
hereinafter called the "Dispute Review Board" or "Board".

WHEREAS, the Department is now engaged in the construction of the \_\_\_\_\_  
[Project Name]

and

WHEREAS, the Contract provides for the establishment of a Board in accordance with subsections 105.22 and 105.23 of the specifications.

NOW, THEREFORE, it is hereby agreed:

ARTICLE I  
DESCRIPTION OF WORK AND SERVICES

The Department and the Contractor shall form a Board in accordance with this agreement and the provisions of subsection 105.23.

ARTICLE II  
COMMITMENT ON PART OF THE PARTIES HERETO

The parties hereto shall faithfully fulfill the requirements of subsection 105.23 and the requirements of this agreement.

ARTICLE III  
COMPENSATION

The parties shall share equally in the cost of the Board, including general administrative costs (meeting space and facilities, secretarial services, telephone, mail, reproduction, filing) and the member's individual fees. Reimbursement of the Contractor's share of the Board expenses for any reason is prohibited.

The Contractor shall make all payments in full to Board members. The Contractor will submit to the Department an itemized statement for all such payments, and the Department will split the cost by including 50 percent payment on the next progress payment. The Contractor and the Department will agree to accept invoiced costs prior to payment by the Contractor.

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Board members shall keep all fee records pertaining to this agreement available for inspection by representatives of the Department and the Contractor for a period of three years after the termination of the Board members' services.

Payment to each Board member shall be at the fee rates established in subsection 105.23 and agreed to by each Board member, the Contractor, and the Department. In addition, reimbursement will be made for applicable expenses.

Each Board member shall submit an invoice to the Contractor for fees incurred each month following a month in which the members participated in Board functions. Such invoices shall be in the format established by the Contractor and the Department.

Payments shall be made to each Board member within 60 days after the Contractor and Department have received all the applicable billing data and verified the data submitted by that member. The Contractor shall make payment to the Board member within seven calendar days of receipt of payment from the Department.

ARTICLE IV  
ASSIGNMENT

Board members shall not assign any of the work to be performed by them under this agreement. Board members shall disclose any conflicts of interest including but not limited to any dealings with the either party in the previous five years other than serving as a Board member under other contracts.

ARTICLE V  
COMMENCEMENT AND TERMINATION OF SERVICES

The commencement of the services of the Board shall be in accordance with subsection 105.23 of the specifications and shall continue until all assigned disputes under the Contract which may require the Board's services have been heard and a Recommendation has been issued by the Board as specified in subsection 105.23. If a Board member is unable to fulfill his responsibilities for reasons specified in subsection 105.23(b)7, he shall be replaced as provided therein, and the Board shall fulfill its responsibilities as though there had been no change.

ARTICLE VI  
LEGAL RELATIONS

The parties hereto mutually agree that each Board member in performance of his duties on the Board is acting as an independent contractor and not as an employee of either the Department or the Contractor. Board members will guard their independence and avoid any communication about the substance of the dispute without both parties being present.

The Board members are absolved of any personal liability arising from the Recommendations of the Board. The parties agree that members of the dispute review board panel are acting as mediators for purposes of C.R.S. § 13-22-302(4) and, as such, the liability of any dispute review board member shall be limited to willful and wanton misconduct as provided for in C.R.S. § 13-22-305(6)

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COLORADO PROJECT NO. \_\_\_\_\_

IN WITNESS HEREOF, the parties hereto have caused this agreement to be executed the day and year first written above.

BOARD MEMBER: \_\_\_\_\_.

BY: \_\_\_\_\_.

BOARD MEMBER: \_\_\_\_\_.

BY: \_\_\_\_\_.

BOARD MEMBER: \_\_\_\_\_.

BY: \_\_\_\_\_.

CONTRACTOR: \_\_\_\_\_.

BY: \_\_\_\_\_.

TITLE: \_\_\_\_\_

COLORADO DEPARTMENT OF TRANSPORTATION

BY: \_\_\_\_\_ Date: \_\_\_\_\_.

TITLE: CHIEF ENGINEER

**105.24 Claims for Unresolved Disputes.** The Contractor may file a claim only if the disputes resolution process described in subsections 105.22 and 105.23 has been exhausted without resolution of the dispute. Other methods of nonbinding dispute resolution, exclusive of arbitration and litigation, can be used if agreed to by both parties.

This subsection applies to any unresolved dispute or set of disputes between CDOT and the Contractor with an aggregate value of more than \$15,000. Unresolved disputes with an aggregate value of more than \$15,000 from subcontractors, materials suppliers or any other entity not a party to the Contract shall be submitted through the Contractor in accordance with this subsection as a pass-through claim. Review of a pass-through claim does not create privity of Contract between CDOT and any other entity.

Subsections 105.22, 105.23 and 105.24 provide both contractual alternative dispute resolution processes and constitute remedy-granting provisions pursuant to Colorado Revised Statutes which must be exhausted in their entirety.

Merit-binding arbitration or litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

The venue for all unresolved disputes with an aggregate value \$15,000 or less shall be the County Court for the City and County of Denver.

Non-binding Forms of alternative dispute resolution such as Mediation are available upon mutual agreement of the parties for all claims submitted in accordance with this subsection.

The cost of the non-binding ADR process shall be shared equally by both parties with each party bearing its own preparation costs. The type of nonbinding ADR process shall be agreed upon by the parties and shall be conducted within the State of Colorado at a mutually acceptable location. Participation in a nonbinding ADR process does not in any way waive the requirement that merit-binding arbitration or litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

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(a) *Notice of Intent to File a Claim.*

Within 30 days after rejection of the Dispute Resolution Board's Recommendation issued in accordance with subsection 105.23, the Contractor shall provide the Region Transportation Director with a written notice of intent to file a claim. The Contractor shall also send a copy of this notice to the Resident Engineer. For the purpose of this subsection Region Transportation Director shall mean the Region Transportation Director or the Region Transportation Director's designated representative. CDOT will acknowledge in writing receipt of Notice of Intent within 7 days.

(b) *Claim Package Submission.* Within 60 days after submitting the notice of intent to file a claim, the Contractor shall submit five copies of a complete claim package representing the final position the Contractor wishes to have considered. All claims shall be in writing and in sufficient detail to enable the RTD to ascertain the basis and amount of claim. The claim package shall include all documents supporting the claim, regardless of whether such documents were provided previously to CDOT.

If requested by the Contractor the 60 day period may be extended by the RTD in writing prior to final acceptance. As a minimum, the following information shall accompany each claim.

1. A claim certification containing the following language, as appropriate:

A. For a direct claim by the Contractor:

CONTRACTOR'S CLAIM CERTIFICATION

Under penalty of law for perjury or falsification, the undersigned, \_\_\_\_\_ (name),  
(title) \_\_\_\_\_, of \_\_\_\_\_ (company) \_\_\_\_\_, hereby certifies that the claim of  
\$ \_\_\_\_\_ for extra compensation and \_\_\_\_ Days additional time, made herein for work on this  
contract is true to the best of my knowledge and belief and supported under the Contract between the parties.

This claim package contains all available documents that support the claims made herein and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.

Dated \_\_\_\_\_ /s/ \_\_\_\_\_

Subscribed and sworn before me this \_\_\_\_ day of \_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires: \_\_\_\_\_

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B. For a pass-through claim:

<p><b>PASS-THROUGH CLAIM CERTIFICATION</b></p> <p>Under penalty of law for perjury or falsification, the undersigned, _____ (name), (title) _____, of _____ (company), hereby certifies that the claim of \$ _____ for extra compensation and ___ Days additional time, made herein for work on this Project is true to the best of my knowledge and belief and supported under the contract between the parties. This claim package contains all available documents that support the claims made herein and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.</p> <p>Dated _____ /s/ _____ Subscribed and sworn before me this ___ day of _____ . _____ NOTARY PUBLIC</p> <p style="text-align: center;">My Commission Expires: _____</p> <p>Dated _____ /s/ _____ The Contractor certifies that the claim being passed through to CDOT is passed through in good faith and is accurate and complete to the best of my knowledge and belief.</p> <p>Dated _____ /s/ _____ Subscribed and sworn before me this ___ day of _____ . _____ NOTARY PUBLIC</p> <p style="text-align: center;">My Commission Expires: _____</p>
--

2. A detailed factual statement of the claim for additional compensation, time, or both, providing all necessary dates, locations, and items of work affected by the claim. The Contractor's detailed factual statement shall expressly describe the basis of the claim and factual evidence supporting the claim. This requirement is not satisfied by simply incorporating into the claim package other documents that describe the basis of the claim and supporting factual evidence.
3. The date on which facts were discovered which gave rise to the claim.
4. The name, title, and activity of all known CDOT, Consultant, and other individuals who may be knowledgeable about facts giving rise to such claim.
5. The name, title, and activity of all known Contractor, subcontractor, supplier and other individuals who may be knowledgeable about facts giving rise to such claim.
6. The specific provisions of the Contract, which support the claim and a statement of the reasons why such provisions support the claim.
7. If the claim relates to a decision of the Project Engineer, which the Contract leaves to the Project Engineer's discretion, the Contractor shall set out in detail all facts supporting its position relating to the decision of the Project Engineer.
8. The identification of any documents and the substance of all oral communications that support the claim.
9. Copies of all known documents that support the claim.
10. The Dispute Review Board Recommendation.
11. If an extension of contract time is sought, the documents required by subsection 108.08(d).
12. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
  - A. These categories represent the only costs that are recoverable by the Contractor. All other costs or categories of costs are not recoverable:

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- (1) Actual wages and benefits, including FICA, paid for additional labor
- (2) Costs for additional bond, insurance and tax
- (3) Increased costs for materials
- (4) Equipment costs calculated in accordance with subsection 109.04(c) for Contractor owned equipment and based on certified invoice costs for rented equipment
- (5) Costs of extended job site overhead
- (6) Salaried employees assigned to the project
- (7) Claims from subcontractors and suppliers at any level (the same level of detail as specified herein is required for all such claims)
- (8) An additional 16 percent will be added to the total of items (1) through (7) as compensation for items for which no specific allowance is provided, including profit and home office overhead.
- (9) Interest shall be paid in accordance with CRS 5-12-102 beginning from the date of the Notice of Intent to File Claim

B. In adjustment for the costs as allowed above, the Department will have no liability for the following items of damages or expense:

- (1) Profit in excess of that provided in 12.A.(8) above
- (2) Loss of Profit
- (3) Additional cost of labor inefficiencies in excess of that provided in A. above
- (4) Home office overhead in excess of that provided in A. above
- (5) Consequential damages, including but not limited to loss of bonding capacity, loss of bidding opportunities, and insolvency
- (6) Indirect costs or expenses of any nature in excess of that provided in A. above
- (7) Attorney's fees, claim preparation fees, and expert fees

(c) *Audit.* An audit may be performed by the Department for any dispute or claim, and is mandatory for all disputes and claims with amounts greater than \$250,000. All audits will be complete within 60 days of receipt of the complete claim package, provided the Contractor allows the auditors reasonable and timely access to the Contractor's books and records. For all claims with amounts greater than \$250,000 the Contractor shall submit a copy of certified claim package directly to the CDOT Audit Unit at the following address:

Division of Audit  
4201 E. Arkansas Ave  
Denver, Co. 80222

(d) *Region Transportation Director Decision.* When the Contractor properly files a claim, the RTD will review the claim and render a written decision to the Contractor to either affirm or deny the claim, in whole or in part, in accordance with the following procedure.

The RTD may consolidate all related claims on a project and issue one decision, provided that consolidation does not extend the time period within which the RTD is to render a decision. Consolidation of unrelated claims will not be made.

The RTD will render a written decision to the Contractor within 60 days after the receipt of the claim package or receipt of the audit whichever is later. In rendering the decision, the RTD: (1) will review the information in the Contractor's claim; (2) will conduct a hearing if requested by either party; and (3) may consider any other information available in rendering a decision.

The RTD will assemble and maintain a claim record comprised of all information physically submitted by the Contractor in support of the claim and all other discoverable information considered by the RTD in reaching a decision. Once the RTD assembles the claim record, the submission and consideration of additional information, other than for clarification and data supporting previously submitted documentation, at any subsequent level of review by anyone, will not be permitted.

The RTD will provide a copy of the claim record and the written decision to the Contractor describing the information considered by the RTD in reaching a decision and the basis for that decision. If the RTD fails to

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render a written decision within the 60 day period, or within any extended time period as agreed to by both parties, the Contractor shall either: (1) accept this as a denial of the claim, or (2) appeal the claim to the Chief Engineer, as described in this subsection.

If the Contractor accepts the RTD decision, the provisions of the decision shall be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the RTD decision, the Contractor shall either: (1) accept the RTD decision as final, or (2) file a written appeal to the Chief Engineer within 30 days from the receipt of the RTD decision. The Contractor hereby agrees that if a written appeal is not properly filed, the RTD decision is final.

- (e) *Chief Engineer Decision.* When a claim is appealed, the RTD will provide the claim record to the Chief Engineer. Within 15 days of the appeal either party may submit a written request for a hearing with the Chief Engineer or duly authorized Headquarters delegates. The Chief Engineer or a duly authorized Headquarters delegate will review the claim and render a decision to affirm, overrule, or modify the RTD decision in accordance with the following.

The Contractor's written appeal to the Chief Engineer will be made a part of the claim record.

The Chief Engineer will render a written decision within 60 days after receiving the written appeal. The Chief Engineer will not consider any information that was not previously made a part of the claim record, other than clarification and data supporting previously submitted documentation.

The Contractor shall have 30 days to accept or reject the Chief Engineer's decision. The Contractor shall notify the Chief Engineer of its acceptance or rejection in writing.

If the Contractor accepts the Chief Engineer's decision, the provisions of the decision will be implemented in accordance with subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the Chief Engineer's decision, the Contractor shall either (1) pursue an alternative dispute resolution process in accordance with this specification or (2) initiate litigation or merit binding arbitration in accordance with subsection 105.24(f).

If the Chief Engineer does not issue a decision as required, the Contractor may immediately initiate either litigation or merit binding arbitration in accordance with subsection 105.24(f).

For the convenience of the parties to the Contract it is mutually agreed by the parties that any merit binding arbitration or De Novo litigation shall be brought within 180-calendar days from the date of the Chief Engineer's decision. The parties understand and agree that the Contractor's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action.

- (f) *De Novo Litigation or Merit Binding Arbitration.* If the Contractor disagrees with the Chief Engineer's decision, the Contractor may initiate de novo litigation or merit binding arbitration to finally resolve the claim that the Contractor submitted to CDOT, depending on which option was selected by the Contractor on Form 1378 which shall be submitted at the preconstruction conference. Such litigation or arbitration shall be strictly limited to those claims that were previously submitted and decided in the contractual dispute and claims processes outlined herein. This does not preclude the joining in one litigation or arbitration of multiple claims from the same project provided that each claim has gone through the dispute and claim process specified in subsections 105.22 through 105.24. The parties may agree, in writing, at any time, to pursue some other form of alternative dispute resolution.

Any offer made by the Contractor or the Department at any stage of the claims process, as set forth in this subsection, shall be deemed an offer of settlement pursuant to Colorado Rule of Evidence 408 and therefore inadmissible in any litigation or arbitration.

If the Contractor selected litigation, then de novo litigation shall proceed in accordance with the Colorado Rules of Civil Procedure and the proper venue is the Colorado State District Court in and for the City and County of Denver, unless both parties agree to the use of arbitration.

If the Contractor selected merit binding arbitration, or if both parties subsequently agreed to merit binding arbitration, arbitration shall be governed by the modified version of ARBITRATION PROVIDER's Construction Industry Arbitration Rules which follow. Pursuant to the modified arbitration rules (R35 through R39), the



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arbitrators shall issue a binding decision with regard to entitlement and a non-binding decision with regard to quantum. If either party disagrees with the decision on quantum, the disagreeing party may seek a trial de novo in Denver District Court with regard to quantum only.

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**AMERICAN ARBITRATION ASSOCIATION CONSTRUCTION INDUSTRY ARBITRATION RULES MODIFIED  
FOR USE WITH CDOT SPECIFICATION SUBSECTION 105.24**

**REGULAR TRACK PROCEDURES**

**R-1. Agreement of Parties**

- (a) The parties shall be deemed to have made these rules a part of their Contract. These rules and any amendments shall apply in the form in effect at the time the administrative requirements are met for a demand for arbitration. The parties, by written agreement, may vary the procedures set forth in these rules. After appointment of the arbitrator, such modifications may be made only with the consent of the arbitrator.
- (b) Unless the parties determine otherwise, the Fast Track Procedures shall apply in any case in which aggregate claims do not exceed \$100,000, exclusive of interest and arbitration fees and costs. Parties may also agree to use these procedures in larger cases. Unless the parties agree otherwise, these procedures will not apply in cases involving more than two parties except for pass-through claims. The Fast Track Procedures shall be applied as described in Sections F-1 through F-13 of these rules, in addition to any other portion of these rules that is not in conflict with the Fast Track Procedures.
- (c) Unless the parties agree otherwise, the Procedures for Large, Complex Construction Disputes shall apply to all cases in which the disclosed aggregate claims of any party is at least \$1,000,000, exclusive of claimed interest, arbitration fees and costs. Parties may also agree to use these procedures in cases involving claims under \$1,000,000, or in nonmonetary cases. The Procedures for Large, Complex Construction Disputes shall be applied as described in Sections L-1 through L-4 of these rules, in addition to any other portion of these rules that is not in conflict with the Procedures for Large, Complex Construction Disputes.
- (d) All other cases shall be administered in accordance with Sections R-1 through R-45 of these rules.

**R-2. Independent Arbitration Provider and Delegation of Duties**

When parties agree to arbitrate under these rules, or when they provide for arbitration by an independent third-party (Arbitration Provider) and arbitration is initiated under these rules, they thereby authorize the Arbitration Provider to administer the arbitration. The authority and duties of the Arbitration Provider are prescribed in the parties' Contract and in these rules, and may be carried out through such of the Arbitration Provider's representatives as it may direct. The Arbitration Provider will assign the administration of an arbitration to its Denver office

**R-3. Initiation of Arbitration**

Arbitration shall be initiated in the following manner.

- (a) The Contractor shall, within 30 days after the Chief Engineer issues a decision, submit to the Chief Engineer written notice of its intention to arbitrate (the "demand"). The demand shall indicate the appropriate qualifications for the arbitrator(s) to be appointed to hear the arbitration.
- (b) CDOT may file an answering statement with the Contractor within 15 days after receiving the demand. If a counterclaim is asserted, it shall contain a statement setting forth the nature of the counterclaim, the amount involved, if any, and the remedy sought.
- (c) The Chief Engineer shall retain an Arbitration Provider, such as the American Arbitration Association, which will administer an arbitration pursuant to these Rules, except to the extent that such rules conflict with the specifications, in which case the specifications shall control.

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(d) The Arbitration Provider shall confirm its retention to the parties.

#### **R-4. Consolidation or Joinder**

If the parties' agreement or the law provides for consolidation or joinder of related arbitrations, all involved parties will endeavor to agree on a process to effectuate the consolidation or joinder.

If they are unable to agree, the Arbitration Provider shall directly appoint a single arbitrator for the limited purpose of deciding whether related arbitrations should be consolidated or joined and, if so, establishing a fair and appropriate process for consolidation or joinder. All requests for consolidation or joinder must be submitted to the Arbitration Provider prior to the appointment of an arbitrator or within 90 days of the date the Arbitration Provider determined that all administrative filing requirements were satisfied, whichever is later. The Arbitration Provider may take reasonable administrative action to accomplish the consolidation or joinder as directed by the arbitrator. Requests for consolidation or joinder submitted beyond these timeframes shall not be permitted absent a determination by the Merits Arbitrator that good cause was shown for the late request.

To request consolidation of arbitrations, the requesting party must have filed a demand for arbitration, including the applicable arbitration provision(s) from the parties' contract(s) and must provide a written request for consolidation which provides the supporting reasons for such request.

To request joinder of parties, the requesting party must file with the AAA a written request to join parties to an existing arbitration which provides the names and contact information for such parties, names and contact information for the parties' representatives, if known, and supporting reasons for such request.

#### **R-5. Appointment of Arbitrator**

An arbitrator shall be appointed in the following manner:

- (a) Immediately after the Arbitration Provider is retained, the Arbitration Provider shall send simultaneously to each party to the dispute an identical list of 10 names of potential arbitrators. The parties are encouraged to agree to an arbitrator from the submitted list and to advise the ARBITRATION PROVIDER of their agreement. Absent agreement of the parties, the arbitrator shall not have served as the mediator in the mediation phase of the instant proceeding.
- (b) If the parties cannot agree to arbitrator(s), each party to the dispute shall have 15 calendar days from the transmittal date in which to strike names objected to, number the remaining names in order of preference, and return the list to the Arbitration Provider. If a party does not return the list within the time specified, all persons named therein shall be deemed acceptable. From among the persons who have been approved on both lists, and in accordance with the designated order of mutual preference, the Arbitration Provider shall invite an arbitrator to serve.
- (c) Unless both parties agree otherwise one arbitrator shall be used for claims less than \$250,000 and three arbitrators shall be used for claims \$250,000 and greater. Within 15 calendar days from the date of the appointment of the last arbitrator, the Arbitration Provider shall appoint a chairperson.
- (d) The entire claim record will be made available to the arbitrators by the Chief Engineer within 15 calendar days from the date of the appointment of the last arbitrator.

#### **R-6. Changes of Claim**

The arbitrator(s) will not consider any information that was not previously made a part of the claim record as transmitted by the Chief Engineer, other than clarification and data supporting previously submitted documentation.

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**R-7. Disclosure**

- (a) Any person appointed or to be appointed as an arbitrator shall disclose to the Arbitration Provider any circumstance likely to give rise to justifiable doubt as to the arbitrator's impartiality or independence, including any bias or any interest in the result of the arbitration or any relationship with the parties or their representatives. Such obligation shall remain in effect throughout the arbitration.
- (b) Upon receipt of such information from the arbitrator or another source, the Arbitration Provider shall communicate the information to the parties and, if it deems it appropriate to do so, to the arbitrator and others.
- (c) In order to encourage disclosure by arbitrators, disclosure of information pursuant to this Section R-6 is not to be construed as an indication that the arbitrator considers that the disclosed circumstances are likely to affect impartiality or independence.
- (d) In no case shall an arbitrator be employed by, affiliated with, or have consultive or business connection with the claimant Contractor or CDOT. An arbitrator shall not have assisted either in the evaluation, preparation, or presentation of the claim case either for the Contractor or the Department or have rendered an opinion on the merits of the claim for either party, and shall not do so during the proceedings of arbitration.

**R-8. Disqualification of Arbitrator**

- (a) Any arbitrator shall be impartial and independent and shall perform his or her duties with diligence and in good faith, and shall be subject to disqualification for: (i) partiality or lack of independence, (ii) inability or refusal to perform his or her duties with diligence and in good faith; and/or (iii) any grounds for disqualification provided by applicable law.
- (b) Upon objection of a party to the continued service of an arbitrator, or on its own initiative, the Arbitration Provider shall determine whether the arbitrator should be disqualified under the grounds set out above, and shall inform the parties of its decision, which decision shall be conclusive.

**R-9. Communication with Arbitrator**

No party and no one acting on behalf of any party shall communicate *ex parte* with an arbitrator or a candidate for arbitrator concerning the arbitration.

**R-10. Vacancies**

- (a) If for any reason an arbitrator is unable to perform the duties of the office, the Arbitration Provider may, on proof satisfactory to it, declare the office vacant. Vacancies shall be filled in accordance with the applicable provisions of these rules.
- (b) In the event of a vacancy in a panel of neutral arbitrators after the hearings have commenced, the remaining arbitrator or arbitrators may continue with the hearing and determination of the controversy, unless the parties agree otherwise.
- (c) In the event of the appointment of a substitute arbitrator, the panel of arbitrators shall determine in its sole discretion whether it is necessary to repeat all or part of any prior hearings.

**R-11. Jurisdiction**

- (a) The arbitrator shall have the power to rule on his or her own jurisdiction, including any objections with respect to the existence, scope or validity of the arbitration agreement.

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- (b) The arbitrator shall have the power to determine the existence or validity of a contract of which an arbitration clause forms a part. Such an arbitration clause shall be treated as an agreement independent of the other terms of the contract. A decision by the arbitrator that the contract is null and void shall not for that reason alone render invalid the arbitration clause.
- (c) A party must object to the jurisdiction of the arbitrator or to the arbitrability of a claim or counterclaim no later than 15 days after the Arbitration Provider confirms its retention to the parties. The arbitrator may rule on such objections as a preliminary matter or as part of the final award.

**R-12. Administrative Conference**

At the request of any party or upon the Arbitration Provider's own initiative, the Arbitration Provider may conduct an administrative conference, in person or by telephone, with the parties and/or their representatives. The conference may address such issues as arbitrator selection, potential exchange of information, a timetable for hearings and any other administrative matters.

**RuleR-13. Preliminary Hearing**

- (a) At the request of any party or at the discretion of the arbitrator or the Arbitration Provider, the arbitrator may schedule as soon as practicable a preliminary hearing with the parties and/or their representatives. The preliminary hearing may be conducted by telephone at the arbitrator's discretion.
- (b) During the preliminary hearing, the parties and the arbitrator should discuss the future conduct of the case, including clarification of the issues and claims, a schedule for the hearings and any other preliminary matters.

**R-14. Pre-Hearing Exchange and Production of Information**

(a) *Authority of arbitrator.* The arbitrator shall manage any necessary exchange of information among the parties with a view to achieving an efficient and economical resolution of the dispute, while at the same time promoting equality of treatment and safeguarding each party's opportunity to fairly present its claims and defenses.

(b) *Documents.* The arbitrator may, on application of a party or on the arbitrator's own initiative:

- i. require the parties to exchange documents in their possession or custody on which they intend to rely;
- ii. require the parties to update their exchanges of the documents on which they intend to rely as such documents become known to them;
- iii. require the parties, in response to reasonable document requests, to make available to the other party documents, in the responding party's possession or custody, not otherwise readily available to the party seeking the documents, reasonably believed by the party seeking the documents to exist and to be relevant and material to the outcome of disputed issues; and
- iv. require the parties, when documents to be exchanged or produced are maintained in electronic form, to make such documents available in the form most convenient and economical for the party in possession of such documents, unless the arbitrator determines that there is good cause for requiring the documents to be produced in a different form. The parties should attempt to agree in advance upon, and the arbitrator may determine, reasonable search parameters to balance the need for production of electronically stored documents relevant and material to the outcome of disputed issues against the cost of locating and producing them.

(a) At the request of any party or at the discretion of the arbitrator, consistent with the expedited nature of arbitration, the arbitrator may direct:

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- i. the production of documents and other information;
- ii. require the parties to update their exchanges of the documents on which they intend to rely as such documents become known to them; and/or
- iii. the identification of any witnesses to be called.

(b) At least five business days prior to the hearing, the parties shall exchange copies of all exhibits they intend to submit at the hearing.

(c) The arbitrator is authorized to resolve any disputes concerning the exchange of information.

(d) Additional discovery may be ordered by the arbitrator in extraordinary cases when the demands of justice require it.

**R-15. Date, Time, and Place of Hearing**

(a) The arbitrator shall set the date, time, and place for each hearing and/or conference. The parties shall respond to requests for hearing dates in a timely manner, be cooperative in scheduling the earliest practicable date, and adhere to the established hearing schedule.

(b) The parties may mutually agree on the locale where the arbitration is to be held. Absent such agreement, the arbitration shall be held in the City and County of Denver.

(c) The Arbitration Provider shall send a notice of hearing to the parties at least ten calendar days in advance of the hearing date, unless otherwise agreed by the parties.

**R-16. Attendance at Hearings**

The arbitrator and the Arbitration Provider shall maintain the privacy of the hearings unless the law provides to the contrary. Any person having a direct interest in the arbitration is entitled to attend hearings. The arbitrator shall otherwise have the power to require the exclusion of any witness, other than a party or other essential person, during the testimony of any other witness. It shall be discretionary with the arbitrator to determine the propriety of the attendance of any person other than a party and its representative.

**R-17. Representation**

Any party may be represented by counsel or other authorized representative. A party intending to be so represented shall notify the other party and the Arbitration Provider of the name and address of the representative at least three calendar days prior to the date set for the hearing at which that person is first to appear.

**R-18. Oaths**

Before proceeding with the first hearing, each arbitrator may take an oath of office and, if required by law, shall do so. The arbitrator may require witnesses to testify under oath administered by any duly qualified person and, if it is required by law or requested by any party, shall do so.

**R-19. Stenographic Record**

Any party desiring a stenographic record shall make arrangements directly with a stenographer and shall notify the other parties of these arrangements at least three days in advance of the hearing. The requesting party or parties shall pay the cost of the record. If the transcript is agreed by the parties, or determined by the arbitrator to be the official record of the proceeding, it must be provided to the arbitrator and made available to the other parties for inspection, at a date, time, and place determined by the arbitrator.

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**R-20. Interpreters**

Any party wishing an interpreter shall make all arrangements directly with the interpreter and shall assume the costs of the service.

**R-21. Postponements**

The arbitrator for good cause shown may postpone any hearing upon agreement of the parties, upon request of a party, or upon the arbitrator's own initiative.

**R-22. Arbitration in the Absence of a Party or Representative**

Unless the law provides to the contrary, the arbitration may proceed in the absence of any party or representative who, after due notice, fails to be present or fails to obtain a postponement. An award shall not be made solely on the default of a party. The arbitrator shall require the party who is present to submit such evidence as the arbitrator may require for the making of an award.

**R-23. Conduct of Proceedings**

- (a) The Contractor shall present evidence to support its claim. CDOT shall then present evidence supporting its defense. Witnesses for each party shall also submit to questions from the arbitrator and the adverse party. The arbitrator has the discretion to vary this procedure; provided that the parties are treated with equality and that each party has the right to be heard and is given a fair opportunity to present its case.
- (b) The arbitrator, exercising his or her discretion, shall conduct the proceedings with a view to expediting the resolution of the dispute and may direct the order of proof, bifurcate proceedings, and direct the parties to focus their presentations on issues the decision of which could dispose of all or part of the case. The arbitrator shall entertain motions, including motions that dispose of all or part of a claim or that may expedite the proceedings, and may also make preliminary rulings and enter interlocutory orders.
- (c) The parties may agree to waive oral hearings in any case.

**R-24. Evidence**

- (a) The arbitrators shall consider all written information available in the claim record and all oral presentations in support of that record by the Contractor and CDOT. Conformity to legal rules of evidence shall not be necessary.
- (b) The arbitrators shall not consider any written documents or arguments which have not previously been made a part of the claim record, other than clarification and data supporting previously submitted documentation. The arbitrators shall not consider an increase in the amount of the claim, or any new claims.
- (c) The arbitrator shall determine the admissibility, relevance, and materiality of any evidence offered. The arbitrator may request offers of proof and may reject evidence deemed by the arbitrator to be cumulative, unreliable, unnecessary, or of slight value compared to the time and expense involved. All evidence shall be taken in the presence of all of the arbitrators and all of the parties, except where: (i) any of the parties is absent, in default, or has waived the right to be present, or (ii) the parties and the arbitrators agree otherwise.
- (d) The arbitrator shall take into account applicable principles of legal privilege, such as those involving the confidentiality of communications between a lawyer and client.

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- (e) An arbitrator or other person authorized by law to subpoena witnesses or documents may do so upon the request of any party or independently.

**R-25. Evidence by Affidavit and Post-hearing Filing of Documents or Other Evidence**

- (a) The arbitrator may receive and consider the evidence of witnesses by declaration or affidavit, but shall give it only such weight as the arbitrator deems it entitled to after consideration of any objection made to its admission.
- (b) If the parties agree or the arbitrator directs that documents or other evidence be submitted to the arbitrator after the hearing, the documents or other evidence, unless otherwise agreed by the parties and the arbitrator, shall be filed with the Arbitration Provider for transmission to the arbitrator. All parties shall be afforded an opportunity to examine and respond to such documents or other evidence.

**R-26. Inspection or Investigation**

An arbitrator finding it necessary to make an inspection or investigation in connection with the arbitration shall direct the Arbitration Provider to so advise the parties. The arbitrator shall set the date and time and the Arbitration Provider shall notify the parties. Any party who so desires may be present at such an inspection or investigation. In the event that one or all parties are not present at the inspection or investigation, the arbitrator shall make an oral or written report to the parties and afford them an opportunity to comment.

**R-27. Interim Measures**

- (a) The arbitrator may take whatever interim measures he or she deems necessary, including injunctive relief and measures for the protection or conservation of property and disposition of perishable goods.
- (b) A request for interim measures addressed by a party to a judicial authority shall not be deemed incompatible with the agreement to arbitrate or a waiver of the right to arbitrate.

**R-28. Closing of Hearing**

When satisfied that the presentation of the parties is complete, the arbitrator shall declare the hearing closed.

If documents or responses are to be filed as provided in Section R-24, or if briefs are to be filed, the hearing shall be declared closed as of the final date set by the arbitrator for the receipt of documents, responses, or briefs. The time limit within which the arbitrator is required to make the award shall commence to run, in the absence of other agreements by the parties and the arbitrator, upon the closing of the hearing.

**R-29. Reopening of Hearing**

The hearing may be reopened on the arbitrator's initiative, or by direction of the arbitrator upon application of a party, at any time before the award is made. If reopening the hearing would prevent the making of the award within the specific time agreed to by the parties in the arbitration agreement, the matter may not be reopened unless the parties agree to an extension of time. When no specific date is fixed by agreement of the parties, the arbitrator shall have 15 calendar days from the closing of the reopened hearing within which to make an award.

**R-30. Waiver of Rules**

Any party who proceeds with the arbitration after knowledge that any provision or requirement of these rules has not been complied with and who fails to state an objection in writing shall be deemed to have waived the right to object.

**R-31. Extensions of Time**



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The parties may modify any period of time by mutual agreement. The Arbitration Provider or the arbitrator may for good cause extend any period of time established by these rules, except the time for making the award. The Arbitration Provider shall notify the parties of any extension.

**R-32. Serving of Notice**

- (a) Any papers, notices, or process necessary or proper for the initiation or continuation of an arbitration under these rules; for any court action in connection therewith, or for the entry of judgment on any award made under these rules, may be served on a party by mail addressed to the party or its representative at the last known address or by personal service, in or outside the state where the arbitration is to be held, provided that reasonable opportunity to be heard with regard thereto has been granted to the party.
- (b) The Arbitration Provider, the arbitrator and the parties may also use overnight delivery, electronic facsimile transmission (fax), or electronic mail (email) to give the notices required by these rules.
- (c) Unless otherwise instructed by the Arbitration Provider or by the arbitrator, any documents submitted by any party to the Arbitration Provider or to the arbitrator shall simultaneously be provided to the other party or parties to the arbitration.

**R-33. Majority Decision**

When the panel consists of more than one arbitrator, unless required by law or by the arbitration agreement, a majority of the arbitrators must make all decisions; however, in a multi-arbitrator case, if all parties and all arbitrators agree, the chair of the panel may make procedural decisions.

Where there is a panel of three arbitrators, absent an objection of a party or another member of the panel, the chairperson of the panel is authorized to resolve or delegate to another member of the panel to resolve any disputes related to the exchange of information or procedural matters without the need to consult the full panel.

**R-34. Time of Award**

The award shall be made promptly by the arbitrator and, unless otherwise agreed by the parties or specified by law, no later than 30 calendar days from the date of closing the hearing, or, if oral hearings have been waived, from the date of the Arbitration Provider's transmittal of the final statements and proofs to the arbitrator.

**R-35. Form of Award**

After complete review of the facts associated with the claim, the arbitrators shall render a written explanation of their decision. When three arbitrators are used, and only two arbitrators agree then the award shall be signed by the two arbitrators. The arbitrator's decision shall include:

- (a) A summary of the issues and factual evidence presented by the Contractor and the Department concerning the claim;
- (b) Decisions concerning the validity of the claim;
- (c) Decisions concerning the value of the claim as to cost impacts if the claim is determined to be valid;
- (d) The contractual and factual bases supporting the decisions made including an explanation as to why each and every position was accepted or rejected;
- (e) Detailed and supportable calculations which support any decisions.

**R-36. Scope of Award**

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- (a) The arbitrator may grant any remedy or relief that the arbitrator deems just and equitable and within the scope of the agreement of the parties, including, but not limited to, equitable relief and specific performance of a contract.
- (b) In addition to the final award, the arbitrator may make other decisions, including interim, interlocutory, or partial rulings, orders, and awards. (c) The award of the arbitrator may include interest at the statutory rate and from such date as the arbitrator may deem appropriate.

**R-37. Delivery of Award to Parties**

Parties shall accept as notice and delivery of the award the placing of the award or a true copy thereof in the mail addressed to the parties or their representatives at the last known address, personal or electronic service of the award, or the filing of the award in any other manner that is permitted by law.

**R-38. Modification of Award**

Within 10 calendar days after the transmittal of an award, the arbitrator on his or her initiative, or any party, upon notice to the other parties, may request that the arbitrator correct any clerical, typographical, technical or computational errors in the award. The arbitrator is not empowered to redetermine the merits of any claim already decided.

If the modification request is made by a party, the other parties shall be given 10 calendar days to respond to the request. The arbitrator shall dispose of the request within 25 calendar days after transmittal by the Arbitration Provider to the arbitrator of the request.

If applicable law provides a different procedural time frame, that procedure shall be followed.

**R-39. Appeal of Award**

Appeal of the arbitrators' decision concerning the merit of the claim is governed by the Colorado Uniform Arbitration Act, C.R.S. §§ 13-22-202 to -230. Either party may appeal the arbitrator's decision on the value of the claim to the Colorado State District Court in and for the City and County of Denver for trial de novo.

**R-40. Release of Documents for Judicial Proceedings**

The Arbitration Provider shall, upon the written request of a party, furnish to the party, at its expense, certified copies of any papers in the Arbitration Provider's possession that may be required in judicial proceedings relating to the arbitration.

**R-41. Applications to Court and Exclusion of Liability**

- (a) No judicial proceeding by a party relating to the subject matter of the arbitration shall be deemed a waiver of the party's right to arbitrate.
- (b) Neither the Arbitration Provider nor any arbitrator in a proceeding under these rules is a necessary or proper party in judicial proceedings relating to the arbitration.
- (c) Parties to these rules shall be deemed to have consented that judgment upon the arbitration award may be entered in any federal or state court having jurisdiction thereof.
- (d) Parties to an arbitration under these rules shall be deemed to have consented that neither the Arbitration Provider nor any arbitrator shall be liable to any party in any action for damages or injunctive relief for any act or omission in connection with any arbitration under these rules.

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**R-42. Administrative Fees**

The Arbitration Provider shall prescribe filing and other administrative fees and service charges to compensate it for the cost of providing administrative services. The fees in effect when the fee or charge is incurred shall be applicable. Such fees and charges shall be borne equally by the parties.

The Arbitration Provider may, in the event of extreme hardship on the part of any party, defer or reduce the administrative fees.

**R-43. Expenses**

The expenses of witnesses for either side shall be paid by the party producing such witnesses. All other expenses of the arbitration, including required travel and other expenses of the arbitrator, Arbitration Provider representatives, and any witness and the cost of any proof produced at the direct request of the arbitrator, shall be borne equally by the parties.

**R-44. Neutral Arbitrator's Compensation**

Arbitrators shall be compensated a rate consistent with the arbitrator's stated rate of compensation.

If there is disagreement concerning the terms of compensation, an appropriate rate shall be established with the arbitrator by the Arbitration Provider and confirmed to the parties.

Such compensation shall be borne equally by the parties.

**R-45. Deposits**

The Arbitration Provider may require the parties to deposit in advance of any hearings such sums of money as it deems necessary to cover the expense of the arbitration, including the arbitrator's fee, if any, and shall render an accounting to the parties and return any unexpended balance at the conclusion of the case.

**R-46. Interpretation and Application of Rules**

The arbitrator shall interpret and apply these rules insofar as they relate to the arbitrator's powers and duties by a majority vote. If that is not possible, either an arbitrator or a party may refer the question to the Arbitration Provider for final decision. All other rules shall be interpreted and applied by the Arbitration Provider.

**R-45. Suspension for Nonpayment**

If arbitrator compensation or administrative charges have not been paid in full, the Arbitration Provider may so inform the parties in order that the parties may advance the required payment. If such payments are not made, the arbitrator may order the suspension or termination of the proceedings. If no arbitrator has yet been appointed, the Arbitration Provider may suspend the proceedings.

**FAST TRACK PROCEDURES****F-1. Limitations on Extensions**

In the absence of extraordinary circumstances, the Arbitration Provider or the arbitrator may grant a party no more than one seven-day extension of the time in which to respond to the demand for arbitration or counterclaim as provided in Section R-3.

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**F-2. Changes of Claim**

The arbitrator will not consider any information that was not previously made a part of the claim record as transmitted by the Chief Engineer, other than clarification and data supporting previously submitted documentation

**F-3. Serving of Notice**

In addition to notice provided above, the parties shall also accept notice by telephone. Telephonic notices by the Arbitration Provider shall subsequently be confirmed in writing to the parties. Should there be a failure to confirm in writing any such oral notice, the proceeding shall nevertheless be valid if notice has, in fact, been given by telephone.

**F-4. Appointment and Qualification of Arbitrator**

Immediately after the retention of the Arbitration Provider, the Arbitration Provider will simultaneously submit to each party a listing and biographical information from its panel of arbitrators knowledgeable in construction who are available for service in Fast Track cases. The parties are encouraged to agree to an arbitrator from this list, and to advise the Arbitration Provider of their agreement, or any factual objections to any of the listed arbitrators, within 7 calendar days of the transmission of the list. The Arbitration Provider will appoint the agreed-upon arbitrator, or in the event the parties cannot agree on an arbitrator, will designate the arbitrator from among those names not stricken for factual objections.

The parties will be given notice by the Arbitration Provider of the appointment of the arbitrator, who shall be subject to disqualification for the reasons specified above. Within the time period established by the Arbitration Provider, the parties shall notify the Arbitration Provider of any objection to the arbitrator appointed. Any objection by a party to the arbitrator shall be for cause and shall be confirmed in writing to the Arbitration Provider with a copy to the other party or parties.

**F-5. Preliminary Telephone Conference**

Unless otherwise agreed by the parties and the arbitrator, as promptly as practicable after the appointment of the arbitrator, a preliminary telephone conference shall be held among the parties or their attorneys or representatives, and the arbitrator.

**F-6. Exchange of Exhibits**

At least 2 business days prior to the hearing, the parties shall exchange copies of all exhibits they intend to submit at the hearing. The arbitrator is authorized to resolve any disputes concerning the exchange of exhibits.

**F-7. Discovery**

There shall be no discovery, except as provided in Section F-4 or as ordered by the arbitrator in extraordinary cases when the demands of justice require it.

**F-8. Date, Time, and Place of Hearing**

The arbitrator shall set the date and time, and place of the hearing, to be scheduled to take place within 30 calendar days of confirmation of the arbitrator's appointment. The Arbitration Provider will notify the parties in advance of the hearing date. All hearings shall be held within the City and County of Denver.

**F-9. The Hearing**

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- (a) Generally, the hearing shall not exceed 1 day. Each party shall have equal opportunity to submit its proofs and complete its case. The arbitrator shall determine the order of the hearing, and may require further submission of documents within two business days after the hearing. For good cause shown, the arbitrator may schedule 1 additional hearing day within 7 business days after the initial day of hearing.
- (b) Generally, there will be no stenographic record. Any party desiring a stenographic record may arrange for one pursuant to the provisions above.

**F-10. Time of Award**

Unless otherwise agreed by the parties, the award shall be rendered not later than 14 calendar days from the date of the closing of the hearing or, if oral hearings have been waived, from the date of the Arbitration Provider's transmittal of the final statements and proofs to the arbitrator.

**F-11. Time Standards**

The arbitration shall be completed by settlement or award within 45 calendar days of confirmation of the arbitrator's appointment, unless all parties and the arbitrator agree otherwise or the arbitrator extends this time in extraordinary cases when the demands of justice require it and such agreement is memorialized by the arbitrator prior to the expiration of the initial 45-day period.

**F-12. Arbitrator's Compensation**

Arbitrators will receive compensation at a rate to be suggested by the Arbitration Provider regional office.

**PROCEDURES FOR LARGE, COMPLEX CONSTRUCTION DISPUTES****L-1. Large, Complex Construction Disputes**

The procedures for large, complex construction disputes shall apply to any claim with a value exceeding \$500,000 or as agreed to by the parties.

**L-2. Administrative Conference**

Prior to the dissemination of a list of potential arbitrators, the Arbitration Provider shall, unless the parties agree otherwise, conduct an administrative conference with the parties and/or their attorneys or other representatives by conference call. The conference call will take place within 14 days after the retention of the Arbitration Provider. In the event the parties are unable to agree on a mutually acceptable time for the conference, the Arbitration Provider may contact the parties individually to discuss the issues contemplated herein. Such administrative conference shall be conducted for the following purposes and for such additional purposes as the parties or the Arbitration Provider may deem appropriate:

- (a) To obtain additional information about the nature and magnitude of the dispute and the anticipated length of hearing and scheduling;
- (b) To discuss the views of the parties about the technical and other qualifications of the arbitrators;
- (c) To obtain conflicts statements from the parties; and
- (d) To consider, with the parties, whether mediation or other non-adjudicative methods of dispute resolution might be appropriate.

**L-3. Arbitrators**

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- (a) Large, Complex Construction Cases shall be heard and determined by three arbitrators.
- (b) The Arbitration Provider shall appoint arbitrator(s) in the manner provided in the Regular Construction Industry Arbitration Rules.

**L-4. Preliminary Hearing**

As promptly as practicable after the selection of the arbitrator(s), a preliminary hearing shall be held among the parties and/or their attorneys or other representatives and the arbitrator(s). Unless the parties agree otherwise, the preliminary hearing will be conducted by telephone conference call rather than in person.

At the preliminary hearing the matters to be considered shall include, without limitation:

- (a) Service of a detailed statement of claims, damages and defenses, a statement of the issues asserted by each party and positions with respect thereto, and any legal authorities the parties may wish to bring to the attention of the arbitrator(s);
- (b) Stipulations to uncontested facts;
- (c) The extent to which discovery shall be conducted;
- (d) Exchange and premarking of those documents which each party believes may be offered at the hearing;
- (e) The identification and availability of witnesses, including experts, and such matters with respect to witnesses including their biographies and expected testimony as may be appropriate;
- (f) Whether, and the extent to which, any sworn statements and/or depositions may be introduced;
- (g) The extent to which hearings will proceed on consecutive days;
- (h) Whether a stenographic or other official record of the proceedings shall be maintained;
- (i) The possibility of utilizing mediation or other non-adjudicative methods of dispute resolution; and
- (j) The procedure for the issuance of subpoenas.

By agreement of the parties and/or order of the arbitrator(s), the pre-hearing activities and the hearing procedures that will govern the arbitration will be memorialized in a Scheduling and Procedure Order.

**L-5. Management of Proceedings**

- (a) Arbitrator(s) shall take such steps as they may deem necessary or desirable to avoid delay and to achieve a just, speedy and cost-effective resolution of Large, Complex Construction Cases.
- (b) Parties shall cooperate in the exchange of documents, exhibits and information within such party's control if the arbitrator(s) consider such production to be consistent with the goal of achieving a just, speedy and cost effective resolution of a Large, Complex Construction Case.
- (c) The parties may conduct such discovery as may be agreed to by all the parties provided, however, that the arbitrator(s) may place such limitations on the conduct of such discovery as the arbitrator(s) shall deem appropriate. If the parties cannot agree on production of document and other information, the arbitrator(s), consistent with the expedited nature of arbitration, may establish the extent of the discovery.

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- (d) At the discretion of the arbitrator(s), upon good cause shown and consistent with the expedited nature of arbitration, the arbitrator(s) may order depositions of, or the propounding of interrogatories to such persons who may possess information determined by the arbitrator(s) to be necessary to a determination of the matter.
- (e) The parties shall exchange copies of all exhibits they intend to submit at the hearing 10 business days prior to the hearing unless the arbitrator(s) determine otherwise.
- (f) The exchange of information pursuant to this rule, as agreed by the parties and/or directed by the arbitrator(s), shall be included within the Scheduling and Procedure Order.
- (g) The arbitrator is authorized to resolve any disputes concerning the exchange of information.
- (h) Generally hearings will be scheduled on consecutive days or in blocks of consecutive days in order to maximize efficiency and minimize costs.

The following flow chart provides a summary of the disputes and claims process described in subsections 105.22, 105.23, and 105.24

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**Figure 105-1  
 DISPUTES AND CLAIMS FLOW CHART**

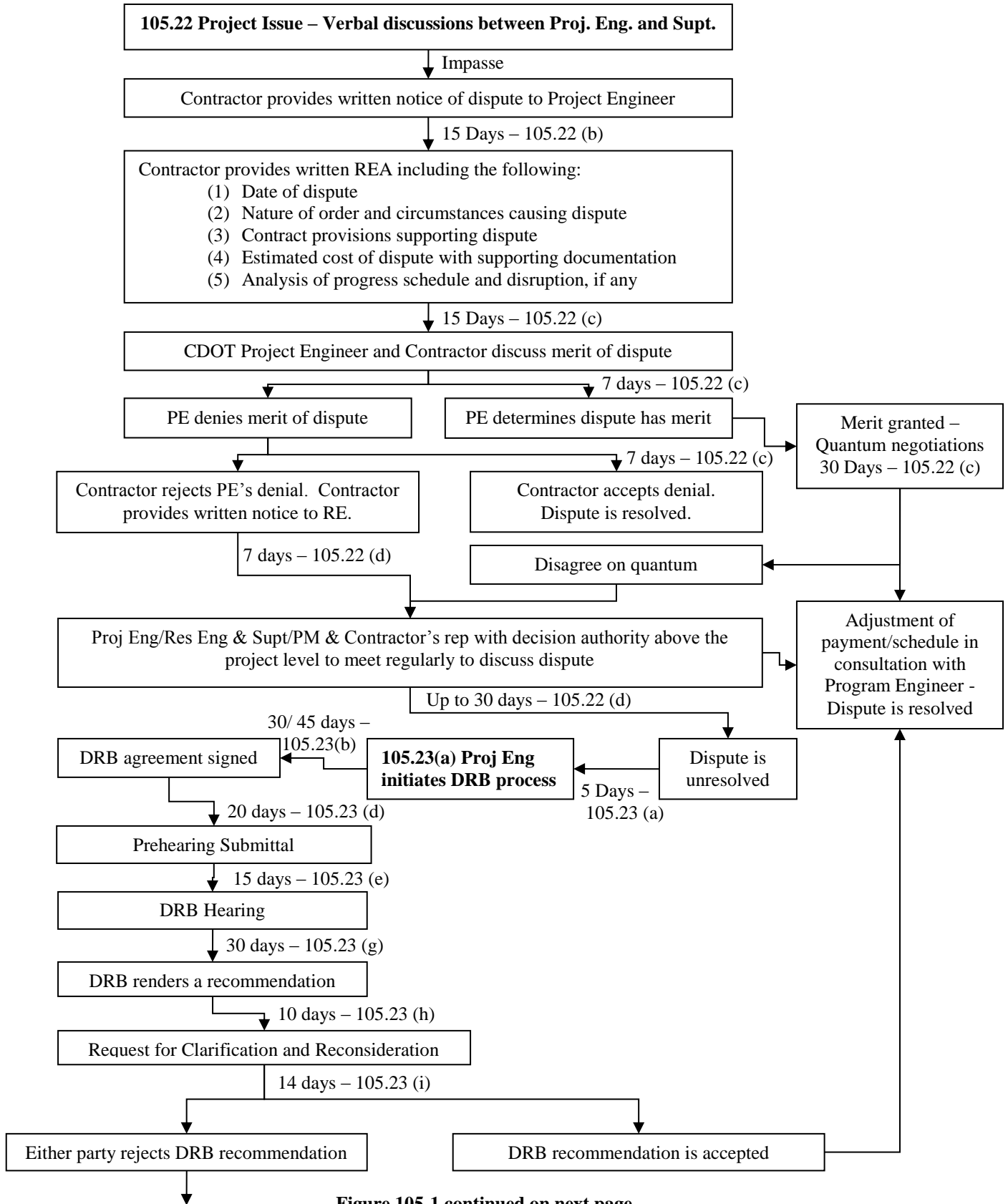
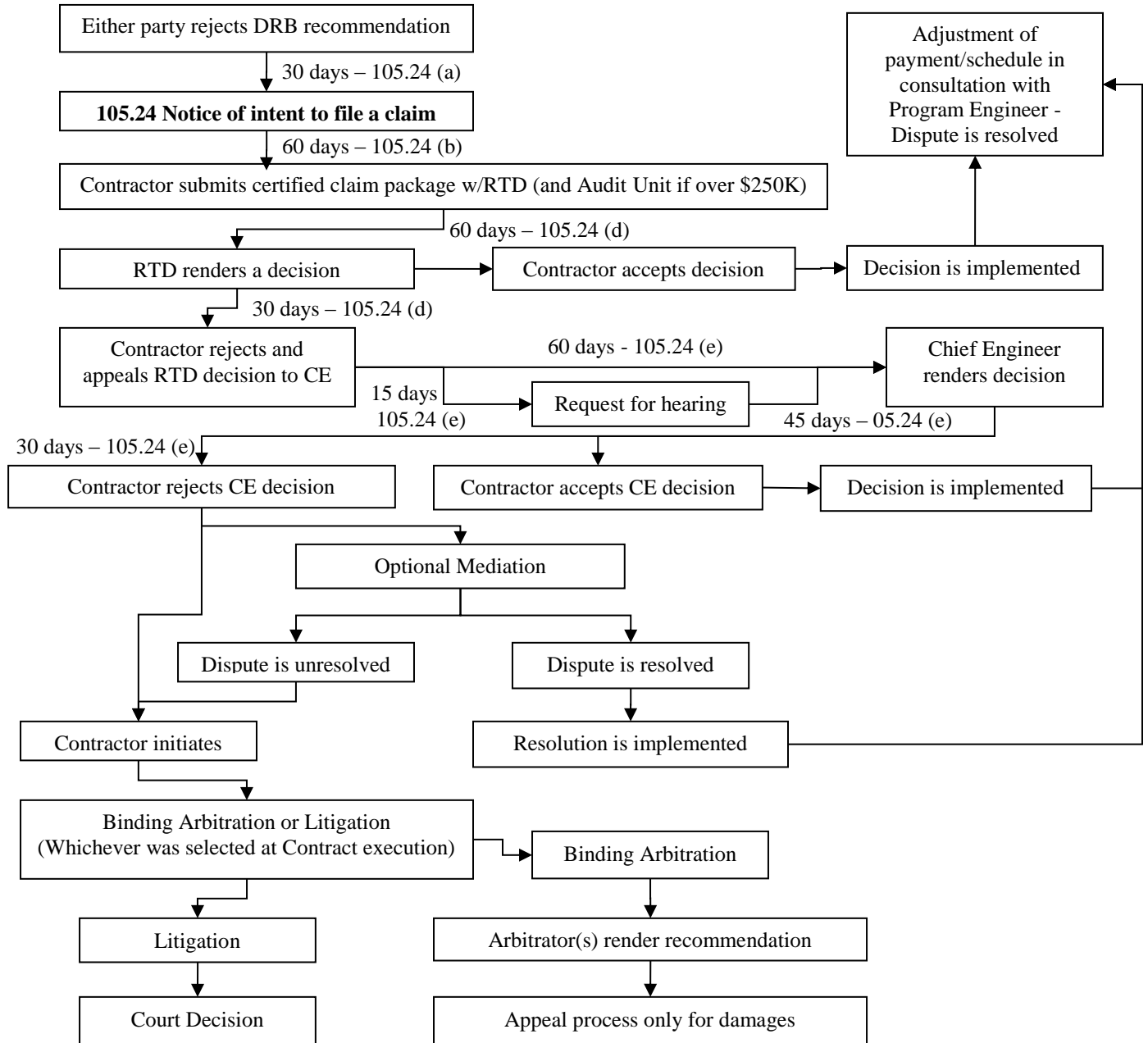


Figure 105-1 continued on next page



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Figure 105-1 (continued)



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HOT MIX ASPHALT PAVEMENT SMOOTHNESS

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 105.07 and replace with the following:

**105.07 Conformity to Roadway Smoothness Criteria of HMA.** Roadway smoothness testing and corrective work shall be performed as described below. The pavement smoothness category shall be MRI Category II unless shown on the plans. At least 2 weeks prior to the pre-paving conference the Contractor may request a change to the pavement smoothness category based on the CDOT's Design Bulletin guidelines for assigning pavement smoothness categories [https://www.codot.gov/business/designsupport/bulletins\\_manuals/design-bulletins/](https://www.codot.gov/business/designsupport/bulletins_manuals/design-bulletins/). The Contractor shall not assume a change will be granted and be prepared to build the pavement according to the assigned smoothness category.

(a) *Smoothness Quality Control Testing.*

1. The Contractor shall perform Smoothness Quality Control (SQC) testing. The test results shall be submitted to the Engineer within 48 hours of completion. SQC test results shall show the Mean Roughness Index (MRI) for each 0.10 mile.

All traffic control costs associated with SQC testing will be paid for in accordance with Section 630.

SQC testing shall be performed on the first 2,000 tons for the final layer.

SQC testing shall be performed using the Contractor's inertial profiler, pursuant to the methods described in subsection 105.07(b) and in accordance with the manufacturer's recommendations. The Contractor's Profiler shall be certified according to CP 78. A list of certified profilers is located at <https://www.codot.gov/business/designsupport/materials-and-geotechnical/pave-smooth-testing/2016-certified-profilers/view>.

Production shall be suspended if SQC testing indicates that corrective work is required in accordance with subsection 105.07 (c). If the SQC data becomes available after production has started for the day, suspension will begin at the end of that production day. Production will remain suspended until the problem is identified and corrected. Each time production is suspended, corrective actions shall be proposed in writing by the Contractor. Production will not be allowed to resume until the proposed corrective actions have been accepted by the Project Engineer in writing.

When production resumes, the Contractor shall profile the first 2,000 tons of HMA. The conditions above for suspension of work will apply.

2. The finished transverse and longitudinal surface elevation of the pavement shall be measured using a 10 foot straightedge. Areas to be measured will be directed by the Engineer. The Contractor shall furnish an approved 10 foot straightedge, depth gauge and operator to aid the Engineer in testing the pavement surface. Areas showing high spots of more than 3/16 inch in 10 feet shall be marked and diamond ground until the high spot does not exceed 3/16 inch in 10 feet.

(b) *Initial Smoothness Acceptance Testing.* The Contractor shall perform Smoothness Acceptance Testing (SA) which will be used for acceptance and calculation of incentive adjustments.

All traffic control costs associated with SA testing will be paid for in accordance with Section 630.

1. Longitudinal Pavement Surface Smoothness Acceptance. Pavement surfaces shall be tested and accepted for longitudinal smoothness as described herein.
  - A. Testing Procedure (General). The longitudinal surface smoothness of the final pavement surface shall be tested by the Contractor in accordance with CP 74 and using the Contractor's high-speed profiler (HSP). The Contractor's Profiler shall be certified according to CP 78. A list of certified

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profilers is located at <https://www.codot.gov/business/designsupport/materials-and-geotechnical/pave-smooth-testing/2016-certified-profilers/view>

The HSP instrumentation shall be verified in accordance with CP 74 prior to measurements. The Contractor shall lay out a distance calibration site. The distance calibration site shall be located no more than ten miles from the Project limits. The distance calibration site shall be 1056 feet long and shall be on a relatively flat, straight section of pavement as approved by the Engineer. The site shall have a speed limit equal to the Project's highest speed limit that allows for the HSP to operate uninterrupted. The limits of the site shall be clearly marked and the distance shall be measured to an accuracy of +/- 3 inches. The Contractor shall provide in writing the site location to the Engineer. The cost of the distance calibration site will not be measured and paid for separately, but shall be included in the work.

The entire length of each through lane, climbing lane and passing lane including bridge approaches, bridge decks and intersections from the beginning to the end of the project shall be profiled in their planned final configuration. Shoulders less than 12 foot in width and medians will not be profiled and will not be subject to incentive adjustments. Shoulders with a width of 12 feet or greater, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be profiled, but will not be subject to incentive/disincentive adjustments. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be evaluated for MRI and shall require corrective work if a 0.10 mile or fraction thereof section exceeds an MRI greater than 100.0 in/mile. The profile of the entire length of a lane shall be taken at one time. However, the Engineer should break a project into sections to accommodate Project phasing.

A sufficient distance shall be deleted from the profile to allow the profiler to obtain the testing speed plus a 300 foot distance to stop and start when required. Incentive adjustments will not be made for this area. The final surface of these areas shall be tested in accordance with subsection 105.07(a) 2.

Shoulders less than 12 foot in width and medians constructed as part of this project shall be measured in accordance with subsection 105.07(a) 2.

The profile shall include transverse joints when pavement is placed by the project on both sides of the joint. When pavement is placed on only one side of the joint, the profile shall start and stop at project paving limits.

The profile of the section of pavement 25 feet outside the paving limits to 5 feet inside paving limits will be evaluated in accordance with subsection 105.07(a) 2.

The profile of the area 25 feet each side of every railroad crossing, cattle guard, bus pad, manhole, gutter pan and intersection (where there is a planned breakpoint in the profile grade line in the direction of traffic) shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for these areas. Areas deleted from the profile shall be tested in accordance with subsection 105.07(a) 2.

When both new pavement and a new bridge or new bridge pavement are being constructed in a project, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for this area. Areas deleted from the profile shall be tested in accordance with subsection 105.07(a) 2. Corrective work required in these areas will not be measured and paid for separately, but shall be included in the work. For all other projects, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for this area. If the Engineer determines that corrective work is required in this area, payment will be made in accordance with subsection 109.04.

REVISION OF SECTION 105  
HOT MIX ASPHALT PAVEMENT SMOOTHNESS

The Contractor shall notify the Engineer in writing at least five working days in advance of his intention to perform SA testing. The Contractor shall profile the Project within 14 days after the completion of paving operations. The Engineer will witness the SA profiling. Within 24 hours after each profile is collected, the Contractor shall submit the data electronically to the Department at DOT\_Profiles@state.co.us and to the Project Engineer.

The Contractor shall not perform any corrective work that will affect the pavement smoothness for ten working days after completion of the SA testing or as approved by the Engineer. This time is to allow for the Department to analyze the data and perform smoothness verification testing.

- B. Smoothness Testing Procedures. The Contractor shall submit a Method for Handling Traffic (MHT) to the Engineer for approval at least five days in advance of SA testing. The MHT shall detail the methods for traffic control that will allow for continuous non-stop profiling of each lane to be profiled at a minimum speed of 15 mph and for the placement of triggers. The Contractor shall provide the traffic control in accordance with the approved MHT. SA testing shall not be performed without an approved MHT

The Contractor shall mark the profiling limits and excluded areas. The Engineer will verify that the Contractor's marks are located properly. The Contractor shall use traffic cones with reflective tape or reflective tape on the pavement at the beginning and end of each lane for triggering the start and stop locations on the profiler and at any other location, where portions of the profile are being excluded. These locations shall be marked with temporary paint so that the Department's profiler uses the same locations for smoothness verification testing.

The ambient temperature shall be at least 34 °F for the profiler to operate.

The Contractor shall clear the lanes to be tested of all debris before profiling.

Each lane shall be profiled at least once. Profiling shall be at a constant speed (+/- 5 mph of the distance calibration speed ) with a minimum speed of 15 mph and a maximum speed of 70 mph. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes shall be profiled. The profile shall be taken in the planned direction of travel. The left and right wheel paths shall be profiled simultaneously. The collected profiles shall be electronically submitted to the Department and Engineer to be analyzed using CP 74.

- (1) The Department will determine a MRI for each 0.1 mile section or fraction thereof of completed pavement. The MRI consists of the left and right wheel path's profile passed through the International Roughness Index (IRI) filter. The IRI for the left and right wheel paths will be averaged to determine MRI.

The Contractor's SA test results will be available within ten working days of the completion of SA testing. The Engineer will give the Contractor a report that will include the lane profiled, the MRI in 0.10 mile increments and a summary of areas requiring corrective work. The Engineer may determine that it is necessary for the Contractor to re-profile a lane.

Areas requiring corrective work will be determined according to subsection 105.07(c)

Sections less than 0.005 miles in length shall not be subject to corrective work as specified by Table 105-10. Sections less than 0.005 miles in length shall be evaluated in accordance with subsection 105.07(a) 2.

- C. Acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive adjustments will be based on the MRI for each 0.1 mile section or fraction thereof.

Incentive adjustments for Pavement Smoothness will be made in accordance with Table 105-6.

REVISION OF SECTION 105  
HOT MIX ASPHALT PAVEMENT SMOOTHNESS

Incentive payments will not be made until all sections requiring corrective work have been corrected.

**Table 105-6  
HMA PAVEMENT SMOOTHNESS (INCHES/MILE)  
MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Maximum Incentive Payment (\$/sqyd)	Incentive Payment (\$/sqyd)	No Incentive	Corrective Work Required
I	MRI ≤ 46.0 I = \$1.28	MRI > 46.0 and < 73.0 I = 3.46 - 0.0474 MRI	MRI ≥ 73.0 and ≤ 88.0	MRI > 88.0
II	MRI ≤ 40.0 I = \$1.28	MRI > 40.0 and < 67.0 I = 3.18 - 0.0474 MRI	MRI ≥ 67.0 and ≤ 82.0	MRI > 82.0
III	MRI ≤ 52.0 I = \$1.28	MRI > 52.0 and < 80.0 I = 3.66 - 0.0457 MRI	MRI ≥ 80.0 and ≤ 97.0	MRI > 97.0

**Table 105-7  
CORRECTIVE WORK CRITERIA (INCHES/MILE)  
0.005 to 0.10 MILE SECTIONS  
MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Corrective Work Required D = Section Length (miles)
I	MRI > 134.32 - 463.16 D
II	MRI > 125.16 - 431.58 D
III	MRI > 148.05 - 510.53 D

(c) *Corrective Work.*

The Department will analyze the SA testing for acceptance and indicate areas requiring corrective work in accordance with subsection 105.07(b). Corrective work shall be proposed in writing by the Contractor. Corrective work shall not be performed until approved in writing by the Engineer. The Contractor shall not perform any corrective work on the final layer until after the Engineer returns the results of the Initial Smoothness Acceptance testing and after the Department's Smoothness Verification testing, if performed. The Contractor shall perform corrective work in the areas indicated by the SA testing.

Corrective work on lower layers shall be at the Contractor's discretion.

The Contractor shall profile the roadway to demonstrate the required corrective work has been completed.

If the Contractor elects to perform corrective work prior to the completion of initial SA testing, the entire 0.10 mile section, or fraction thereof, will not be eligible for incentive payment. The Engineer will not modify the limits of the 0.10 mile sections to group corrective work areas in an effort to reduce the number of sections impacted by this decision.

REVISION OF SECTION 105  
HOT MIX ASPHALT PAVEMENT SMOOTHNESS

The criteria for determining if a 0.1 mile section requires corrective work is specified in Table 105-6. The criteria for determining if a section less than 0.10 miles in length and greater than 0.005 miles in length requires corrective work is specified in Table 105-7

- A. Corrective Methods. Corrective work shall consist of diamond grinding, an approved overlay, or removal and replacement.

Corrective work shall conform to one of the following conditions:

- (1) Removal and Replacement. The pavement requiring corrective work shall be removed, full width of the lane and the full thickness of the layer in accordance with subsection 202.09.

The removal area shall begin and end with a transverse butt joint, which shall be constructed with a transverse saw cut perpendicular to centerline. Replacement material shall be placed in sufficient quantity so the finished surface conforms to grade and smoothness requirements. Sections removed and replaced shall be at least 0.20 miles in length.

- (2) Overlay. The overlay shall cover the full width of the pavement including shoulders. The area overlaid shall begin and end with a transverse butt joint, which shall be constructed with a transverse saw cut and asphalt removal. All material shall be approved hot bituminous mixtures that meet all contract requirements. The overlay shall be placed so that the finished surface conforms to grade and smoothness requirements. The overlay area shall be compacted to the specified density. The overlay thickness shall be equivalent to that of the final layer in accordance with the Contract. Sections overlaid shall be at least 0.20 miles in length.

- (3) Diamond Grinding. Grinding shall not reduce planned pavement thickness by more than 0.3 inches. Diamond grinding shall be the full width of a wheel path, the wheel path is from the stripe to the center of the lane. The entire ground area of the final pavement surface shall be covered with a Tack Coat conforming to Section 407 (CSS-1h at 0.1 gallons per square yard of diluted emulsion; the emulsion shall be diluted with water at the rate of 50 percent water and 50 percent emulsion) when grinding is complete. The grinding process shall produce a pavement surface that is true to grade and uniform in appearance. The grooves shall be evenly spaced. Any ridges on the outside edge next to the shoulder, auxiliary, ramps or adjacent lanes greater than 3/16 inch high shall be feathered out to the satisfaction of the Engineer in a separate, feather pass operation.

The pavement surface after grinding shall have no depressions or misalignment of slope in the longitudinal direction exceeding 1/8 inch in 12 feet when measured with a 12 foot straightedge placed parallel to the centerline. All areas of deviation shall be reground at no additional cost.

The slurry and residue resulting from the grinding operation shall not be allowed to flow across lanes occupied by the traffic and shall be continuously removed during the grinding operation, leaving the pavement in a clean condition. The Contractor shall haul the grinding residue to a suitable location at an approved location at no additional cost.

Cores shall be taken to verify that minimum pavement thicknesses have been maintained. A minimum of one core shall be taken every 100 cumulative feet or fraction thereof per lane of diamond grinding, as directed by the Engineer. Coring shall be at the Contractor's expense.

- (d) *Final Smoothness Acceptance Testing.* After the Contractor has completed the required corrective work the Contractor shall retest the pavement in accordance with subsection 105.07(b). Final SA testing shall only be required on lanes with sections requiring corrective work. Final SA testing shall start and stop at the same locations as the Initial SA testing. If additional corrective work is required, the Contractor shall perform the corrective work and perform additional Final SA Testing. Time count will be charged pursuant to contract requirements during the time period required for all Final SA Testing. Delays associated with additional Final SA Testing will be considered non-excusable and non-compensable.

REVISION OF SECTION 105  
HOT MIX ASPHALT PAVEMENT SMOOTHNESS

The Contractor shall notify the Engineer pursuant to 105.07(b) to schedule the final SA testing.

Final acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive payments will be based on the MRI for each 0.1 mile section or fraction thereof from the Contractor's initial SA testing.

Those sections requiring corrective work indicated by the initial SA testing, will be re-evaluated; however, no incentives may be earned in these areas, regardless of the final smoothness.

- (e) *Department Smoothness Verification Testing (SV)*. The Department may elect to perform smoothness verification (SV) testing using the Department's inertial profiler, with the methods described in subsection 105.07(b). The Engineer will notify the Contractor of the Department's intention to perform SV testing. All traffic control costs associated with Department SV testing will be paid for by the Department in accordance with Section 630.

The Contractor's SA test results will be compared to the Department's SV test results. The Contractor's SA test results will be considered acceptable and will be used for incentive payment if the following criteria are met:

- (1) The difference in MRI for a 1/10 mile section is less than 6.1 inches/mile for a minimum of 90 percent of the 1/10 mile sections for each lane.
- (2) The difference in average MRI for each lane is less than 6.1 inches/mile.
- (3) The difference in the length of each lane is less than 0.2 percent

When the Contractor's SA test results are not considered acceptable, the Department's SV test results will be used for incentive payment and the Contractor's profiler certification will be evaluated pursuant to CP 78. The Department will have 30 days to complete this evaluation.

The Contractor will be assessed a charge of \$1,000 for SV testing when the Contractor's SA test results are not considered acceptable.

- (f) *MRI Category IV: HMA Recycling Treatments Thin Lifts and Urban Rehabilitation treatments smoothness criteria*. For MRI Category IV pavements, the following shall be used for acceptance:

An MRI for each 0.1 mile section shall be determined on the original pavement surface prior to beginning the work.

An MRI for each 0.1 mile section shall be determined on the pavement surface after the work is complete.

When a 0.1 mile section has a final MRI greater than 92.0 in/mile and the final MRI is greater than the MRI prior to performing the work, that 0.1 mile section shall be corrected by a method approved in writing by the Engineer. Corrective work shall be such that the resulting final MRI is equal to or less than the initial MRI or 92.0 in/mile, whichever is greater. All costs associated with corrective work shall be at the Contractor's expense, including but not limited to traffic control, additional hot mix asphalt, grinding and milling.

Incentive adjustments for smoothness will not be made for Category IV.

The pavement smoothness for HMA Recycling Treatments and Thin Lifts that will be overlaid with a final riding surface will not be evaluated by the Department for Smoothness acceptance.

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REVISION OF SECTION 105  
PORTLAND CEMENT CONCRETE PAVEMENT SMOOTHNESS

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 105.08 and replace with the following:

**105.08 Conformity to Roadway Smoothness Criteria of Portland Cement Concrete Pavement.** Roadway smoothness testing and corrective work shall be performed as described below. The pavement smoothness category shall be MRI Category II unless shown on the plans. At least 2 weeks prior to the pre-paving conference the Contractor may request a change to the pavement smoothness category based on the CDOT's Design Bulletin guidelines for assigning pavement smoothness categories [https://www.codot.gov/business/designsupport/bulletins\\_manuals/design-bulletins/](https://www.codot.gov/business/designsupport/bulletins_manuals/design-bulletins/). The Contractor shall not assume a change will be granted and be prepared to build the pavement according to the assigned smoothness category.

(a) *Smoothness Quality Control Testing.*

1. The Contractor shall perform Smoothness Quality Control (SQC) testing. A profile shall be taken for each day's paving within 24 hours after the concrete has achieved sufficient strength. The Contractor shall not perform the SQC testing until after the concrete has attained a compressive strength of 1,000 psi if a light weight profiler is used or 2,000 psi if a high speed profiler is used. The test results shall be submitted to the Engineer within 48 hours of completion. SQC test results shall show the Mean Roughness Index (MRI) for each 0.10 mile.

All traffic control costs associated with SQC testing will be paid for in accordance with Section 630.

SQC testing shall be performed using the Contractor's inertial profiler, pursuant to the methods described in subsection 105.08(b) and in accordance with the manufacturer's recommendations. The Contractor's Profiler shall be certified according to CP 78. A list of certified profilers is located at <https://www.codot.gov/business/designsupport/materials-and-geotechnical/pave-smooth-testing/2016-certified-profilers/view>.

Production shall be suspended if SQC testing indicates that corrective work is required in accordance with subsection 105.08 (c). If the SQC data becomes available after production has started for the day, suspension will begin at the end of that production day. Production will remain suspended until the problem is identified and corrected. Each time production is suspended, corrective actions shall be proposed in writing by the Contractor. Production will not be allowed to resume until the proposed corrective actions have been accepted by the Project Engineer in writing.

When production resumes, the Contractor shall profile the day's paving. The conditions above for suspension of work will apply.

2. The finished transverse and longitudinal surface elevation of the pavement shall be measured using a 10 foot straightedge. Areas to be measured will be directed by the Engineer. The Contractor shall furnish an approved 10 foot straightedge, depth gauge and operator to aid the Engineer in testing the pavement surface. Areas showing high spots of more than 3/16 inch in 10 feet shall be marked and diamond ground until the high spot does not exceed 3/16 inch in 10 feet.
3. No more than 5 working days prior to the Department's Initial Acceptance (SA) Testing, the Contractor shall profile each lane 3 times following the procedures in Subsection 105.08 (b). One profile will be collected in the morning (~6:00 am to 10:00 am), one profile will be collected mid-day (~12:00 pm to 4:00 pm) and one profile will be collected in the evening (~6:00 pm to 10:00 pm). The Contractor shall submit the data electronically to the Department at DOT\_Profiles@state.co.us and to the Project Engineer. The Contractor will use this data to determine the best time of day for the Department perform SA Testing.



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REVISION OF SECTION 105  
CONCRETE PAVEMENT SMOOTHNESS

- (b) *Initial Smoothness Acceptance Testing.* The Department will perform Smoothness Acceptance Testing (SA) which will be used for acceptance and calculation of incentive adjustments.

All traffic control costs associated with SA testing will be paid for in accordance with Section 630.

1. Longitudinal Pavement Surface Smoothness Acceptance. Pavement surfaces shall be tested and accepted for longitudinal smoothness as described herein.
  - A. Testing Procedure (General). The longitudinal surface smoothness of the final pavement surface shall be tested by the Department in accordance with CP 74 and using the Department's high-speed profiler (HSP).

The Contractor shall lay out a distance calibration site. The distance calibration site shall be located no more than ten miles from the Project limits. The distance calibration site shall be 1056 feet long and shall be on a relatively flat, straight section of pavement as approved by the Engineer. The site shall have a speed limit equal to the Project's highest speed limit that allows for the HSP to operate uninterrupted. The limits of the site shall be clearly marked and the distance shall be measured to an accuracy of +/- 3 inches. The Contractor shall provide in writing the site location to the Engineer. The cost of the distance calibration site will not be measured and paid for separately, but shall be included in the work.

The entire length of each through lane, climbing lane and passing lane including bridge approaches, bridge decks and intersections from the beginning to the end of the project shall be profiled in their planned final configuration. Shoulders less than 12 foot in width and medians will not be profiled and will not be subject to incentive adjustments. Shoulders with a width of 12 feet or greater, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be profiled, but will not be subject to incentive adjustments. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes will be evaluated for MRI and shall require corrective work if a 0.10 mile or fraction thereof section exceeds an MRI greater than 100.0 in/mile. The profile of the entire length of a lane shall be taken at one time. However, the Engineer should break a project into sections to accommodate Project phasing.

A sufficient distance shall be deleted from the profile to allow the profiler to obtain the testing speed plus a 300 foot distance to stop and start when required. Incentive adjustments will not be made for this area. The final surface of these areas shall be tested in accordance with subsection 105.08(a) 2.

Shoulders less than 12 foot in width and medians constructed as part of this project shall be measured in accordance with subsection 105.08(a) 2.

The profile shall include transverse joints when pavement is placed by the project on both sides of the joint. When pavement is placed on only one side of the joint, the profile shall start and stop at project paving limits.

The profile of the section of pavement 25 feet outside the paving limits to 5 feet inside paving limits will be evaluated in accordance with subsection 105.08(a) 2.

The profile of the area 25 feet each side of every railroad crossing, cattle guard, bus pad, manhole, gutter pan and intersection (where there is a planned breakpoint in the profile grade line in the direction of traffic) shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for these areas. Areas deleted from the profile shall be tested in accordance with subsection 105.08(a) 2.

When both new pavement and a new bridge or new bridge pavement are being constructed in a project, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile

REVISION OF SECTION 105  
CONCRETE PAVEMENT SMOOTHNESS

before the MRI is determined. Incentive adjustments will not be made for this area. Areas deleted from the profile shall be tested in accordance with subsection 105.08(a) 2. Corrective work required in these areas will not be measured and paid for separately, but shall be included in the work. For all other projects, the profile of the area 25 feet each side of the bridge deck shall be deleted from the profile before the MRI is determined. Incentive adjustments will not be made for this area. If the Engineer determines that corrective work is required in this area, payment will be made in accordance with subsection 109.04.

- B. Smoothness Testing Procedures. The Contractor shall submit a Method for Handling Traffic (MHT) to the Engineer for approval at least ten days in advance of SA testing. The MHT shall detail the methods for traffic control that will allow for continuous non-stop profiling of each lane to be profiled at a minimum speed of 15 mph and for the placement of triggers. The Contractor shall provide the traffic control in accordance with the approved MHT. SA testing will not be performed without an approved MHT

The Contractor shall mark the profiling limits and excluded areas. The Engineer will verify that the Contractor's marks are located properly. The Department will use traffic cones with reflective tape or reflective tape on the pavement at the beginning and end of each lane for triggering the start and stop locations on the profiler and at any other location, where portions of the profile are being excluded. The Contractor shall provide sufficient traffic control for the Department to safely place the traffic cones or reflective tape.

The ambient temperature shall be at least 34 °F for the profiler to operate.

The Contractor shall clear the lanes to be tested of all debris before profiling.

Each lane will be profiled at least once. Profiling will be at a constant speed (+/- 5 mph of the distance calibration speed ) with a minimum speed of 15 mph and a maximum speed of 70 mph. Shoulders with a width of 12 feet or more, ramps, tapers, turn slots, acceleration lanes and deceleration lanes shall be profiled. The profile will be taken in the planned direction of travel. The left and right wheel paths will be profiled simultaneously. The collected profiles will be analyzed using CP 74.

The Department will determine a MRI for each 0.1 mile section or fraction thereof of completed pavement. The MRI consists of the left and right wheel path's profile passed through the International Roughness Index (IRI) filter. The IRI for the left and right wheel paths will be averaged to determine MRI.

The SA test results will be available within ten working days of the completion of SA testing. The Engineer will give the Contractor a report that will include the lane profiled, the MRI in 0.10 mile increments and a summary of areas requiring corrective work. The Engineer may determine that it is necessary to re-profile a lane.

Areas requiring corrective work will be determined according to subsection 105.08(c)

Sections less than 0.005 miles in length shall not be subject to corrective work as specified by Table 105-10. Sections less than 0.005 miles in length shall be evaluated in accordance with subsection 105.08(a) 2.

- C. Acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive adjustments will be based on the MRI for each 0.1 mile section or fraction thereof. Incentive adjustments for Pavement Smoothness will be made in accordance with Table 105-10.

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 REVISION OF SECTION 105  
 CONCRETE PAVEMENT SMOOTHNESS

Incentive payments will not be made until all sections requiring corrective work have been corrected.

**Table 105-10  
 PCCP SMOOTHNESS (INCHES/MILE)  
 MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Maximum Incentive Payment (\$/sqyd)	Incentive Payment (\$/sqyd)	No Incentive	Corrective Work Required (0.10 mile sections)
I	MRI ≤ 46.0 I = \$2.80	MRI > 46.0 and < 73.0 I = 7.57 – 0.1037 MRI	MRI ≥ 73.0 and ≤ 88.0	MRI > 88.0
II	MRI ≤ 40.0 I = \$2.80	MRI > 40.0 and < 67.0 I = 6.948 – 0.1037 MRI	MRI ≥ 67.0 and ≤ 82.0	MRI > 82.0
III	MRI ≤ 52.0 I = \$2.80	MRI > 52.0 and < 80.0 I = 8.00 – 0.100 MRI	MRI ≥ 80.0 and ≤ 97.0	MRI > 97.0

**Table 105-11  
 CORRECTIVE WORK CRITERIA (INCHES/MILE)  
 0.005 TO 0.10 MILE SECTIONS  
 MEAN ROUGHNESS INDEX**

Pavement Smoothness Category	Corrective Work Required D = Section Length (miles)
I	MRI > 134.32 – 463.16 D
II	MRI > 125.16 – 431.58 D
III	MRI > 148.05 – 510.53 D

(c) *Corrective Work.*

The Department will analyze the SA testing for acceptance and indicate areas requiring corrective work in accordance with subsection 105.08(b). Corrective work shall be proposed in writing by the Contractor. Corrective work shall not be performed until approved in writing by the Engineer. The Contractor shall perform corrective work in the areas indicated by the SA testing.

The Contractor shall profile the roadway to demonstrate the required corrective work has been completed.

If the Contractor elects to perform corrective work prior to the completion of initial SA testing, the entire 0.10 mile section, or fraction thereof, will not be eligible for incentive payment. The Engineer will not modify the limits of the 0.10 mile sections to group corrective work areas in an effort to reduce the number of sections impacted by this decision.

The criteria for determining if a 0.1 mile section requires corrective work is specified in Table 105-10. The criteria for determining if a section less than 0.10 miles in length and greater than 0.005 miles in length requires corrective work is specified in Table 105-11.

REVISION OF SECTION 105  
CONCRETE PAVEMENT SMOOTHNESS

Corrective work shall consist of diamond grinding. Diamond Grinding. Grinding shall not reduce planned pavement thickness by more than 0.3 inches. Diamond grinding shall be the full width of a wheel path, the wheel path is from the stripe to the center of the lane. When any grinding on concrete pavement occurs where a core for determining pavement thickness has been previously taken, another core shall be taken after the grinding has been completed and shall replace the original core in the calculation of pavement thickness incentive and disincentive. Joint sealant that has been damaged by grinding on concrete pavement shall be repaired or replaced at the Contractor's expense in accordance with Standard Plan M-412-1 and subsection 412.18. Cores shall be taken to verify that minimum pavement thicknesses have been maintained. A minimum of one core shall be taken every 100 cumulative feet or fraction thereof per lane of diamond grinding, as directed by the Engineer. Coring shall be at the Contractor's expense.

The grinding process shall produce a pavement surface that is true to grade and uniform in appearance. The grooves shall be evenly spaced. Any ridges on the outside edge next to the shoulder, auxiliary, ramps or adjacent lanes greater than 3/16 inch high shall be feathered out to the satisfaction of the Engineer in a separate, feather pass operation.

The pavement surface after grinding shall have no depressions or misalignment of slope in the longitudinal direction exceeding 1/8 inch in 12 feet when measured with a 12 foot straightedge placed parallel to the centerline. All areas of deviation shall be reground at no additional cost.

Diamond ground surface texture will be considered acceptable when the average texture depth (ATD) of the panel is greater than 0.05 inch. The Contractor will perform surface texture testing in accordance with CP 77 Method B. Each area in a lane that required diamond grinding will be tested at least once. Areas in a lane with more than 500 continuous feet of grinding will be tested at a frequency of 1 test per 500 linear feet. Areas with deficient surface texture shall be diamond ground and retested.

The slurry and residue resulting from the grinding operation shall not be allowed to flow across lanes occupied by the traffic and shall be continuously removed during the grinding operation, leaving the pavement in a clean condition. The Contractor shall haul the grinding residue to a suitable location at an approved location at no additional cost.

- (d) *Final Smoothness Acceptance Testing.* After the Contractor has completed the required corrective work the Department will retest the pavement in accordance with subsection 105.08(b). Final SA testing will only be required on lanes with sections requiring corrective work. Final SA testing will start and stop at the same locations as the Initial SA testing. If additional corrective work is required, the Contractor shall perform the corrective and additional Final SA Testing will be performed by the Department. Time count will be charged pursuant to contract requirements during the time period required for all Final SA Testing. Delays associated with additional Final SA Testing will be considered non-excusable and non-compensable.

The Contractor shall notify the Engineer pursuant to 105.08(b) to schedule the final SA testing.

Final acceptance and incentive adjustments for pavement smoothness will be made on a square yard basis in accordance with the following:

Incentive payments will be based on the MRI for each 0.1 mile section or fraction thereof from the Department's initial SA testing.

Those sections requiring corrective work indicated by the initial SA testing, will be re-evaluated; however, no incentives may be earned in these areas, regardless of the final smoothness.

REVISION OF SECTION 105  
VIOLATION OF WORKING TIME LIMITATION

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.03 shall include the following:

If there is a violation of the working time limitations for traffic control as set forth in the special provisions, a written notice to stop work will be imposed on the Contractor at the start of the next working day. Work shall not resume until the Contractor assures the Engineer, in writing, that there will not be a reoccurrence of the working time violation. If more violations take place, the Engineer will notify the Contractor in writing that there will be a price reduction charge for each incident in accordance with this specification. This incident price reduction charge will be deducted from any money due the Contractor. This price reduction will not be considered a penalty but will be a price reduction for failure to perform traffic control in compliance with the Contract.

An incident is any violation up to 30 minutes in duration. Each 30 minutes or increment thereof will be considered as an incident. A price reduction will be assessed for each successive or cumulative 30 minute period in violation of the working time limitations, as determined by the Engineer. The price reduction for each incident will increase at a progressive rate starting with \$150 for the second incident and increasing to \$1200 for the fifth and subsequent incidents in accordance with the following schedule. A 15 minute grace period will be allowed at the beginning of the second incident on the project before the price reduction is applied. This 15 minute grace period applies only to the second incident.

The number of incident charges will be accumulative throughout the duration of the Contract.

**PRICE REDUCTION SCHEDULE**

<b>Incident</b>	<b>Incident Rate</b>	<b>Total Price Reduction</b>
1 <sup>st</sup>	Notice to Stop Work	----
2 <sup>nd</sup>	\$150	\$150
3 <sup>rd</sup>	300	450
4 <sup>th</sup>	600	1,050
5 <sup>th</sup>	1,200	2,250
6 <sup>th</sup>	1,200	3,450
Etc.	1,200	4,650
	Etc.	Etc.

REVISION OF SECTIONS 105 AND 106  
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT  
(VOIDS ACCEPTANCE)

Sections 105 and 106 of the Standard Specifications are hereby revised for this project as follows:

Delete subsection 105.05 and replace with the following:

**105.05 Conformity to the Contract of Hot Mix Asphalt.** Conformity to the Contract of all Hot Mix Asphalt, Item 403, except Hot Mix Asphalt (Patching) and temporary pavement will be determined by tests and evaluations of elements that include asphalt content, voids in the mineral aggregate, air voids, in-place density, and joint density in accordance with the following:

All work performed and all materials furnished shall conform to the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown in the Contract.

For those items of work where working tolerances are not specified, the Contractor shall perform the work in a manner consistent with reasonable and customary manufacturing and construction practices.

When the Engineer finds the materials or work furnished, work performed, or the finished product are not in conformity with the Contract and has resulted in an inferior or unsatisfactory product, the work or material shall be removed and replaced or otherwise corrected at the expense of the Contractor.

Materials will be sampled randomly and tested by the Department in accordance with subsection 106.05 and with the applicable procedures contained in the Department's Field Materials Manual. The approximate maximum quantity represented by each sample will be as set forth in subsection 106.05. Additional samples may be selected and tested at the Engineer's discretion.

A process will consist of either a test value or a series of test values resulting from related tests of an element of the Contractor's work and materials. An element is a material and/or workmanship property that can be tested and evaluated for quality level by the Department approved sampling, testing, and analytical procedures. All materials produced will be assigned to a process of each element being tested and evaluated. A change in process is defined as a change that affects the element involved. A process for any element normally will include all produced materials associated with that element prior to a change in the job mix formula (Form 43) with the exception of the process for joint density element. For joint density, a new process will be established for each new layer of pavement or for changes in joint construction. In-place density measurements taken within each compaction test section will be a separate process. The Engineer may separate a process in order to accommodate small quantities or unusual variations.

Evaluation of materials for pay factors (PF) will be done using only the Department's acceptance test results. Each process will have a PF computed in accordance with the requirements of this Section. Test results determined to have sampling or testing errors will not be used.

Except for in-place density measurements taken within a compaction test section, any test result for the asphalt content, in-place density and/or joint density element greater than the distance  $2 \times V$  (see Table 105-2) outside the tolerance limits will be designated as a separate process and the quantity it represents will be evaluated in accordance with subsection 105.05(a). An element pay factor less than zero shall be zero. The calculated PF will be used to determine the Incentive/Disincentive Payment (I/DP) for the process in accordance with 105.05(e) Evaluation of Work.

Any test result for the air voids or VMA elements greater than the distance  $2 \times V$  (see Table 105-2) outside the tolerance limits will be designated as a separate process and the quantity it represents shall be removed and replaced with specification material at the Contractor's expense.

In the case of in-place density or joint density, the Contractor will be allowed to core the exact location (or immediately adjacent location for joint density) of a test result more than  $2 \times V$  outside the tolerance limit. The core must be taken and furnished to the Engineer within eight hours after notification by the Engineer of the test result. The result of this core will be used in lieu of the previous test result. Cores not taken within eight hours

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after notification by the Engineer will not be used in lieu of the test result. All costs associated with coring will be at the Contractor's expense.

- (1) *Representing Small Quantities.* When it is necessary to represent a process by only one or two test results, PF will be the average of PFs resulting from the following:

If the test result is within the tolerance limits then PF = 1.00. If the test result is above the maximum specified limit, then

$$PF = 1.00 - [0.25(T_0 - T_U)/V]$$

If the test result is below the minimum specified limit, then

$$PF = 1.00 - [0.25(T_L - T_0)/V]$$

- Where: PF = pay factor.  
 V = V factor from Table 105-2.  
 T<sub>0</sub> = the individual test result.  
 T<sub>U</sub> = upper specification limit.  
 T<sub>L</sub> = lower specification limit.

If the pay factor of any of the above calculations is less than 0.75 for any element, the acceptance of the work will be evaluated according to subsection 105.05(e).

- (2) *Determining Quality Level.* Each process with three or more test results will be evaluated for a quality level (QL) in accordance with Colorado Procedure 71.
- (3) *Joint Density Element.* Joint density will be tested according to subsection 401.17.
- (4) *Process Pay Factor.* Using the calculated QL for the process, compute the PF as follows: The final number of random samples (Pn) in each process will determine the final pay factor. As test values are accumulated for each process, Pn will change accordingly. When the process has *been* completed, the number of random samples it contains will determine the computation of PF, based on Table 105-3 and formula (1) below. When Pn is from 3 to 9, or greater than 200, PF will be computed using the formulas designated in Table 105-3. Where Pn is equal to or greater than 10 and less than 201, PF will be computed by formula (1):

$$(1) PF = \frac{(PF_1 + PF_2)}{2} + \frac{(PF_2 + PF_3)}{2} \frac{(PF_1 + PF_2)}{2} \frac{(Pn_2 - Pn_x)}{(Pn_2 - Pn_3)}$$

Where, when referring to Table 105-3:

- PF<sub>1</sub>= PF determined at the next lowest Pn formula using process QL  
 PF<sub>2</sub>= PF determined using the Pn formula shown for the process QL  
 PF<sub>3</sub>= PF determined at the next highest Pn formula using process QL  
 Pn<sub>2</sub>= the lowest Pn in the spread of values listed for the process Pn formula  
 Pn<sub>3</sub>= the lowest Pn in the spread of values listed for the next highest Pn formula  
 Pn<sub>x</sub>= the actual number of test values in the process

When evaluating the item of Furnish Hot mix asphalt, the PF for the element of In-Place Density shall be 1.0.

Regardless of QL, the maximum PF in relation to Pn is limited in accordance with Table 105-3.

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As test results become available, they will be used to calculate QL and PF numbers for each process. The process I/DP's will then be calculated and accumulated for each element and for the item. The test results and the accumulated calculations will be made available to the Contractor upon request.

Numbers from the calculations will be carried to significant figures and rounded according to AASHTO Standard Recommended Practice R-11, Rounding Method.

- (5) *Evaluation of Work.* When the PF of a process is 0.75 or greater, the finished quantity of work represented by the process will be accepted at the appropriate pay factor. If the PF for the air voids or VMA elements within *any* process is less than 0.75, the Contractor shall remove and replace the material with specification material at the Contractor's expense. If PF for any other element within any process is less than 0.75, the Engineer may:
1. Require complete removal and replacement with specification material at the Contractor's expense,
- or
2. Where the finished product is found to be capable of performing the intended purpose and the value of the finished product is not affected, permit the Contractor to leave the material in place. If the material is permitted to remain in place, the PF for the process shall not be greater than 0.75. The Region Materials Engineer (RME) will be consulted prior to determining the material will be allowed to remain in place. The RME will also be consulted to assist in determining an appropriate pay factor.

When condition red, as described in subsection 106.05(g), exists for any element, resolution and correction will be in accordance with subsection 106.05(g). Material that the Engineer determines is defective may be isolated and rejected without regard to sampling sequence or location within a process.

If removal and replacement is required because the joint density PF for a process is below 0.75, the Contractor shall remove and replace the full lane width adjacent to and including at least six inches beyond the visible joint line for the entire length of joint representing the process. If the lane removed is adjacent to another joint, that joint shall also be removed to a point six inches beyond the visible joint line. When a single joint density core is more than 2V outside the tolerance limits, the removal and replacement limits shall be identified by coring the failing joint at 25 foot intervals until two successive cores are found to be 1V or less below the minimum tolerance limit. If removal and replacement is required, the Contractor shall submit documentation identifying the process to be used to correct the area in question. The process will be approved by the Engineer before commencing the corrective work

**Table 105-2**  
**"W" AND "V" FACTORS FOR VARIOUS ELEMENTS**

Element	V Factor	W Factor
Asphalt Content	0.20	10
Voids in the Mineral Aggregate	0.60	10
Air Voids	0.60	30
In-place Density	1.10	35
Joint Density	1.60	15



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**Table 105-3  
 FORMULAS FOR CALCULATING PF BASED ON PN**

Pn	When Pn as shown at left is 3 to 9, or greater than 200, use designated formula below to calculate Pay Factor, PF = ..., when Pn is 10 to 200, use formula (1) above:	Maximum PF
3	$0.31177 + 1.57878 (QL/100) - 0.84862 (QL/100)^2$	1.025
4	$0.27890 + 1.51471 (QL/100) - 0.73553 (QL/100)^2$	1.030
5	$0.25529 + 1.48268 (QL/100) - 0.67759 (QL/100)^2$	1.030
6	$0.19468 + 1.56729 (QL/100) - 0.70239 (QL/100)^2$	1.035
7	$0.16709 + 1.58245 (QL/100) - 0.68705 (QL/100)^2$	1.035
8	$0.16394 + 1.55070 (QL/100) - 0.65270 (QL/100)^2$	1.040
9	$0.11412 + 1.63532 (QL/100) - 0.68786 (QL/100)^2$	1.040
10 to 11	$0.15344 + 1.50104 (QL/100) - 0.58896 (QL/100)^2$	1.045
12 to 14	$0.07278 + 1.64285 (QL/100) - 0.65033 (QL/100)^2$	1.045
15 to 18	$0.07826 + 1.55649 (QL/100) - 0.56616 (QL/100)^2$	1.050
19 to 25	$0.09907 + 1.43088 (QL/100) - 0.45550 (QL/100)^2$	1.050
26 to 37	$0.07373 + 1.41851 (QL/100) - 0.41777 (QL/100)^2$	1.055
38 to 69	$0.10586 + 1.26473 (QL/100) - 0.29660 (QL/100)^2$	1.055
70 to 200	$0.21611 + 0.86111 (QL/100)$	1.060
≥ 201	$0.15221 + 0.92171 (QL/100)$	1.060

(6) Process I/DP Computation.

$$I/DP = (PF - 1)(QR)(UP)(W/100)$$

Where: I/DP= Incentive/Disincentive Payment  
 PF = Pay Factor  
 QR = Quantity in Tons of HMA Represented by the Process  
 UP = Unit Bid Price of Asphalt Mix  
 W = Element Factor from Table 105-2

When AC is paid for separately UP shall be:

$$UP = [(Ton_{HMA})(UP_{HMA}) + (Ton_{AC})(UP_{AC})]/Ton_{HMA}$$

Where: Ton<sub>HMA</sub> = Tons of Asphalt Mix  
 UP<sub>HMA</sub> = Unit Bid Price of Asphalt Mix  
 Ton<sub>AC</sub> = Tons of Asphalt Cement  
 UP<sub>AC</sub> = Unit Bid Price of Asphalt Cement

For the Joint Density element:

$$UP = UP_{HMA}$$

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Where:  $UP_{HMA}$  is as defined above.

When AC is paid for separately UP shall be:

$$UP = [(B_{TonHMA})(BUP_{HMA}) + (B_{TonAC})(BUP_{AC})]/B_{TonHMA}$$

Where:  $B_{TonHMA}$  = Bid Tons of Asphalt Mix  
 $BUP_{HMA}$  = Unit Bid Price of Asphalt Mix  
 $B_{TonAC}$  = Bid Tons of Asphalt Cement  
 $BUP_{AC}$  = Unit Bid Price of Asphalt Cement

- (7) *Element I/DP.* The I/DP for an element shall be computed by accumulating the process I/DP for that element.
- (8) *I/DP for a Mix Design.* The I/DP for a mix design shall be computed by accumulating the process I/DP's for the asphalt content, voids in the mineral aggregate, air voids, and in-place density elements for that mix design. The accumulated quantities of materials for each element must be the same at the end of I/DP calculations for a mix design.
- (9) *Project I/DP.* The I/DP for the project shall be computed by accumulating the mix design I/DP's and the joint density I/DP's. The accumulated quantities of materials for each element must be the same at the end of I/DP calculations for the project.

Delete subsection 106.05 and replace with the following:

106.05 Sampling and Testing of Hot Mix Asphalt. All HMA, Item 403, except HMA (Patching) and temporary pavement shall be tested in accordance with the following program of process control testing and acceptance testing:

- (a) *Process Control Testing.* The Contractor shall be responsible for process control testing on all elements listed in Table 106-1. Process control testing shall be performed at the expense of the Contractor. The Contractor shall develop a quality control plan (QCP) in accordance with the following:
1. *Quality Control Plan.* For each element listed in Table 106-1, the QCP must provide adequate details to ensure that the Contractor will perform process control. The Contractor shall submit the QCP to the Engineer at the preconstruction conference. The Contractor shall not start any work on the project until the Engineer has approved the QCP in writing.
    - A. *Frequency of Tests or Measurements.* The QCP shall indicate a random sampling frequency, which shall not be less than that shown in Table 106-1. The process control tests shall be independent of acceptance tests.
    - B. *Worksheets, Forms, and Charts.* The Contractor shall submit examples of worksheets, test result forms, and test results charts in accordance with CP 12 as part of the QCP.
    - C. *Test Result Chart.* Each process control test result, the appropriate tonnage and the tolerance limits shall be plotted. For in-place density tests, only results after final compaction shall be shown. The chart shall be posted daily at a location convenient for viewing by the Engineer.
    - D. *Quality Level Chart.* The Quality Level (QL) for each element used to calculate incentive or disincentive in Table 106-1 and each required sieve size shall be plotted. The QL will be calculated in accordance with the procedure in CP 71 for Determining Quality Level (QL). The QL will be calculated on tests 1 through 3, then tests 1 through 4, then tests 1 through 5, then thereafter the last

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five consecutive test results. The tonnage of material represented by the last test result shall correspond to the QL. For in-place density tests, only results after final compaction shall be shown. The chart shall be posted daily at a location convenient for viewing by the Engineer.

2. Elements Not Conforming to Process Control. The QL of each discrete group of five test results, beginning with the first group of five test results, shall be a standard for evaluating material not conforming to process control. When the group QL is below 65, the process shall be considered as not conforming to the QCP. In this case, the Contractor shall take immediate action to bring the process back into control. Except where the cause of the problem is readily apparent and corrected without delay, production shall be suspended until the source of the problem is determined and corrected. A written explanation of actions taken to correct control problems shall accompany the test data and be submitted to the Engineer on the day the actions are taken.
  3. Point of Sampling. The material for process control testing shall be sampled by the Contractor using approved procedures. Acceptable procedures are Colorado Procedures, AASHTO and ASTM. The order of precedence is Colorado Procedures, AASHTO procedures and then ASTM procedures. The location where material samples will be taken shall be indicated in the QCP.
  4. Testing Standards. The QCP shall indicate which testing standards will be followed. Acceptable standards are Colorado Procedures, AASHTO and ASTM. The order of precedence is Colorado Procedures, AASHTO procedures and then ASTM procedures.
  5. Testing Supervisor Qualifications. The person responsible for the process control sampling and testing shall be identified in the QCP and be qualified according to the requirements of CP 10
  6. Technician Qualifications. Technicians taking samples and performing tests must be qualified according to the requirements of CP 10.
  7. Testing Equipment. All of the testing equipment used to conduct process control testing shall conform to the standards specified in the test procedures and be in good working order. Nuclear testing devices used for process control testing of in-place density do not have to be calibrated on the Department's calibration blocks.
  8. Reporting and Record Keeping. The Contractor shall report the results of the process control tests to the Engineer in writing at least once per day. The Contractor shall assemble a Quality Control (QC) notebook and update it daily. This notebook shall contain all worksheets, test results forms, test results charts and quality level charts for each of the elements listed in Table 106-1. The Contractor shall submit the QC notebook to the Engineer for review once a month on the date agreed to at the Pre-Paving Conference. The QC notebook will be returned to the Contractor within one working day after submittal. The Engineer will notify the Contractor in writing of any deficiencies in the QC notebook, including the failure to submit the notebook on time or an absence of the required reports. Upon the second failure to submit the complete QC notebook on time or with an absence of the required reports, the Engineer will notify the Contractor, and the pay estimate will be withheld until the Contractor submits, in writing, a report detailing the cause for the failure to submit the complete QC notebook on time or the cause for the absence of required reports. The report shall include how the Contractor plans to resolve the failures. Additional failures to submit the QC notebook on time or absent the required reports will result in a delay of the pay estimate until the Contractor has identified and resolved the failure along with revising and resubmitting his QCP to address these issues. Once the Engineer has reviewed and approved the revised QCP the estimate may be paid. Upon submittal of the QC notebook for the semi-final estimate, the QC notebook shall become the property of the Department. The Contractor shall make provisions such that the Engineer can inspect process control work in progress, including QC notebook, sampling, testing, plants, and the Contractor's testing facilities at any time.
- (b) *Acceptance Testing.* Acceptance testing is the responsibility of the Department and shall not be addressed in the QCP. The Department will determine the locations where samples or measurements are to be taken

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and as designated in Section 403. The maximum quantity of material represented by each test result and the minimum number of test results will be in accordance with Table 106-1. The location or time of sampling will be based on a stratified random procedure. Acceptance sampling and testing procedures will be in accordance with the Schedule for Minimum Materials Sampling, Testing and Inspection in the Department's Field Materials Manual. Samples for project acceptance testing shall be taken by the Contractor in accordance with the designated method. The samples shall be taken in the presence of the Engineer. Where appropriate, the Contractor shall reduce each sample to the size designated by the Engineer. The Contractor may retain a split of each sample which cannot be included as part of the QCP.

If the Contractor elects to question the Hot Mix Asphalt (HMA) acceptance test results, the steps outlined in CP 17 shall be followed. The results from the CP 17 resolution process shall be binding on both the Department and the Contractor. Requests for CP 17 process for all elements except density shall be submitted in writing to the Engineer within five working days from the date the Contractor receives acceptance test data from the Engineer. The specific element questioned shall be identified in writing. All requests for the CP 17 process for the density element shall be submitted in writing to the Engineer within 24 hours of receiving test data from the Engineer. The Contractor shall choose either the CDOT Materials and Geotechnical Branch or a consultant laboratory not associated with the project to perform the third party testing. The Contractor shall document his choice in writing at the Pre-Paving Conference. If a consultant laboratory is chosen, the CDOT Materials and Geotechnical Branch will determine the consultant that will be used from a pre-established list and ensure there is no conflict of interest. If third party testing is required, the responsibility for the testing expenses shall be assigned in accordance with CP 17. The costs for testing are shown in CP 17, Table 17-2.

All materials being used are subject to inspection and testing at any time prior to, during, or after incorporation into work. Acceptance tests will be made by and at the expense of the Department, except when otherwise provided.

- (c) *Check Testing Program (CTP)*. Prior to or in conjunction with placing the first 500 tons of asphalt pavement, under the direction of the Engineer, a CTP will be conducted between acceptance testing and process control testing programs. The CTP will consist of testing for asphalt content, theoretical maximum specific gravity, voids in the mineral aggregate, air voids, in-place density, and joint density in accordance with CP 13 of the Department's Field Materials Manual. The CTP will be continued until the acceptance and process control test results are within the acceptable limits shown in Table 13-1 of CP 13. For joint density, the initial check test will be a comparison of the seven cores tested by CDOT and the seven cores tested by the Contractor. These are the cores from the compaction test section used for nuclear gauge calibration and test section payment.

During production a split sample check will be conducted at the frequency shown in Table 106-1. The split samples will be from an acceptance sample obtained in accordance with subsection 106.05(b). Except for joint density, the split samples will be from an acceptance sample obtained in accordance with subsection 106.05(b). The acceptance test result will be compared to the process control test result obtained by the Contractor using the acceptable limits shown in Table 13-1 of CP 13. For joint density, the comparison sample material for testing by the Contractor will be obtained by taking a second core adjacent to the joint density acceptance core. The acceptance test result will be compared to the process control test result obtained by the Contractor using the acceptable limits shown in the above table and following the check testing procedure given in CP 13.

If production has been suspended and then resumed, the Engineer may order a CTP between process control and acceptance testing persons to assure the test results are within the acceptable limits shown in Table 13-1 of CP 13. Check test results shall not be included in process control testing. The Region Materials Engineer shall be called upon to resolve differences if a CTP shows unresolved differences beyond the values shown in Table 13-1 of CP 13.

- (d) *Stability Verification Testing*. After the mix design has been approved and production commences, the

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*Department* will perform a minimum of three stability verification tests to verify that the field produced Hot mix asphalt conforms to the approved mix design:

The test frequency shall be one per day unless altered by the Engineer.

The test results will be evaluated and the Contractor shall make adjustments if required in accordance with the following:

1. The minimum value for stability will be the minimum specified in Table 403-1 of the specifications. There will be no tolerance limit.
2. Quality Level. Calculate a QL for stability.

If the QL for stability is less than 65, then production shall be halted and the Contractor shall submit a written proposal for a mix design revision to the Engineer. The Engineer shall give written approval to the proposed mix design revision before production continues.

After a new or revised mix design is approved, three additional stability tests will be performed on asphalt produced with the new or revised mix design. The test frequency shall be one per day unless altered by the Engineer.

If the stability QL is less than 65, then production shall be halted until a new mix design has been completed and approved using plant produced material or the Contractor shall submit a written proposal for a mix design revision to the Engineer. The Engineer shall give written approval to the proposed mix design revision before production continues.

3. New or Revised Mix Design. Whenever a new or revised mix design is used and production resumes, three additional stability field verification tests shall be performed and the test results evaluated in accordance with the above requirements. The test frequency shall be one per day unless altered by the Engineer.
  4. Field Verification Process Complete. When the field verification process described above is complete and production continues, the sample frequency will revert back to 1/10,000 tons.
- (e) *Target Values for VMA.* After the mix design has been approved and production commences, the first three *acceptance* tests for Voids in Mineral Aggregate (VMA) will be analyzed to verify and establish a target value for VMA. The Contractor shall make adjustments if required in accordance with the following: The target value for VMA will be the average of the first three volumetric field verification test results on project produced hot mix asphalt or the target value specified in Table 403-1 and Table 403-2 of the specifications, whichever is higher. The target value for VMA will be set no lower than 1.0 percent below the VMA target on original Form 43.

Whenever a new or revised mix design is used and production resumes, the next three acceptance tests will be evaluated and a target value for VMA will be established in accordance with the above requirements.

- (f) *Independent Assurance Testing.* Independent assurance testing for Asphalt Content and In-Place Density will be in accordance with the Department's Field Materials Manual. Independent assurance testing for Voids in the Mineral Aggregate and Air Voids will be performed by the Department's Flexible Pavement laboratory on samples sent from the field at a frequency of one per 10 000 tons.
- (g) *Reference Conditions.* Three reference conditions can exist determined by the Moving Quality Level (MQL). The MQL will be calculated in accordance with the procedure in CP 71 for Determining Quality Level (QL). The MQL will be calculated using only acceptance tests. The MQL will be calculated on tests 1 through 3, then tests 1 through 4, then tests 1 through 5, then thereafter on the last five consecutive test results. The MQL will not be used to determine pay factors. The three reference conditions and actions that will be taken are described as follows:

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1. Condition green will exist for an element when an MQL of 90 or greater is reached, or maintained, and the past five consecutive test results are within the specification limits.
2. Condition yellow will exist for all elements at the beginning of production or when a new process is established because of changes in materials or the job-mix formula, following an extended suspension of work, or when the MQL is less than 90 and equal to or greater than 65. Once an element is at condition green, if the MQL falls below 90 or a test result falls outside the specification limits, the condition will revert to yellow or red as appropriate.
3. Condition red will exist for any element when the MQL is less than 65. The Contractor shall be notified immediately in writing and the process control sampling and testing frequency increased to a minimum rate of 1/250 tons for that element. The process control sampling and testing frequency shall remain at 1/250 tons until the process control QL reaches or exceeds 78. If the QL for the next five process control tests is below 65, production will be suspended.

After condition red exists, a new MQL will be started. Acceptance testing will stay at the frequency shown in Table 106-1. After three acceptance tests, if the MQL is less than 65, production will be suspended. Production will remain suspended until the source of the problem is identified and corrected. Each time production is suspended; corrective actions shall be proposed in writing by the Contractor and approved in writing by the Engineer before production may resume.

Upon resuming production, the process control sampling and testing frequency for the elements causing the condition red shall remain at 1/250 tons. If the QL for the next five process control tests is below 65, production will be suspended again.

(h) *Correction Factor.* In determining the air voids and VMA in the materials compacted with the SuperPave Gyrotory Compactor (SGC), the following correction for bulk specific gravity shall be performed during the CTP:

1. The difference in the average value of bulk specific gravity between the process control testing SGC and acceptance testing SGC will be determined and used as a correction factor for the process control bulk specific gravity.
2. This correction factor shall be used to correlate the process control SGC to the acceptance testing SGC for comparison of air voids and VMA during the CTP and full project production. Values in Table 13-1 of CP 13 apply to SGC comparison after correction factor has been applied.
3. This correction factor shall be applied in correlating the SGC's air voids and VMA test results from process control and acceptance testing to produce comparable data. Any changes in SGC equipment or in the mix design properties, specifically the number of gyrations, asphalt binder grade, aggregate gradation, combination of aggregates, and aggregate sources shall require a new correction factor to be determined under a CTP.

Example: If for the five CTP tests on split samples the process control SGC averages bulk specific gravity of 2.391 and the acceptance SGC averages 2.382, the correction factor would be  $-0.009$  ( $2.382 - 2.391$ ) to the process control bulk specific gravities. Each of the five process control CTP bulks would be decreased by 0.009 before CTP result comparison of voids and VMA is made. If the volumetric results satisfy Table 13-1 of CP 13, use corrected bulks to calculate voids and VMA for process control testing program.

If process control and acceptance SGCs are not from the same equipment manufacturer, project-specific material shall be used to perform the CTP and generate the correction factor.

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**Table 106-1  
 SCHEDULE FOR MINIMUM SAMPLING AND TESTING**

Element	Process Control	Acceptance <sup>3</sup>	Check (CTP)
Determining Asphalt Content of Hot Bituminous Mixtures	1/500 tons	1/1000 tons <sup>1</sup>	1/10,000 tons
Theoretical Maximum Specific Gravity	1/1000 tons, minimum 1/day	1/1000 tons, minimum 1/day	1/10,000 tons
VOIDS in the Mineral Aggregate	1/1000 tons	1/1000 tons <sup>1</sup>	1/10,000 tons
Air Voids	1/1000 tons	1/1000 tons <sup>1</sup>	1/10,000 tons
Hveem Stability	1/10,000 tons	1/10,000 tons <sup>2</sup>	Not applicable.
Resistance to Moisture Damage (Lottman)	1/10,000 tons	According to subsection 401.02	Not applicable.
Gradation	1/10,000 tons	1/10 000 tons <sup>2</sup>	Not applicable.
Determining Percent Relative Compaction of Bituminous Pavement	1/500 tons <sup>1</sup>	1/500 tons <sup>1</sup>	1/5000 tons
Joint Density	1 core/2500 linear feet of joint	1 core/5000 linear feet of joint <sup>1</sup>	1 core/50,000 linear feet of joint
Aggregate Percent Moisture <sup>(4)</sup>	1/2000 T or 1/Day if less than 2000 T	1/2000 T	Not applicable
Percent Lime <sup>(4) (5)</sup>	1/Day	Not applicable	Not applicable

Notes for Table 106-1:

- (1) The minimum number of acceptance tests will be at least 5 asphalt content, 5 voids in the mineral aggregate, 5 air voids, 10-in-place density and 5 joint densities for all projects.
- (2) For information only. These elements are not used to calculate pay factors.
- (3) When unscheduled job mix formula changes are made (Form 43) acceptance of the elements, except for in-place density, will be based on the actual number of samples that have been selected up to that time, even if the number is below the minimum listed in Table 106-1. At the Engineer's discretion, additional random in-place density test may be taken in order to meet scheduled minimums, provided the applicable pavement layer is available for testing under safe conditions. Beginning with the new job mix formula, the quantity it will represent shall be estimated. A revised schedule of acceptance tests will be based on that estimate.
- (4) Not to be used for incentive/disincentive pay. Test according to CP-60B and report results from Form 106, Form 565 or Form 6.
- (5) Verified per Contractor's QC Plan.

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Sections 105, 106, 412, 601 and 709 of the Standard Specifications are hereby revised for this project as follows:

Delete subsection 105.06 and replace with the following:

**105.06 Conformity to the Contract of Portland Cement Concrete Pavement.** Conformity to the Contract of all Portland Cement Concrete Pavement, Item 412, will be determined in accordance with the following:

When the Engineer finds that the materials furnished, the work performed, or the finished product does not conform with the Contract, or the Pay Factor (PF) for an element's process is less than 0.75 but that reasonably acceptable work has been produced, the Engineer will determine the extent of the work that will be accepted and remain in place. The Engineer will use a Contract Modification Order to document the justification for allowing the work to remain in place and the price adjustment that will be applied.

When the Engineer finds the materials furnished, work performed, or the finished product is not in conformity with the Contract, or the PF for an element's process is less than 0.75 and has resulted in an inferior or unsatisfactory product, the work or material shall be removed and replaced or otherwise corrected by and at the expense of the Contractor. When the PF for any process is 0.75 or greater, the finished quantity of work represented by the process will be accepted at the calculated pay factor.

Materials will be sampled and tested by the Contractor and the Department in accordance with subsection 106.06 and with procedures contained in the Department's Field Materials Manual. The approximate quantity represented by each sample will be as set forth in subsection 106.06, Tables 106-2 and 106-3. Additional samples may be selected and tested at the Engineer's discretion.

- (a) Incentive and Disincentive Payments (I/DP) will be made based on a statistical analysis that yields Pay Factors (PF) and Quality Levels (QL). The PF and QL will be made based on test results for the elements of compressive strength and pavement thickness (compressive strength criteria) or the elements of flexural strength and pavement thickness (flexural strength criteria). The Department will indicate in the plans whether compressive strength or flexural strength criteria will be used. If the acceptance criteria is not indicated, flexural strength criteria shall be used..

Incentive or Disincentive payment will not be made for thickness of concrete pavement furnished by the Contractor and placed by others.

When compressive strength criteria is indicated, then the QL will be calculated for the elements of compressive strength and pavement thickness on a process basis. When flexural strength criteria is indicated, then the QL will be calculated for the elements of flexural strength and pavement thickness on a process basis. A separate process will be established for an element when a change in the process affects that element. A process will consist of the test results from a series of random samples. Test results determined to have sampling or testing errors will not be used. All materials produced will be assigned to a process. A change in process is defined as a change that affects the element involved. Changes in mix design, material source, design pavement thickness, or the method being utilized to place the pavement are considered changes in process. The following is provided to clarify changes in processes for each element:

1. Construction of mainline pavement, including the shoulders if placed with the mainline, is a single process, providing there are no changes in process as described above.
2. Construction of ramps, acceleration and deceleration lanes, shoulders placed separately, and areas requiring hand work are considered separate processes.
3. A change in the mix design is a process change for the compressive strength element or the flexural strength element, but is not a process change for the pavement thickness element.

- (b) When it is necessary to represent material by one or two tests, each individual test shall have a PF computed in accordance with the following:



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If the value of the test is at or above the lower tolerance limit, then  $PF = 1.000$ . If the value of the test is below the lower tolerance limit, then:

$$PF = 1.00 - [0.25(T_L - T_0)/V]$$

where: PF = pay factor.

V = V factor from Tables 105-4 or 105-5.

$T_0$  = the individual test value.

$T_L$  = lower tolerance limit.

(c) The following procedures will be used to compute Incentive and Disincentive Payments (I/DP), quality levels (QL), and pay factors (PF) for processes represented by three or more tests:

1. Quality Level (QL) will be calculated according to CP-71.
2. Compute the PF for the process. When the process has been completed, the number of tests ( $P_n$ ) it includes shall determine the formula to be used to compute the final pay factor in accordance with the following:
  - A. For compressive strength and pavement thickness:
 

When  $3 \leq P_n \leq 5$

If  $QL \geq 85$ , then  $PF = 1.00 + (QL - 85)0.001333$   
If  $QL < 85$ , then  $PF = 1.00 + (QL - 85)0.005208$

When  $6 \leq P_n \leq 9$

If  $QL \geq 90$ , then  $PF = 1.00 + (QL - 90)0.002000$   
If  $QL < 90$ , then  $PF = 1.00 + (QL - 90)0.005682$

When  $10 \leq P_n \leq 25$

If  $QL \geq 93$ , then  $PF = 1.00 + (QL - 93)0.002857$   
If  $QL < 93$ , then  $PF = 1.00 + (QL - 93)0.006098$

When  $P_n \geq 26$

If  $QL \geq 95$ , then  $PF = 1.00 + (QL - 95)0.004000$   
If  $QL < 95$ , then  $PF = 1.00 + (QL - 95)0.006757$
  - B. For flexural strength:
 

When  $3 \leq P_n \leq 5$

If  $QL \geq 85$ , then  $PF = 1.00 + (QL - 85)0.002000$   
If  $QL < 85$ , then  $PF = 1.00 + (QL - 85)0.005208$

When  $6 \leq P_n \leq 9$

If  $QL \geq 90$ , then  $PF = 1.00 + (QL - 90)0.003000$   
If  $QL < 90$ , then  $PF = 1.00 + (QL - 90)0.005682$

When  $10 \leq P_n \leq 25$

If  $QL \geq 93$ , then  $PF = 1.00 + (QL - 93)0.004286$   
If  $QL < 93$ , then  $PF = 1.00 + (QL - 93)0.006098$

When  $P_n \geq 26$

If  $QL \geq 95$ , then  $PF = 1.00 + (QL - 95)0.006000$   
If  $QL < 95$ , then  $PF = 1.00 + (QL - 95)0.006757$

3. Compute the I/DP for the process:

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$$I/DP = (PF-1)(QR)(UP)$$

where: QR = Quantity Represented by the process.

UP = Unit Price bid for the Item.

The total I/DP for an element shall be computed by accumulating the individual I/DP for each process of that element.

- (d) As acceptance test results become available, they will be used to calculate accumulated QL and Incentive and Disincentive Payments (I/DP) for each element and for the item. The Contractor's test results and the accumulated calculations shall be made available to the Engineer upon request. The Engineer's test results and the calculations will be made available to the Contractor as early as reasonably practical. Numbers from the calculations shall be carried to significant figures and rounded according to AASHTO Standard Recommended Practice R-11, Rounding Method.

I/DP will be made to the Contractor in accordance with subsection 412.24(a). During production, interim I/DP will be computed for information only. The Pn will change as production continues and test results accumulate. The Pn at the time an I/DP is computed shall determine the formula to be used.

- (e) The Contractor shall not have the option of accepting a price reduction or disincentive in lieu of producing specification material. Continued production of non-specification material will not be permitted. Material which is obviously defective may be isolated and rejected without regard to sampling sequence or location within a process.
- (f) When compressive strength is indicated, the Contractor may take cores at his own expense and in accordance with Colorado Procedure 65 to provide an alternative determination of strength to replace acceptance test results with a compressive strength less than 4,500 psi. The higher value of the 28 day compressive strength of acceptance cylinders or the corresponding core's compressive strength will be used for I/DP.

When flexural strength is indicated, the Contractor may take cores at his own expense and in accordance with Colorado Procedure 65 to provide an alternative determination of strength to replace QC test results with a flexural strength less than 650 psi. The cores shall be obtained prior to 45 days after placement. The higher value of the 28 day flexural strength of QC beams or the corresponding core's flexural strength will be used for I/DP.

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**Table 105-4**  
**"V" FACTORS AND INCENTIVE PAYMENTS**  
**COMPRESSIVE STRENGTH CRITERIA**

Element	V factor	Maximum Incentive Payment	Lower Tolerance Limit, T <sub>L</sub>	Plan Value
Compressive Strength	400 psi	3.00 percent	4,500 psi	4,500 psi
Pavement Thickness	0.4 inch	2.00 percent	Plan Thickness -0.4 inch	Plan Thickness

**Table 105-5**  
**"V" FACTORS AND INCENTIVE PAYMENTS**  
**FLEXURAL STRENGTH CRITERIA**

Element	V factor	Maximum Incentive Payment	Lower Tolerance Limit, T <sub>L</sub>	Plan Value
Flexural Strength	50 psi	3.00%	570 psi	650 psi
Pavement Thickness	0.4 inch	2.00%	Plan Thickness -0.4"	Plan Thickness

*Sand Equivalence.* If compressive strength criteria is indicated then the sand equivalence (SE) as determined by CP 37 will be considered acceptable when the running average of three consecutive tests is greater than 80 percent and no individual test result is less than 75 percent. When the running average of three consecutive SE tests falls below 80 percent or an individual SE test result falls below 75 percent, paving operations shall be suspended. The Contractor shall submit a written plan to correct the low SE test results to the Engineer for approval. The Contractor shall not continue paving operations until the Engineer approves the plan in writing and three SE test results from random samples in the stockpile are above 80 percent.

Delete subsection 106.06 and replace with the following:

**106.06 Sampling and Testing of Portland Cement Concrete Paving.** All Portland Cement Concrete Pavement, Item 412, shall be tested in accordance with the following quality control and acceptance testing procedures:

(a) *Quality Control Testing.* The Contractor shall be responsible for quality control testing of all elements listed in Table 106-2 or 106-3. Quality control testing shall be performed at the expense of the Contractor. The Contractor shall develop a quality control plan (QCP) in accordance with the following:

1. **Quality Control Plan.** For each element listed in Tables 106-2 or 106-3, the QCP must provide adequate details to ensure that the Contractor will perform quality control. The Contractor shall submit the QCP to the Engineer at the preconstruction conference. The Contractor shall not start any work on the project until the Engineer has approved the QCP in writing.
  - A. **Frequency of Tests or Measurements.** The QCP shall indicate a random sampling frequency, which shall be equal to or more frequent than that shown in Table 106-2 or 106-3. The quality control tests shall be independent of acceptance tests.
  - B. **Test Result Chart.** Each quality control test result, the appropriate area, volume, and the tolerance limits shall be plotted. The chart shall be posted daily at a location convenient for viewing by the Engineer.
  - C. **Quality Level Chart.** The QL for each element in Table 106-2 or 106-3 shall be plotted. The QL shall

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be calculated in accordance with the procedure in CP 71 for Determining Quality Level. The QL shall be calculated on tests 1 through 3, then tests 1 through 4, then tests 1 through 5, then thereafter the last five consecutive test results. The area of material represented by the last test result shall correspond to the QL.

- D. F-test and t-test Charts. If flexural strength criteria is indicated, then the results of F-test and t-test analysis between the Department's verification tests of flexural strength and the Contractor's quality control tests of flexural strength shall be shown on charts. The F-test and t-test shall be calculated in accordance with standard statistical procedures using all verification tests and quality control tests completed to date. When a verification test is completed, the F-test and t-test calculations shall be redone. The area of material represented by the last test result shall correspond to the F-test and t-test. A warning value of 5 percent and an alert value of 1 percent shall be shown on each chart. The chart shall be posted daily at a location convenient for viewing by the Engineer.
2. Point of Sampling. The material for quality control testing shall be sampled by the Contractor using CP 61. The location where material samples will be taken shall be indicated in the QCP.
  3. Testing Standards. The QCP shall indicate which testing standards will be followed. Acceptable standards are Colorado Procedures, AASHTO and ASTM. The order of precedence is Colorado Procedures, AASHTO procedures and then ASTM procedures.

The compressive strength test for quality control will be the average strength of two test cylinders cast in plastic molds from a single sample of concrete, cured under standard laboratory conditions, and tested three to seven days after molding.

4. Testing Supervisor Qualifications. The person in charge of and responsible for the quality control testing shall be identified in the QCP. This person shall be present on the project and possess one or more of the following qualifications:
  - A. Registration as a Professional Engineer in the State of Colorado.
  - B. Registration as an Engineer in Training in the State of Colorado with two years of paving experience.
  - C. A Bachelor of Science in Civil Engineering or Civil Engineering Technology with three years of paving experience.
  - D. National Institute for Certification in Engineering (NICET) certification at level III or higher in the subfields of Transportation Engineering Technology, Highway Materials, or Construction Materials Testing Engineering Technology, Concrete and four years of paving experience.
5. Technician Qualifications. Technicians performing tests shall meet the requirements of Colorado Procedure 10.
6. Testing Equipment. All of the testing equipment used to conduct quality control testing shall conform to the standards specified in the test procedures and be in good working order. If flexural strength criteria is indicated, then the Contractor shall provide the following equipment and supplies which will not be paid for separately but shall be included in the work:
  - A. A separate, temperature controlled facility of at least 300 square feet usable space. This facility shall be used exclusively for the molding, storage and testing of concrete test specimens as required. This facility shall be provided in addition to other facilities required in Section 620. The storage facility shall have sufficient water storage capacity for curing all required test specimens. The storage facility shall provide separate storage tanks for each type of required testing. Each storage tank shall have a continuously recording thermometer and sufficient blank charts for the project. Temperatures of each storage tank shall be recorded for the duration of the project.
  - B. A machine for testing flexural strength of concrete specimens. The machine shall be one of the following or an approved equal:

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1. Forney model number FHS-300 with a Co-Pilot digital monitor.
2. Humboldt model number HCM-3000 with a iD Digital Indicator
3. Gilson model number MC-400 with Pro Controller

Both the Contractor and the Engineer will use this machine for testing concrete specimens. The machine shall meet the requirements of AASHTO T 97 and T 22 and the following: The machine and the flexural strength assembly shall be of a rigid construction. The applied vertical load shall be uniformly distributed to the third points and uniformly across the width of the beam (transverse distribution). Uniform distribution of the load is defined as less than a 3 percent variation in the load between each of the nine strain gages placed in the middle third section of the tension face for loads from 1,000 to 10,000 pounds. Two firms that can evaluate and assess the ability of the machine to distribute the load evenly are KPF Consulting Engineers, Chicago Illinois 847-859-7790 and Construction Testing Laboratories, Skokie Illinois 847-965-7500 . Other firms may be capable of evaluating and assessing the load distribution of the machine. The Engineer must approve the firm prior to assessing the machine. The machine shall be ready for use and certified two days before paving begins. After the machine has been certified and accepted by the Engineer it shall not be moved until all portland cement concrete paving and flexural strength acceptance tests have been completed. A weekly check of the planeness of all bearing surfaces on the flexural strength apparatus shall be made and recorded in the Contractor's QC notebook for each week that flexural strength testing occurs. If the nominal maximum aggregate size of the mix is  $\frac{3}{4}$  inches or less, then the Contractor shall also provide a separate flexural strength apparatus that is configured to test 4x4x14 inch beam specimens. Swapping flexural strength apparatuses will not require recertification of the test machine.

- C. Beam molds for molding all test specimens required. Beam molds shall have a cross section of approximately 6 inches by 6 inches. All beam molds shall be checked by the Contractor prior to being placed in service and monthly. The checks of each beam mold shall be recorded in the Contractor's QC notebook. This shall include all testing described in subsection 106.06. If the nominal maximum aggregate size of the mix is  $\frac{3}{4}$  inches or less, then the Contractor shall also provide beam molds with a cross section of 4 inches by 4 inches and a minimum length of 14 inches.
7. Reporting and Record Keeping. The Contractor shall report the results of the tests to the Engineer in writing at least once per day.

The Contractor shall assemble a Quality Control (QC) notebook and update it daily. This notebook shall contain all worksheets, test results forms, test results charts and quality level charts for each of the elements listed in Table 106-2 or 106-3. The Contractor shall submit examples of worksheets, test result forms and test results charts in accordance with CP 12B as part of the Contractor's Quality Control Plan (QCP). The Contractor shall submit the QC notebook to the Engineer for review once a month on the date agreed to at the Pre-Construction Conference.

The QC notebook will be returned to the Contractor with a list of recognized deficiencies within two working days after submittal. Deficiencies may include, but are not limited to, the failure to submit the notebook on time or an absence of the required reports. For any month in which deficiencies are identified, the QC notebook will be submitted for review two weeks after the QC notebook is returned. Upon the second recognized deficiency the Engineer will notify the Contractor, and the pay estimate shall be withheld until the Contractor submits, in writing, a report detailing the cause for the recognized deficiency. The report shall include how the Contractor plans to resolve the deficiencies. Additional recognized deficiencies will result in a delay of the pay estimate until the Contractor has identified and resolved the deficiency along with revising and resubmitting his QCP to address these issues. Once the Engineer has reviewed and approved the revised QCP the estimate may be paid. Upon submittal of the QC notebook for the semi-final estimate, the QC notebook shall become the property of the Department.

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The Contractor shall make provisions such that the Engineer can inspect quality control work in progress, including QC notebook, sampling, testing, plants, and the Contractor's testing facilities at any time.

8. **Optimized Gradation.** The Contractor will be required to perform quality control testing of the combined aggregate gradation (CAG) when an Optimized Gradation (OG) is used for Class E or P Concrete. The combined aggregate gradation testing frequency shall be three per day. Test one shall be sampled and tested after full production begins but before production reaches 100 cubic yards. Test two shall be sampled and tested after four hours of continuous production or production reaches 1000 cubic yards, whichever comes first. Test three shall be sampled and tested after seven hours of continuous production or production reaches 1750 cubic yards, whichever comes first. The frequency shall be a minimum of one per day if production is less than 750 cubic yards.

The Department will perform one gradation each day that may be a split of one of the three daily QC samples. This data will not be used to determine acceptability of the material but as information only.

The Contractor's gradation test data will be used to calculate the coarseness factor (CF) and workability factor (WF) and must plot within the workability box. No corrective action shall be required if the data falls within the workability box.

When the Contractor's gradation test results and the CF and WF fall outside the workability box, the Contractor shall immediately make corrections to bring the aggregate gradation within the workability box and notify the Engineer. If two or more consecutive test results for any single day or two successive days are found to fall outside the workability box, the Contractor shall immediately suspend production and provide a written corrective plan to the Engineer for approval prior to resuming production.

Upon being allowed to resume production, the Contractor shall follow the daily sampling frequency. If the next two consecutive gradation tests indicate the CF and WF plot inside the workability box, the Contractor may continue production. If the first two aggregate samples do not have CF and WF that fall inside the workability box, production shall be suspended.

Prior to resuming production the Contractor shall be required to sample the individual aggregate stockpiles at two or more locations to determine the range of variability within each stockpile, make appropriate adjustments to the percentages for each aggregate component, and discharge and sample the combined aggregates. The combined aggregate gradation shall be tested to determine if the CF and WF fall inside the workability box. Production can resume if the CF and WF plot within the workability box. Production will continue to be suspended for additional evaluation of stockpiles and aggregate feed rates until gradation sampling and testing indicate the CF and WF fall inside the workability box.

All gradation test information during production shall be provided to the Engineer daily. The Contractor shall immediately report all gradation test data to the Engineer for evaluation during periods when production is suspended or upon resuming production. The Contractor will be notified in writing in all cases when production may resume or shall remain suspended.

- (b) **Acceptance Testing.** Acceptance testing frequencies shall be in accordance with the Schedule (Quality Assurance) in the Department's Field Materials Manual. Except for flexural strength, acceptance tests will be conducted by and at the expense of the Department. Acceptance sampling and testing procedures will be in accordance with the Department's Field Materials Manual with the following exceptions and inclusions:

A split sample from an acceptance test shall not be used for a quality control test. The Engineer will designate the location where samples are to be taken. Samples shall be taken by the Contractor in accordance with CP 61. The Engineer will be present during the sampling and take possession of all acceptance samples. Samples transported in different containers will be combined and mixed before molding specimens. All materials are subject to inspection and testing at all times.

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Pavement thickness acceptance will be determined by cores.

The compressive strength test for acceptance will be the average compressive strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions prior to testing. If the compressive strength of any one specimen differs from the average by more than 10 percent, that specimen will be deleted and the average strength will be determined using the remaining two specimens. If the compressive strength of more than one specimen differs from the average by more than 10 percent the average strength will be determined using all three specimens. Each set of three cylinders will be tested at 28 days after molding.

Acceptance tests for flexural strength shall be the Contractor's quality control tests. The flexural strength tests shall be the average flexural strength of four test beams. The test beams shall be prepared according to AASHTO T 23. The flexural strength of each specimen shall be measured according to AASHTO T 97 with the following additional requirements: If the flexural strength of only one specimen differs from the average by more than 10 percent, that specimen shall be deleted and the average strength shall be determined using the remaining three specimens. If the flexural strength of more than one specimen differs from the average by more than 10 percent, the test value shall be the average of all four specimens. Each set of four beams shall be tested at 28 days after molding. If the nominal maximum aggregate size of the mix is  $\frac{3}{4}$  inches or less, then the Contractor shall prepare three additional test beams using the 4x4x14 inch molds. The 4x4x14 inch specimens will be tested 28 days. The results of the 4x4x14 inch specimens will be for information only and will not be used to determine the acceptability of the concrete. Results of the 4x4x14 inch specimens will be reported to the Engineer with the corresponding acceptance test results. These additional specimens are being used to evaluate the validity of using smaller test specimens for acceptance.

- (c) *Verification Testing.* Verification testing will be used only when flexural strength criteria is indicated and is the responsibility of the Department. The Department will determine the locations where samples or measurements are to be taken. The location of sampling shall be based on a stratified random procedure.

Verification sampling and testing procedures will be in accordance with Sections 105, 106, 412, the Schedule for Minimum Materials Sampling, Testing and Inspection in the Department's Field Materials Manual, and CP 13. Samples for verification testing shall be taken by the Contractor in accordance with CP 61 in the presence of the Engineer.

An analysis of test results will be performed after all test results are known using the t-test and F-test statistical methods with an alpha value set at 0.05. If either the above t-test and F-test analysis shows a significant difference, then the following items shall be checked: comparison of beam fracture locations and types, computations and flexural testing machine outputs, curing tank temperature charts, slump and air contents, plant batch tickets for major changes, review of sampling, molding, testing procedures, along with IAT check tests and any other investigations that may clarify the significant differences. If after a review of the data no reasons can be determined for the significant difference, the Department's test data shall be used for determining Quality Levels and Incentive or Disincentive according to the methods in this Section.

- (d) *Check Testing.* The Contractor and the Engineer shall conduct a check testing program (CTP) prior to the placement of any concrete pavement. The check testing program will include a conference directed by the Region Materials Engineer, the Contractor's testers and the Department's testers concerning methods, procedures and equipment for compressive or flexural strength testing. Check testing shall be completed before any portland cement concrete pavement is placed. A set of three cylinders or four beams will be molded by both the Contractor and the Department's project testers from a split sample. The specimens will be sampled, molded and cured for seven days and tested for compressive or flexural strength according to the procedures of Section 106. The Department's Independent Assurance Tester will also mold, cure and test a set of three cylinders or four beams, but the Independent Assurance Test results will not be entered in the check testing analysis. If the results of the check tests do not meet the following criteria, then the check testing will be repeated until the following criteria are met:

- (1) The average of the Contractor's test results and the average of the Department's test results shall be

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within 10 percent of the average of all test results.

- (2) Each specimen test result shall be within 15 percent of the average of all test results.

When compressive strength criteria is indicated, a check test must also be conducted on the sand equivalent test. A set of 5 sand equivalents will be run by both the Contractor's and the Department's project tester, from a split sample. The average of the absolute differences between tests taken by the quality control personnel and the acceptance testing personnel will be compared to the acceptable limits shown in Table 13-1 of CP 13. The CTP will be continued until the acceptance and quality control test results are within the permissible ranges shown in Table 13-1 of CP 13.

During production, split samples of randomly selected acceptance tests will be compared to the permissible ranges shown in Table 13-1 of CP 13. The minimum frequency will be as shown in Table 106-3.

If production has been suspended and then resumed, the Engineer may order a CTP between tests taken by quality control and acceptance testing persons to assure the test results are within the permissible ranges shown in Table 13-1 of CP 13. Check test results shall not be included in quality control testing. The Region Materials Engineer shall be called upon to resolve differences if a CTP shows unresolved differences beyond the ranges shown in Table 13-1 of CP 13.

- (e) *Independent Assurance Testing.* The sample for the IAT will be a split sample of the Contractor's quality control test. The Department's representative performing verification tests shall also use a split sample of the Contractor's quality control test and participate in the IAT. The IAT for flexural strength will be the average flexural strength of four test beams prepared according to the requirements of Section 106 and cured for seven days in the field before being transferred to the IAT lab. IAT specimens will be tested at 28 days.
- (f) *Testing Schedule.* All samples used to determine Incentive or Disincentive payment by quality level formulas in accordance with Section 105, will be selected by a stratified random process.



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**Table 106-2**  
**QC TESTING SCHEDULE - ITEM 412**  
**PORTLAND CEMENT CONCRETE**  
**PAVEMENT, FLEXURAL STRENGTH CRITERIA**

<b>Element</b>	<b>Minimum Testing Frequency Contractor's Quality Control</b>
Aggregate Gradation and Sand Equivalent	For the first five days, minimum of 1/day, then 1/10,000 sq. yds. After 5 days, 1/40,000 sq. yds.
Slump	First three loads each day, then as needed for control.
Water Cement Ratio	First three loads each day, then 1/500 cu. yds.
Air Content and Yield	Minimum of 1/day, then 1/2,500 sq. yds.
Flexural Strength	Minimum of 1/day, then 1/2,500 sq. yds.
Compressive Strength	1/10,000 sq. yds.
Pavement Thickness	In accordance with subsection 412.21.
Pull Test Joints	Minimum of six transverse and six longitudinal joint locations for the 1 <sup>st</sup> 2500 linear feet, then three transverse and three longitudinal joints thereafter
Load Transfer Dowel Bar Placement	In accordance with subsection 412.13 (b) 2
Texture Depth	1 per 528 linear feet in each lane and shoulder wider than 8 feet.

**Table 106-3**  
**QC TESTING SCHEDULE - ITEM 412**  
**PORTLAND CEMENT CONCRETE**  
**PAVEMENT, COMPRESSIVE STRENGTH CRITERIA**

<b>Element</b>	<b>Minimum Testing Frequency Contractor's Quality Control</b>
Aggregate Gradation	Minimum of 1/day, then 1/10,000 sq. yds.
Slump	First three loads each day, then as needed for control.
Compressive Strength, Air Content, Yield, and Sand Equivalent	Minimum of 1/day, then 1/2,500 sq. yds.
Pavement Thickness	In accordance with subsection 412.21.
Pull Test Joints	Minimum of six transverse and six longitudinal joint locations for the 1 <sup>st</sup> 2500 linear feet, then three transverse and three longitudinal joints thereafter
Load Transfer Dowel Bar Placement	In accordance with subsection 412.13 (b) 2
Texture Depth	1 per 528 linear feet in each lane and shoulder wider than 8 feet.
Water Cement Ratio	First three loads each day, then 1/500 cu. yds.

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Subsection 412.10 shall include the following:

The Contractor shall provide a MIT-Scan-2 which is manufactured by MIT GmbH.

The Contractor shall ensure the MIT-Scan-2 is calibrated for the specific dowel bar size or load transfer device being placed, and is operating within the manufacturer's tolerances. The Contractor shall also ensure that the operator of the MIT-Scan-2 is fully competent in the use of the device. The Contractor shall supply the serial number of the device to be utilized on the project.

In subsection, 412.13 (a) 3<sup>rd</sup> paragraph, delete the first sentence and replace with the following:

Holes with a diameter 1/4 inch greater than the bar diameter shall be drilled laterally into the hardened concrete slabs at one half the slab depth, 36 inches on center, 15 to 16 inches deep.

In subsection 412.13 (a), delete the 5th paragraph and replace with the following:

When tie bars are placed in plastic state concrete or drilled and epoxied into a construction joint, and if required by the Engineer, the Contractor shall demonstrate by testing at least 15 of the tie bars that the bar pullout resistance is at least 11,250 pounds with slippage of 1/16 inch or less. If two or more tie bars do not meet the required pullout resistance, then another 15 tie bars shall be tested. If any of the second 15 do not meet the required pullout resistance, then all remaining tie bars shall be tested. The Contractor shall perform additional pullout tests and take corrective action when and as directed. All steps taken to test bars, and to correct, repair or replace failed tie bars and the surrounding failed area shall be at the Contractor's expense. Concrete strength shall have a compressive strength of at least 2500 psi before testing. ASTM E488 shall be used for performing pullout testing..

Delete subsection 412.13 (b) 1 and 412.13 (b) 2 and replace with the following:

*1. Longitudinal Weakened Plane Joints.* Epoxy coated deformed steel tie bars shall be inserted into the plastic state concrete after the auger. In the event the tie bars are placed behind the machine paving mold, vibration will be required during placement. Other methods of bar placement may be acceptable if the Contractor can demonstrate satisfactory performance of the alternate method. Proposals of alternate methods or additional costs associated with other methods shall be at the Contractor's expense. Tie bars shall be placed according to a method approved by the Engineer. The Contractor shall use an MIT Scan-2 to evaluate the location of tie bars that cannot be visually inspected. Each longitudinal joint located within the dowel bar test locations described in subsection 412.13 (b) 2 that were not visually inspected shall be evaluated with the MIT Scan-2. The MIT Scan-2 shall be calibrated for the tie bar size placed. The tie bars shall be located within the middle third of the slab, and a minimum of 1/2 inch below the saw cut. Tie bars shall have a minimum embedment of 12 inches on each side of the joint. The weakened plane joint shall be made by sawing in hardened concrete in accordance with the plan details.

Tie bars that are cut during sawing operations shall be replaced at the contractor's expense. Tie bars that are located less than 2 inches above the bottom of the slab shall be replaced at the contractor's expense. Tie bars that are not embedded a minimum of 12 inches on each side of the joint shall be replaced. When the spacing between two in-place tie bars exceeds 40 inches but less than 72 inches, a tie bar will be installed halfway between the two tie bars, unless this installation location is within 12 inches of a transverse weakened plane joint. When the spacing between two in-place tie bars exceeds 72 inches, tie bars will be installed at an even spacing not to exceed 36 inches, but shall not be installed within 12 inches of a transverse weakened plane joint. The Contractor shall submit to the Engineer a method for replacing the tie bars. The Contractor shall not proceed to replace the tie bars until the method for replacement has been approved by the Engineer.

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2. *Transverse Weakened Plane Joints.* When dowel bars are specified in the Contract, they shall be installed within the tolerances and of the size, grade, and spacing specified. Horizontal support wires or shipping braces shall be non-deformed bars or wires with a diameter less than or equal to 0.307 inches (gauge 0 wire). The number of horizontal support wires or shipping braces shall be limited to five per assembly. The horizontal support wires or shipping braces shall not be cut prior to concrete placement. The center of the dowel assembly or the insertion location shall be marked on both sides of the pavement slab for reference in sawing the joint. Dowel bars shall be furnished in a rigid welded assembly or placed by a dowel bar insertion (DBI) machine.

When a DBI is used, the Contractor shall submit details and specifications of the proposed slip-form paver and DBI to the Engineer a minimum of 14 calendar days prior to the Concrete Pavement Pre-Paving Conference. The Contractor shall detail his methodology for ensuring correct marking of dowel bar insertion points and correct sawing of the joints. The Contractor shall ensure that the slip-form paver is compatible with the DBI.

The rigid assembly shall be fabricated from number 1/0 wire or heavier with vertical support wires every 1 foot. Assembly shall be securely fastened to the subbase and constructed to firmly hold all the dowel bars at T/2 depth, parallel to each other and to the pavement grade and alignment.

See Standard Plan M-412-1 for schematic describing the measurement of each tolerance.

.A weighted-score system will be used to conduct a joint-by-joint evaluation of rotational misalignments of the dowel bars. The Joint Score is a measure of the combined effects of rotational misaligned dowel bars at a joint. A Joint Score is determined by summing the product of the weights (given in Table 412-1) and the number of bars in each misalignment category and adding 1. For example, if a joint has four misaligned bars in the 0.6 to 0.8 inch range, the joint score is 9; if a joint has one misaligned bar in the range 0.6 to 0.8 inch and one bar in the 1 to 1.5 inch range, the score is 8. A Joint Score of 10 is the critical level, above which the risk of joint locking is considered high.

**Table 412-1  
 WEIGHTING FACTORS USED TO DETERMINE JOINT SCORE**

Range of Rotational Misalignment	Weight
< 0.6 in.	0
≥ 0.6 in and < 0.8 in.	2
≥ 0.8 in and < 1 in.	4
≥ 1 in	5

Individual Dowel Bar Rejection Criteria:

Rotational Alignment:

Any bar with a misalignment greater than 1.5 in.

Longitudinal (side) shift:

Any bar that is not embedded at least 6 inches on each side of the joint

Depth:

Any bar within the top 3 inches of the pavement or at a depth less than the saw-cut depth.

Any bar within the bottom 3 inches of the pavement

When rigid assemblies are used to install dowel bars and the bars are rejected for depth, the Contractor may core the pavement to verify the MIT Scan depth results.

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Joint Rejection Criteria:

- Any joint with a Joint Score greater than 10. An individual joint may be allowed if the two longitudinally adjacent joints each have a joint score less than or equal to 10
- Any joint that does not have at least three acceptable dowel bars in each wheel path.

Corrective Measures: The following corrective measures will be allowed for the bars or joints that are rejected.

Rotational misalignment.

Saw-cut the misaligned bars. Joints with less than three un-cut bars in each wheel path will require the addition of dowel bars using an approved dowel bar retrofit method.

Longitudinal (side) Shift and missing bars.

Addition of dowel bars using an approved dowel bar retrofit method.

Depth.

Inadequate cover above the bar—Remove the bar and install a replacement bar using an approved dowel bar retrofit method.

Inadequate cover below the bar— Addition of dowel bars using an approved dowel bar retrofit method.

Retrofitted dowel bars shall not exceed the dowel bar rejection criteria.

In addition to the above procedures, the Contractor may propose removal and replacement of the affected slabs.

The Contractor shall submit his method of repair to the Engineer for approval.

The Contractor shall demonstrate his ability to place dowel bars in conformance with the specifications by placement of a test section.

The test section shall be a minimum of 300 feet in length. Upon completion of the test section, the Contractor shall shut down paving operations. During the shutdown period, the Contractor shall evaluate all joints in the test section using the MIT-Scan-2, analyze the results and submit the results to the Engineer. Paving operations shall not be restarted until the Engineer approves the test section results. The test section will be found acceptable if 85% of the dowel bars placed are found to be within the rejection criteria. All dowel bars exceeding the Rejection Criteria must be addressed using the above corrective measures. The Contractor may continue paving at his own risk before the test section evaluation is complete.

If the Project has less than 500 linear feet of pavement, the test section will not be required. If a Project does not have sections of continuous pavement greater than 45 linear feet, the test section will not be required.

Upon completion of the test section(s) and for each week of production, the Contractor shall prepare an electronic report generated using MagnoProof software and submit it to the Engineer at the start of each working week during production for the previous weeks work. All data shall be submitted in the manufacturer's native file format, along with the calibration files.

The electronic report shall include the following:

- (1) Contract number, date, highway number and direction of traffic.
- (2) Joint number, lane number and station.
- (3) Bar number and x-location of dowel bar.
- (4) Horizontal and vertical misalignment of each bar in inches.
- (5) Overall misalignment of each bar in inches of each bar
- (6) Side shift of each bar in inches.
- (7) Depth to center of each bar in inches.
- (8) Joint Score

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(9) All measurements exceeding the rejection criteria shall be highlighted in red.

Due to potential magnetic interference from tie bars, dowel bars located within 15 inches of a tied joint shall not be included in the evaluation.

When the test section is found to be unacceptable, the Contractor shall perform corrective actions and place a second test section. If the second test section is found to be unacceptable, the Contractor shall pave no more than 500 feet per day until an acceptable test section has been achieved.

Once a test section is successfully completed, Dowel Bar Placement testing frequency shall be a minimum of one location per 1,250 linear feet of each continuous lane including climbing lanes, passing lanes, acceleration and deceleration lanes and ramps. Sections greater than 45 linear feet and less than 1,250 linear feet require a minimum one of test location. Testing locations shall be determined by a random procedure so that each area has a randomly selected transverse joint location. At each location, five consecutive joints shall be tested.

Sections of continuous pavement constructed by the project less than 45 linear feet will not require Dowel Bar Placement Testing.

When any joint score is greater than 10 or any one bar in a single joint exceeds the rejection criteria, joints shall be tested in each direction from the rejected joint, until two consecutive joints in each direction are found to be within the rejection criteria.

All delays or costs associated with equipment being rejected for use by the Engineer will not be paid for by the Department, and will be considered a Non-excusable Delay in accordance with subsection 108.08 (c) 2.

When concrete shoulders or widenings are constructed subsequent to the driving lanes, transverse weakened plane joints shall immediately be formed in the plastic concrete of these widenings to create an extension of the existing transverse joint. This tooled joint shall be formed in such a manner that it controls the cracking and shall be sawed and sealed in accordance with the above requirements.

In subsection 412.21, delete the first sentence in the sixth paragraph.

In subsection 601.02, delete Class E and P Concrete from Table 601-1 and replace with the following:

Concrete Class	Required Field Compressive Strength (psi)	Cementitious Material Content: Minimum or Range (lbs/yd <sup>3</sup> )	Air Content: % Range (Total)	Water /Cementitious Material Ratio: Maximum or Range
E	4500 at 28 days	520	4 – 8	0.44
P	4500 at 28 days	520	4 – 8	0.44

In subsection 601.02, delete the sixth and ninth paragraphs and replace with the following:

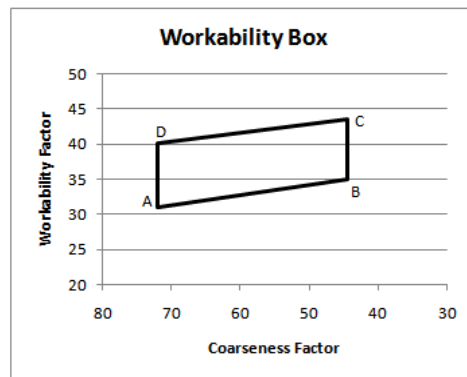
**Class E** concrete is used for fast track pavements needing early strength in order to open a pavement to service soon after placement. Class E concrete shall meet the requirements of Class P concrete. ASTM C150 Type III or ASTM C1157 Type HE cement may be used. Accelerating admixtures may be used.

**Class P** concrete is used in pavements. Additional requirements are: The Required Field Flexural Strength shall be 650 psi when flexural strength acceptance is specified. The laboratory trial mix shall produce a minimum average 28 day flexural strength 700 psi. Two aggregate gradation options are available:

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- (a) *Standard Gradation (SG)*. The concrete mix shall consist of a minimum 55 percent AASHTO M 43 size No. 357 or No. 467 coarse aggregate by weight of total aggregate. If all transverse joints are doweled, the concrete mix shall consist of a minimum 55 percent AASHTO M 43 sizes No. 57, No. 6, No. 67, No. 357, or No. 467 coarse aggregate by weight of total aggregate.
- (b) *Optimized Gradation (OG)*. Aggregate proportions must be a result of an optimized combined aggregate gradation (CAG) developed by an approved mix design technique such as Shilstone or KU Mix. The amount of aggregate in the CAG passing the 19 mm (¾ inch) sieve and retained on the 12.5 mm (½ inch) sieve shall be a minimum of 8 percent for the trial mix design. The coarseness factor (CF) and workability factor (WF) must plot within the workability box (ABCD) depicted graphically by the following 4 coordinate points:
  - a. Point A > (CF,WF) 72, 31
  - b. Point B > (CF,WF) 44.5, 35
  - c. Point C > (CF,WF) 44.5, 43.5
  - d. Point D > (CF,WF) 72, 40

Figure 601-1



$$CF = (S / T) \times 100$$

Where:

S = Percent Cumulative Retained on 9.5 mm (3/8 inch) Sieve

T = Percent Cumulative retained on 2.36 mm (No. 8) Sieve

WF is the percent passing the 2.36 mm (No. 8) sieve. Increase workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used in excess of 564 pounds per cubic yard in the mix design. Decrease workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used below 564 pounds per cubic yard in the mix design. Do not adjust the workability factor if the amount of cementitious material is 564 pounds per cubic yard.

Delete Subsection 601.05 (7) and replace with the following:

- (7) Class E and P concrete shall include AASHTO T97 (ASTM C78) Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading). When compressive strength is indicated, at least two specimens will be tested at 7 days and four specimens at 28 days. When flexural strength is indicated, at least two specimens will be tested at 3, 7 and 14 days and four specimens at 28 days.

When flexural strength is indicated, the mix design shall include AASHTO T198 (ASTM C496) Splitting Tensile Strength of Cylindrical Concrete Specimens. At least two specimens will be tested at 3, 7 and 14 and

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28 days. The splitting tensile strength specimens for each age shall be cast from the same trial batch as the same age flexural strength specimens. Multiple trial batches may be used. The Engineer will verify the correlation curve during production by casting and testing Splitting Tensile specimens. If the correlated flexural strength of the splitting tensile sample is not within 50 psi of the verification beam specimen's flexural strength, a new correlation curve shall be required if low flexural strength specimen are to be evaluated.

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Subsection 601.05 shall include the following in the second paragraph:

- (8) Class P concrete with an OG shall indicate the gradation proportions that results in a combined aggregate gradation corresponding to compliance within the specified CF and WF box and shall include the following charts used to perform aggregate gradation analysis:
  - (i) Coarseness Factor
  - (ii) Workability Factor
  - (iii) 0.45 power
  - (iv) Combined gradation

Delete Subsection 601.06 (10) and (11) and replace with the following:

- (10) Weights of fine and coarse aggregates or combined weight when an OG is pre-blended
- (11) Moisture of fine and coarse aggregates or combined moisture when an OG is pre-blended

Subsection 601.06 (c) shall include the following:

Aggregates for Class P concrete using an OG, a combination of aggregates (stockpiled separately) shall be combined prior to the stationary charging drum to meet the approved CAG.

In subsection, 709.03, delete the first paragraph and replace with the following:

**709.03 Dowel Bars and Tie Bars.** Tie bars for longitudinal and transverse joints shall conform to AASHTO M 284 and shall be grade 60, epoxy-coated, and deformed. Bar size shall be as designated on the Standard Plan M-412-1.



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**Colorado Procedure 65-15a**  
**Standard Practice for**

**EVALUATING LOW CONCRETE STRENGTH TEST RESULTS OF CONCRETE CYLINDERS**

**1. SCOPE**

1.1 Field test procedures and strength test results for standard molded and cured cylinders and beams shall be evaluated separately for each class of concrete. Such evaluation shall be conducted to determine if tests have been conducted in accordance with the ASTM, AASHTO and/or approved CDOT procedures and specifications.

1.1.1 The evaluation process will include investigation to ensure that proper procedures were followed in the following areas:

- Molding
- Curing methods and temperatures
- Initial curing period
- Laboratory curing period
- Testing procedure
- Personnel qualifications

**NOTE: Contact the Central Laboratory at (303) 398-6543 at least 48 hours before coring so that additional instruction can be given.**

1.2 This practice is comprised of two methods. Method A for evaluation of low concrete compressive strength and Method B for the evaluation of low concrete flexural strength.

**2. EVALUATION**

2.1 Should cylinders or beams fall below the specified strength, a field investigation will be conducted as follows:

2.1.1 If test procedures outlined in Subsection 1.1 were not followed, results will be considered to be invalid and the tests shall be discarded. If cores are required, they will be at the expense of CDOT to replace acceptance cylinders and at the expense of the Contractor to replace QC beams.

2.1.2 The concrete supplier will furnish concrete batch tickets of the suspected low

strength concrete for comparison against approved mix design.

2.1.3 Batch tickets will be checked to determine job site water addition.

2.1.4 Evaluation of the concrete in question will be made based on Subsections 2.1.1, 2.1.2 and 2.1.3.

**3. Section Deleted**

**4. CORING**

4.1 This procedure describes the method used to obtain and evaluate cores from in-place concrete. This will be performed in accordance with the latest revision of AASHTO T 24 (ASTM C 42), with the exception that immediately after removal from the structure, cores will be cured at a temperature between 60° - 80°F (15° - 27°C) and at a relative humidity below 60% for the first 24 hours.

4.2 Cores taken for the determination of strength shall be of a standard size and within appropriate tolerance.

**NOTE 1** Bits cut approximately 1/4" smaller than nominal OD (outside diameter). The 4 1/4" and 6 1/4" OD bits produce 4" and 6".

**5. APPARATUS**

5.1 The apparatus shall be as described in AASHTO T 24 (ASTM C 42).

**Method A Compressive Strength**

**6. PROCEDURE**

6.1 Within 45 days after placement, cores with a diameter at least 3 times the nominal maximum size of the coarse aggregate used in the concrete

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shall be obtained in accordance with AASHTO T 24 (ASTM C 42). The cores shall be conditioned in accordance with Subsection 4.1. The cores will then be tested for compressive strength between 24 and 48 hours after removal.

6.2 At least 3 representative cores shall be taken from the concrete represented by each out-of-specification cylinder set.

6.3 Coring location shall be in locations directed by the Engineer. .

6.4 Core holes shall be filled with low slump concrete or mortar.

6.5 If the compressive strength of any one core differs from the average by more than 10% that core will be discarded and the average will be determined using the compressive strengths of the remaining two cores. If more than one core's compressive strength differs from the average by more than 10%, the average will be determined using all three cores.

6.6 Pay factors for strength of structural concrete shall be according to Table 601-3 of the CDOT Standard Specifications, and will be used to price reduce the cores or standard test cylinders, whichever are higher in strength. Pay factors for concrete pavement will be evaluated according to subsection 105.06 of the CDOT Standard Specifications.

6.7 The following examples are for structural concrete in accordance with Subsection 601.17 of the CDOT Standard Specifications:

**Example 1:**

Given:  $f'_c = 3000$  psi  
 Concrete test cylinders averaged 2800 psi.

	<u>PSI</u>
Core 1	2900
Core 2	2850
Core 3	2450

Average compressive strength of 3 cores = 2730 psi.

Find: Is the concrete in the structure adequate under CDOT specifications?

Solution:

Test Evaluation:

$$f'_c = 3000 \text{ psi}$$

Average compressive strength of 3 cores - 2730 psi

Do any compressive strengths differ from the average by more than 10%?

$$10\% \text{ of Average compressive strength} = 273 \text{ psi}$$

Core 1:  $2900 - 2730 = 170$  psi,  $< 273$  therefore OK

Core 2:  $2850 - 2730 = 120$  psi,  $< 273$  therefore OK

Core 3:  $2450 - 2730 = -280$  psi,  $> 273$  therefore - discard core and re-compute average compressive strength using two remaining cores.

New average compressive strength = 2875 psi

Use Table 601-3 to compute appropriate price reduction based on 2875 psi, since core strengths were higher than the cylinders strengths.

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**Example 2:**

Price Reduction of Concrete

In this example calculation, a certain project has a pay item for 720 cubic yards of Concrete Class D (bridge). The contractor bid \$700 per cubic yards. To cover this quantity 8 sets of cylinders were molded and tested for compressive strength at 28 days. Some of the test results showed the concrete had less than the required 28-day compressive strength of 4500 psi. The project engineer has used all eight sets of cylinders to calculate the appropriate price reduction.

Test Number	Cylinder Strength psi	Cylinder Strength psi	Cylinder Strength psi	Average Cylinder Strength Psi
1	4510	4270	4580	4450
2	6200	6100	6250	6180
3	3800	4310	3840	3980
4	4210	4380	4060	4220
5	4040	3830	3790	3890
6	4130	4020	3930	4030
7	4710	4670	4790	4720
8	4960	5160	5200	5110

**TABLE 65-1**

The average strength of three 28-day cylinders is used to determine the acceptability of concrete placed in a structure. The break results of test numbers 1, 3, 4, 5 & 6 are below the required 28-day strength of 4500 psi for bridge decks. According to Section 601.17(c) of the *CDOT Standard Specification for Road and Bridge Construction* "The concrete will be considered acceptable when the running average of three consecutive strength tests is equal to or greater than the specified strength and no single test falls below the specified strength by more than 3.5 MPa (500 psi)."

Test Number	Average Cylinder Strength psi	Average of Three Consecutive Tests (psi)	Strength Below f <sub>c</sub> ' psi
1	4450	---	---
2	6180	---	---
3	3980	4870	520
4	4220	4793	280
5	3890	4030	610
6	4030	4047	470
7	4720	4213	---
8	5110	4620	---

**TABLE 65-2**

The table above shows that the running average of three consecutive tests fall below the required strength of 4500 psi, and the concrete placed will be price reduced according to the pay factors in Table

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601-3 in Subsection 601.17. Test numbers 3, 4, 5, & 6 are represented in the low consecutive averages and will be price reduced. Test number 1 is considered acceptable and will not be price reduced because its running average with the next two tests is greater than the required strength, and it is not more than 500 psi below the required strength.

To price reduce the low strength results you need to know the bid price for the concrete, and the quantity represented by each test. As stated above, the concrete was bid at \$700.00 per cubic yard. The contractor placed 720 cubic yards of Concrete Class D (bridge). The 720 cubic yards are represented by 8 sets of cylinders. Therefore, on this project the Engineer determined that each test represents 90 cubic yards. This is only an example and the quantity represented per test shall be determined by the Project Engineer. The formula for price reduction is:

$$PR = P \times (1 - PF) \times CY$$

Where:

- PR = Price Reduction,
- P = Bid Price of Concrete,
- PF = Pay Factor from Table 601-3 of Subsection 601.17,
- CY = Cubic Yards represented by the test.

Test Number	Average Strength Psi	Average of Three Consecutive Tests (psi)	Strength Below f <sub>c</sub> ' psi	Pay Factor Table 601-2E	Price Reduction
1	4450	---	---	---	---
2	6180	---	---	---	---
3	3980	4870	520	0.65	\$22,050.00
4	4220	4793	280	0.92	\$ 5,040.00
5	3890	4030	610	0.54	\$28,980.00
6	4030	4047	470	0.75	\$15,750.00
7	4720	4213	---	---	---
8	5110	4620	---	---	---
Total Price Reduction					\$71,820.00

**TABLE 65-3**

The Contractor has the option to obtain cores from the areas represented by tests 3, 4, 5 & 6 before the concrete is 45 days old. Coring will be in accordance to CP 65. In this case the contractor elected to obtain cores from the bridge deck. The following is a summary of the core break results:

Test Area	Core Strength psi	Core Strength psi	Core Strength psi	Average Core Strength psi
3	4230	4010	4100	4110
4	4630	4570	4510	4570
5	3690	3740	3700	3710
6	4270	4510	4400	4390

**TABLE 65-4**

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The core strength results will replace the cylinder strength results if the core strengths are higher. In this case, cores from areas 3, 4 & 6 will replace the cylinder strength results for tests 3, 4 & 6. The following table shows the new price reductions:

Test Number	Average Cylinder Strength psi	Average Core Strength psi	Strength Below $f_c'$ psi	Pay Factor Table 601-2E	Price Reduction
1	4450	---	---	---	---
2	6180	---	---	---	---
3	<del>3080</del>	4110	390	0.84	\$ 10,080.00
4	<del>4220</del>	4570	---	---	---
5	3890	<del>3710</del>	610	0.54	\$28,980.00
6	<del>4030</del>	4390	110	0.96	\$ 2,520.00
7	4720	---	---	---	---
8	5110	---	---	---	---
Total Adjusted Price Reduction					\$41,580.00

**TABLE 65-5**

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**Method B Flexural Strength**

**7. PROCEDURE**

7.1 Within 45 days after placement, cores of the same size as the splitting tensile cylinders used in the trial mix shall be obtained in accordance with AASHTO T 24 (ASTM C 42). The cores shall be conditioned in accordance with Subsection 4.1. The cores will then be tested for splitting tensile strength between 24 and 48 hours after removal.

7.2 At least 3 representative cores shall be taken from a single slab represented by each low flexural strength. A core containing rebar or dowel bars shall be discarded and a new core shall be taken.

7.3 Coring location shall be in locations directed by the Engineer. .

7.4 Core holes shall be filled with low slump concrete or mortar.

7.5 If the splitting tensile strength of any one core differs from the average by more than 10% that core will be discarded and the average will be determined using the splitting tensile of the remaining two cores. If more than one core's splitting tensile strength differs from the average by more than 10%, the average will be determined using all three cores.

7.6 The flexural strength of the concrete will be determined by using a correlation of the concrete's flexural strength to its splitting tensile strength.

7.6.1 Using the flexural strength and splitting tensile strengths from the concrete's trial mix, for each age, plot the flexural strength on one axis and the splitting tensile strength on the second axis. Determine a linear equation relating the two strengths.

7.6.2 Using the average splitting tensile strength from a set of cores, and the equation in section 7.6.1, determine the corresponding flexural strength.

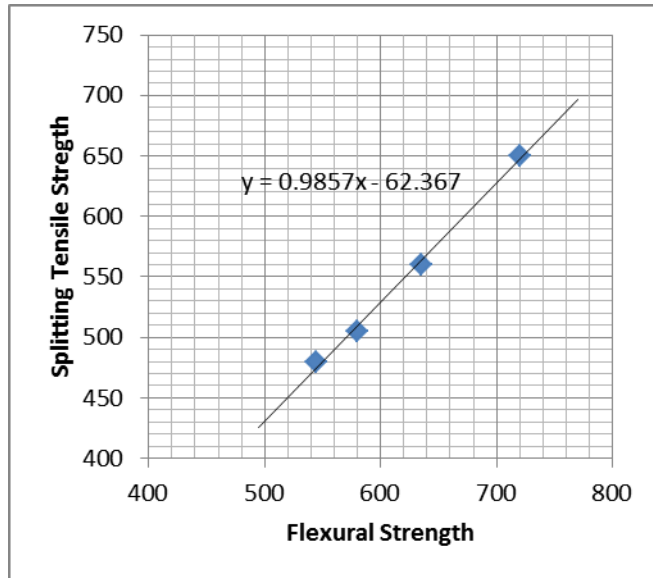
7.7 Pay factors for concrete pavement will be evaluated according to subsection 105.06 of the CDOT Standard Specifications.

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**Example 3:**

The following example shows a plot of flexural strength and splitting tensile strength.

Age	Average Flexural Strength (psi)	Average Splitting Tensile Strength (psi)
3	545	480
7	580	505
14	635	560
28	720	650



November 6, 2014

REVISION OF SECTION 106  
BUY AMERICA REQUIREMENTS

Section 106 of the Standard Specifications is hereby revised for this project as follows:

Subsection 106.11 shall include the following:

The Contractor shall maintain a document summarizing the date and quantity of all steel and iron material delivered to the project. The document shall show the pay item, quantity of material delivered to the project, along with the quantity of material installed by the cutoff date for the monthly progress payment. The summary shall also reconcile the pay item quantities to the submitted Buy America certifications. The Contractor shall also maintain documentation of the project delivered cost of all foreign steel or iron permanently incorporated into the project. Both documents shall be submitted to the Engineer within five days of the cutoff date for the monthly progress payment. A monthly summary shall be required even if no steel or iron products are incorporated into the project during the month. The summary document does not relieve the Contractor of providing the necessary Buy America certifications of steel and or iron prior to permanent incorporation into the project.



REVISION OF SECTION 106  
CERTIFICATES OF COMPLIANCE AND  
CERTIFIED TEST REPORTS

Section 106 of the Standard Specifications is hereby revised for this project as follows:

In subsection 106.12, delete the second paragraph and replace it with the following:

The original Certificate of Compliance shall include the Contractor's original signature as directed above. The original signature (including corporate title) on the Certificate of Compliance, under penalty of perjury, shall be of a person having legal authority to act for the manufacturer. It shall state that the product or assembly to be incorporated into the project has been sampled and passed all specified tests in conformity to the plans and specifications for this project. One legible copy of the fully signed Certificate of Compliance shall be furnished to the Engineer prior to installation of material. The original shall be provided to the Engineer before payment for the represented item will be made.

In subsection 106.13, delete the second paragraph and replace it with the following:

The Certified Test Report shall be a legible copy or an original document and shall include the Contractor's original signature as directed above. The signature (including corporate title) on the Certified Test Report, under penalty of perjury, shall be of a person having legal authority to act for the manufacturer or the independent testing laboratory. It shall state that the test results show that the product or assembly to be incorporated into the project has been sampled and passed all specified tests in conformity to the plans and specifications for this project. One legible copy or original document of the fully signed Certified Test Report shall be furnished to the Engineer prior to installation of material. Failure to comply may result in delays to the project or rejection of the materials.

REVISION OF SECTION 106  
MATERIAL SOURCES

Section 106 of the Standard Specifications is hereby revised for this project as follows:

In subsection 106.02 (a), delete the third paragraph and replace with the following:

The Contract will indicate whether the Department has or has not obtained the necessary County or City Zoning Clearance and the required permit from Colorado Department of Natural Resources needed to explore and remove materials from the available source. If the Department did not obtain the necessary clearances or permits, the Contractor shall obtain them. Any delays to the project or additional expenses that are incurred while these clearances or permits are being obtained shall be the responsibility of the Contractor. The Contractor shall ensure that the requirements of the permits do not conflict with the pit construction and reclamation requirements shown in the Contract for the available source.

In subsection 106.02 (b), delete the first paragraph and replace with the following:

(b) *Contractor Source*. Sources of sand, gravel, or borrow other than available sources will be known as contractor sources. The contractor source will be tested by the Department and approved by the Engineer prior to incorporation of the material into the project. If the submitted materials do not meet the contract specifications it will become the Contractor's responsibility to re-sample and test the material. The Contractor will supply the Department with passing test results from an AASHTO accredited laboratory and signed and sealed by a Professional Engineer. If requested by the Engineer, the Department will then re-sample and re-test the material for compliance to the contract specifications. The Contractor shall produce material which meets contract specifications throughout construction of the project.

The cost of sampling, testing, and corrective action by the Contractor will not be paid for separately but shall be included in the work.

May 12, 2016

REVISION OF SECTIONS 106  
MODIFIED EPOXY PAVEMENT MARKING  
ACCEPTANCE AND PAY FACTORS

Sections 106 and 627 of the Standard Specifications are hereby revised for this project as follows:

Subsection 106.03 shall include the following:

The Contractor shall take retroreflectivity readings on all modified epoxy pavement marking lines for each mile of roadway striping on the project. A test section is defined as each continuous line type (lane lines, centerlines, edge lines, channelizing lines, and others) no greater than one mile in length, which has been completed in a single day. The Contractor shall use a Contractor-furnished retroreflectometer conforming to ASTM E 1710 or AASHTO TP111. The retroreflectometer shall be calibrated, tested and operated in accordance with manufacturer recommendations. The Contractor shall take 10 retroreflectivity readings within the test section for each stripe. These 10 readings shall be taken approximately 40 feet apart, and shall be averaged to determine the retroreflectivity of that test section of striping. In cases where striping is less than 500 feet long, 10 readings shall be taken in 10 equal intervals.

The calibration for the retroreflectometer shall be verified every day, prior to the readings being taken. The retroreflectivity readings shall be taken in the presence of the Engineer no sooner than 3 days and no later than 14 days after the marking is tack free. Traffic control required for retroreflectivity readings shall be included in the cost of the work. Initial minimum retroreflectivity reading (mcd/m<sup>2</sup>/lux) in a one mile line section of pavement marking paint shall be 400 for white and 250 for yellow. The pay factor for Modified Epoxy Pavement Marking which is allowed to remain in place at a reduced price shall be according to the following table and shall be applied to the unit bid price for Item 627, Modified Epoxy Pavement Marking:

<b>Color</b>	<b>Retro-reflectivity Reading (R) in a 1-mile section (mcd/m<sup>2</sup>/lux)</b>	<b>Pay Factor (Percent) for the entire 1-mile section</b>
White	$R \geq 400$	100
	$375 \leq R < 400$	85
	$350 \leq R < 375$	75
	$325 \leq R < 350$	60
	$300 \leq R < 325$	50
	$R < 300$	Remove and replace
Yellow	$R \geq 250$	100
	$225 \leq R < 250$	85
	$200 \leq R < 225$	75
	$175 \leq R < 200$	60
	$150 \leq R < 175$	50
	$R < 150$	Remove and replace

Prior to taking retro-reflectivity readings, the Contractor shall remove at the retro-reflectivity reading locations any excess beads placed during marking application.

January 30, 2014

REVISION OF SECTION 106  
SUPPLIER LIST

Section 106 of the Standard Specifications is hereby revised for this project as follows:

Subsection 106.01 shall include the following:

Prior to beginning any work the Contractor shall submit to the Engineer a completed Form 1425, Supplier List. During the performance of the Contract, the Contractor shall submit an updated Form 1425 when requested by the Engineer.

Failure to comply with the requirements of this subsection shall be grounds for withholding of progress payments.

REVISION OF SECTIONS 106 AND 412  
SURFACE TEXTURE OF PORTLAND CEMENT CONCRETE PAVEMENT

Sections 106 and 412 of the Standard Specifications are hereby revised for this project as follows:

Subsection 106.06 (a) shall include the following:

The Contractor shall submit the proposed method of PCCP texturing at the Pre-Construction conference for approval by the Engineer. The Contractor shall perform process control (PC) testing for the pavement surface texture depth in accordance with CP 77 Method B. All PC results for surface texture depth measurements shall be included in the Contractor's QC notebook. The start of PC testing for texturing depth shall be completed within 24 hours after the first 500 linear feet of textured pavement is placed for each lane. Paving shall not proceed until results are accepted by the Engineer.

Surface texture will be considered acceptable when the average texture depth (ATD) of the panel is greater than 0.05 inch. When the ATD is less than 0.05 inches, the Contractor shall determine the area represented by this test. The area shall be determined by taking additional tests at 15 foot intervals parallel to the centerline in each direction from the affected location until two consecutive tests are found to be within the specified limits. Any surface with unacceptable texturing exceeding 25 linear feet in any lane or shoulder greater than 8 feet wide shall be diamond ground full width of the lane. Upon the second unacceptable test result, the Contractor shall notify the Engineer, in writing, the action taken to provide an acceptable surface texture.

Subsection 106.06 (b) shall include the following

The Department will perform surface texture acceptance testing in accordance with CP 77 Method B. The Department will determine the panel locations where acceptance test measurements are to be taken. One stratified random acceptance test per 2,500 linear feet or fraction thereof in each lane and shoulder wider than 8 feet shall be taken with a minimum of one test per day when the Contractor is paving.

When the Department locates areas of surface texture that do not meet the minimum ATD, the Contractor will be notified and the Contractor shall be responsible for identifying the limits of the deficient texture depth. After the Engineer approves the limits, the Contractor shall correct the deficient surface texture by diamond grinding full lane width to provide an ATD greater than 0.05 inch at no additional cost to the project. Correcting surface texture deficiencies shall occur prior to pavement smoothness testing and pavement thickness determinations.

In subsection 106.06, delete the Tining Depth element from Tables 106-2 and 106-3 and replace with the following:

**Table 106-2**

Element	Minimum Testing Frequency Contractor's Quality Control
Average Texture Depth	1 per 528 linear feet in each lane and shoulder wider than 8 feet.

**Table 106-3**

Element	Minimum Testing Frequency Contractor's Quality Control
Average Texture Depth	1 per 528 linear feet in each lane and shoulder wider than 8 feet.

Delete subsection 412.07 (c)

Delete subsection 412.12 (c) and (d) and replace with the following:

- (c) *Final Finish and Stationing.* The final surface of the pavement shall be uniformly textured with a broom, burlap drag, artificial turf or diamond ground in order to obtain the specified texture depth. Surface imperfections resulting from the texturing operation shall be corrected by the Contractor at no additional cost.

REVISION OF SECTIONS 106 AND 412  
SURFACE TEXTURE OF PORTLAND CEMENT CONCRETE PAVEMENT

Broom, burlap drag or artificial turf texture shall be installed within 15 minutes after strike-off, or as pavement conditions allow

Diamond grinding shall be performed using diamond blades mounted on a self-propelled machine designed for diamond grinding and texturing concrete pavement. The equipment shall have a positive means of vacuuming the grinding residue from the pavement surface, leaving the surface in a clean, near-dry condition. Diamond grinding shall not occur until the concrete has attained strength of at least 2,500 psi.

The diamond grinding process shall produce a pavement surface that is true to grade and uniform in appearance. The grooves shall be evenly spaced. Any ridges on the outside edge next to the shoulder, auxiliary, or ramp lanes greater than 3/16 inch high shall be feathered out to the satisfaction of the Engineer in a separate, feather pass operation.

The pavement surface after diamond grinding shall have no depressions or misalignment of slope in the longitudinal direction exceeding 1/8 inch in 12 feet when measured with a 12 foot straightedge placed parallel to the centerline. All areas of deviation shall be reground at no additional cost.

Stationing shall be stamped into the outside edge of the pavement, as shown on the plans.

Delete subsection 412.14 and replace with the following:

**412.14 Curing.** Immediately after the finishing operations have been completed the entire surface and exposed sides of the newly placed concrete, shall be sprayed uniformly with a curing compound meeting the requirements of ASTM C309, Type 2. The ASTM C309 Type 2 curing compound shall be volatile organic content (VOC) compliant.

The curing compound shall be applied within 10 minutes after the final finish has been applied. Failure to cover the surface of the concrete within 10 minutes shall be cause for immediate suspension of the paving operations.

An initial application of curing compound shall be applied under pressure by mechanical sprayers at the rate of not less than 1 gallon per 180 square feet of pavement surface. A second application of curing compound shall be applied within 30 minutes after the initial application. The second application rate shall be not less than 1 gallon per 180 square feet of pavement surface. Alternatively, the Contractor may apply the curing compound in one application of not less than 1 gallon per 120 square feet. Additional curing compound shall be applied as needed to ensure that 100 percent of the pavement is covered. The spraying equipment shall be fully automated, equipped with a tank agitator, and a wind guard. During application, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle and the compound shall be stirred continuously by effective mechanical means. Hand spraying of irregular widths or shapes and surfaces exposed by removal of forms will be permitted. Curing compounds shall not be applied to the inside faces of joints to be sealed.

Should the curing film become damaged from any cause, within 72 hours after concrete placement, except for Class E concrete open to traffic, the damaged portions shall be repaired immediately with additional curing compound, payment for which shall be at the Contractor's expense.

The sides of pavement slabs shall be immediately sprayed with curing compound when the forms are removed.

Delete subsection 412.18(2) and replace with the following:

(2) Corrective work for texturing.

Delete subsection 412.22 and replace with the following:

**412.22 Opening to Traffic.** The pavement shall not be opened to traffic until the concrete has achieved a compressive strength of 3000 psi. Concrete compressive strength shall be determined by maturity meters. Prior to opening the pavement to traffic the roadway shall be cleaned, as approved.

REVISION OF SECTIONS 106 AND 412  
SURFACE TEXTURE OF PORTLAND CEMENT CONCRETE PAVEMENT

Prior to placement of concrete whose strength will be determined with maturity meters, the Contractor shall provide the Engineer a report of maturity relationships in accordance with CP 69. The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meters and wires. At a minimum a maturity meter will be placed at a minimum of once per day and then once per 5,000 square yards. Placement shall be as directed by the Engineer.

For placements with multiple maturity meters, the lowest compressive strength shall determine when the pavement may be opened to traffic.

If a maturity meter fails, is tampered with, is destroyed or was not placed, the section of pavement represented by the maturity meter shall remain closed to traffic for a period of 28 days. The Contractor may choose at his own expense to core the section of pavement represented by the maturity meter. Cores will be obtained and tested according to CP 65. Cores will be a minimum of 4 inches in diameter. A minimum of three cores in a two square foot area will be obtained. If the compressive strength of any one core differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two cores. If the compressive strength of more than one core differs from the average by more than 10 percent the average strength will be determined using all three compressive strengths of the cores. To open the section of pavement, the average compressive strength of the cores shall be a minimum of 3,000 psi.

In subsection 412.24 (a) delete the second paragraph and replace with the following:

The price per square yard of Concrete Pavement shall be full compensation for furnishing and placing all materials, including any dowels, tie bars, joint materials, texturing, sawing, finishing, and rumble strips.

February 3, 2011

REVISION OF SECTION 107  
RESPONSIBILITY FOR DAMAGE CLAIMS,  
INSURANCE TYPES AND COVERAGE LIMITS

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 107.15(c) and replace it with the following:

- (c) Each insurance policy shall include provisions preventing cancellation or non-renewal without at least 30 days prior notice to Contractor. The Contractor shall forward to the Engineer any such notice received within seven days of the Contractor's receipt of such notice.



January 30, 2014

REVISION OF SECTION 107  
WARNING LIGHTS FOR WORK VEHICLES AND EQUIPMENT

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.06 (b) shall include the following:

All work vehicles and mobile equipment shall be equipped with one or more functioning warning lights mounted as high as practicable, which shall be capable of displaying in all directions one or more flashing, oscillating, or rotating lights for warning roadway traffic. The lights shall be amber in color. The warning lights shall be activated when the work vehicle or mobile equipment is operating within the roadway, right of way or both. All supplemental lights shall be SAE Class 1 certified.

REVISION OF SECTION 107  
WATER QUALITY CONTROL  
(CONTRACTOR OBTAINED STORMWATER PERMIT)

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 107.25 and replace with the following:

**107.25 Water Quality Control.** The project work shall be performed using practices that minimize water pollution during construction. All the practices listed in (b) below shall be followed to minimize the pollution of any State waters, including wetlands.

*(a) Definitions.*

1. Areas of Disturbance (AD). Locations where any activity has altered the existing soil cover or topography, including vegetative and non-vegetative activities during construction.
2. Construction Site Boundary/Limits of Construction (LOC). The project area defined by the Stormwater Construction Permit.
3. Discharge of Pollutants. One or more pollutants leaving the LOC or entering State waters or other conveyances.
4. Limits of Disturbed Area (LDA). Proposed limits of ground disturbance as shown on the Plans.
5. Pollutant. Dredged spoil, dirt, slurry, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, chemical waste, biological nutrient, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, or any industrial, municipal, or agricultural waste, as defined in the Colorado Code of Regulations (CCR) [5 CCR 1002-61, 2(76)]
6. Pollution. Man-made, man-induced, or natural alteration of the physical, chemical, biological, and radiological integrity of water. [25-8-103 (16), CRS]
7. State waters. Defined in subsection 101.77.

*(b) Construction Requirements.*

1. The Contractor shall comply with the "Colorado Water Quality Control Act" (Title 25, article 8, CRS), the "Protection of Fishing Streams" (Title 33, Article 5, CRS), the "Clean Water Act" (33 USC 1344), regulations promulgated, certifications or permits issued, and to the requirements listed below. In the event of conflicts between these requirements and water quality control laws, rules, or regulations of other Federal, or State agencies, the more restrictive laws, rules, or regulations shall apply.
2. If the Contractor determines construction of the project will result in a change to the permitted activities or LDA, the Contractor shall detail the changes in a written report to the Engineer. Within five days after receipt of the report, the Engineer, after coordination with Region Planning and Environmental Manager (RPEM), will approve or reject in writing the request for change, or detail a course of action including revision of existing permits or obtaining new permits.
3. If construction activities result in noncompliance of any permit requirement, the project will be suspended and the permitting agency notified, if required. The project will remain suspended until the Engineer receives written approval by the permitting agency.
4. The Contractor is legally required to obtain all permits associated with specific activities within, or off the Right of Way, such as borrow pits, concrete or asphalt plant sites, waste disposal sites, or other facilities. It is the Contractor's responsibility to obtain these permits. The Contractor shall consult with the Engineer, and contact the Colorado Department of Public Health and Environment (CDPHE) or other appropriate federal, state, or local agency to determine the need for any permit.

REVISION OF SECTION 107  
WATER QUALITY CONTROL  
(CONTRACTOR OBTAINED STORMWATER PERMIT)

5. The Contractor shall conduct the work in a manner that prevents pollution of any adjacent State waters. Erosion control work shall be performed in accordance with Section 208, this subsection, and all other applicable parts of the Contract.
6. Prior to the Environmental Pre-construction Conference the SWMP Administrator, identified in subsection 208.03(c), shall identify and describe all potential pollutant sources, including materials and activities, and evaluate them for the potential to contribute pollutants to stormwater discharges associated with construction activities. The list of potential pollutants shall be continuously updated during construction. At a minimum, each of the following shall be evaluated for the potential for contributing pollutants to stormwater discharges and identified in the SWMP, if found to have such potential:
  - (1) All exposed and stored soils
  - (2) Vehicle tracking of sediments
  - (3) Management of contaminated soils
  - (4) Vehicle and equipment maintenance and fueling
  - (5) Outdoor storage activities (building materials, fertilizers, chemicals, etc.)
  - (6) Significant dust or particle generating processes
  - (7) Routine maintenance involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.
  - (8) On site waste management practices (waste piles, dumpsters, etc.)
  - (9) Dedicated asphalt and concrete batch plants
  - (10) Concrete truck and equipment washing, including the concrete truck chute and associated fixtures and equipment
  - (11) Concrete placement and finishing tool cleaning
  - (12) Non-industrial waste sources that may be significant, such as worker trash and portable toilets
  - (13) Loading and unloading operations
  - (14) Other areas or procedures where spills could occur

The SWMP Administrator shall record the location of potential pollutants on the site map. Descriptions of the potential pollutants shall be added to the SWMP notebook.

At or prior to the Environmental Pre-construction Conference the Contractor shall submit a Spill Response Plan for any petroleum products, chemicals, solvents, or other hazardous materials in use, or in storage, at the work site. See subsection 208.06(c) for Spill Response Plan requirements. Work shall not be started until the plan has been submitted to and approved by the Engineer.

On site above ground bulk storage containers with a cumulative storage shell capacity greater than 1,320 U.S. gallons, or storage containers having a "reasonable expectation of an oil discharge" to State waters, are subject to the Spill Prevention, Control and Countermeasure Plan (SPCC) Rule. Oil of any type and in any form is covered, including, but not limited to: petroleum; fuel oil; sludge; oil refuse; oil mixed with wastes other than dredged spoil. EPA Region 8 is responsible for administering and enforcing the SPCC plan requirements in Colorado. Prior to start of work, the Contractor shall submit a SPCC Form which has been approved by the EPA for the project.

REVISION OF SECTION 107  
WATER QUALITY CONTROL  
(CONTRACTOR OBTAINED STORMWATER PERMIT)

7. The Contractor shall obtain a Construction Dewatering (CDW) permit from CDPHE anytime uncontaminated groundwater, including groundwater that is commingled with stormwater or surface water, is encountered during construction activities and the groundwater or commingled water needs to be discharged to State waters. If contaminated groundwater is encountered, a Remediation permit may be needed from CDPHE in accordance with Section 250.
8. Water from dewatering operations shall not be directly discharged into any State waters, unless allowed by a permit. Water from dewatering shall not be discharged into a ditch unless:
  - (1) Written permission is obtained from the owner of the ditch.
  - (2) It is covered in the approved CDW or Remediation permit that allows the discharge.
  - (3) A copy of this approval is submitted to the Engineer. A copy of the Permit shall be submitted to the Engineer prior to dewatering operations commencing.

If the site is covered by a Colorado Discharge Permit System Stormwater Construction Permit (CDPS-SCP) and the following conditions are met, a separate CDW permit will not be required for discharge to the ground:

- (1) The source is identified in the Stormwater Management Plan (SWMP) as updated by the SWMP Administrator.
- (2) The SWMP describes and locates the practices implemented at the site to control stormwater pollution from the dewatering of groundwater or stormwater.
- (3) The SWMP describes and locates the practices to be used that will ensure that no groundwater from construction dewatering is discharged from the LOC as surface runoff or to surface waters or storm sewers.
- (4) Groundwater and groundwater combined with stormwater do not contain pollutants in concentrations exceeding the State groundwater standards in Regulations 5 CCR 1002-41 and 42.

If surface water are diverted around a construction area and no pollutants are introduced during the diversion, a CDW Permit is not required. If the diverted water enters the construction area and contacts pollutant sources (e.g. disturbed soil, concrete washout, etc.), the Contractor shall obtain a CDW permit for the discharge of this water to State waters or to the ground.

Construction Dewatering may be discharged to the ground on projects that are not covered by a CDPS-SCP if the conditions of the CDPHE's low risk guidance document for Discharges of Uncontaminated Groundwater to Land are met. The conditions of this guidance are:

- (1) The source of the discharge is solely uncontaminated groundwater or uncontaminated groundwater combined with stormwater and does not contain pollutants in concentrations that exceed water quality standards for groundwater referenced above.
- (2) Discharges from vaults or similar structures shall not be contaminated. Potential sources of contamination include process materials used, stored, or conveyed in the structures, or introduced surface water runoff from outside environments that may contain oil, grease, and corrosives.
- (3) The groundwater discharge does not leave the project boundary limits where construction is occurring.
- (4) Land application is conducted at a rate and location that does not allow for any runoff into State waters or other drainage conveyance systems, including but not limited to streets, curb and gutter, inlets, borrow ditches, open channels, etc.

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WATER QUALITY CONTROL  
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- (5) Land application is conducted at a rate that does not allow for any ponding of the groundwater on the surface, unless the ponding is a result of implementing BMPs that are designed to reduce velocity flow. If the BMPs used result in ponding, the land application shall be done in an area with a constructed containment, such as an excavation or berm area with no outfall. The constructed containment shall prevent the discharge of the ponding water offsite as runoff.
- (6) A visible sheen is not evident in the discharge.
- (7) BMPs are implemented to prevent any sediment deposited during land application from being transported by stormwater runoff to surface waters or other conveyances.
- (8) All BMPs used shall be selected, installed, implemented, and maintained according to good Engineering, hydrologic and pollution control practices. The selected BMPs shall provide control for all potential pollutant sources associated with the discharge of uncontaminated groundwater to land. The discharge shall be routed in such a way that it will not cause erosion to land surface. Energy dissipation devices designed to protect downstream areas from erosion by reducing the velocity of flow (such as hose attachments, sediment and erosion controls) shall be used when necessary to prevent erosion.

Discharged water shall be drained slowly so that it soaks into the ground without running outside the project boundary or causing flooding issues. The discharge shall be routed in such a way that it will not contact petroleum products or waste.

9. At least 15 days prior to commencing dredging or fill operations in a watercourse, the Contractor shall provide written notification to owners or operators of domestic or public water supply intakes or diversion facilities, if these facilities are within 20 miles downstream from the dredging or fill operations. Notification shall also be given to Owners or operators of other intakes or diversions that are located within five miles downstream from the site of the project. Identities of downstream owners and operators can be obtained from Colorado Division of Water Resources, Office of the State Engineer.
10. Temporary fill into wetlands or streams will not be allowed, except as specified in the Contract and permits. If such work is allowed, upon completion of the work all temporary fills shall be removed in their entirety and disposed of in an upland location outside of flood plains unless otherwise specified in the Contract.
11. Construction operations in waters of the United States as defined in 33 CFR Part 328.3, including wetlands, shall be restricted to areas and activities authorized by the U.S. Army Corps of Engineers as shown in the Contract. Fording waters will be allowed only as authorized by the U.S. Army Corps of Engineers 404 Permit.
12. Wetland areas outside of the permitted limits of disturbance shall not be used for storage, parking, waste disposal, access, borrow material, or any other construction support activity.
13. Pollutant byproducts of highway construction, such as concrete, asphalt, solids, sludges, pollutants removed in the course of treatment of wastewater, excavation or excess fill material, and material from sediment traps shall be handled, stockpiled, and disposed of in a manner that prevents entry into State waters, including wetlands. Removal of concrete waste and washout water from mixer trucks, concrete finishing tools, concrete saw and all concrete material removed in the course of construction operations or cleaning shall be performed in a manner that prevents waste material from entering State waters. A minimum of ten days prior to the start of the construction activity, the Contractor shall submit in writing a Method Statement for Containing Pollutant Byproducts to the Engineer for approval.
14. The use of chemicals such as soil stabilizers, dust palliatives, herbicides, growth inhibitors, fertilizers, deicing salts, etc., shall be in accordance with the manufacturer's recommended application rates, frequency, and instructions.

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WATER QUALITY CONTROL  
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15. All materials stored on-site shall be stored in a neat, orderly manner, in their original containers, with the original manufacturer's label. Materials shall not be stored in a location where they may be carried into State waters at any time.
16. Spill prevention and containment measures conforming to subsection 208.06 shall be used at storage, and equipment fueling and servicing areas to prevent the pollution of any State waters, including wetlands. All spills shall be cleaned up immediately after discovery, or contained until appropriate cleanup methods can be employed. Manufacturer's recommended methods for spill cleanup shall be followed, along with proper disposal methods. When required by the Colorado Water Quality Control Act, Regulation 5 CCR 1002-61, spills shall be reported to the Engineer and CDPHE in writing.
17. The Contractor shall prevent construction activities from causing grass or brush fires.
18. The construction activities shall not impair Indian tribal rights, including, but not limited to, water rights, and treaty fishing and hunting rights.
19. Prior to start of work, the Contractor shall certify in writing to the Engineer that construction equipment has been cleaned prior to initial site arrival. Vehicles and equipment shall be free of soil and debris capable of transporting noxious weed seeds or invasive species onto the site. Additional equipment required for construction shall also be certified prior to being brought onto the project site.
20. Vehicles which have been certified by the Contractor as having been cleaned prior to arrival on site may be cleaned on site at an approved area where wash water can be properly contained. Vehicles leaving and reentering the project site shall be recertified.
21. At the end of each day the Contractor shall collect all trash and dispose of it in appropriate containers.
22. Construction waste that is considered a pollutant or contaminant shall be collected and disposed of in appropriate containers. This material may be stockpiled on the project when it is contained or protected by an appropriate BMP.

(c) *Measurement and Payment.*

1. All the work listed in (b) above, including but not limited to dewatering, erosion control for dewatering, and disposal of water resulting from dewatering operations, including all costs for CDPHE concurrences and permits, will not be measured and paid for separately, but shall be included in the work.
2. The Contractor shall be liable for any penalty (including monetary fines) applied to the Department caused by the Contractor's noncompliance with any water quality permit or certification. Monetary fines shall be deducted from any money due to the Contractor. If the monetary fine is in excess of all the money due to the Contractor, then the Contractor shall pay to the Department the amount of such excess.
3. The Contractor will not receive additional compensation, or time extensions, for any disruption of work or loss of time caused by any actions brought against the Contractor for failure to comply with good Engineering, hydrologic and pollution control practices.
4. If a spill occurs as a direct result of the Contractor's actions or negligence, the clean-up of such spill shall be performed by the Contractor at the Contractor's expense.
5. Areas exposed to erosion by fire resulting from the Contractor's operations shall be stabilized in accordance with Section 208 by the Contractor and at the Contractor's expense.

(d) *Contractor Obtained Stormwater Construction Permit.* The Contractor shall obtain a Colorado Discharge Permit System Stormwater Construction Permit (CDPS-SCP) for any project work that disturbs at least 1 acre of land. The Contractor shall apply for and obtain the permit upon award of the Contract. The Contractor shall provide a copy of permit certification or the submitted CDPS-SCP application to the Engineer prior to or

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(CONTRACTOR OBTAINED STORMWATER PERMIT)

at Pre-construction Conference. No work shall begin until the CDPS-SCP permit has been approved from CDPHE, unless otherwise directed. A copy of the Permit and application to obtain a permit shall be placed in the project SWMP notebook.

If a Utility Company has pulled a permit for the area prior to the Contractor being on site, then the Contractor shall coordinate with the Utility Company to transfer those areas over to the Contractor prior to work commencing. The Contractor shall not commence construction until Application for Transfer of Ownership for All Permits, Certifications and Authorizations has been approved by CDPHE and submitted to the Engineer.

To initiate Partial Acceptance of the stormwater construction work (including seeding and planting required for erosion control), the Contractor shall request in writing a Stormwater Completion Walkthrough. The Engineer will set up the walkthrough and will include: the Engineer or designated representative, Superintendent or designated representative, Stormwater Management Plan (SWMP) Administrator, Region Water Pollution Control Manager (RWPCM) and Landscape Architect representing the region. Unsatisfactory and incomplete erosion control work will be identified in this walkthrough, and will be summarized by the Engineer in a punch list. The Water Quality Permit Transfer to Maintenance Punch List may be used as a template in creating the Engineer's punch list.

The Engineer will coordinate with CDOT Maintenance on regular inspections of the corrective work. The completed action items associated with the corrective work shall be shown as completed on the Punch List. Upon completion of all items shown, the Contractor shall submit the completed Punch List to the Engineer for review. Upon written approval of the Punch List, the Contractor shall submit the "Application for Transfer of Ownership for All Permits, Certifications and Authorizations" to the CDPHE requesting transfer of ownership of the CDPS-SCP to CDOT Maintenance. When requested by CDOT Maintenance and approved by the Engineer, the Permit may be transferred by the Contractor to the Resident Engineer instead of CDOT Maintenance.

Until the transfer of the permit has been approved by the CDPHE the Contractor shall continue to adhere to all permit requirements. Requirements shall include erosion control inspections, BMP installation, BMP maintenance, BMP repair, including seeded areas, and temporary BMP removal. All documentation shall be submitted to the Engineer and placed in the SWMP notebook.

All costs associated with the Contractor applying for, holding, and transferring the CDPS-SCP permit between parties will not be measured and paid for separately, but shall be included in the work in accordance with subsection 107.02.

REVISION OF SECTION 108  
DELAY AND EXTENSION OF CONTRACT TIME

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.08, delete (c) and (d) and replace with the following:

(c) *Delay*. Any event, action or factor that extends the performance period of the Contract.

1. *Excusable Delay*: A delay that was beyond the Contractor's control and was not due to the Contractor's fault or negligence. The Department may grant a contract time extension for an excusable delay.
  - A. *Compensable Delay*: A delay that the Department, not the Contractor, is responsible for entitling the Contractor to a time extension and monetary compensation. Monetary compensation for compensable delays will be made in accordance with Subsection 109.10.
  - B. *Noncompensable Delay*: An excusable delay that neither the Contractor nor the Department is responsible for that may entitle the Contractor to a contract time extension but no additional monetary compensation. Contract time allowed for the performance of the work may be extended for delays due to force majeure (i.e. acts of God, acts of the public enemy, terrorist acts, fires, floods, area wide strikes, embargoes, or unusually severe weather).
2. *Nonexcusable Delay*: A delay that was reasonably foreseeable or within the control of the Contractor for which the Department will not grant monetary compensation or a contract time extension.
3. *Concurrent Delay*. Independent delays to critical activities occurring at the same time.
  - A. The Department will not grant a time extension or additional compensation for the period of time that a non-excusable delay is concurrent with an excusable delay.
  - B. The Department may grant time but no compensation for the period of time that a non-compensable delay is concurrent with a compensable delay.

Delays in delivery of materials or fabrication scheduling resulting from late ordering, financial considerations, or other causes that could have been foreseen or prevented will be considered nonexcusable delays. However, delays caused by fuel shortage or delay in delivery of materials to the Contractor due to some unusual market condition caused by industry-wide strike, national disaster, area-wide shortage, or other reasons beyond the control of the Contractor which prevent procurement of materials or fuel within the allowable contract time limits will be considered excusable delays.

(d) *Extension of Contract Time*. The Contractor's assertion that insufficient contract time was specified is not a valid reason for an extension of contract time. For time extension requests, the Contractor shall provide a two-part submittal: part one shall consist of a written notice of the delay and part two shall consist of the Contractor's delay documentation and supporting analysis.

Part 1: The Contractor shall provide the written notice of delay within seven days of the delay occurrence. The notice shall describe the delay and include documentation substantiating the nature and cause of the delay. Failure to submit the written notice constitutes a waiver of entitlement to additional time or compensation.

Part 2: This shall be submitted within 30 days of the written notice. The Contractor shall include all documentation needed to support the time extension request. In order to request additional contract time for an unexpected delay, the Contractor shall provide a contemporaneous schedule analysis in accordance with subsection 108.03. The schedule analysis shall show that the delayed activity or activities were on the critical path or became critical due to the delay.



REVISION OF SECTION 108  
DELAY AND EXTENSION OF CONTRACT TIME

The Engineer will base a determination of an allowable contract time extension on:

- (1) The current Schedule in effect at the time of the alleged delay;
- (2) The supporting documentation submitted by the Contractor;
- (3) The contemporaneous schedule analysis; and
- (4) Any other relevant information available to the Engineer.

For a time extension request resulting from a change order, the Contractor shall demonstrate the delay to the project completion date by:

- (1) Inserting a fragnet containing the change order activities into an unprogressed copy of the schedule that is current at the time of the change order;
- (2) tying the fragnet into the schedule logic; and
- (3) Recalculating the schedule.

The Department will not consider delays to activities which do not affect the performance period of the Contract as a basis for a Contract time extension. If the Engineer grants a contract time extension, the revised Contract Completion date will be in effect as though it were the original contract date.

A Contractor's failure to have an approved, or approved with comments, current project schedule in place will preclude the Department from considering a Contractor's a time extension request.

February 18, 2016

REVISION OF SECTION 108  
HOLIDAY WEEKEND

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.08, delete the second paragraph and replace with the following:

The Contractor shall not carry on construction operations on Saturdays, Sundays or holidays unless previously arranged and approved. The Contractor shall not perform work on any day of a three or four day holiday weekend when the holiday is New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, or Christmas Day. Construction operations shall stop at 12:00 Noon the day before the start of the holiday weekend and shall commence the day after the three or four days have passed. The Contractor shall only make emergency repairs, and provide proper protection of the work and traveling public on these days.

REVISION OF SECTION 108  
LIQUIDATED DAMAGES

Section 108 of the Standard Specifications is hereby revised for this project as follows:

In subsection 108.09, delete the Schedule of Liquidated Damages and replace with the following:

<b>Original Contract Amount (\$)</b>		<b>Liquidated Damages per Calendar Day (\$)</b>
<b>From More Than</b>	<b>To And Including</b>	
0	150,000	500
150,000	500,000	1,000
500,000	1,000,000	1,600
1,000,000	2,000,000	2,300
2,000,000	4,000,000	4,100
4,000,000	10,000,000	5,800
10,000,000	----	7,000

July 31, 2014

REVISION OF SECTION 108  
NOTICE TO PROCEED

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.02 and replace with the following:

**108.02 Notice to Proceed.** The Contractor shall not commence work prior to the issuance of a Notice to Proceed. The "Notice to Proceed" will stipulate the date on which contract time commences. When the Contractor proceeds with work prior to that date, contract time will commence on the date work actually begins. The Contractor shall commence work under the Contract on or prior to the 15th day following Contract execution or the 30th day following the date of award, whichever comes later, or in accordance with the selected start date allowed in the special provisions.

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REVISION OF SECTION 108  
PROJECT SCHEDULE

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.03 and replace with the following:

**108.03 Project Schedule.**

(a) *Definitions.*

**Activity.** An activity is a project element on a schedule that affects completion of the project. An activity has a description, start date, finish date, duration, and one or more logic ties.

**Activity ID.** A unique, alphanumeric, identification code assigned to an activity and remains constant throughout the project.

**Bar Chart.** A simple depiction of a Project Schedule without relationships or supporting logic of the schedule.

**Calendar.** Defined work periods and no work periods that determine when project activities can occur. Multiple calendars may be used for different activities; e.g., a 5-day work-week and a 7-day work-week calendar.

**Constraint.** A restriction imposed in a schedule, which fixes a value that would otherwise be calculated within the schedule. Examples of values that can be fixed by a constraint include start date, end date, and completion date.

**Critical Path.** The sequence of activities that determines the duration of the project.

**Critical Path Method Scheduling.** (CPM Scheduling) is a logic-based planning technique using activity durations and relationships between activities to calculate a schedule determining the minimum total project duration.

**Data Date.** The starting point from which to schedule all remaining work.

**Duration.** The estimated amount of time needed to complete an activity.

**Float.** The amount of time between the earliest date an activity can start and the latest date when an activity must start, or the earliest date an activity can finish and latest date when an activity can finish before the activity becomes critical. The time between the Project Schedule completion date and the Contract completion date is not considered float.

**Gantt Chart.** A time-scaled graphical display of the project's schedule.

**Lag.** A time-value assigned to a relationship.

**Logic.** Relationships between activities defining the sequence of work (See also predecessor activity and successor activity).

**Milestone.** An activity, with no duration used to represent an event.

**Open-Ended Activity.** An activity that does not have both a predecessor activity and a successor activity.

**Predecessor Activity.** An activity that is defined by schedule logic to precede another activity.

**Relationship.** The interdependence between activities.

**Salient Feature.** An item of work that is of special interest for CDOT in coordinating the project schedule but may not affect the overall completion of the project project.

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REVISION OF SECTION 108  
PROJECT SCHEDULE

Successor Activity. An activity that is defined by schedule logic to follow another activity.

Time-Scaled Logic Diagram. Gantt chart that illustrates logic links depicting both schedule logic and the time at which activities are performed.

(b) *Project Schedule - General*

The Contractor shall use either Microsoft Project or Primavera Scheduling software to develop and manage a CPM Project Schedule to plan, schedule, and report the progress of the work. Prior to, or at the Pre-construction Conference, the Contractor shall notify the Engineer in writing, which scheduling software the Contractor shall use to manage the project. The Contractor's selection and use of particular scheduling software cannot be changed after the first schedule submittal. If the Contractor selects Primavera, the Contractor shall calculate the schedule using the Retained Logic scheduling option. The Department will not allow use of bar charts for the Project Schedule.

The Contractor shall submit schedules for approval by the Engineer. The purpose of these schedules is to allow the Contractor and the Department to jointly manage the work and evaluate progress. The schedules also serve to evaluate the affect of changes and delays to the scheduled project completion. Either party may require a formal schedule review meeting.

The Contractor's schedule shall consist of a time-scaled logic diagram and shall show the logical progression of all activities required to complete the work.

The Contractor shall use activity descriptions that ensure the work is easily identifiable. The Contractor shall show the no-work days in the schedule calendars.

The Contractor shall use durations for individual construction activities that do not exceed 15 calendar days unless approved by the Engineer. The Contractor may group a series of activities with an aggregate duration of five days or less into a single activity. Non-construction activities may have durations exceeding 15 working days, as approved by the Engineer.

The Contractor may include summary bars in the schedule as long as the detailed activities to complete the work are displayed.

The Contractor shall not use the following:

- (1) Negative lags
- (2) Lags in excess of 10 working days without approval by the Engineer. The Contractor's written request shall justify the need for the lag. Lags shall be identified.
- (3) Start-to-finish relationships.
- (4) Open-ended activities - every activity shall have at least one predecessor activity and at least one successor activity, except for the first and last activities in the network. If the contractor uses a start-to-start relationship to link two activities, then both of those two activities should also have successor activities linked by either a finish-to-start or a finish-to-finish relationship.
- (5) Constraints without approval by the Engineer. The Contractor's written request shall explain why the use of constraints in the schedule is necessary.

The Project Schedule shall show all activities required by all parties to complete the work. The Project Schedule shall include subcontracted work, delivery dates for critical material, submittal and review periods, permits and governmental approvals, milestone requirements, utility work by others and no work periods. The Contractor, its subcontractors, suppliers, and engineers, at any tier, shall perform the work according to the approved Project Schedule.

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 REVISION OF SECTION 108  
 PROJECT SCHEDULE

Float within the Baseline Schedule or any other Project Schedule is not for the exclusive use or benefit of either party, but is a project resource available to both parties as needed until it is depleted.

For any schedule submittal that shows completion in less than 85 percent of the Contract Time, the Contractor shall submit planned production rates in the schedule for all activities with float of 10 days or less. The Engineer may require additional methods statements for activities with float of 10 days or less.

The Engineer's review of the schedule will not exceed 10 calendar days. The Engineer will provide the Contractor with one of the following responses within 10 days after receipt of the Project Schedule:

- (1) Approved, no exceptions taken;
- (2) Approved-as-Noted; or
- (3) Revise and Resubmit within 10 days.

The Contractor shall not assume that approval of the Project Schedule relieves the Contractor of its obligation to complete all work within the Contract Time.

(c) *Schedule Submittals.* The Contractor shall include a time-scaled logic diagram with all schedule submittals that:

- (1) Is plotted on a horizontal time-scale in accordance with the project calendar.
- (2) Uses color to clearly identify the critical path.
- (3) Is based on early start and early finish dates of activities.
- (4) For Schedule Updates and Schedule Revisions, shows actual completion dates up to but not including the data date.
- (5) Clearly shows the sequence and relationships of all activities necessary to complete the contract work.
- (6) Includes an activity block for each activity with the following information:

Activity ID	Activity Description
Original Duration	Total Float
Early start date	Early finish date
Late start date*	Late finish date*
Actual Start date^	Actual Finish date^
Calendar used on the activity	Activity Responsibility
Remaining Duration^	Duration Percent Complete^
Gantt chart (time-scaled logic diagram)	
*Required with the Preliminary and Baseline Schedule.	
^Required with the Project Schedule Update and Schedule Revision.	

The Contractor shall include the following with all schedule submittals:

- (1) A Job Progress Narrative Report that includes the following:
  - (i) A description of the work performed since the previous month's schedule update.
  - (ii) A description of problems encountered or anticipated since the previous month's schedule submission.
  - (iii) A description of unusual labor, shift, equipment, or material conditions or restrictions encountered or anticipated.

REVISION OF SECTION 108  
PROJECT SCHEDULE

- (iv) The status of all pending items that could affect the schedule.
- (v) Explanations for milestones forecasted to occur late.
- (vi) Scheduled completion date status and any change from the previous month's submission.
- (vii) An explanation for a scheduled completion date forecasted to occur before or after the contract completion date or contract time.
- (viii) Schedule Delays:
  1. A description of current and anticipated delays including: Identification of the delayed activity or activities by Activity ID(s) and description(s).
  2. Delay type with reference to the relevant specification subsection.
  3. Delay cause or causes.
  4. Effect of the delay on other activities, milestones, and completion dates.
  5. Identification of the actions needed to avoid a potential or mitigate an actual delay.
  6. A description of the critical path impact and effect on the scheduled completion date in the previous month's schedule update.
- (ix) A list of all added and deleted activities along with an explanation for the change.
- (x) All logic and duration changes along with an explanation for the change.
- (2) A Predecessor Activity and Successor Activity report that defines all schedule logic and clearly indicates all logical relationships and constraints.
- (3) An Early Start report listing all activities, sorted by actual start/early start date.
- (4) A Float report listing all activities sorted in ascending order of available float.
- (5) A Critical Path report listing all activities not yet complete with the percent complete, sorted by float and then by early start.
- (6) A listing of all non-work days.

For all required schedule submittals, the Contractor shall submit two electronic copies on two compact disk, USB flash drive, or other media as directed by the Engineer. Electronic copies of CPM schedules shall be submitted both in the native schedule format and in "PDF" format. The Contractor shall also provide two printed copies of the CPM Schedule and all reports.

Each schedule submittal shall be appropriately labeled as a Preliminary Schedule, Baseline Schedule, Project Schedule Update, or Schedule Revision. The title bar shall include the CDOT project number, subaccount, project name, contractor name, schedule data date. If an originally submitted schedule is revised during review, the title bar shall also include a revision number (REV1, REV2, etc.) and revision date.

- (d) *Preliminary Schedule.* Within 14 days of award of the Contract, the Contractor may submit a Preliminary Schedule showing all planned activities from the Notice to Proceed through the first 60 days of the project. If the Contractor elects not to submit a Preliminary Schedule, then the Contractor shall submit a complete Baseline Schedule within 14 days of award of the Contract, which will be subject to all requirements of a Baseline submittal. The Preliminary Schedule shall not show any progress and it will be approved by the Engineer before work can commence. The Preliminary Schedule shall be used as the basis for the Baseline Schedule.
- (e) *Baseline Schedule.* If the Contractor elects to submit a Preliminary Schedule, within 45 days of the award of Contract, the Contractor shall submit a Baseline Schedule that includes all work activities completed within Contract Time. The Contractor shall not show progress in the Baseline Schedule. Further partial payments will not be made beyond 60 days after the start of Contract Time unless the Baseline Schedule is approved. When approved, the Baseline Schedule shall become the Project Schedule.

The Contractor shall use all information known by the Contractor at the time of bid submittal to develop the Baseline Schedule.



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REVISION OF SECTION 108  
PROJECT SCHEDULE

If the Contractor elects to submit a Baseline Schedule in lieu of a Preliminary Schedule, the Baseline Schedule shall be approved before work can commence.

- (f) *Methods Statements.* The Contractor shall submit a Methods Statement for each salient feature or as directed by the Engineer that describes all work necessary to complete the feature. The Contractor shall include the following information in the Methods Statement:
- (1) Salient feature name;
  - (2) Responsibility for the salient feature work;
  - (3) Planned work procedures;
  - (4) The planned quantity of work per day for each salient feature using the same units of measure as the applicable pay item;
  - (5) The anticipated labor force by labor type;
  - (6) The number, types, and capacities of equipment planned for the work;
  - (7) The planned time for the work including the number of work days per week, number of shifts per day, and the number of hours per shift.
- (g) *Project Schedule Update.* The Contractor shall submit a monthly update of the Project Schedule updated through the cut-off date for the monthly progress pay estimate, and a projection for completing all remaining activities. A schedule update may show a completion date that is different than the Contract completion date, after the baseline schedule is approved. Approval of this schedule shall not relieve the Contractor of its obligation to complete the work within the Contract Time. In this case, the Contractor shall provide an explanation for a late scheduled completion date in the Job Progress Narrative Report included with the schedule submittal.
- When approved, the Project Schedule Update will become the Project Schedule. The Engineer will not issue a monthly progress payment if the Engineer has not received the Project Schedule Update. The Engineer will not make monthly progress payments for the months following the Project Schedule Update submission until the Engineer approves the Project Schedule Update.
- When the project has a maintenance or landscape establishment period, the Engineer may waive the monthly update requirement. The Contractor shall submit a final Project Schedule Update that shows all work through the final acceptance date.
- (h) *Weekly Planning Schedule.* The Contractor shall submit, in writing, a Weekly Planning Schedule that shows the Contractor's and all Subcontractor's planned activities for a minimum of two weeks immediately following the date of submittal and actual days worked versus planned for the week prior to the date of submittal. This schedule shall include the description, duration and sequence of work activities and anticipated lane closures for the upcoming two weeks. The Weekly Planning Schedule may be a time-scaled logic diagram or other standard format as approved by the Engineer. subsection 108.03(c) Schedule Submittal requirements for reports do not apply to the Weekly Planning Schedule.
- (i) *Schedule Revision.* A Schedule Revision is required in the event of any major change to the work. Examples of major changes are:
- (1) Significant changes in logic or methods of construction or changes to the critical path;
  - (2) Addition, deletion, or revision of activities required by contract modification order;
  - (3) Approval of a Contractor submitted Value Engineering Change Proposal;
  - (4) Delays in milestones or project completion;
  - (5) Phasing revisions, or;
  - (6) If the Engineer determines that the schedule does not reflect the actual work.

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REVISION OF SECTION 108  
PROJECT SCHEDULE

This revision shall include a description of the measures necessary to achieve completion of the work within the Contract Time. The Contractor may also need to submit revised Methods Statements. The Contractor shall provide a Schedule Revision within 10 days of written notification and shall include the diagrams and reports as described in subsection 108.03 (b) Schedule - General and (c) Schedule Submittals. In this case, the Contractor shall provide an explanation for a late scheduled completion date in the Job Progress Narrative Report included with the schedule.

Once approved, the Schedule Revision becomes the Project Schedule.

- (j) *Payment.* All costs relating to the requirements of this subsection will not be paid for separately, but shall be included in the work.

REVISION OF SECTION 108  
SUBLETTING OF CONTRACT

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 108.01 and replace with the following:

**108.01 Subletting of Contract.** The Contractor shall not sublet, sell, transfer, assign, or dispose of the Contract or Contracts, or any portion thereof without written permission of the Engineer. Prior to beginning any work by subcontractor, the Contractor shall request permission from the Engineer by submitting a completed Sublet Permit Application, CDOT Form No. 205. The subcontract work shall not begin until the Contractor has received the Engineer's written permission. The Contractor shall make all project related written subcontracts, agreements, and purchase orders available to the Engineer for viewing, upon request and at a location convenient to the Engineer.

The Contractor will be permitted to sublet a portion of the Contract, however, the Contractor's organization shall perform work amounting to 30 percent or more of the total original contract amount. Any items designated in the contract as "specialty items" may be performed by subcontract. The cost of "specialty items" so performed by subcontract may be deducted from the total original contract amount before computing the amount of work required to be performed by the Contractor's own organization. The original contract amount includes the cost of material and manufactured products which are to be purchased or produced by the Contractor and the actual agreement amounts between the Contractor and a subcontractor. Proportional value of a subcontracted partial contract item will be verified by the Engineer. When a firm both sells material to a prime contractor and performs the work of incorporating the materials into the project, these two phases shall be considered in combination and as constituting a single subcontract.

The calculation of the percentage of subcontracted work shall be based on subcontract unit prices.

Subcontracts or transfer of Contract shall not release the Contractor of liability under the Contract and Bond.

REVISION OF SECTIONS 108 AND 109  
PAYMENT SCHEDULE (MULTIPLE FISCAL YEARS)

Sections 108 and 109 of the Standard Specifications are hereby revised for this project as follows:

Delete subsection 108.04, and replace with the following:

**108.04 Payment Schedule.** The Contractor shall prepare a payment schedule which shall show the dollar amount of work the Contractor expects to complete, including Force Accounts, retainage and expected incentive payments, by the progress estimate date each month for the duration of construction. The payment schedule shall be signed by the Contractor's authorized agent. The payment schedule shall show the dollar amount of work the Contractor expects to complete for every month on the Contract from commencement of work to Project Acceptance. The fiscal year (July 1 to June 30) totals shall also be shown on the payment schedule. The payment schedule may be prepared using standard spreadsheet software such as MS Excel and submitted in electronic format.

- (a) *Initial Payment Schedule.* The Contractor shall submit the certified initial payment schedule within 15 days of the award of the Contract.
- (b) *Payment Schedule Updates.* Once each month the Contractor shall submit an update to the Engineer. The update shall be in the same format as the initial payment schedule and shall be submitted to the Engineer by the first day of each month. In each update, estimated monthly dollar amounts shall be revised to show the dollar amount for actual work accomplished which includes actual progress payments made to the Contractor to date and work accomplished but not paid. Each update shall show corrected dollar amounts of work to be completed each month through the expected completion date as shown on the Contractor's progress schedule.

If the update has any State Fiscal Year (July 1 to June 30) payment in excess of the encumbrance amount, the Department may, in its sole discretion, approve the update. If the Department does not approve the update the Contractor shall either revise the payment schedule or proceed at his own risk. The risk is either not being paid in a timely manner, or not being paid at all for any amounts over the encumbrance amount. If a Contractor proceeds at his own risk, then payment for the at-risk work will be dependent upon ratification of this work by the State Controller's Office.

If the update exceeds the encumbrance amount because of additional compensable work, and the Department does not approve this update, any delay to critical path work related to this additional compensable work will be considered excusable and compensable in accordance with subsection 108.08 (c), if the Contractor does not proceed at his own risk.

If the update exceeds the encumbrance amount because of the Contractor's accelerated schedule, and the Department does not approve the update, the delay for not performing the work associated with the Contractor's accelerated schedule in the scheduled Fiscal Year will be noncompensable in accordance with subsection 108.08(c), if the Contractor does not proceed at his own risk.

- (c) *Failure to Submit Payment Schedule.* If the Contractor fails to submit the initial payment schedule, the Contract will not be executed. If a payment schedule update is not submitted by the required date, the Engineer will withhold progress payments until such time as the Contractor has submitted a current payment schedule.

Subsection 109.06 shall include the following:

- (i) *Maximum Partial Payments.* Partial payments will not be made in excess of the encumbrance amount except at the sole discretion of the Department. Work performed in excess of the encumbrance amount, without written approval of the Department, shall be performed at the Contractor's risk.

If a Contractor proceeds at his own risk, then payment for the at-risk work will be dependent upon ratification of this work by the State Controller's Office.

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 REVISION OF SECTION 109  
 ASPHALT CEMENT COST ADJUSTMENT  
 (ASPHALT CEMENT INCLUDED IN THE WORK)

Section 109 of the Standard Specifications is hereby revised for this project as follows:

Subsection 109.06 shall include the following:

(i) *Asphalt Cement Cost Adjustments.* Contract cost adjustments will be made to reflect increases or decreases in the monthly average price of asphalt cement from the average price for the month preceding the month in which bids were received for the Contract. These cost adjustments are not a change to the contract unit prices bid.

1. Cost adjustments will be based on the asphalt cement price index established by the Department and calculated as shown below. The index will be the average for the month of the daily Hardisty WCS spot price. This will be calculated by applying the monthly Hardisty WCS differential (as published on [http://www.fhr.com/refining/crude\\_oil.aspx](http://www.fhr.com/refining/crude_oil.aspx)) from the West Texas Intermediate (WTI) daily spot price (as published on <http://www.up.com/customers/surcharge/wti/prices/index.htm>). The daily prices and the average index number for the month will be posted as soon as they are available on the CDOT website at:

<http://www.coloradodot.info/business/designsupport/construction-specifications/2011-Specs/asphalt-cement-cost-adjustment>

2. Cost adjustments will be made on a monthly basis subject to the following conditions:

A. Adjustment will be based on the pay quantities on the monthly partial pay estimate for the following two pay items when measured by the ton and asphalt cement is included in the pay items:

Item No.	Item	Pay Unit
403*	Hot Mix Asphalt (Grading __) (Asphalt)	Ton
403	Stone Matrix Asphalt (Grading __) (Asphalt)	Ton
*Hot Mix Asphalt (Patching) is not subject to asphalt cement cost adjustment.		

B. A cost adjustment will be made only when the asphalt cement price index varies by more than 5 percent from the asphalt cement price index at the time of bid, and only for that portion of the variance in excess of 5 percent. Cost adjustments may be either positive or negative dollar amounts.

C. Asphalt cement cost adjustments will not be made for any partial estimate falling wholly after the expiration of contract time.

D. Adjustment formula:

EP greater than BP:  
 $ACCA = (EP - 1.05 BP)(PA) (Q)$

EP less than BP:  
 $ACCA = (EP - 0.95 BP) (PA) (Q)$

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 REVISION OF SECTION 109  
 ASPHALT CEMENT COST ADJUSTMENT  
 (ASPHALT CEMENT INCLUDED IN THE WORK)

Where:

BP = Average Asphalt Cement price index for the calendar month prior to the calendar month in which bids are opened

EP = Average Asphalt Cement price index for the calendar month prior to the calendar month in which the partial estimate pay period ends

ACCA = Asphalt Cement Cost Adjustment

PA = Percent of the paving mixture that is asphalt cement. Asphalt Cement content will be determined by the weighted average of all asphalt cement content percentages obtained from the field acceptance tests for that item (Use decimal in formula, e.g.: 0.05.). If Reclaimed Asphalt Pavement (RAP), Reclaimed Asphalt Shingles (RAS), or both is used, the percent of Virgin Asphalt Cement added to the mix will be determined by subtracting the percent of asphalt cement in the RAP, RAS, or both from the percent of asphalt cement in the mix as calculated from Revision of Section 401, Reclaimed Asphalt Pavement and Revision of Section 401 Reclaimed Asphalt Shingles.

Q = Increased pay quantity for all 403 items shown above on the monthly partial pay estimate in Tons.

Example: Bids are opened on July 16. The BP will be the average of the daily postings for June 1 through June 30. For an estimate cut-off date selected by the Contractor at the Pre-Construction Conference of the 20<sup>th</sup> of the month a February estimate will include HMA quantities measured from the 21<sup>st</sup> of January through the 20<sup>th</sup> of February, and the EP index used to calculate ACCA will be the average of the daily prices for January 1 through January 31 as established by CDOT)

- E. Cost adjustment will not be made for the quantity of any item that is left in place at no pay or for material removed and replaced at the Contractor's expense.
- F. Cost adjustments will not be made to items of work added to the Contract by Change Order after the award of the Contract.
- G. The asphalt cement cost adjustment will be the sum of the individual adjustments for each of the pay items shown above. No adjustment will be made for asphalt cement costs on items other than those shown above.
- H. Asphalt cement cost adjustments resulting in an increased payment to the Contractor will be paid for under the planned force account item: Asphalt Cement Cost Adjustment. Asphalt cement cost adjustments resulting in a decreased payment to the Contractor will be deducted from monies owed the Contractor.

REVISION OF SECTION 109  
COMPENSATION FOR COMPENSABLE DELAYS

In subsection 109.10, delete the first two paragraphs and replace with the following:

**109.10 Compensation for Compensable Delays.** If the Engineer determines that a delay is compensable in accordance with either subsection 105.22, 105.23, 105.24, or 108.08, monetary compensation will be determined in accordance with this subsection.

- (a) These categories represent the only costs that are recoverable by the Contractor. All other costs or categories of costs are not recoverable:
- (1) Actual wages and benefits, including FICA, paid for additional labor not otherwise included in (5) below;
  - (2) Costs for additional bond, insurance and tax;
  - (3) Increased costs for materials;
  - (4) Equipment costs calculated in accordance with subsection 109.04(c) for Contractor owned equipment and based on invoice costs for rented equipment;
  - (5) Costs of extended job site overhead;
  - (6) Costs of salaried employees not otherwise included in (1) or (5) above incurred as a direct result of the delay;
  - (7) Claims from subcontractors and suppliers at any level (the same level of detail as specified herein is required for all such claims);
  - (8) An additional 16 percent will be added to the total of items (1) through (7) as compensation for items for which no specific allowance is provided, including profit and home office overhead.

REVISION OF SECTION 109  
FUEL COST ADJUSTMENT

Section 109 of the Standard Specifications is hereby revised for this project as follows:

Subsection 109.06 shall include the following:

(h) *Fuel Cost Adjustments*. Contract cost adjustments will be made to reflect increases or decreases in the monthly average prices of gasoline, diesel and other fuels from the average price for the month preceding the month in which bids were received for the Contract. These cost adjustments are not changes to the Contract unit prices bid. When bidding, the Contractor shall specify on the Form 85 whether the cost adjustment will apply to the Contract. After bids are submitted, the Contractor will not be given any other opportunity to accept or reject this adjustment. If the Contractor fails to indicate a choice on the Form 85, the cost adjustment will not apply to the Contract. If the fuel cost adjustment is accepted by the Contractor, the adjustment will be made in accordance with the following criteria:

1. Cost adjustments will be based on the fuel price index established by the Department and calculated as shown in subsection 109.06(h)2.D below. The index will be the monthly average of the rates posted by the Oil Price Information Service (OPIS) for Denver No. 2 Diesel. The rate used will be the *OPIS Average* taken from the OPIS Standard Rack table for *Ultra-Low Sulfur w/Lubricity Gross Prices* (ULS column), expressed in dollars per gallon and rounded to two decimal places.
2. Cost adjustments will be made on a monthly basis subject to the following conditions:
  - A. Adjustment will be based on the pay quantities on the monthly partial pay estimate for each of the pay items listed in the table below for which fuel factors have been established. Adjustment will be made only when the pay item is measured by the pay unit specified in the table:

Item	Pay Unit	Fuel Factor (FF)
202-Removal of Asphalt Mat (Planing)	Square Yard	0.006 Gal/SY/Inch depth
203-Excavation (muck, unclassified) Embankment, Borrow	Cubic Yard	0.29 Gal/CY
203-Rock Excavation	Cubic Yard	0.39 Gal/CY
206-Structure Excavation and Backfill [applies only to quantities paid for by separate bid item; no adjustment will be made for pay items that include structure excavation & backfill, such as RCP(CIP)]	Cubic Yard	0.29 Gal/CY
304-Aggregate Base Course (Class ___)	Cubic Yard	0.85 Gal/CY
304-Aggregate Base Course (Class ___)	Ton	0.47 Gal./Ton
307-Processing Lime Treated Subgrade	Square Yard	0.12 Gal/SY
310-Full Depth Reclamation	Square Yard	0.06 Gal/SY
403-Hot Mix Asphalt (HMA) (Grading ___) *	Ton	2.47 Gal/Ton
403-Stone Matrix Asphalt (Grading ___)	Ton	2.47 Gal/Ton
405-Heating and Scarifying Treatment	Square Yard	0.44 Gal/SY
405-Heating and Repaving Treatment	Square Yard	0.44 Gal/SY
405-Heating and Remixing Treatment	Square Yard	0.44 Gal/SY
406-Cold Bituminous Pavement (Recycle)	Square Yard	0.01 Gal/SY/Inch depth
412- Concrete Pavement (___ Inch)	Square Yard	0.03 Gal/SY/Inch thickness
412-Place Concrete Pavement**	Square Yard	0.03 Gal/SY/Inch thickness
*Hot Mix Asphalt (Patching) is not subject to fuel cost adjustment.		
**Use the thickness shown on the plans.		



REVISION OF SECTION 109  
FUEL COST ADJUSTMENT

- B. A fuel cost adjustment will be made only when the current fuel price index varies by more than 5 percent from the price index at the time of bid, and only for that portion of the variance in excess of 5 percent. Fuel cost adjustments may be either positive or negative dollar amounts.
- C. Fuel cost adjustments will not be made for any partial estimate falling wholly after the expiration of contract time.
- D. Adjustment formula:

EP greater than BP:

$$FA = (EP - 1.05 BP)(Q)(FF)$$

EP less than BP:

$$FA = (EP - 0.95 BP)(Q)(FF)$$

Where:

BP	= Average fuel price index for the calendar month prior to the calendar month in which bids are opened
EP	= Average fuel price index for the calendar month prior to the calendar month in which the partial estimate pay period ends
FA	= Adjustment for fuel costs in dollars
FF	= Fuel usage factor for the pay item
Q	= Pay quantity for the pay item on the monthly partial pay estimate

Note: When the pay item is based on area, and the rate of fuel use varies with thickness, Q should be determined by multiplying the area by the thickness. For example: for 1000 square yards of 8-inch concrete pavement Q should be 8000.

Example: Bids are opened on July 16. The BP will be the average of the daily postings for June 1 through June 30. For an estimate cut-off date selected by the Contractor at the Pre-Construction Conference of the 20<sup>th</sup> of the month a February estimate will include HMA quantities (Q) measured from the 21<sup>st</sup> of January through the 20<sup>th</sup> of February, the FF will be 2.47 Gal/Ton, and the EP index used to calculate FA will be the average of the daily postings for January 1 through January 31 as established by CDOT.

- E. Fuel cost adjustment will not be made for the quantity of any item that is left in place at no pay.
- F. Fuel cost adjustments will not be made to items of work added to the Contract by Change Order after the award of the Contract.

The fuel cost adjustment will be the sum of the individual adjustments for each of the pay items shown. No adjustment will be made for fuel costs on items other than those shown. The factors shown are aggregate adjustments for all types of fuels used, including but not limited to gasoline, diesel, propane, and burner fuel. No additional adjustments will be made for any other type of fuel.

Fuel cost adjustments resulting in an increased payment to the Contractor will be paid for under the planned force account item: Fuel Cost Adjustment. Fuel cost adjustments resulting in a decreased payment to the Contractor will be deducted from monies owed the Contractor.

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REVISION OF SECTION 109  
MEASUREMENT OF QUANTITIES

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01, delete the 17<sup>th</sup> paragraph and replace it with the following:

Vehicles used to haul material being paid for by weight shall bear a plainly legible identification mark. Each of these vehicles shall be weighed empty daily at times directed by the Engineer. The Contractor shall furnish to the Engineer, in writing, a vehicle identification sheet that lists the following for each delivery vehicle to be used on the project:

- (1) identification mark
- (2) vehicle length
- (3) tare weight
- (4) number of axles
- (5) the distance between extreme axles
- (6) information related to legal weight, including the Permit No. and permitted weight of each vehicle for which the State has issued an overweight permit.

This information shall be furnished prior to time of delivery of the material and at any subsequent time the Contractor changes vehicles, combination vehicles, axle length relationships, or overweight permitting of vehicles.

REVISION OF SECTION 109  
MEASUREMENT OF WATER

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01, delete the twenty-sixth paragraph and replace with the following:

Water may be measured either by volume or weight. Water meters shall be accurate within a range of  $\pm 3$  percent. When water is metered, the Contractor shall use an approved metering device and shall furnish the Engineer a certificate showing the meter has been accurately calibrated within the time allowed in the following schedule:

2 inch	4 years
4 inch to 6 inch	2 years
8 inch to 10 inch	1 year

REVISION OF SECTION 109  
PROMPT PAYMENT

Section 109 of the Standard Specifications is hereby revised as follows:

Delete subsection 109.06 (e) and replace with the following:

(e) *Prompt Payment.* The Contractor shall pay subcontractors and suppliers for all work which has been satisfactorily completed within seven calendar days after receiving payment for that work from the Department. For the purpose of this section only, work shall be considered satisfactorily complete when the Department has made payment for the work. The Contractor shall include in all subcontracts a provision that this requirement for prompt payment to subcontractors and suppliers must be included in all subcontracts at every tier. The Contractor shall ensure that all subcontractors and suppliers at every tier are promptly paid. If the Contractor or its subcontractors fail to comply with this provision, the Engineer will not authorize further progress payment for work performed directly by the Contractor or the noncompliant subcontractor until the required payments have been made. The Engineer will continue to authorize progress payments for work performed by compliant subcontractors.

Delete subsection 109.06 (g) and replace with the following:

(g) *Good Cause Exception.* If the Contractor has “good cause” to delay or withhold a subcontractor’s progress payment, the Contractor shall notify the subcontractor in writing within seven calendar days after receiving payment from the Department. The notification shall specify the amount being withheld and provide adequate justification for withholding the payment. The notice shall also clearly state what conditions the subcontractor must meet to receive payment. “Good cause” shall include but not be limited to the failure of the subcontractor to make timely submission of required paperwork.

Subsection 109.06 shall include the following:

(h) *Monthly Reporting.* For CDOT projects, by the 15th of each month, the Contractor shall record all payments to subcontractors by completing an audit in the B2GNow System. If the contractor has good cause for delay as described in subsection (g), the Contractor shall include the justification in its monthly audit. Once the prime enters a payment to a subcontractor or supplier, the subcontractor or supplier will receive a notice to confirm payment. The subcontractor or supplier shall have fifteen days from the notice to confirm payment or report an issue. If a subcontractor or supplier is also a payor, the subcontractor or supplier shall also report all prompt payment to its subcontractors. If the subcontractor or supplier does not report a prompt payment issue within fifteen days from the Contractor’s monthly reporting, the subcontractor waives CDOT’s assistance in resolving the prompt payment issue and the monthly audit will be closed. This provision should not be construed to limit the subcontractor’s contractual remedies.

October 29, 2015

REVISION OF SECTION 109  
SCALES

Section 109 of the Standard Specifications is hereby revised for this project as follows:

In subsection 109.01, delete the 11<sup>th</sup> paragraph and replace with the following:

Materials measured or proportioned by weight shall be weighed on accurate scales. Scales shall be accurate within the allowable tolerances as prescribed by State law. The scales shall be tested for accuracy by the Colorado Department of Agriculture or an approved Colorado Department of Agriculture vendor (<https://www.colorado.gov/pacific/aginspection/scale-companies>) as least once each year, each time the scales are relocated, and as often as the Engineer may deem necessary. Scales shall be furnished by the Contractor or the Contractor may utilize commercial scales.

November 10, 2016

REVISION OF SECTION 201  
CLEARING AND GRUBBING

Section 201 of the Standard Specifications is hereby revised for this project as follows:

In subsection 201.02, delete the third paragraph and replace with the following:

All surface objects, trees, stumps, roots, and other protruding obstructions not designated to remain shall be cleared and grubbed. In areas to be rounded at the tops of backslopes, stumps shall be removed to at least 2 feet below the surface of the final slope line.

In subsection 201.02, delete the ninth paragraph and replace with the following:

The Contractor shall clear and grub the areas within the excavation or embankment grading limits and shall include the removal from the ground of brush, roots, sod, grass, residue of agricultural crops, sawdust, and other vegetable matter. See subsection 208.04(e) for disturbed area limits.

REVISION OF SECTIONS 202, 627 AND 708  
PAVEMENT MARKING PAINT

Sections 202, 627 and 708 of the Standard Specifications are hereby revised for this project as follows:

In subsection 202.05, delete the third paragraph and replace with the following:

(a) *Removal of temporary pavement marking on final alignment.* Temporary pavement marking paint on the approved final alignment shall be removed completely from the roadway surface at locations of permanent pavement markings as shown on the plans. The ground location shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants prior to application of final pavement marking. The Contractor shall not remove more pavement marking paint than what can be replaced with permanent pavement marking during the same working day or working period. If an event occurs that precludes the contractor from completing the work during the placement of permanent marking, the Contractor shall halt the removal operation and raised flexible pavement markers shall be placed at locations that have been removed but not marked while the pavement is drying prior to the marking application. Marking application shall resume when pavement is dry and has had no moisture for a minimum of 24 hours. Raised flexible pavement markers shall be installed with one marker at 40-foot centers.

(b) *Removal of temporary pavement marking on transitions.* Removal of pavement marking paint on temporary transitional alignments shall be performed by grinding or water-blasting. The removal shall result in 100 percent removal of the paint and a wide swath of ground pavement surrounding the former location of the temporary paint. The width of the swath shall be as follows; the center of the swath shall be the location of the paint line:

Width of Pavement Marking to be removed	Width of Swath
≤ 8 inches	12 inches
> 8 inches	15 inches

Subsection 202.11 shall include the following:

Removal of temporary pavement marking on transitions will be measured as the actual square feet of the swath constructed for the required width. Removal of pavement marking for the permanent alignment will be measured as the actual number of square feet removed.

Subsection 202.12 shall include the following:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Removal of Pavement Marking	Square Foot
Removal of Pavement Marking (12 Inch)	Square Foot
Removal of Pavement Marking (15 Inch)	Square Foot

Raised pavement markings shall be at the Contractor's expense.

In subsection 627.04, delete the first paragraph and replace with the following:

**627.04 Pavement Marking with Low Temperature Acrylic Paint and High Build Acrylic Paint.**

Striping shall be applied when the air and pavement temperatures are no less than 45 °F for waterborne and high-build paint, and 35°F for low temperature waterborne paint on asphalt or portland cement concrete pavements. The pavement surface shall be dry and clean, and free of all latent materials, in

REVISION OF SECTIONS 202, 627 AND 708  
PAVEMENT MARKING PAINT

accordance with manufacturer recommendations. Weather conditions shall be conducive to satisfactory results.

Glass beads shall be applied into the paint by means of a low pressure, gravity drop bead applicator.

In subsection 627.04 delete the table and replace it with the following:

Description		Pavement Marking Paint	
		Low Temp	High Build
Alignment	Lateral Deviation	2.0 inch per 200 foot Max	
Coverage Rate	Sq. Ft. per Gallon	89-93	67-70
Thickness	Mil	17-18	23-24
Width	Inches	Per Plans +/- 0.25	Per Plans +/- 0.25
Dry Time	Minutes	5-10	7-12
Beads	Application Rate, lbs./gal	7-8	9-10

Subsection 627.13 shall include the following:

Pay Item	Pay Unit
Pavement Marking Paint (High Build)	Gallon
Pavement Marking Paint (Low Temperature)	Gallon

Delete subsection 708.05 and replace with the following:

**708.05 Pavement Marking Materials.** All pavement marking materials shall be selected from the Department's Approved Products List (APL). Prior to start of work, a Certificate of Compliance (COC) for all pavement marking materials shall be submitted in accordance with subsection 106.13.

(a) *Color.* The pavement marking paint, without drop-on beads, shall correspond following requirements:

White – Federal Standard No. 595B-17925. The Yellowness Index (YI) of white shall not exceed 8.0 per ASTM E-313-10 initially. The color after drying shall be a flat-white, free from tint, and shall provide the maximum amount of opacity and visibility under both daylight and artificial light.

Yellow – Materials for pavement markings shall meet the initial daytime chromaticity that fall within the box created by the following corner points:

Initial Daytime Chromaticity Coordinates (Corner Points)

	1	2	3	4
x	0.530	0.510	0.455	0.472
y	0.456	0.485	0.444	0.400

(b) *Low Temperature Acrylic Waterborne Paint.* Low Temperature Acrylic Waterborne Paint binder (nonvolatile portion of vehicle) shall be 100 percent XSR acrylic polymer, by weight, as determined by infrared analysis or other chemical analysis available to the Department.



REVISION OF SECTIONS 202, 627 AND 708  
PAVEMENT MARKING PAINT

(c) *High Build Acrylic Waterborne Paint.* High build acrylic waterborne paint binder (nonvolatile portion of vehicle) shall be 100 percent HD 21 acrylic cross linking polymer, by weight, as determined by infrared analysis or other chemical analysis available to the Department.

Low Temperature Acrylic Waterborne Paint, and High Build Acrylic Waterborne paint shall meet the following requirements:

**Performance Requirements:** The paint shall be water resistant and shall show no softening or blistering.

**Table 708-1**  
**LOW TEMPERATURE WATERBORNE AND HIGH BUILD ACRYLIC WATERBORNE PAINT**

Property	White	Yellow	Test Method
Nonvolatile portion of vehicle (white and yellow), %	43.0 (min)	43.0 (min)	ASTM D 2205
<b>Pigment Composition</b>			
Percent by weight♦	60.0	60.0	ASTM D 4451 ASTM D 3723
Paint			
Titanium Dioxide Content, lb./gal	1.0 (min)		ASTM D 5381
<b>Properties of the Finished Paint</b>			
Total Non-volatiles, (solids) % by weight	77.0 (min)	77.0 (min)	FTMS 141C - Method 4053.1, ASTM D 2369, or ASTM D 4758
Density, lbs./gal	14.0-14.6	13.7-14.3	ASTM D 2205
Consistency (Viscosity) White and Yellow, Krebs-Stormer Units	85-95	85-95	ASTM D 562
Freeze Thaw Stability	Shall complete 5 or more test cycles successfully		ASTM D 2243
Fineness of Grind, Cleanliness Rating B, minimum	3	3	ASTM D 1210
Scrub Resistance	800	800	ASTM D2486
Directional Reflectance: [15 mil Wet Film]	88 (min)	50 (min)	ASTM E 1347
Dry Opacity (Contrast Ratio): [5 mil Wet Film]	0.95 (min)	0.95 (min)	ASTM D 2805

REVISION OF SECTION 203  
EXCAVATION AND EMBANKMENT

Section 203 of the Standard Specifications is hereby deleted for this project and replaced with the following:

**DESCRIPTION**

**203.01 General.** This work consists of excavation, hauling, disposal, placement, and compaction of all material encountered within the limits of the work, including construction of dikes and the excavation for ditches and channels, necessary for the construction of the roadway in accordance with the Contract.

**MATERIALS**

**203.02 Definitions.** All excavation will be defined as, "unclassified excavation", "stripping", "removal of unsuitable material", "rock excavation", "borrow", or "potholing" as described below:

- (a) *Unclassified Excavation.* Unclassified Excavation shall consist of the excavation of all materials of whatever character required for the work, obtained within the right of way, including surface boulders and excavation for ditches and channels that is not removed under some other item.
- (b) *Stripping.* Stripping shall consist of removing overburden or other specified material from borrow pits, and the replacement of overburden or other specified material over the disturbed area of the site or pit after the underlying material has been removed.
- (c) *Removal of Unsuitable Material.* Removal of Unsuitable Material shall consist of the removal of soils or mixtures of soil and organic matter identified in the Contract or as directed by the Engineer that would be detrimental to the roadway or embankment if left in place in its existing condition.
- (d) *Rock Excavation.* Rock Excavation shall consist of igneous, metamorphic, and sedimentary rock which cannot be excavated without blasting or with the use of rippers, including all boulders or other detached stones having a volume of  $\frac{1}{2}$  cubic yard or more. Unless specified in the Contract, Rock Excavation is material that meets one of the following field test criteria to be conducted by the Contractor:
  - 1. Ripping Test: Material that cannot be broken down by one pass with a single tooth ripper mounted on a crawler type tractor in low gear with a minimum net flywheel power rating of 235 horsepower; or material that cannot be broken down with a 48000 pound tracked excavator utilizing a bucket with rock teeth.
  - 2. Seismic Test: Material that has a seismic velocity of 6,000 feet per second or greater. The Contractor shall submit the qualifications of the individual performing or interpreting the seismic testing to the Engineer a minimum of 14 days prior to testing. The ripping test will be used to resolve differences if seismic velocities fall below 6,000 feet per second.
  - 3. Handling Test: Any boulder or detached stone having a volume of  $\frac{1}{2}$ -cubic yard or more that cannot be readily broken down with the excavation equipment described above in 1.
- (e) *Borrow.* Borrow shall consist of approved material obtained from outside the right of way, required for the construction of the project.
- (f) *Potholing.* Potholing consists of exposing and verifying the location of existing utilities at locations as directed.

REVISION OF SECTION 203  
EXCAVATION AND EMBANKMENT

**203.03 Embankment Materials.** Embankment Material shall consist of approved material acquired from excavations or borrow pits, and hauled and placed in embankments. Approval of Embankment Material shall be contingent on the material meeting the Atterberg Limit and gradation requirements specified in the Contract. Approval of the embankment material in the upper 2 feet of embankment below the subgrade elevation is contingent on the material meeting one of the following as specified in the Contract:

- (1) the specified resistance value when tested by the Hveem Stabilometer, or equivalent resilient modulus
- (2) the specified Atterberg Limit and gradation requirements
- (3) the specified resistance value when tested by the Hveem Stabilometer, or equivalent resilient modulus, and the specified Atterberg Limit and gradation requirements

Non-durable bedrock shall be identified and classified using Colorado Procedure CP-L 3104. Any material that classifies as Soil-like Non-durable (S-N) as defined in the procedure shall be pulverized, broken down and processed to 6-inch maximum particle sizes before incorporation into embankment fill. These materials shall be placed and compacted as "Soil Embankment" in accordance with subsection 203.07 (a). Non-durable bedrock particles in excess of 6 inches shall not be placed into embankment fill.

If recycled concrete or asphalt are to be incorporated into embankment fill; the maximum dimension permitted for concrete is 24 inches and the maximum dimension permitted for asphalt is 12 inches.

Embankment Material imported onto the project will be tested for water soluble sulfates using CP-L 2103 Method B. The average of three consecutive tests shall show that the sulfate content is not greater than that corresponding to the sulfate exposure level specified in the Contract. No single test shall have a sulfate content more than 20 percent greater than that corresponding to the sulfate exposure level specified in the Contract. A single failing test shall have the remaining sample split into four equal portions. CDOT Region Lab shall receive one portion, the Contractor shall receive one portion and the remaining two portions shall go to the CDOT Central lab. The CDOT Region Lab, CDOT Central Lab and the Contractor's Lab shall retest the sample. If the results from the three Labs are within 10 percent of each other, the results will be averaged. The averaged result will be used for determining Contract compliance. If the results from the Labs are not within 10 percent of each other, the remaining split sample will be sent to an independent laboratory for testing using CP-L 2103. The independent laboratory will be mutually agreed upon by the Department and the Contractor. The Independent Lab's test result will be used for determining Contract compliance.

If the water soluble sulfate content is less than that corresponding to the sulfate exposure level specified in the Contract, CDOT will bear all costs associated with the independent lab test. If the soluble sulfate content is greater than that corresponding to the sulfate exposure level specified in the Contract, all costs associated with independent lab testing shall be at the Contractor's expense. Embankment represented by failing tests shall be removed from the project and replaced at the Contractor's expense.

Imported Material used for backfilling pipes (storm sewer, cross culverts, side drains, etc) shall be tested for compatibility with the selected pipe material. When Non-reinforced Concrete Pipe or Reinforced Concrete Pipe is used, the imported material shall be tested for sulfate and pH. When Corrugated Steel Pipe, Bituminous Coated Corrugated Steel Pipe or Pre-coated Corrugated Steel Pipe is used, the imported material shall be tested for sulfates, chlorides, pH and resistivity. When Aramid Fiber Bonded Corrugated Steel Pipe or Corrugated Aluminum Pipe is used, the imported material shall be tested for pH and resistivity. When Plastic pipe is selected, the imported material does not need to be tested for sulfates, chlorides, pH or resistivity.

Sulfates, chlorides, pH and resistivity shall be determined by the following procedures:

- (1) Water soluble sulfates using CP-L 2103 Method B
- (2) Chlorides using CPL 2104
- (3) Resistivity using ASTM G57
- (4) pH using ASTM G51

**REVISION OF SECTION 203  
EXCAVATION AND EMBANKMENT**

The average of three consecutive tests shall show the imported material's sulfate, chloride, pH and resistivity is not greater than the limits corresponding to the Pipe Class in Table 203-1 or 203-2 for the pipe class specified in the Contract. No single test shall have a result more than 20 percent greater than that corresponding to the limit in Table 203-1 or Table 203-2 for sulfates, chlorides and resistivity. No single test shall have a result more than 5 percent outside the limit in Table 203-1 for pH. The remaining sample material from a single failing test shall be split into three equal portions. CDOT shall receive one portion, the Contractor shall receive one portion and the remaining portion shall be retained by the Project. CDOT and the Contractor's Lab shall retest the failed sample; if the results from those tests are within 10 percent of each other, the results will be averaged. The averaged result will be used for Contract compliance. If the results from the Labs are not within 10 percent of each other, the remaining sample portion will be sent to an independent laboratory for testing using the testing requirements specified above. The independent laboratory will be mutually agreed upon by the Department and the Contractor. The Independent Lab's test result will be used for Contract compliance.

If the imported material's sulfates, chlorides, and resistivity are less than the limits and the pH is within the limits in Table 203-1 or 203-2, CDOT will bear all costs associated with the independent lab test. If the imported material's sulfates, chlorides, and resistivity is greater than the limits and the pH is outside the limits in Table 203-1 or 203-2, all costs associated with independent lab testing shall be at the Contractor's expense.

Embankment represented by failing tests shall be removed from the project and replaced at the Contractor's expense.

**Table 203-1  
SULFATE, CHLORIDE AND PH OF IMPORTED MATERIAL**

Pipe Class	SOIL		
	Sulfate	Chloride	
	(SO <sub>4</sub> )	(Cl)	pH
	% max	% max	
0, 7	0.05	0.05	6.0-8.5
1, 7	0.10	0.10	6.0-8.5
2, 8	0.20	0.20	6.0-8.5
3, 9	0.50	0.50	6.0-8.5
4, 9	1.00	1.00	5.0-9.0
5, 10	2.00	2.00	5.0-9.0
6, 10	>2.00	>2.00	<5 or >9

**Table 203-2  
RESISTIVITY AND PH OF IMPORTED MATERIAL**

SOIL SIDE	
Resistivity, R (Ohm – cm)	pH
≥1,500	5.0-9.0
≥250	3.0-12.0

REVISION OF SECTION 203  
EXCAVATION AND EMBANKMENT

Embankment Material shall be classified into one of the material groups listed below, and placed and compacted in accordance with the appropriate methods specified in subsection 203.07. If any material does not meet the criteria for one of the following classifications, it shall be processed on site to meet the requirements for one of the material groups listed below, or disposed of at the Contractor's expense.

(a) *Soil Embankment.* Soil Embankment shall have all particle sizes less than 6 inches. The material shall be classified in accordance with AASHTO M 145 and placed and compacted in accordance with subsection 203.07 (a).

(b) *Rock Embankment.* Rock Embankment shall meet all of the following requirements:

- (1) Contains 50 percent or more retained on the 4.75 mm (No. 4) sieve.
- (2) Contains > 30 percent retained on the 19.0 mm (¾-inch) sieve.
- (3) Classifies as an AASHTO A-1 soil type.
- (4) All particle sizes shall be less than 6 inches.
- (5) Particles retained on the 4.75mm (No. 4) sieve shall not be composed of non-durable bedrock types.

Rock Embankment can be placed without moisture density control as described in subsection 203.07 (b).

(c) *Rock Fill.* Rock Fill shall meet all of the following requirements:

- (1) A minimum of 50 percent of the material shall be retained on a 100 mm (4-inch) sieve.
- (2) Maximum dimension of any particle permitted is 36 inches.
- (3) Shall be well-graded by visual inspection.
- (4) Shall contain less than 20 percent by volume of material passing the 75 µm (No. 200) sieve based on visual inspection. This requirement shall be at the discretion of the Engineer.
- (5) Particles retained on the 4.75 mm (No. 4) sieve shall not be composed of non-durable bedrock types.

Rock Fill can be placed without moisture density control as described in subsection 203.07 (c).

### CONSTRUCTION REQUIREMENTS

**203.04 General.** The excavations and embankments shall be finished to smooth and uniform surfaces conforming to the typical sections specified. Variation from the subgrade plan elevations specified shall not be more than 0.08 foot. Where asphalt or concrete surfacing materials are to be placed directly on the subgrade, the subgrade plane shall not vary more than 0.04 foot. Materials shall not be wasted without written permission of the Engineer. Excavation operations shall be conducted so material outside of the slope limits will not be disturbed. Prior to beginning grading operations, all necessary clearing and grubbing in that area shall have been performed in accordance with Section 201.

The Contractor shall notify the Engineer not less than five working days prior to beginning excavation so the necessary cross sections may be taken. The Contractor shall not excavate beyond the dimensions and elevations established.

Archaeological and paleontological materials encountered during the work shall be dealt with in accordance with subsection 107.23.

All excavation activities in areas where asbestos is encountered or expected to be encountered shall conform to the Colorado Department of Public Health and Environment's Asbestos-Contaminated Soil Guidance Document or the State of Colorado's Asbestos Contaminated Soil Statewide Management Plan (ACS), whichever is more recent at the time of advertisement and in accordance with subsection 250.07(d) and the Air Quality Control Commission Regulation No. 8 Part B or Section 5.5 of the solid Waste Regulation 6 CCR 1007-2, as applicable.

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**203.05 Excavation.** Excavation shall be one or more of the following:

- (a) *Rock.* Unless otherwise specified, rock shall be excavated to a minimum depth of 0.5 foot and a maximum depth of 1 foot below subgrade, within the limits of the roadbed. Rock removed in excess of 1 foot below subgrade will not be paid for. Backfilling of the depth in excess of 1 foot below subgrade shall be at the Contractor's expense. Approved embankment material shall be used to bring the rock-excavated areas to subgrade elevations within the tolerances specified in subsection 203.04.

Undrained pockets shall not be left in the rock surface and depressions shall be drained at the Contractor's expense.

Any change to cut slopes by the Department will be made prior to the next drilling operations.

When required for rock excavation, controlled blasting shall be conducted in accordance with the Contract.

- (b) *Unclassified.* Excess or unsuitable excavated material, including rock and boulders, that cannot be used in embankments may be placed on the side slopes of the nearest fill as approved.

Unless otherwise specified by the Engineer, intercepting ditches shall be made above the top of cut slopes and carried to outlets near the ends of the cuts. In order to blend the intersection of cut slopes with the slope of the adjacent natural ground surfaces in a uniform manner, the tops of all cut slopes, except those in solid rock, shall be flattened and rounded in accordance with typical sections and details specified. Earth overburden lying above solid rock cuts shall be treated in the same manner as earth cuts.

The Department reserves the right to change cut slopes during the progress of excavation.

- (c) *Unsuitable Material.* Unsuitable materials encountered in the subgrade that are determined to be detrimental to the roadway or embankment shall be removed to the depth and extents as directed by the Engineer. The excavated area shall be backfilled to the finished graded section with approved material. Materials that contain organics or that cannot be dried or moisture conditioned, then compacted to the required density will be disposed of and cannot be reused as embankment fill. Materials not containing organics and that can be dried or moisture conditioned and compacted to the required density can be reused as embankment fill as approved by the Engineer.
- (d) *Borrow.* If the Contractor places more borrow than is specified or approved and causes a waste of roadway excavation, the quantity of waste will be deducted from the borrow volume. All borrow areas shall be bladed and shaped to permit accurate measurements after excavation is completed. The finished borrow areas shall be graded to a smooth and uniform surface and shall be finished so water will not collect or stand therein, unless otherwise specified.
- (e) *Stripping.* Overburden shall be removed to the depth required for the production of acceptable material, and at least 5 feet beyond the working limits of the area being excavated.
- (f) *Potholing.* All necessary potholing as determined by the Contractor and agreed to by the Engineer shall be completed under this item with appropriate equipment as approved.

The Contractor shall acquire necessary permits, locate utilities, excavate all materials of whatever character required to expose the utilities, survey the location of the utilities, and backfill the excavation to existing grade lines with the excavated or other approved materials. Backfilling shall be accomplished in accordance with subsection 206.03.

The Contractor shall use extreme caution during this work. All damage to existing utility lines or adjacent facilities shall be repaired promptly at the Contractor's expense.

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**203.06 General Embankment Construction Requirements.** When Contractor Process Control is required, the Contractor's Process Control Representative shall be certified for WAQTC Embankment and Base Testing and CDOT's Excavation, Embankment, and Soil Inspection certification course.

Embankment construction shall include preparation of the areas upon which embankments are to be placed, construction of dikes, placing and compacting of approved material within roadway areas including holes, pits, and other depressions within the roadway area. Only approved materials shall be used in the construction of embankments and fills.

All sod, vegetable and other organic matter, stumps, and roots shall be removed from the surface upon which the embankment is to be placed in accordance with Section 201. Unless a thickness is otherwise specified in the Contract, the upper 4 inches of the ground surface will be considered top soil and shall be removed in accordance with Section 207 prior to placement of Embankment Fill.

The cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches or as specified in the Contract, the moisture content increased or reduced as necessary, and compacted to the specified embankment density for the material type present.

When embankment is placed on a slope that is steeper than 4H:1V, as measured in the steepest direction, the existing slope shall be benched as the embankment is placed in layers. A 2-foot deep key shall be excavated at the base of the existing slope and backfilled with approved and compacted material. The embankment shall be placed in layers from that key. Each horizontal cut shall begin at the intersection of the original ground and the vertical sides of the previous bench. Excavated material from benching may be placed and compacted with the embankment material at the Contractor's expense.

During the course of construction, embankment side slopes shall be built a minimum of 12 inches beyond the final grade indicated in the Contract to allow for compaction equipment to compact the outer edges of the embankment. Once the specified level of compaction is achieved, the side slopes shall be trimmed back to final grade. Excess material placement and removal to satisfy this requirement shall be at the Contractor's expense.

If embankment can be placed on only one side of structures such as retaining walls, abutments, wing walls, piers, or culvert headwalls, compaction shall be accomplished without initiating movement or deformation of the structure and without placing excessive pressure against the structure. When noted in the Contract, the fill adjacent to the abutment of a bridge shall not be placed higher than the bottom of the backwall until the superstructure is in place. When embankment is placed on both sides of a concrete wall or box type structure, the embankment shall be brought up equally on both sides of the structure.

Where embankment is to be placed and compacted and end dumping is permitted, the slopes of the original ground or embankment shall be deeply plowed or scarified before starting end dumping.

Embankment fill other than A-1 soil types shall not be placed within standing water, unless otherwise noted in the Contract. During the construction of the embankment, the top surface shall be maintained so that it is well drained at all times.

Frozen materials shall not be used in construction of embankments. Frozen material will be identified by the visual observation of ice crystals within the foundation or embankment material, or by measuring the surface temperature of the ground surface.

**203.07 Embankment Placement and Compaction Requirements.** Materials incorporated into embankment fill shall be placed and compacted according to the following requirements:

- (a) *Soil Embankment.* All Soil Embankment shall be placed in horizontal layers not to exceed 8 inches in loose lift thickness. Each layer shall be compacted prior to the placement of subsequent layers. Spreading equipment shall be used to obtain uniform thickness prior to compaction. As the compaction progresses, continuous mixing, leveling, and manipulating shall be done to assure uniform moisture and density. Additional work involved in drying Soil Embankment to the required moisture content shall be included in the contract price paid for excavating or furnishing the material with no additional

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compensation.

Soil Embankment that classifies as A-1 material can be used to bridge across standing water or swampy ground within the embankment foundation, and can be placed in lift thicknesses greater than 8 inches if used for this purpose as approved by the Engineer.

Soil Embankment with less than or equal to 30 percent retained on the 19mm (¾-inch) sieve shall be tested for compaction using CP 80. Materials that classify as AASHTO A-1, A-2-4, A-2-5, and A-3 soils shall be compacted at  $\pm 2$  percent of Optimum Moisture Content (OMC) and to at least 95 percent of maximum dry density determined in accordance with AASHTO T 180 as modified by CP 23. All other soil types will be compacted to 95 percent of the maximum dry density determined in accordance with AASHTO T 99 as modified by CP 23. Soils with 35 percent fines or less shall be compacted at  $\pm 2$  percent of OMC. Soils with greater than 35 percent fines shall be compacted at a moisture content equal to or above OMC to achieve stability of the compacted lift. Stability is defined as the absence of rutting or pumping as observed and documented by the Contractor's Process Control Representative and as approved by the Engineer. If the soils cannot be compacted and prove to be unstable at a moisture content equal to or above OMC, then the required moisture content for compaction can be reduced below OMC as approved by the Engineer.

Prior to placing any Soil Embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve, the Contractor will be required to construct a test strip to the dimensions specified in the Contract or as directed by the Engineer. The test strip can be incorporated into the final embankment. The Contractor will be responsible for determining the moisture conditioning necessary to achieve compaction, and will determine the equipment and number of passes necessary to achieve adequate compaction. The Contractor is required to use compression-type or vibratory rollers on granular materials and sheepfoot rollers on cohesive soils. Adequate compaction will be demonstrated by the absence of rutting, pumping, or deflection following a proof roll of the test strip using any piece of construction equipment that exerts a minimum 18-kip per axle load. The proof roll will be observed and accepted by the Engineer. Once the test strip passes a proof roll, the Contractor can resume embankment construction with the same moisture conditioning and compaction methods as the test strip was constructed.

Placement, moisture conditioning, and compaction of every lift of soil embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve will be observed by the Contractor's Process Control Representative, and accepted by the Engineer. Adequate compaction of each lift will be demonstrated as the absence of rutting, pumping, or deflection as construction equipment is routed over a lift following the compactive efforts that were used and accepted for the respective test strip. The Engineer may request a proof roll at any time to document the condition of a lift.

Significant changes in the material being hauled for soil embankment with greater than 30 percent retained on the 19 mm (¾-inch) sieve will require construction of a new test strip, and demonstration of adequate compaction methods using a proof roll. The Contractor's Process Control representative shall be authorized to require additional test strips at their discretion. However, the requirement for an additional test strip shall not be waived without the written approval of the Engineer.

Non-durable bedrock shall be watered to promote slaking and break down, and pulverized/processed to a maximum particle size of 6 inches. These materials shall be placed and compacted as Soil Embankment; except they shall be compacted with a heavy tamping foot roller, weighing at least 30 tons. Each tamping foot shall protrude from the drum a minimum of 4 inches. Each embankment layer shall receive a minimum of four passes with the tamping foot roller. The roller shall be operated at a uniform speed not exceeding 3 miles per hour. No additional compensation will be made for additional roller passes to achieve specified density requirements.

Non-durable Bedrock shall not be used to bridge over standing water or swampy ground within an embankment foundation. Non-durable bedrock shall also not be placed within 2 feet of the final subgrade elevation.



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- (b) *Rock Embankment and Rock Fill.* Rock Embankment shall be placed in horizontal layers not to exceed 8 inches in loose lift thickness. The lift thickness can be increased when bridging over standing water or swampy ground in the embankment foundation as directed by the Engineer. Each layer shall be compacted prior to the placement of subsequent layers. Spreading equipment shall be used to obtain uniform thickness prior to compaction.

Rock Fill shall be placed in horizontal layers not to exceed a loose lift thickness equivalent to the average particle size up to a maximum permitted lift thickness of 18 inches. Particles with a maximum dimension of 36 inches are permitted; however, rocks larger than the lift thickness shall be separated enough to allow compaction equipment to operate in between. Material shall be placed to fill in voids between larger stones with finer particle sizes and to avoid nesting. Spreading equipment shall be used to obtain uniform thickness prior to compaction. If the use of leveling equipment is not practical, the Engineer may permit rock fill material to be cast or end dumped. In such cases sufficient hand or machine work will be required to construct a compact, stable fill and to finish the slopes to a neat and smooth appearance. Rock Fill shall not be placed within 2 feet of the final subgrade elevation. When a Rock Fill is placed over any structure, the structure shall be covered with a minimum of 2 feet of compacted Soil or Rock Embankment material before the Rock Fill is placed.

The Contractor will be responsible for determining the moisture conditioning necessary to achieve compaction for Rock Embankment or Rock Fill. Vibratory or compression-type rollers will be used to compact these materials. At a minimum, compression-type rollers weighing 20 tons shall complete 4 passes over the entire width of a lift at a speed not to exceed 3 miles per hour. Vibratory rollers shall exert a minimum dynamic force of 30,000 pounds of impact per vibration, and achieve a minimum 1,000 vibrations per minute. Vibratory rollers shall complete a minimum of 4 passes over the entire width of a lift at a speed not to exceed 1.5 miles per hour.

Prior to placing Rock Embankment or Rock Fill, the Contractor will be required to construct a test strip to the dimensions specified in the Contract, or as directed by the Engineer. The test strip can be incorporated into the final embankment. Adequate compaction of the Rock Embankment or Rock Fill test strip will be demonstrated by the absence of rutting, pumping, or deflection following a proof roll of the test strip using any piece of construction equipment that exerts a minimum 18-kip per axle load. The proof roll will be observed and accepted by the Engineer. Once the test strip passes a proof roll, the Contractor can resume Rock Embankment or Rock Fill construction with the same moisture conditioning and compaction methods as the test strip was constructed. Placement, moisture conditioning, and compaction of every lift of Rock Embankment and Rock Fill will be observed by the Contractor's Process Control Representative, and accepted by the Engineer. Adequate compaction of each lift will be demonstrated as the absence of rutting, pumping, or deflection as construction equipment is routed over a lift following the compactive efforts that were used and accepted for the respective test strip. The Engineer may request a proof roll at any time to document the condition of a lift.

Significant changes in the characteristics of material being hauled for Rock Embankment or Rock Fill will require construction of a new test strip, and demonstration of adequate compaction methods using a proof roll. The Contractor's Process Control representative shall be authorized to require additional test strips at their discretion. However, the requirement for an additional test strip shall not be waived without the written approval of the Engineer.

If the Contractor wishes to deviate from the minimum equipment and compactive efforts specified above for Rock Embankment or Rock Fill, the Contractor must first demonstrate the adequacy of their proposed methods with a test strip and passing proof roll. In addition, a proof roll will be required for every lift placed for the first 2,000 cubic yards of Rock Embankment or Rock Fill placed. The proof rolls used to demonstrate adequate compaction of the first 2,000 cubic yards placed will not be measured and paid separately, but will be performed at the Contractor's expense.

Recycled concrete and asphalt can be incorporated into embankment material, and shall be processed, placed, and compacted in accordance with 203.07 (a) or (b); depending on the overall classification of the embankment material once the recycled material is incorporated. Rebar shall not extend more than one inch beyond the edges of recycled concrete particles. Recycled concrete or asphalt shall not be

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permitted in the upper 2 feet of the final subgrade elevation or within 2 feet of the final finished side slopes unless otherwise noted in the Contract.

**203.08 Proof Rolling.** Proof rolling with pneumatic tire equipment shall be performed using a minimum axle load of 18 kips per axle. A weigh ticket from an approved scale shall be furnished by the Contractor to substantiate this weight.

The subgrade shall be proof rolled after the required compaction has been obtained and the subgrade has been shaped to the required cross section.

The proof roller shall be operated in a systematic manner so that a record may be readily kept of the area tested and the working time required for the testing. Areas that are observed to have soft spots in the subgrade, where deflection is not uniform or is excessive as determined by the Engineer, shall be ripped, scarified, dried or wetted as necessary and recompacted to the requirements for density and moisture at the Contractor's expense. After recompaction, these areas shall be proof rolled again and all failures again corrected at the Contractor's expense.

Upon approval of the proof rolling, the sub base, base course, or initial pavement course shall be placed within 48 hours. If the Contractor fails to place the sub base, base course, or initial pavement course within 48 hours or the condition of the subgrade changes due to weather or other conditions, proof rolling and correction shall be performed again at the Contractor's expense.

**203.09 Blading.** Blading shall consist of furnishing motor graders of the specified horsepower rating, with operators, for shaping roadway, shoulders, or other areas as designated by the Engineer.

When scarifying is specified the motor grader shall be equipped with an independently operated "V" type scarifier and attachments.

**203.10 Dozing.** Dozing shall consist of furnishing crawler-type tractors of the specified horsepower rating, complete with operators and bulldozer blades. Rippers, if specified, will not be measured and paid for separately, but shall be included in the work.

#### METHOD OF MEASUREMENT

**203.11** Items paid for by volume will be the quantities designated in the Contract. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies in the Contract in an amount of at least plus or minus two percent of the plan quantity.

(a) *Excavation.* The original cross-sections will be used for determination of volumes of excavated material removed, unless changes have been directed. These measurements will include authorized excavation of rock, shale, or other unsuitable material. All accepted stripping will be measured in stockpiled locations by cross-sectioning.

When the excavation conforms to the staked lines and grades, the original cross-sections and the staked sections shall be used for the determination of volumes excavated. Volumes will be computed from the cross-sections by the average end area or other acceptable method.

When topsoil or wetland topsoil is included as an additional pay item and is specified, the measured volume of excavation will be reduced by the volume of topsoil or wetland topsoil removed from the area shown as excavation in the Contract.

Measurements will include over-breakage in rock excavation from the back slopes to an amount not to exceed, in any half station of 50 feet, 10 percent of the actual quantity required for that half station.

Costs associated with ripping tests or seismic tests to evaluate if a material meets the criteria for "Rock

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Excavation" shall not be measured or payed separately, but shall be incurred by the Contractor and included in the cost for excavation.

- (b) *Embankment.* If provided in the Contract, embankment material will be measured in its final compacted position in the roadway. Measurement will be made upward from the original ground line without any allowance for subsidence due to compaction of the base under the embankment. The original cross-sections will be used for determination of volumes of embankment material placed, unless changes have been directed.

The measured volume of embankment material will be increased by the volume of topsoil or wetland topsoil removed from the area below the original ground line and under the embankment

- (c) *Rock Fill.* Rock fill will be measured as the volume in cubic yards in its final position, unless otherwise specified, and shall be limited to the elevations specified.
- (d) *Blading and Dozing.* The quantity measured under blading and dozing will be the number of hours that each motor grader or bulldozer is actually used as ordered. A minimum of four hours for any half shift or part thereof will be paid for unless the equipment is inoperative due to breakdown or other causes determined to be the Contractor's responsibility. Time involved in moving onto or off the project will not be measured and paid for.

Time will be paid for moving motor graders or bulldozers from one location on the project to another, if directed; but time will not be allowed for moves which are made for the convenience of the Contractor.

Payment for a minimum of four hours will not be allowed in cases where the motor grader, bulldozer, or operator is assigned to work on other pay items connected with the project.

- (e) *Potholing.* Potholing will be measured by the total number of hours that excavation and backfilling equipment is actually used as directed. All other related work, including removal of existing pavement, backfilling, shoring, and labor will not be measured and paid for separately, but shall be included in the work.
- (f) *Proof Rolling.* Proof rolling will be measured by the actual number of hours that the pneumatic equipment is used as a proof roller.

The time to be measured under this item will be the number of hours that each piece of equipment is actually used as ordered.

Proof rolling will be measured and paid for only once for each test strip required during construction; for final verification of subgrade prior to placement of subbase, base coarse, or pavement; or for each incident where the Engineer directs it through the course of construction. Additional proof rolling that is required due to failure of embankment fill; due to the Contractor's failure to place sub base, base course, or initial pavement course within 48 hours of the initial proof roll; or due to the condition of the subgrade changing due to weather; or additional proof rolls deemed necessary due to the Contractor's choice to deviate from minimum equipment and compaction efforts specified herein, shall be at the Contractor's expense.

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**BASIS OF PAYMENT**

**203.12** The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Rock Excavation	Cubic Yard
Rock Fill	Cubic Yard
Unclassified Excavation	Cubic Yard
Unclassified Excavation (Complete in Place)	Cubic Yard
Unsuitable Materials	Cubic Yard
Borrow	Cubic Yard
Borrow (Complete in Place)	Cubic Yard
Embankment Material (Complete in Place)	Cubic Yard
Stripping	Cubic Yard
Blading	Hour
Dozing	Hour
Potholing	Hour
Proof Rolling	Hour

Water will not be measured and paid for separately but shall be included in the work.

Compaction will not be measured and paid for separately, but shall be included in the work.

Payment for replacement of Unsuitable Material shall be as follows: If excavated material can be re-used as embankment fill by moisture conditioning and compaction, replacement shall be included in the cost for Removal of Unsuitable Material. If the material cannot be re-used as embankment fill, payment for replacement of Unsuitable Material shall be for the volume that is placed in the excavated area at the respective unit price for the material that is approved by the Engineer and used.

Payment for Unclassified Excavation (Complete in Place), Embankment Material (Complete in Place), and Borrow (Complete in Place) shall be full compensation for all work necessary to complete the item including construction of embankments, rework of existing materials to satisfy benching requirements, unclassified excavation, borrow, compaction, compaction of bases of cuts and fills, all work in available materials pits, and disposal of excess excavated material.

All costs associated with reducing the size of the claystone particles, removing the oversized particles, and disposal of the oversized particles will not be paid for separately but shall be included in the work.

Pavement replacement if required due to potholing, shall be accomplished, measured, and paid for in accordance with appropriate sections of the specifications.

Pneumatic tire equipment and load required to achieve the desired weight of proof rolling equipment will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTIONS 206, 304 AND 613  
COMPACTION

Sections 206, 304 and 613 of Standard Specifications are hereby revised for this project as follows:

In subsection 206.03, delete the fourth and fifth paragraphs and replace with the following:

Backfill shall consist of approved materials uniformly distributed in layers brought up equally on all sides of the structure. Each layer of backfill shall not exceed 6 inches and shall be compacted to the required density before successive layers are placed. Structure backfill (Class 1) shall be compacted to a density of not less than 95 percent of maximum dry density determined in accordance with AASHTO T 180 as modified by CP 23. Backfill shall be compacted at  $\pm 2$  percent of Optimum Moisture Content (OMC).

Structure backfill (Class 2) shall be compacted to a density of not less than 95 percent of maximum dry density. The maximum dry density and OMC for A-1, A-2-4, A-2-5 and A-3 materials will be determined in accordance with AASHTO T 180 as modified by CP 23. The maximum dry density and OMC for all other materials will be determined in accordance with AASHTO T 99 as modified by CP 23. Materials shall be compacted at  $\pm 2$  percent of Optimum Moisture Content (OMC). Materials having greater than 35 percent passing the 75  $\mu\text{m}$  (No. 200) sieve shall be compacted at 0 to 3 percent above OMC.

In subsection 304.06, delete the first paragraph and replace with the following:

**304.06 Shaping and Compaction.** Compaction of each layer shall continue until a density of not less than 95 percent of the maximum density determined in accordance with AASHTO T 180 as modified by CP 23 has been achieved. The moisture content shall be at  $\pm 2$  percent of optimum moisture content. The surface of each layer shall be maintained during the compaction operations so that a uniform texture is produced and the aggregates are firmly keyed. Moisture conditioning shall be performed uniformly during compaction.

In subsection 613.07, delete the 15<sup>th</sup> paragraph and replace with the following:

Trenching shall be backfilled and compacted as follows: Backfill shall be deposited in uniform layers. The thickness of each layer shall be 6 inches or less thick prior to compaction. The space under the conduit shall be completely filled. The remainder of the trench and excavation shall be backfilled to the finished grade. The backfill material shall be compacted to the density of not less than 95 percent of maximum dry density. The maximum dry density and optimum moisture content (OMC) for A-1, A-2-4, A-2-5 and A-3 materials will be determined in accordance with AASHTO T 180 as modified by CP 23. The maximum dry density and OMC for all other materials will be determined in accordance with AASHTO T 99 as modified by CP 23. Materials shall be compacted at  $\pm 2$  percent of Optimum Moisture Content (OMC). Materials having greater than 35 percent passing the 75  $\mu\text{m}$  (No. 200) sieve shall be compacted at 0 to 3 percent above OMC. Each layer shall be mechanically compacted by tamping with power tools approved by the Engineer. Compaction methods or equipment that damage the conduit shall not be used.

REVISION OF SECTIONS 206 AND 601  
MATURITY METER AND CONCRETE  
FORM AND FALSEWORK REMOVAL

Sections 206 and 601 of the Standard Specifications are hereby revised for this project as follows:

In subsection 206.03, delete the ninth paragraph and replace with the following:

Backfill material shall not be deposited against newly constructed masonry or concrete structures, until the concrete has developed a compressive strength of  $0.8 f'_c$ , except in cases where the structures support lateral earth pressure. Concrete compressive strength for structures supporting lateral earth pressure shall conform to subsection 601.12 (o). Concrete compressive strength shall be determined by maturity meters.

In subsection 601.09, delete (h) and replace with the following:

(h) *Removal of Forms*. The forms for any portion of the structure shall not be removed until the concrete is strong enough to withstand damage when the forms are removed.

Unless specified in the plans, forms shall remain in place for members that resist dead load bending until concrete has reached a compressive strength of at least 80 percent of the required 28 day strength,  $0.80f'_c$ . Forms for columns shall remain in place until concrete has reached a compressive strength of at least 1,000 psi. Forms for sides of beams, walls or other members that do not resist dead load bending shall remain in place until concrete has reached a compressive strength of at least 500 psi.

Forms and supports for cast-in-place concrete box culverts (CBCs) shall not be removed until the concrete compressive strength exceeds  $0.6 f'_c$  for CBCs with spans up to and including 12 feet, and  $0.67 f'_c$  for CBCs with spans exceeding 12 feet but not larger than 20 feet. Forms for CBCs with spans larger than 20 feet shall not be removed until after all concrete has been placed in all spans and has attained a compressive strength of at least  $0.80f'_c$ .

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location where maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meter and wire. . At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the forms can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove forms.

When field operations are controlled by maturity meters, the removal of forms, supports and housing, and the discontinuance of heating and curing may begin when the concrete is found to have the required compressive strength.

Forms for median barrier, railing or curbs, may be removed at the convenience of the Contractor after the concrete has hardened.

All forms shall be removed except permanent steel bridge deck forms and forms used to support hollow abutments or hollow piers when no permanent access is available into the cells. When permanent access is provided into box girders, all interior forms and loose material shall be removed, and the inside of box girders shall be cleaned.

REVISION OF SECTIONS 206 AND 601  
MATURITY METER AND CONCRETE  
FORM AND FALSEWORK REMOVAL

In subsection 601.11, delete (e) and replace with the following:

- (e) *Falsework Removal.* Unless specified in the plans or specifications, falsework shall remain in place until concrete has attained a minimum compressive strength of 0.80f'c.

Falsework supporting any span of a simple span bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has attained a compressive strength of at least 0.80f'c.

Falsework supporting any span of a continuous or rigid frame bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has been placed in all spans and has attained the compressive strength of at least 0.80f'c.

Falsework for arch bridges shall be removed uniformly and gradually, beginning at the crown, to permit the arch to take its load slowly and evenly.

Falsework supporting overhangs and deck slabs between girders shall not be released until the deck concrete has attained a compressive strength of at least 0.80f'c.

Falsework for pier caps which will support steel or precast concrete girders shall not be released until the concrete has attained a compressive strength of at least 0.80f'c. Girders shall not be erected onto such pier caps until the concrete in the cap has attained the compressive strength of at least 0.80f'c.

Falsework for cast-in-place prestressed portions of structures shall not be released until after the pre-stressing steel has been tensioned.

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location that maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meters and wires. At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the falsework can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove falsework.

Subsection 601.12 (l) shall include the following after the first paragraph:

Concrete compressive strength shall be determined by maturity meters.

Subsection 601.12 shall include the following:

- (o) *Backfilling Structures that Support Lateral Earth Pressure.* Concrete compressive strengths shall reach f'c before backfilling operations can begin with heavy equipment, such as skid-steers or self-powered riding compactors. Concrete compressive strengths shall reach 0.8 f'c before backfilling operations can begin with hand operated equipment. Concrete compressive strength shall be determined by maturity meters.

REVISION OF SECTIONS 206 AND 601  
MATURITY METER AND CONCRETE  
FORM AND FALSEWORK REMOVAL

Delete subsections 601.13 (2) and 601.13 (3) and replace with the following:

- (2) The minimum curing period shall be from the time the concrete has been placed until the concrete has met a compressive strength of 80 percent of the required field compressive strength. The Contractor shall develop a maturity relationship for the concrete mix design in accordance with CP 69. The Contractor shall provide the maturity meter and all necessary thermocouples, thermometers, wires and connectors. The Contractor shall place, protect and maintain the maturity meters and associated equipment. Locations where the maturity meters are placed shall be protected in the same manner as the rest of the structure.

Subsection 601.17 shall include the following:

- (f) *Maturity Meter Strength.* When maturity meters are specified for determining strength for removing forms, removing false work, backfilling against structures or loading the structure, the Contractor shall provide the Engineer a report of maturity relationships in accordance with CP 69 prior to placement of concrete.

If a maturity meter fails, is tampered with, is destroyed or was not placed, the following shall apply:

The minimum curing time or waiting time for removing forms, removing false work, backfilling against structures or loading the structure shall be 28 days.

The Contractor may choose at his own expense to core the structure represented by the maturity meter. Cores will be obtained and tested according to CP 65. Cores will be a minimum of 4 inches in diameter. A minimum of three cores in a two square foot area will be obtained. If the compressive strength of any one core differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two cores. If the compressive strength of more than one core differs from the average by more than 10 percent the average strength will be determined using all three compressive strengths of the cores. The average compressive strength of the cores shall be achieve the specified compressive strength of the structure. A structure may only be cored once.



REVISION OF SECTION 208  
EROSION CONTROL

Section 208 is hereby deleted from the Standard Specifications for this project and replaced with the following:

**DESCRIPTION**

**208.01** This work consists of constructing, installing, maintaining, and removing when required, Best Management Practices (BMPs) during the life of the Contract to prevent or minimize erosion, sedimentation, and pollution of any State waters as defined in subsection 107.25, including wetlands.

The Contractor shall coordinate the construction of temporary BMPs with the construction of permanent BMPs to assure economical, effective, and continuous erosion and sediment control throughout the construction period.

When a provision of Section 208 or an order by the Engineer requires that an action be immediate or taken immediately, it shall be understood that the Contractor shall at once begin effecting completion of the action and pursue it to completion in a manner acceptable to the Engineer, and in accordance with the Colorado Discharge Permit System Stormwater Construction Permit (CDPS-SCP) requirements.

**MATERIALS**

**208.02** Erosion control materials are subject to acceptance in accordance with subsection 106.01. Erosion control materials shall be subject to the following approval process:

Material	Approval Process	Notes:
Erosion Bales (Weed Free)	COC	The Contractor shall provide a transit certificate number or a copy of the transit certificate as supplied from the producer.
Silt Fence	COC	
Silt Berm	APL	
Erosion Log (Type 1 and 2)	COC	
Silt Dikes	COC	
Pre-fabricated Concrete Washout Structures (above ground)	APL	
Pre-fabricated Vehicle Tracking Pad	APL	
Aggregate Bag	COC	
Storm Drain Inlet Protection (Type I, II and III)	APL	

The material for BMPs shall conform to the following:

- (a) *Erosion Bales.* Material for erosion bales shall consist of Certified Weed Free hay or straw. The hay or straw shall be certified under the Colorado Department of Agriculture Weed Free Forage Certification Program and inspected as regulated by the Weed Free Forage Act, Title 35, Article 27.5, CRS. Each certified weed free erosion bale shall be identified by blue and orange twine binding the bales.

The Contractor shall not place certified weed free erosion bales or remove their identifying twine until the Engineer has inspected and accepted them.

The Contractor may obtain a current list of Colorado Weed Free Forage Crop Producers who have completed certification by contacting the Colorado Department of Agriculture, Weed Free Forage Program, 305 Interlocken Pkwy, Broomfield, CO 80021, Contact: Weed Free Forage Coordinator at (303) 869-9038. Also available at [www.colorado.gov/ag/csd](http://www.colorado.gov/ag/csd).

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 REVISION OF SECTION 208  
 EROSION CONTROL

Bales shall be approximately 5 cubic feet of material and weigh at least 35 pounds. Stakes shall be wood and shall be 2 inch by 2 inch nominal.

- (b) *Silt Fence*. Silt fence posts shall be wood with a minimum length of 42 inches. Wood posts shall be 1.5 inch by 1.5 inch nominal. Geotextile shall be attached to wood posts with three or more staples per post.

Silt fence geotextile shall conform to the following requirements:

**Physical Requirements for Silt Fence Geotextiles**

Property	Wire Fence Supported Requirements	Self-Supported Requirements Geotextile Elongation <50%	Test Method
Grab Strength, lbs	90 minimum	124 minimum	ASTM D 4632
Permittivity sec-1	0.05	0.05	ASTM D 4491
Ultraviolet Stability	Minimum 70% Strength Retained	Minimum 70% Strength Retained	ASTM D 4355

Silt Fence (Reinforced). Silt fence posts shall be metal "studded tee" T-post with a minimum length of 66 inches. Metal posts shall be "studded tee" with .095 inch minimum wall thickness. Wire fabric reinforcement for the silt fence geotextile shall be a minimum of 14 gauge, with a maximum mesh spacing of 6 inches. Geotextile shall be attached to welded wire fabric with ties or nylon cable ties 12 inch O.C. at top, mid and bottom wire. Welded wire fabric shall be attached to the post with a minimum three 12 gauge wire ties per post. Vinyl or rubber safety caps shall be installed on all T-post.

- (c) *Temporary Berms*. Temporary berms shall be constructed of compacted soil.
- (d) *Temporary Slope Drains*. Temporary slope drains shall consist of fiber mats, plastic sheets, stone, concrete or asphalt gutters, half round pipe, metal or plastic pipe, wood flume, flexible rubber or other materials suitable to carry accumulated water down the slopes. Outlet protection riprap shall conform to section 506. Erosion control geotextile shall be a minimum Class 2, conforming to subsection 712.08.
- (e) *Silt Berm*. Silt berm shall consist of an ultraviolet (UV) stabilized high-density polyethylene, shall be triangular in shape, and shall have the following dimensions:

Width	6 - 11 inches
Height	6 - 10 inches
Weight	0.3 - 1.4 lbs./sq. ft.
Percent Open Area	30 – 50%

Securing spikes shall be 10 to 12 inch x 0.375 inch diameter (minimum).

- (f) *Rock Check Dam*. Rock Check dams shall be constructed of stone. Stone shall meet the requirements of Section 506.
- (g) *Sediment Trap*. In constructing an excavated Sediment Trap, excavated soil may be used to construct the dam embankment, provided the soil meets the requirements of subsection 203.03. Outlet protection riprap shall be the size specified in the Contract and shall conform to Section 506. Erosion control geotextile shall be a minimum Class 1, conforming to subsection 712.08.

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(h) *Erosion log.* Shall be one of the following types unless otherwise shown on the plans:

- (1) Erosion Log (Type 1) shall be curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log. The casing shall be seamless, photo-degradable tube netting and shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log called for on the plans. The curled aspen wood excelsior shall be fungus free, resin free, and free of growth or germination inhibiting substances.
- (2) Erosion Log (Type 2) shall consist of a blend of 30-40 percent weed free compost and 60-70 percent wood chips. The compost/wood blend material shall pass a 50 mm (2 inch) sieve with a minimum of 70 percent retained on the 9.5 mm (3/8 inch) sieve and comply to subsection 212.02 for the remaining compost physical properties. The compost/wood chip blend may be pneumatically shot into a geotextile cylindrical bag or be pre-manufactured. The geotextile bag shall consist of material with openings of 1/8 to 3/8 inches of HDPE or polypropylene mesh (knitted, not extruded), and contain the compost/wood chip material while not limiting water infiltration.

Erosion log (Type 1 and Type 2) shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log.

**Table 208-1  
NOMINAL DIMENSIONS OF EROSION LOGS**

Diameter Type 1 (Inches)	Diameter Type 2 (Inches)	Length (feet)		Weight (minimum) (pounds/foot)	Stake Dimensions (Inches)
		Min.	Max.		
9	8	10	180	1.6	1.5 by 1.5 (nominal) by 18
12	12	10	180	2.5	1.5 by 1.5(nominal) by 24
20	18	10	100	4.0	2 by 2 (nominal) by 30

Stakes to secure erosion logs shall consist of pinewood or hardwood.

- (i) *Silt Dikes.* Silt dikes shall be pre-manufactured triangular shaped urethane foam covered with a woven geotextile fabric. The fabric aprons shall extend a minimum of two feet beyond each side of the triangle.

Each silt dike shall have the following dimensions:

Dimension	Length
Center height	8 to 10 inches
Base	16 to 21 inches
Section length	3 to 7 feet
Section width including fabric extensions	5.6 feet

Staples shall be 6 gauge and at least 8 inches long.

- (j) *Concrete Washout Structure.* The Contractor shall construct a washout structure that will contain washout from concrete placement and construction equipment cleaning operations. Embankment required for the concrete washout structure may be excavated material, provided that this material meets the requirements of Section 203 for embankment.

A pre-fabricated concrete washout structure shall only be used when specified in the Contract. It shall consist of a watertight container designed to contain liquid and solid waste from concrete washout.

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- (k) *Vehicle Tracking Pad.* Aggregate for the vehicle tracking pad shall be crushed natural aggregate with at least two fractured faces that meets the following gradation requirements:

Sieve size	Percent by weight Passing Square Mesh Sieves
75 mm (3 inch)	100
50 mm (2 inch)	0-25
19.0 mm (¾ inch)	0-15

Recycled crushed concrete or asphalt shall not be used for vehicle tracking pads.

Erosion Control Geotextile shall be Class 2 and conform to the requirements of subsection 712.08.

Pre-fabricated vehicle tracking pads if specified in the Contract shall have the following properties.

Minimum overall dimensions of the modular systems shall be:

Width of pad along edge of roadway	14 feet
Length of pad	30 feet

Weight (min.) (lbs./sq. ft.)	8
Crush strength (min.) (psi)	400

- (l) *Aggregate Bag.* Aggregate bags shall consist of crushed stone or recycled rubber filled fabric with the following properties:

Diameter (inches)	Weight (minimum) (pounds per foot)
6-8	6
10	10
12	15

Rubber used in bags shall be clean, 95 percent free of metal and particulates.

Crushed stone contained in the aggregate bags shall conform to subsection 703.09, Table 703-7 for Class C.

The aggregate bag shall consist of a woven geotextile fabric with the following properties:

Property	Requirement	Test Method
Grab Tensile Strength	90 lbs. min.	ASTM D 4632
Trapezoid Tear Strength	25 lbs. min.	ASTM D 4533
Mullen Burst	300 psi	ASTM D 3786
Ultraviolet Resistance	70%	ASTM D 4355

- (m) *Storm Drain Inlet Protection.* Storm drain inlet protection shall consist of aggregate filled fabric with the following dimensions:

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Storm Drain Inlet Protection Properties	Protection Types		
	<sup>1</sup> Type I	Type II	<sup>3</sup> Type III
Diameter	4 in.	4 in.	N/A
Minimum Section Length	7 ft.	5 ft.	5 ft.
Apron Insert	---	30 in. or sized to grate	30 in or sized to grate
<sup>1</sup> Type I protection shall be used with Inlet Type R. <sup>2</sup> Type II protection shall be used with Combination Inlet. Option A or B <sup>3</sup> Type III protection Inlet Vane Grate only. Option A or B			

The storm drain inlet protection (Type I, II and III) shall consist of a woven geotextile fabric with the following properties:

Property	Test Method	Unit	Requirement
Grab tensile strength	ASTM D 4632	lbs.	minimum 350X280
Mullen Burst Strength	ASTM D 3786	lbs.	600
Trapezoid Tear Strength	ASTM D 4533	lbs.	minimum 110X95
Percent Open Area	COE-22125-86	%	28
Water Flow Rate	ASTM D 4491	gal./min./sq. ft.	250
Ultraviolet Resistance	ASTM D 4355	%	70

Curb roll for storm drain inlet protection (Type I and II) shall have an approximate weight of 7 to 10 pounds per linear foot of device. The device shall be capable of conforming to the shape of the curb. Aggregate contained in the storm drain inlet device shall consist of gravel or crushed stone conforming to Table 703-7 for Class C.

Storm drain inlet protection (Type III) shall have insert containment (option A) or insert without storage capacity (option B).

### CONSTRUCTION REQUIREMENTS

**208.03 Project Review, Schedule, and Transportation Erosion Control Supervisor.** Prior to construction, an on-site Environmental Pre-construction Conference shall be held. The conference shall be attended by:

- (1) The Engineer,
- (2) The Superintendent,
- (3) The Contractor's SWMP Administrator
- (4) Supervisors or Foremen of subcontractors working on the project,
- (5) The Region Water Pollution Control Manager (RWPCM), and

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- (6) CDOT personnel (e.g., CDOT Landscape Architect) who prepared or reviewed the Stormwater Management Plan (SWMP).

At this conference, the attendees shall discuss the SWMP, CDPS-SCP, sensitive habitats on site, wetlands, other vegetation to be protected, and the enforcement mechanisms for not meeting the requirements of this specification.

Prior to beginning construction the Contractor shall evaluate the project site for storm water draining into or through the site. When such drainage is identified, BMPs (i.e., Control Measures) shall be used if possible to divert stormwater from running on-site and becoming contaminated with sediment or other pollutants. The diversion may be accomplished with a temporary pipe or other conveyance to prevent water contamination or contact with pollutants. Run-on water that cannot be diverted shall be treated as construction runoff and adequate BMPs shall be employed.

The SWMP Administrator shall evaluate all non-stormwater coming onto the site, such as springs, seeps, and landscape irrigation return flow. If such flow is identified, BMPs shall be used to protect off-site water from becoming contaminated with sediment or other pollutants.

The SWMP Administrator shall review existing inlets and culverts to determine if inlet protection is needed due to water flow patterns. Prior to beginning construction, inlets and culverts needing protection shall be protected and the location of the implemented BMP added to the SWMP site map.

Prior to construction, the Contractor shall implement appropriate BMPs for protection of wetlands, sensitive habitat and existing vegetation from ground disturbance and other pollutant sources, in accordance with the approved project schedule as described in subsection 208.03(b).

When additional BMPs are required and approved by the Engineer, the Contractor shall implement the additional BMPs and the SWMP Administrator shall record and describe them on the SWMP site map. The approved BMPs will be measured and paid for in accordance with subsections 208.11 and 208.12.

- (a) *Project Review.* The Contractor may submit modifications to the Contract's BMPs in a written proposal to the Engineer. The written proposal shall include the following information:

- (1) Reasons for changing the BMPs.
- (2) Diagrams showing details and locations of all proposed changes.
- (3) List of appropriate pay items indicating new and revised quantities.
- (4) Schedules for accomplishing all erosion and sediment control work.
- (5) Effects on permits or certifications caused by the proposed changes.

The Engineer will approve or reject the written proposal in writing within 5 working days after the submittal. The Engineer may require additional control measures prior to approving the proposed modifications. Additional modifications and additional BMPs will be paid for at the Contract Unit Price for the specific items involved. If no items exist, they will be paid for as extra work in accordance with subsection 109.04.

- (b) *Erosion and Sediment Control Activities.* The erosion and sediment control activities shall be included in the weekly meeting update. The project schedule shall specifically indicate the sequence of clearing and grubbing, earthwork operations, and construction of temporary and permanent erosion control features and stabilization. Project schedule shall include erosion and sediment control work for haul roads, borrow pits, storage and asphalt or concrete batch sites, and all areas within the project limits. If during construction the Contractor proposes changes which would affect the Contract's BMPs, the Contractor shall propose revised BMPs to the Engineer for approval in writing. If necessary, the SWMP Administrator shall update proposed sequencing of major activities in the SWMP. Revisions shall not be implemented until the proposed measures have been approved in writing by the Engineer.

- (c) *Erosion Control Management (ECM).* Erosion Control Management for this project shall consist of Erosion Control Inspection and the Administration of the Stormwater Management Plan (SWMP). All ECM staff shall have working knowledge and experience in construction, and shall have successfully completed the Transportation Erosion Control Supervisory Certificate Training (TECS) as provided by the Department. The Superintendent will not be permitted to serve in an ECM role. The Erosion Control Inspector and the Stormwater Administrator may be the same person in projects involving less than 40 acres of disturbed area.

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1. Stormwater Management Plan (SWMP) Administration. The SWMP Plan shall be maintained by a SWMP Administrator. The SWMP Administrator shall have completed the TECS certification training as provided by the Department. In the case of a project requiring only one TECS, the SWMP Administrator may also be the Erosion Control Inspector for the project. The name of the SWMP Administrator shall be recorded on SWMP Plan Section 3. B. The SWMP Administrator shall have full responsibility to maintain and update the SWMP Plan and identify to the Superintendent critical action items needed to conform to the CDPS-SCP as follows:
  - (1) Complete the SWMP Notebook as described in subsection 208.03 (d).
  - (2) Participate in the Environmental Pre-construction Conference
  - (3) Attend weekly meetings
  - (4) Attend all Headquarter and Region water quality control inspections. The Contractor and the Contractor's SWMP Administrator will be notified a minimum of five days in advance of each inspection by the CDOT region or headquarter water quality staff.
  - (5) Coordinate with the Superintendent to implement necessary actions to reduce anticipated or presently existing water quality or erosion problems resulting from construction activities.
  - (6) Coordinate with the Superintendent to ensure that all labor, material, and equipment needed to install, maintain, and remove BMPs are available as needed.
  - (7) During construction, update and record the following items on the SWMP site map as changes occur:
    - (i) Limits of Construction (LOC).
    - (ii) Areas of disturbance (AD)
    - (iii) Limits of Disturbance (LDA)
    - (iv) Limits of cut and fill.
    - (v) Areas used for storage of construction materials, equipment, soils, or wastes.
    - (vi) Location of any dedicated asphalt or concrete batch plants.
    - (vii) Location of construction offices and staging areas.
    - (viii) Location of work access routes during construction.
    - (ix) Location of borrow and waste.
    - (x) Location of temporary, interim and permanent stabilization.
    - (xi) Location of outfall(s)
    - (xii) Arrows showing direction of surface flow
    - (xiii) Structural and non-structural BMPs
    - (xiv) LDA and LOC lines as defined in subsection 107.25
  - (8) Amend the SWMP whenever there are: additions, deletions, or changes to BMPs. SWMP revisions shall be recorded immediately. Items shall be dated and initialed by the SWMP Administrator. Specifically, amendments shall include the following:
    - (i) A change in design, construction, operation, or maintenance of the site which would require the implementation of new or revised BMPs; or
    - (ii) Changes when the SWMP proves to be ineffective in achieving the general objectives of

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controlling pollutants in stormwater discharges associated with construction activity.

(iii) Changes when BMPs are no longer necessary and are removed.

- (9) Complete vegetative survey transects when required in accordance with CDOT Erosion Control and Stormwater Quality Guide.
- (10) Start a new site map before the current one becomes illegible. All site maps shall remain in the SWMP notebook.
- (11) Document all inspection and maintenance activities. The SWMP and documentation shall be kept on the project site.
- (12) When adding or revising BMPs on the SWMP, add a narrative explaining what, when, where, why, and how the BMP is being used, and add a detail to the SWMP notebook.
- (i) How to install and inspect the BMP
- (ii) Where to install the BMP
- (iii) When to maintain the BMP
- (13) If using existing topography, vegetation, etc. as a BMP, label it as such on the SWMP site map; add a narrative as to when, where, why, and how the BMP is being used.
- (14) Indicate BMPS in use or not in use by recording on Standard Plans M-208-1, M-216-1, and M-615-1 in the SWMP notebook
- (15) Record on the SWMP, the approved Method Statement for Containing Pollutant Byproducts.
- (16) Update the potential pollutants list in the SWMP notebook and Spill Response Plan throughout construction.

## 2. Erosion Control Inspection.

Erosion control inspection shall be performed by TECS certified staff assigned as Erosion Control Inspector (ECI) to the project. One ECI is required for every 40 acres of total disturbed area which is currently receiving temporary and interim stabilization measures as defined in subsection 208.04 (e). An ECI shall not be responsible for more than 40 acres in the project. Accepted permanent stabilization methods as defined in subsection 208.04 (e) will not be included in the 40 acres.

ECI duties shall be as follows:

- (1) Coordinate with the SWMP Administrator on reporting the results of inspections
- (2) Review the construction site for compliance with the Stormwater Construction Permit.
- (3) Inspect with the Superintendent and the Engineer (or their designated representatives) the stormwater management system at least every seven calendar days. Post storm event inspections shall be conducted within 24 hours after the end of any precipitation or snow melt event that may cause surface erosion. If no construction activities will occur following a storm event, post-storm event inspections shall be conducted prior to commencing construction activities, but no later than 72 hours following the storm event. The occurrence of delay in inspections shall be documented in the inspection report. Form 1176 shall be used for all 7 day inspections and inspections following storm events. The Contractor shall notify the Erosion control inspector when a storm event occurs. Failure to perform inspections on time will result in liquidated damages in accordance with subsection 208.09.



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Inspections are not required at sites when construction activities are temporarily halted, when snow cover exists over the entire site and melting conditions do not pose a risk of surface erosion. This exception shall be applicable only during the period where melting conditions do not exist, and applies to the routine 7 day, Headquarters and Region inspections, as well as the post-storm event inspections. The following information shall be documented on Form 1176 for use of this exclusion: dates when snow cover occurred, date when construction activities ceased, and date melting conditions began.

The order of precedence for required inspections shall be as follows:

- (i) Headquarter water quality inspections
- (ii) Region water quality inspections
- (iii) Post-storm event inspections
- (iv) 7 day inspections

When one of the listed inspections is performed, the inspections listed below it need not be performed on that day if the required CDOT and Contractor personnel participated in the inspection.

For example: A 7 day inspection is not required on the same day a headquarters or Region inspection is conducted. A sheet shall be placed in the inspections area of the SWMP Notebook to refer to the date inspection performed.

- (4) Follow all other agency Stormwater requirements and inspections unless a waiver or other agreement has been made.
- (5) The ECI shall immediately report to the Contractor's Superintendent and the SWMP Administrator the following instances of noncompliance:
  - (i) Noncompliance which may endanger health or the environment.
  - (ii) Spills or discharge of hazardous substance or oil which may cause pollution of waters of the State.
  - (iii) Discharge of stormwater which may cause an exceedance of a water quality standard.
  - (iv) Upset conditions that occur on site.
- (6) Spills, leaks, or overflows that result in the discharge of pollutants shall be documented on the Form 1176 by the ECI. The ECI shall record the time and date, weather conditions, reasons for spill, and how it was remediated.

(d) *Documentation Available on the Project.* The following Contract documents and references will be made available for reference at the CDOT field office during construction:

1. SWMP Notebook. The Engineer will provide a SWMP Notebook at the Preconstruction Conference, which is and shall remain the property of CDOT. CDOT will initially provide the documentation for the first four items when available. The Contractor shall provide the contents required for items (5) through (18). The notebook shall be stored in the CDOT field office or at another on-site location approved by the Engineer. The SWMP Administrator shall modify and update the notebook as needed to reflect actual site conditions, prior to or as soon as practicable but in no case more than 72 hours after the change. The following Contract documents and reports shall be kept, maintained, and updated in the notebook under

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the appropriate items by the SWMP Administrator:

- (1) SWMP Plan Sheets - Notes, tabulation, sequence of major activities, area of disturbance, existing soil data, existing vegetation percent cover, potential pollutant sources, receiving water, non-stormwater discharges and environmental impacts.
- (2) Site Map and Plan Title Sheet - Construction site boundaries, ground surface disturbance, limits of cut and fill, flow arrows, structural BMPs, non-structural BMPs, Springs, Streams, Wetlands and surface water. Also included on the sheets is the protection of trees, shrubs and cultural resources.
- (3) Specifications - Standard and Project special provisions related to Stormwater and Erosion Control.
- (4) Standard Plans M-208-1, M-216-1 and M-615-1
- (5) BMP Details not in Standard Plan M-208-1 - Non-standard details.
- (6) Weekly meeting sign in sheet.
- (7) Calendar of Inspections -Calendar of inspections marking when all inspections take place.
- (8) Form 1176 – Weekly meeting notes and inspection report
- (9) Region and Headquarter Water Quality Reports and Form 105(s) relating to Water Quality.
- (10) Description of Inspection and Maintenance Methods - Description of inspection and maintenance methods implemented at the site to maintain all BMPs identified in the SWMP and Items not addressed in the design
- (11) Spill Response Plan - Reports of reportable spills submitted to CDPHE
- (12) List and Evaluation of Potential Pollutants - List of potential pollutants as described in subsection 107.25 and approved Method Statement for Containing Pollutant Byproducts.
- (13) Other Correspondence e.g., agreements with other MS4s, approved deferral request, CDPHE audit documentation, Water Quality Permit Transfer to Maintenance Punch List and other miscellaneous documentation.
- (14) TECS Certifications of the SWMP Administrator and all ECIs, keep current through the life of the project.
- (15) Environmental Pre-construction Conference – Conference agenda with a certification of understanding of the terms and conditions of the CDPS-SCP and SWMP. The certification shall be signed by all attendees. A certification shall also be signed by all attendees of meetings held for new subcontractors beginning work on the project that could adversely affect water quality after the Environmental Pre-construction Conference has been held.
- (16) All Project Environmental Permits - All project environmental permits and associated applications and certifications, including, CDPS-SCP, Senate Bill 40, USACE 404, temporary stream crossings, dewatering, biological opinions and all other permits applicable to the project, including any separate CDPS-SCP obtained by the Contractor for staging area on private property, asphalt or concrete plant, etc.
- (17) Photographs Documenting Existing Vegetation – Project photographs shall be time stamped on paper with a maximum of four colored images per 8 ½ inch by 11 inch sheet and/or a digital copy of all photographs on CD-ROM/Flash Drive in (JPG format), documenting existing vegetation prior to construction commencing. On the bottom of each photograph shall be a description using Station

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Number or Mile Post of where the photograph was taken.

- (18) Permanent Water Quality Plan Sheets - Plan sheets and specifications for permanent water quality structures, riprap.

The Engineer will incorporate the documents and reports available at the time of award. The Contractor shall provide and insert all other documents and reports as they become available during construction. The SWMP Administrator shall finalize the SWMP for CDOT Maintenance use upon completion of the project. SWMP completeness shall be approved by the Engineer, corrections to the SWMP shall be at the Contractor's expense. The following Reference materials shall be used:

- (1) CDOT Erosion Control and Stormwater Quality Guide.
- (2) CDOT Erosion Control and Stormwater Quality Field Guide.

- (e) *Weekly Meetings.* The Engineer, Superintendent and the SWMP Administrator shall conduct a weekly meeting with supervisors involved in construction activities that could adversely affect water quality. The meeting shall follow an agenda prepared by the Engineer or a designated representative, and have a sign in sheet on which the names of all attendees shall be recorded. The SWMP Administrator shall take notes of water quality comments and action items at each weekly meeting, and place the agenda and sign in sheet in the SWMP notebook. At this meeting the following shall be discussed and documented on Form 1176:

- (1) Requirements of the SWMP.
- (2) Problems that may have arisen in implementing the site specific SWMP or maintaining BMPs.
- (3) Unresolved issues from inspections and concerns from last inspection
- (4) BMPS that are to be installed, removed, modified, or maintained.
- (5) Planned activities that will effect stormwater in order to proactively phase BMPs.
- (6) Recalcitrant inspection findings

All subcontractors who were not in attendance at the Environment Pre-construction conference shall be briefed on the project by the Engineer, Superintendent, and the SWMP Administrator prior to start of work. The SWMP Administrator shall record the names of these subcontractors as an addendum to the list of attendees, and added the SWMP Notebook.

#### **208.04 Best Management Practices (BMPs) for Stormwater.**

The SWMP Administrator shall modify the SWMP to clearly describe and locate all BMPs implemented at the site to control potential sediment discharges.

Vehicle tracking control shall be used at all vehicle and equipment exit points from the site to prevent sediment exiting the Limits of Construction (LOC) of the project site. Access shall be provided only at locations approved by the Engineer. The SWMP Administrator shall record vehicle tracking control pad locations on the SWMP site map.

New inlets and culverts shall be protected during their construction. Appropriate protection of each culvert and inlet shall be installed immediately. When riprap is called for at the outlet of a culvert, it shall be installed within 24 hours of completion of each pipe. The Contractor shall remove sediment, millings, debris, and other pollutants from within the newly constructed drainage system in accordance with the CDPS-SCP, prior to use, at the Contractor's expense. All removed sediment shall be disposed of outside the project limits in accordance with all applicable regulations.

Concrete products wasted on the ground during construction shall include, but shall not be limited to: excess concrete removed from forms, spills, slop, and all other unused concrete are potential pollutants that shall be contained or protected by an approved BMP at a pre-approved containment area. The concrete shall be picked up and recycled in accordance with 6 CCR 1007-2 (CDPHE Regulations Pertaining to Solid Waste Sites and Facilities) at regular intervals, as directed. The uses of recycled concrete from approved recycling facilities shall be in accordance with Section 203.

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- (a) *Unforeseen Conditions.* The Contractor shall design and implement erosion and sediment BMPs for correcting conditions unforeseen during the design of the project, or for emergency situations, that develop during construction. The Department's "Erosion Control and Stormwater Quality Guide" shall be used as a reference document for the purpose of designing erosion and sediment BMPs. Measures and methods proposed by the Contractor shall be reviewed and approved in writing by the Engineer prior to installation.
- (b) *Other Agencies.* If CDPHE, US Army Corps of Engineers (USACE), or the Environmental Protection Agency (EPA) reviews the project site and requires additional measures to prevent and control erosion, sediment, or pollutants, the Contractor shall cease and desist activities resulting in pollutant discharge and immediately implement these measures. If the work may negatively affect another MS4, the Contractor shall cease and desist activities resulting in the discharge and shall implement appropriate measures to protect the neighboring MS4, including installing additional measures. . Implementation of these additional measures will be paid for at contract unit price.
- (c) *Work Outside the Right of Way.* Disturbed areas, including staging areas, which are outside CDOT ROW and outside easements acquired by CDOT for construction, are the responsibility of the Contractor. These areas may be subject to a separate CDPS-SCP or other permits. The Contractor shall acquire these permits and submit copies to the Engineer prior to any disturbance. These permits, shall be acquired and all erosion and sediment control work performed at the Contractor's expense. These areas are subject to inspections by CDOT or any other agency, as agreed upon in writing.
- (d) *Construction Implementation.* The Contractor shall incorporate BMPs into the project as outlined in the accepted schedule.
- (e) *Stabilization.* Once earthwork has started, the Contractor shall continue erosion BMPs until permanent stabilization of the area has been completed and accepted. Clearing, grubbing and slope stabilization measures shall be performed regularly to ensure final stabilization. Failure to properly maintain erosion control and stabilization methods, either through improper phasing or sequencing will require the Contractor to repair or replace sections of earthwork at his expense. The Contractor shall schedule and implement the following stabilization measures during the course of the project:
- (1) *Temporary Stabilization.* At the end of each day, the Contractor shall stabilize disturbed areas by surface roughening, vertical tracking, or a combination thereof. Disturbed areas are locations where actions have been taken to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, road bed preparation, soil compaction, and movement and stockpiling of top soils. Other stabilization measures may be implemented, as approved. The maximum area of temporary stabilization shall not exceed 20 acres.
  - (2) *Interim Stabilization.* Stockpiles and disturbed areas as soon as known with reasonable certainty that work will be temporarily halted for 14 days or more shall be stabilized using one or more of the specified following methods:
    - (i) Application of 1.5 tons of mechanically crimped certified weed free hay or straw in combination with an approved organic mulch tackifier.
    - (ii) Placement of bonded fiber matrix in accordance with Section 213.
    - (iii) Placement of mulching (hydraulic) wood cellulose fiber mulch with tackifier, in accordance with Section 213.
    - (iv) Application of spray-on mulch blanket in accordance with Section 213. Magnesium Chloride, Potassium Chloride and Sodium Chloride, or other salt products, will not be permitted as a stabilization method.

Protection of the interim stabilization method is required. Reapplication may be required as approved.
  - (3) *Summer and Winter Stabilization.* Summer and winter stabilization is defined as months when seeding will not be permitted. As soon as the Contractor knows shutdown is to occur, interim stabilization shall be applied to the disturbed area. Protection of the interim stabilization method is required. Reapplication of

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interim stabilization may be required as directed.

- (4) **Permanent Stabilization.** Permanent stabilization is defined as the covering of disturbed areas with seeding, mulching with tackifier, soil retention coverings, and such non-erodible methods such riprap, road shouldering, etc., or a combination thereof as required by the Contract. Other permanent stabilization techniques may be proposed by the Contractor, in writing, and shall be used when approved in writing by the Engineer. Permanent stabilization shall begin within 48 hours after topsoil placement, soil conditioning, or combination thereof starts and shall be pursued to completion.
- (5) **Final Stabilization.** Final stabilization is defined as when all ground disturbing activities at the site have been completed, and uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent physical erosion reduction methods have been employed.
- (f) **Maintenance.** Erosion and sediment control practices and other protective measures identified in the SWMP as BMPs for stormwater pollution prevention shall be maintained in effective operating condition until the CDPS-SCP has been transferred to CDOT. BMPs shall be continuously maintained in accordance with good engineering, hydrologic and pollution control practices, including removal of collected sediment when silt depth is 50 percent or more of the height of the erosion control device. When possible, the Contractor shall use equipment with an operator rather than labor alone to remove the sediment.

Maintenance of erosion and sediment control devices shall include replacement of such devices upon the end of their useful service life as recommended by the Contractor and approved by the Engineer. Maintenance of rock check dams and vehicle tracking pads shall be limited to removal and disposal of sediment or addition of aggregate. Damages resulting from failure to maintain BMPs shall be paid at the contractors expense.

Complete site assessment shall be performed as part of comprehensive inspection and maintenance procedures, to assess the adequacy of BMPs at the site and the necessity of changes to those BMPs to ensure continued effective performance. Where site assessment results in the determination that new or replacement BMPs are necessary, the BMPs shall be installed to ensure continuous effectiveness. When identified, BMPs shall be maintained, added, modified or replaced as soon as possible, immediately in most cases.

Approved new or replaced BMPs will be measured and paid for in accordance with subsections 208.11 and 208.12. Devices damaged due to the Contractor's negligence shall be replaced at Contractor's expense.

From the time seeding and mulching work begins until the date the Contract work is accepted, the Contractor shall maintain all seeded areas. Damage to seeded areas or to mulch materials shall be immediately restored. Damage to seeded areas or to mulch materials due to Contractor negligence shall be immediately restored at the Contractor's expense. Restoration of other damaged areas will be measured and paid for under the appropriate bid item.

Temporary BMPs may be removed upon completion of the project, as determined by the Water Quality Partial Acceptance walk-through. If removed, the area in which these BMPs were constructed shall be returned to a condition similar to that which existed prior to its disturbance. Removed BMPs shall become the property of the Contractor.

If a project delay occurs, the Contractor shall be responsible to continue erosion and sediment control operations beyond the original contract time.

Sediment removed during maintenance of BMPs and material from street sweeping may be used in or on embankment, provided it meets conditions of Section 203 and is distributed evenly across the embankment.

Whenever sediment collects on the paved surface, the surface shall be cleaned. Street washing will not be allowed. Storm drain inlet protection shall be in place prior to shoveling, sweeping, or vacuuming. Sweeping shall be completed with a pickup broom or equipment capable of collecting sediment. Sweeping with a kick broom will not be allowed.

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Material from pavement saw cutting operations shall be cleaned from the roadway surface during operations using a vacuum. A BMP, such as a berm, shall be placed to contain slurry from joint flushing operations until the residue can be removed from the soil surface. Aggregate bags, erosion logs or other permeable BMPs shall not be used. Residue shall not flow into driving lanes. It shall be removed and disposed of in accordance with subsection 107.25(b) 13. Material containment and removal will not be paid for separately, but shall be included in the work.

**208.05 Construction of BMPs.** BMPs shall be constructed in accordance with Standard Plans M-208-1, M-216-1 and with the following.

- (a) *Seeding, Mulching, Sodding, Soil Retention Blanket.* Seeding, mulching, sodding, and soil retention blanket shall be performed in accordance with Sections 212, 213, and 216.
- (b) *Erosion Bales.* The bales shall be anchored securely to the ground with wood stakes.
- (c) *Silt Fence.* Silt fence shall be installed in locations specified in the Contract prior to any grubbing or grading activity.
- (d) *Temporary Berms.* Berms shall be constructed to the dimensions shown in the Contract, and sufficiently compacted to prevent erosion or failure. If the berm erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense.
- (e) *Temporary Diversion.* Diversions shall be constructed to the dimensions shown in the Contract, and graded to drain to a designated outlet. The berm shall be sufficiently compacted to prevent erosion or failure. If the diversion erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense.
- (f) *Temporary Slope Drains.* Temporary slope drains shall be installed prior to installation of permanent facilities or growth of adequate ground cover on the slopes. All temporary slope drains shall be securely anchored to the slope. The inlets and outlets of temporary slope drains shall be protected to prevent erosion.
- (g) *Silt Berm.* Prior to installation of silt berms, the Contractor shall prepare the surface of the areas in which the berms are to be installed such that they are free of materials greater than 2 inches in diameter and are suitably smooth for the installation of the silt berms, as approved. Silt berms shall be secured with spikes. The Contractor shall install the silt berm in a manner that will prevent water from going around or under the silt berm. Silt berms shall be installed on top of soil retention blanket.
- (h) *Rock Check Dam.* Rock shall be installed at locations shown on the plans. Rock check dams shall conform to the dimensions shown on the plans.
- (i) *Riprap Outlet Protection.* Geotextile used shall be protected from cutting or tearing. Overlaps between two pieces of geotextile shall be 1 foot minimum. Riprap size shall be as shown on the plans.
- (j) *Storm Drain Inlet Protection.* Prior to installation, the Contractor shall sweep the surface of the area in which the storm drain inlet protection devices are to be installed such that the pavement is free of sediment and debris. The ends of the inlet protection Type 1 and Type 2 shall extend a minimum of 1 foot past each end of the inlet.

The Contractor shall remove all accumulated sediment and debris from the surface surrounding all storm drain inlet protection devices after each rain event or as directed. The Contractor shall remove accumulated sediment from Type II and III containment area when it is more than a maximum one third full of sediment, or as directed.

The Contractor shall protect storm drain facilities adjacent to locations where pavement cutting operations involving wheel cutting, saw cutting, sand blasting, or abrasive water jet blasting are to take place.

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- (k) *Sediment Trap*. Sediment traps shall be installed to collect sediment laden water and to minimize the potential of pollutants leaving the project site. Locations shall be as shown on the plans or as directed.

Sediment traps shall be constructed prior to disturbance of upslope areas and shall be placed in locations where runoff from disturbed area can be diverted into the trap.

The area under the embankment shall be cleared, grubbed and stripped of any vegetation and roots.

Fill material for the embankment shall be free of roots or other vegetation, organic material, large stones, and other objectionable material.

Sediment shall be removed from the trap when it has accumulated to one half of the wet storage depth of the trap and shall be disposed of in accordance with subsection 208.04(f).

- (l) *Erosion Logs*. Erosion logs shall be embedded 2 inches into the soil. Stakes shall be embedded to a minimum depth of 12 inches. At the discretion of the Engineer, a shallower depth may be permitted if rock is encountered.

The Contractor shall maintain the erosion logs during construction to prevent sediment from passing over or under the logs.

- (m) *Silt Dikes*. Prior to installation of silt dikes, the Contractor shall prepare the surface of the areas in which the silt dikes are to be installed such that they are free of materials greater than two inches in diameter and are suitably smooth for the installation of the silt dikes, as approved by the Engineer.

- (n) *Concrete Washout Structure*. The concrete washout structure shall meet or exceed the dimensions shown on the plans or be used in accordance with manufacturer's recommendations. Work on this structure shall not begin until written acceptance is provided by the Engineer.

Concrete washout structure shall conform to standard plan M-208-1 and shall meet the following requirements:

- (1) Structure shall contain all washout water.
- (2) Stormwater shall not carry wastes from washout and disposal locations.
- (3) The site shall be located a minimum of 50 horizontal feet from State waters and shall meet all requirements for containment and disposal as defined in subsection 107.25.
- (4) The site shall be signed as "Concrete Washout".
- (5) The site shall be accessible to appropriate vehicles.
- (6) Freeboard capacity shall be included into structure design to reasonably ensure the structure will not overtop during or because of a precipitation events.
- (7) The Contractor shall prevent tracking of washout material out of the washout structure.
- (8) Solvents, flocculents, and acid shall not be added to wash water.
- (9) The structure shall be surrounded on three sides by a compacted berm.
- (10) The structure shall be fenced with orange plastic construction fencing to provide a barrier to construction equipment and to aid in identification of the concrete washout area.
- (11) Concrete waste, liquid and solid, shall not exceed 2/3 the storage capacity of the washout structure.

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Pre-fabricated concrete washout structures shall meet the following requirements:

- (1) Structure shall contain all washout water.
- (2) Structure shall be located 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas are as defined in the Contract. Locations shall be as approved by the Engineer. The site shall be delineated with orange plastic fence or other means and signed as "Concrete Washout".
- (3) The site shall be accessible to appropriate vehicles.
- (4) Freeboard capacity shall be included into structure design to reasonably ensure the structure will not overtop during or because of a precipitation event.
- (5) Solvents, flocculants, and acid shall not be added to wash water.
- (6) Concrete waste, liquid and solid, shall not exceed 2/3 the storage capacity of the washout structure.
- (7) Prefabricated structures cannot be moved when they contain liquid, unless otherwise approved.
- (8) The concrete washout structure shall be completed and ready for use prior to concrete placement operations.
- (9) Washout areas shall be checked and maintained as required. On site permanent disposal of concrete washout waste is not allowed.

All liquid and solid wastes, including contaminated sediment and soils generated from concrete washout shall be hauled away from the site and disposed of properly at the Contractor's expense.

- (o) *Vehicle Tracking Pad (VTP)*. Vehicle tracking pads shall be constructed to the minimum dimensions shown in the Contract, unless otherwise directed by the Engineer. Construction of approved vehicle tracking pads shall be completed before any disturbance of the area.

The Contractor shall maintain each vehicle tracking pad during the entire time that it is in use for the project. The vehicle tracking pad shall be removed at the completion of the project unless otherwise directed by the Engineer. Additional aggregate may be required for maintenance and will be paid for under Pay Item, Maintenance Aggregate (Vehicle Tracking Pad).

- (p) *Detention Pond*. Permanent detention ponds shown on the construction plans may be used as temporary BMPs if all the following conditions are met:
- (1) The pond is designated as a construction BMP in the SWMP.
  - (2) The pond outfall and outlet are designed and implemented for use as a BMP during construction in accordance with good engineering, hydrologic, and pollution control practices. The stormwater discharges from the outfall shall not cause degradation or pollution of State waters, and shall have BMPs, as appropriate.
  - (3) All silt shall be removed and the pond returned to the design grade and contour prior to project acceptance
- (q) *Aggregate Bag*. Aggregate bags shall be placed on a stable surface, consisting of pavement, grass or gravel. Aggregate bags shall be placed to conform to the surface without gaps. Discharge water shall not cause



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erosion.

- (r) *Surface Roughening.* Surface roughening creates horizontal grooves along the contour of the slope. Roughening may be accomplished by furrowing, scarifying, ripping or disking the soil surface to create a 2 to 4 inch minimum variation in soil surface. Surface roughening will not be paid for separately, but shall be included in the work.
- (s) *Vertical Tracking.* Vertical tracking involves driving a tracked vehicle up and down the soil surface and creating horizontal grooves and ridges along the contour of the slope. Sandy soils or soils that are primarily rock need not be tracked. Vertical tracking will not be paid for separately, but shall be included in the work.

**208.06 Materials Handling and Spill Prevention.** The SWMP Administrator shall clearly describe and record on the SWMP, all practices implemented at the site to minimize impacts from procedures or significant material that could contribute pollutants to runoff. Areas or procedures where potential spills can occur shall have a Spill Response Plan in place as specified in subsections 107.25(b) 6 or 208.06(c). Construction equipment, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within 50 horizontal feet of any State waters or more if the Contractor determines necessary. Equipment fueling and servicing shall occur only within approved designated areas.

- (a) *Bulk Storage Structures.* Bulk storage structures for petroleum products and other chemicals shall have impervious secondary containment or equivalent adequate protection so as to contain all spills and prevent any spilled material from entering State waters. Secondary containment shall be capable of containing the combined volume of all the storage containers plus at least 10 percent freeboard. For secondary containment that is used and may result in accumulation of stormwater within the containment, a plan shall be implemented to properly manage and dispose of all accumulated stormwater which is deemed to be contaminated (e.g., has an unusual odor or sheen).
- (b) *Lubricant Leaks.* The Contractor shall inspect equipment, vehicles, and repair areas daily to ensure petroleum, oils, and lubricants (POL) are not leaking onto the soil or pavement. Absorbent material or containers approved by the Engineer shall be used to prevent leaking POL from reaching the soil or pavement. The Contractor shall have onsite approved absorbent material or containers of sufficient capacity to contain any POL leak that can reasonably be foreseen. The Contractor shall inform all Spill Response Coordinators in accordance with the Spill Response Plan if unforeseen leakage is encountered. All materials resulting from POL leakage control and cleanup shall become the property of the Contractor and shall be removed from the site. Control, cleanup, and removal of by-products resulting from POL leaks shall be performed at the Contractor's expense.
- (c) *Spill Response Plan.* A spill Response Plan shall be developed and implemented to establish operating procedures for handling potential pollutants and preventing spills.

The Response Plan shall contain the following information:

- (1) Identification and contact information of each Spill Response Coordinator
- (2) Locations of areas on project site where equipment fueling and servicing operations are permitted.
- (3) Location of cleanup kits.
- (4) Quantities of chemicals and locations stored on site.
- (5) Label system for chemicals and Safety Data Sheets (SDS) for products.
- (6) Clean up procedures to be implemented in the event of a spill that does not enter State waters or ground water.
- (7) Procedures for spills of any size that enter surface waters or ground water, or have the potential to do so. CDOT's Erosion Control and Stormwater Quality Guide contains Spill notification contacts and

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phone numbers required in the Spill Response Plan.

- (8) A summary of the employee training provided.

Information in items (1) through (8) shall be updated in the SWMP Notebook when they change.

**208.07 Stockpile Management.** Material stockpiles shall be located 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas as defined in the Contract. Locations shall be approved by the Engineer.

Erodible stockpiles (including topsoil) shall be contained with acceptable BMPs at the toe (or within 20 feet of the toe) throughout construction. BMPs shall be approved by the Engineer. The SWMP Administrator shall describe, detail, and record the sediment control devices on the SWMP.

**208.08 Limits of Disturbance.** The Contractor shall limit construction activities to those areas within the limits of disturbance shown on the plans and cross-sections. Construction activities, in addition to the Contract work, shall include the on-site parking of vehicles or equipment, on-site staging, on-site batch plants, haul roads or work access, and all other action which would disturb existing soil conditions. Staging areas within the LDA shall be as approved by the Engineer. Construction activities beyond the limits of disturbance due to Contractor negligence shall be restored to the original condition by the Contractor at the Contractor's expense. The SWMP Administrator shall tabulate additional disturbances not identified in the CDPS\_SCP application and indicate changes to locations and quantities on the SWMP. The Contractor shall report the changes and additional disturbances to the Engineer, Water Quality Control Division of CDPHE and all other involved agencies.

The Contractor shall pursue and stabilize all disturbances to completion.

**208.09 Failure to Perform Erosion Control.** Failure to implement the Stormwater Management Plan is a violation of the CDPS – SCP and CDOT specifications. CDOT is obligated to implement enforcement mechanisms in accordance with CDOT's MS4 Permit COS000005 for Stormwater Management and erosion control Best Management Practices. Penalties may be assessed to the Contractor by the appropriate agencies. Penalties will be assessed by the Department as liquidated damages for failure to meet the Permit. All fines assessed to the Department for the Contractor's failure to implement the SWMP will be deducted from moneys due the Contractor in accordance with subsection 107.25(c) 2.

The Contractor will be subject to liquidated damages for incidents of failure to perform erosion control as required by the Contract. Liquidated damages will be applied for failure to comply with the CDPS-SCP and these specifications, including the following:

- (1) Failure to include erosion control in the project schedule or failure to include erosion control in each schedule update as specified in subsection 208.03(b).
- (2) Failure of the Contractor to perform the inspections required by subsection 208.03(c) 2.
- (3) Failure of the Contractor to implement necessary actions required by the Engineer as required by subsection 208.03(c).
- (4) Failure to amend the SWMP and implement BMPs as required by subsection 208.04.
- (5) Failure to keep documentation and records current.
- (6) Failure to construct or implement erosion control or spill containment measures required by the Contract, or failure to construct or implement them in accordance with the Contractor's approved schedule as required by subsection 208.06(c).
- (7) Failure to limit temporary stabilization to 20 or fewer acres as required by subsection 208.04 (e).
- (8) Failure to replace or perform maintenance on an erosion control feature after notice from the Engineer or

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from a water quality inspection as required by subsection 208.04(f).

- (9) Failure to remove and dispose of sediment from BMPs as required.
- (10) Failure to install and properly utilize a concrete washout structure for containing washout from concrete placement operations.
- (11) Failure to perform stabilization as required by subsection 208.04 (e).
- (12) Failure of the Superintendent or designated representative to attend inspections as required by subsection 208.03(c) and record findings in the appropriate form.
- (13) Failure to prevent discharges not composed entirely of stormwater from leaving the Construction Site.
- (14) Failure to provide the survey of Permanent Water Quality BMPs when required on the project in accordance with 208.10.

The Engineer will immediately notify the Contractor of each incident of failure to perform erosion control in accordance with the CDPS-SCP and these specifications, including items (1) through (14) above by issuing the Form 105. Correction shall be made as soon as possible but no later than 48 hours from the date of notification to correct the failure. The Contractor will be charged liquidated damages in the amount of \$970 for each day after the 48 hour period has expired, that one or more of the incidents of failure to perform the requirements for each Form 105 remains uncorrected. Liquidated damages will begin at Midnight of the date the 48 hours has expired.

This deduction will not be considered a penalty, but will be considered liquidated damages based on estimated additional construction engineering costs. The liquidated damages will accumulate, for each cumulative day that one or more of the incidents remain uncorrected. The number of days for which liquidated damages are assessed will be cumulative for the duration of the project; that is: the damages for a particular day will be added to the total number of days for which liquidated damages are accumulated on the project. The liquidated damages will be deducted from any monies due the Contractor.

If all other failures are not corrected within 48 hours after liquidated damages have begun to be assessed, the Engineer will issue a Stop Work Order in accordance with subsection 105.01. Work shall not resume until the Engineer has approved a written corrective action plan submitted by the Contractor that includes measures to prevent future violations and a schedule for implementation.

If the Contractor requires more than 96 hours to perform the corrective work from the date on the Form 105, the Contractor shall submit a request for deferment. The deferment request shall be in writing and shall include the specific failure, temporary measures until final correction is made, the methodology which will be employed to make the correction and interim milestones to completing the work. The Region Water Pollution Control Manager (RWPCM), Engineer, the SWMP Administrator and the Contractor shall concur on this deferral and set a proposed date of completion. If approved, the Contractor shall complete the corrective measures by Midnight of the proposed completion date. If corrective work is not corrected by the completion date the Engineer will issue a Stop Work Order. Liquidated Damages will apply retroactively back to the 48 hours after the 105 date of notification. Liquidated Damages will be assessed until the corrective work has been completed and accepted.

Deferment of work to correct failures to perform erosion control will not affect the Contractor's other contractual responsibilities, notifications for other non-compliance, nor the final completion date of the project. Liquidated Damages for other non-compliance notifications will continue to apply during the deferment period in addition to liquidated damages associated with the deferment.

Based on the submittal date of the approved deferment Liquidated Damages and a Stop Work Order may not be mandated to the Contractor.

Disagreements regarding the suggested corrective action for a BMP compliance issue between the Project Engineer, SWMP Administrator, and Superintendent, shall be discussed with the Resident Engineer and Region Water Pollution Control Manager. If after the discussions, the Project Engineer and the Contractor are still in disagreement and feel that additional compensation is owed, the Contractor will follow the decision of the Project

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Engineer, keep track of the costs and negotiate further with the Project Engineer. If after pursuing the issue, the Contractor is unable to reach agreement with the Project Engineer, then the Contractor can follow the dispute process outlined in subsection 105.22.

If the Contractor's corrective action plan and schedule are not submitted and approved within 96 hours of the initial notice, the Engineer will issue a Stop Work Order and have an on-site meeting with the Superintendent, SWMP Administrator, and the Superintendent's supervisor. This meeting will also be attended by the Resident Engineer, the Region Water Pollution Control Manager, and the Region Program Engineer. This meeting will identify and document needed corrective actions and a schedule for completion. If after the meeting, the unacceptable work is not remedied within the schedule as agreed to in the meeting, the Engineer will take action to effect compliance with the CDPS-SCP and these specifications by utilizing CDOT Maintenance personnel or other non-Contractor forces and deduct the cost from any moneys due or to become due to the Contractor pursuant to subsection 105.17. Delays due to these Stop Work Orders shall be considered non-excusable. The Stop Work Order shall be in place until the project is in CDPS-SCP compliance.

If the Contractor remains non-responsive to requirements of the on-site meeting, the Engineer will start default or Contract termination procedures in accordance with subsections 108.09 and 108.10. CDOT will proceed with corrective or disciplinary action in accordance with the Rules for Prequalification, Debarment, Bidding and Work on Transportation, Road, Highway and Bridge Public Projects.

When a failure meets any one of the following conditions, the Engineer will immediately issue a Stop Work Order in accordance with subsection 105.01 irrespective of any other available remedy:

- (1) It may endanger health or the environment.
- (2) It consists of a spill or discharge of hazardous substances or oil which may cause pollution of the waters of the state.
- (3) It consists of a discharge which may cause a violation of a water quality standards.

**208.10 Items to Be Completed Prior to Requesting Partial Acceptance of Water Quality Work.**

- (a) *Reclamation of Washout Areas.* After concrete operations are complete, washout areas shall be reclaimed in accordance with subsection 208.05(n) at the Contractor's expense.
- (b) *Survey.* When Permanent Water Quality BMPs (Permanent BMP) are required on the project, the Contractor shall survey the BMPs to confirm that they conform to the configuration and grade shown on the Plans. The survey shall conform to Section 625. The results of the survey shall be submitted as Microstation or AutoCad drawing files and PDF files, showing both designed and final elevations and configurations. Paper versions of the drawings shall be submitted with the stamp and seal of the Contractor's Surveyor.

The Engineer and the CDOT Hydraulics Engineer for the region will perform a walkthrough of the Permanent BMPs to confirm conformance to material requirements, locations and dimensions of the Permanent BMPs. Permanent BMPs not meeting the Contract requirements will be identified in writing by the Engineer, and shall be repaired or replaced at the Contractor's expense. Correction surveys shall be performed at the Contractor's expense to confirm the locations and dimensions of each Permanent BMP. Final as-built plans of the Permanent BMPs shall be provided to the Engineer and the CDOT Region and Headquarter Permanent Water Quality Control Specialist for their records.

- (c) *Locations of Temporary BMPs.* The Engineer will identify locations where modification, cleaning or removal of temporary BMPs are required, and will provide these in writing to the Contractor. Upon completion of work required, the SWMP Administrator shall modify the SWMP to provide an accurate depiction of BMPS to remain on the project site.

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**METHOD OF MEASUREMENT**

**208.11** Erosion Control Management will be measured as the actual number of days of ECM work performed onsite, regardless of the number of ECIs required, including erosion control inspections, documentation, meeting participation, SWMP Administration, and the preparation of the SWMP notebook.

Erosion bales will be measured by the actual number installed and accepted.

Silt fence, silt berms, erosion logs, aggregate bags, silt dikes, temporary berms, rock check dams, temporary diversions, and temporary slope drains, will be measured by the actual number of linear feet that are installed and accepted. Measured length will not include required overlap.

Concrete washout structure will be measured by the actual number of structures that are installed and accepted.

Storm drain inlet protection will be measured by linear foot or actual number of devices that are installed and accepted.

Sediment trap quantities will be measured by the actual number installed and accepted.

Removal of trash that is not generated by construction activities will be measured by the actual number of hours that Contractor workers actively remove trash from the project. Each week the Contractor shall submit to the Engineer a list of workers and the hours spent collecting such trash.

Removal of accumulated sediment from traps, basins, areas adjacent to silt fences and erosion bales, and other clean out excavation of accumulated sediment, and the disposal of such sediment, will be measured by the number of hours that equipment, labor, or both are used for sediment removal.

Vehicle tracking pads will be measured by the actual number constructed and accepted.

Additional aggregate required for maintaining vehicle tracking pads will be measured as the actual number of cubic yards installed and accepted.

**BASIS OF PAYMENT**

**208.12** ECM and BMPs will be paid for at the Contract unit price for each of the items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
Aggregate Bag	Linear Foot
Concrete Washout Structure	Each
Erosion Bales (Weed Free)	Each
Erosion Control Management	Day
Erosion Log (Type 1) (___ Inch)	Linear Foot
Erosion Log (Type 2) (____ Inch)	Linear Foot
Pre-Fabricated Concrete Washout Structure	Each
Pre-Fabricated Vehicle Tracking Pad	Each
Maintenance Aggregate (Vehicle Tracking Pad)	Cubic Yard
Removal and Disposal of Sediment (Equipment)	Hour
Removal and Disposal of Sediment (Labor)	Hour
Removal of Trash	Hour
Rock Check Dam	Each
Sediment Basin	Each
Sediment Trap	Each
Silt Berm	Linear Foot
Silt Dike	Linear Foot
Silt Fence	Linear Foot

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EROSION CONTROL

Silt Fence (Reinforced)	Linear Foot
Storm Drain Inlet Protection (Type__)	Linear Foot
Storm Drain Inlet Protection (Type__)	Each
Sweeping (Sediment Removal)	Hour
Temporary Berm	Linear Foot
Temporary Diversion	Linear Foot
Temporary Slope Drains	Linear Foot
Vehicle Tracking Pad	Each

Payment for Erosion Control Management (ECM) will be full compensation for all labor, materials and equipment necessary for the SWMP Administrator and Erosion Control Inspectors to perform all the work described in this specification. This includes assembling items 5-19 and required updates to the SWMP Notebook on site.

The SWMP Administrator and ECI's commute times will not be measured and paid for separately, but shall be included in the work.

Modifications to the SWMP Notebook due to construction errors or survey errors by the contractor shall be at the Contractor's expense.

Temporary erosion control will be measured and paid for by the BMPs used. Surface roughening and vertical tracking will not be measured and paid for separately but shall be included in the work. Payment for each BMP item will be full compensation for all work and materials required to furnish, install, maintain and remove the BMP when directed.

Payment for Removal and Disposal of Sediment (Equipment) will be full compensation for use of the equipment, including the operator. Payment for Removal and Disposal of Sediment (Labor) will be full compensation for use of the labor.

Payment for concrete washout structure, whether constructed or prefabricated, will be full compensation for all work and materials required to install, maintain, and remove the item. Maintenance and relocation, as required, of these structures throughout the duration of the project will not be measured and paid for separately, but shall be included in the work.

Silt berm spikes will not be measured and paid for separately, but shall be included in the work. When required, soil retention blankets will be measured and paid for in accordance with Section 216. Silt dike staples will not be measured and paid for separately, but shall be included in the work.

Spray-on mulch blankets required by the Contract, including those used in both interim and final stabilization, will be measured and paid for in accordance with Section 213.

Payment for storm drain inlet protection will be full compensation for all work, materials, and equipment required to complete the item, including surface preparation, maintenance throughout the project, and removal upon completion of the work. Aggregate will not be measured and paid for separately, but shall be included in the work.

Sweeping, when used as a BMP as shown in the Contract, will be measured by the number of hours that a pickup broom or equipment capable of collecting sediment, authorized by the Engineer, is used to remove sediment from the roadway or other paved surfaces. Each week the Contractor shall submit to the Engineer a statement detailing the type of sweeping equipment used and the number of hours it was used to pick up sediment. Operator will not be measured and paid for separately, but shall be included in the work.

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EROSION CONTROL

Stakes, anchors, connections, geotextile, riprap and tie downs used for temporary slope drains will not be measured and paid for separately, but shall be included in the work.

Payment for vehicle tracking pad will be full compensation for all work, materials and equipment required to construct, maintain, and remove the entrance upon completion of the work. Aggregate and geotextile will not be measured and paid for separately, but shall be included in the work. If additional aggregate for maintenance of vehicle tracking pads is required, it will be measured by the cubic yard in accordance with Section 304 and will be paid for under this Section.

Seeding, sod, mulching, soil retention blanket, and riprap will be measured and paid for in accordance with Sections 212, 213, 216, and 506.

Geotextile (Erosion Control) (Class 2) will be measured and paid for in accordance with Section 420.

All work and materials required to perform the permanent BMP survey and furnish the electronic files shall be included in the original unit price bid for surveying. Surveying will be measured and paid for in accordance with Section 625.

Payment will be made for BMPs replaced as approved by the Engineer. Temporary erosion and sediment BMPs required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer or for the Contractor's convenience, shall be performed at the Contractor's expense. If the Contractor fails to complete construction within the contract time, payment will not be made for Section 208 pay items for the period of time after expiration of the contract time. These items shall be provided at the Contractor's expense.

REVISION OF SECTION 212  
SEED

Section 212 of the Standard Specifications is hereby revised for this project as follows:

In subsection 212.02 (a), delete the first paragraph and replace with the following:

- (a) *Seed.* All seed shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin, the percent of weed seed content, the guaranteed percentage of purity and germination, pounds of pure live seed (PLS) of each seed species, and the total pounds of PLS in the container. All seeds shall be free from noxious weed seeds in accordance with current state and local lists and as indicated in Section 213. The Contractor shall furnish to the Engineer a signed statement certifying that the seed is from a lot that has been tested by a recognized laboratory for seed testing within thirteen months prior to the date of seeding. The Engineer may obtain seed samples from the seed equipment, furnished bags or containers to test seed for species identification, purity and germination. Seed tested and found to be less than 10 percent of the labeled certified PLS and different than the specified species will not be accepted. Seed which has become wet, moldy, or damaged in transit or in storage will not be accepted.



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 REVISION OF SECTION 213  
 MULCHING

Section 213 of the Standard Specifications is hereby revised for this project as follows:

In subsection 213.01, delete the last paragraph and replace with the following:

This work includes furnishing and applying spray-on mulch blanket or bonded fiber matrix on top of rock cuts and slopes after seeding or as temporary stabilization as shown on the plans or as directed by the Engineer.

In subsection 213.02, delete the eighth paragraph and replace with the following:

The hydromulch material for hydraulic mulching shall consist of virgin wood fibers manufactured expressly from clean whole wood chips. The chips shall be processed in such a manner as to contain no growth or germination inhibiting factors. Fiber shall not be produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and paper plants. The wood cellulose fibers of the mulch must maintain uniform suspension in water under agitation. Upon application, the mulch material shall form a blotter like mat covering the ground. This mat shall have the characteristics of moisture absorption and percolation and shall cover and hold seed in contact with the soil. The Contractor shall obtain certifications from suppliers that laboratory and field testing of their product has been accomplished, and that it meets all of the foregoing requirements pertaining to wood cellulose fiber mulch.

In subsection 213.02, delete the eleventh paragraph and replace with the following:

Material for mulch tackifier shall consist of a free-flowing, noncorrosive powder produced either from the natural plant gum of *Plantago Insularis* (Desert Indianwheat) or pre-gelatinized 100 percent natural corn starch polymer. The powders shall possess the following properties:

*Plantago Insularis* (Desert Indianwheat):

Property	Requirement	Test Method
(1) pH 1% solution	6.5 - 8.0	
(2) Mucilage content	75% min.	ASTM D7047

Pre-gelatinized 100 percent natural corn starch polymer:

(1) Organic Nitrogen as protein	5.5-7%
(2) Ash content	0-2%
(3) Fiber	4-5%
(4) pH 1% solution	6.5 – 8.0
(5) Size	100% thru 850 microns (20 mesh)
(6) Settleable solids	<2%

All fibers shall be colored green or yellow with a biodegradable dye.

Delete the last paragraph in subsection 213.02 and replace with the following:

(a) *Spray-on Mulch Blanket*. Spray on mulch blanket shall be one of the following, unless otherwise shown on the plans:

- (1) Spray-on Mulch Blanket (Type 1) shall be a hydraulically applied matrix containing organic fibers, water soluble cross-linked tackifier, reinforcing natural and/or synthetic interlocking fibers. Mulch Blanket (Type 1) shall conform to the following:

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<b>Properties</b>	<b>Requirement</b>	<b>Test Method</b>
Organic Fibers	71% Min.	ASTM D 2974
Cross linked Tackifiers	10% +/- 2% Min.	
Reinforcing Interlocking Fibers	10% +/- 1% Min.	
Biodegradability	100%	ASTM D 5338
Ground Cover @ Application Rate	90% Min.	ASTM D 6567
Functional Longevity	12 Months Min.	
Cure Time	< 8 hours	
<b>Application</b>		
Application Rate	3,000 lb./acre	

The organic fiber shall not contain lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach. The organic fibers and reinforcing interlocking fibers cannot be produced from sawdust, cardboard, paper, or paper by-products.

- (2) Spray-on Mulch Blanket (Type 2) shall be a hydraulically applied matrix pre-packaged in 50 pound bags containing both a soil and fiber stabilizing compound and thermally processed wood fiber.

The sterilized weed-free wood fiber mulch shall be manufactured through a thermo-mechanical defibrating process containing a specific range of fiber lengths averaging 0.25 inches or longer.

Mulch Blanket (Type 2) shall meet the following requirements:

<b>Property</b>	<b>Requirement</b>	<b>Test Method</b>
Fiber Retention On 28-Mesh Screen	≥ 40%	Tyler Ro-Tap Method
Moisture Content	12% ± 2%	Total Air Dry Weight Basis
Organic Matter	99.2% ± 0.2%	Oven Dry Weight Basis
Ash Content	0.8% ± 0.2%	Oven Dry Weight Basis
pH At 3% Consistency In Water	4.5-7.0 ± 0.5%	
Sterilized Weed-Free	Yes	
Non-Toxic To Plant Or Animal Life	Yes	

The soil and fiber stabilizing compound shall be composed of linear anionic copolymers of acrylamide pre-packed within the bag having a minimum content of 1.0 percent. The compound shall conform to the following:

<b>Property</b>	<b>Requirement</b>
Molecular Weight	≥ 12x10 <sup>6</sup>
Charge Density	> 25%
Non-Toxic To Plant Or Animal Life	Yes

- (b) *Bonded Fiber Matrices (BFM)*. BFM shall consist of hydraulically-applied matrix with a minimum of 70 percent non-toxic thermally processed or refined long strand organic fibers and water soluble tackifier to provide erosion control and designed to be functional for a minimum of 9 months. BFMs form an erosion-resistant

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blanket that promotes vegetation and prevents soil erosion. The BFM shall be 100 percent biodegradable. The binder in the BFM should also be biodegradable. Biodegradable BFMs should not be applied immediately before, during, or immediately after rainfall if the soil is saturated. BFM shall conform to the following requirements:

Property	Requirement	Test Method
Ground Cover (%)	95	ASTM 6567
Bio-degradability (%)	100	ASTM 5338
Functional Longevity (months)	9 month minimum	
Cure Time (hours)	24-48	
Cross-linked tackifier	10% minimum	

Application	
Application Rate (lbs./Acre)	3000

The fibers shall not contain lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, or chlorine bleach. Fiber shall not be produced from sawdust, cardboard, paper, or paper by-products.

In subsection 213.03 (b) 2, delete the second paragraph and replace with the following:

Application Rate: Apply this as an overspray at the following rate or as approved by the Engineer.

Powder	Fiber	Water
200 lbs./Acre	300 lbs./Acre	2000 gal./Acre

In subsection 213.03, delete (f) and replace with the following:

- (f) *Spray-on Mulch Blanket*. Spray-on Mulch Blanket shall strictly comply with the Manufacturer’s mixing recommendations and installation instructions. No chemical additives with the exception of fertilizer, soil pH modifiers, extended-term dyes and bio nutrients will be permitted. Apply Spray-on mulch blanket in a uniform application using a minimum 22 degree arc type nozzle. Apply hydro slurry in two direction (from top of slope down and from toe of the slope up, as well as, be applied at a minimum of two layers).

Hydromulching vessel shall be filled with water to at least 1/3 capacity (high enough to cover agitators) prior to adding any material. Continue to fill vessel with water and slowly add the fibers while agitators are in motion. Run agitators at ¾ speed. Continue to mix tank a minimum of 10 minutes prior to application.

Co-polymer shall not be used use in channels, swales, or other areas where concentrated flows are anticipated and should not be used on saturated soils that have groundwater seeps.

Subsection 213.03 shall include the following:

- (g) *Bonded Fiber Matrices (BFM)*. Bonded fiber matrices shall strictly comply with the Manufacturer’s mixing recommendations and installation instructions. No chemical additives with the exception of fertilizer, soil pH modifiers, extended-term dyes and bio stimulant materials shall be permitted. BFM shall be applied in a uniform application using a minimum 22 degree arc type nozzle. Apply BFM in two direction (from top of slope down and from toe of the slope up, as well as, be applied at a minimum of two layers).

Biodegradable BFMs should not be applied immediately before, during, or immediately after rainfall if the soil is saturated.

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MULCHING

Product shall not be used use in channels, swales, or other areas where concentrated flows are anticipated and should not be used on saturated soils that have groundwater seeps.

Foot traffic, mechanical traffic or grazing shall not be permitted on treated areas until vegetated. Treated areas damaged due to circumstances beyond Contractor's control shall be repaired or re-applied as ordered. Payment for corrective work, when ordered, shall be at contract rates.

In subsection 213.04, delete the first paragraph and replace with the following:

The quantity of hay and straw mulch, wood chip mulch, wood fiber and, spray-on mulch tackifier, bonded fiber matrix and tackifier will not be measured but shall be the quantity designated in the Contract, except that measurements will be made for revisions requested by the Engineer, or for discrepancies of plus or minus five percent of the total quantity designated in the Contract. Measurement for acres will be by slope distances.

In subsection 213.04, delete the fourth paragraph and replace with the following:

Spray-on Mulch Blanket and Bonded Fiber Matrix will be measured by the acre or by the actual pounds of product applied, as shown on the plans. The area will be calculated on the basis of actual or computed slope measurements. The Contractor shall verify prior to application, weight of spray on mulch blanket and bonded fiber matrix bags for certification of materials and application rate.

Subsection 213.05 shall include the following:

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Bonded Fiber Matrix	Acre
Bonded Fiber Matrix	Pound
Spray on Mulch Blanket	Pound

Payment for spray-on mulch blanket and bonded fiber matrix will be full compensation for all work and materials necessary to complete this item.

REVISION OF SECTION 216  
SOIL RETENTION COVERING

Section 216 of the Standard Specifications is hereby deleted for this project and replaced with the following:

**DESCRIPTION**

**216.01** This work consists of furnishing, preparing, applying, placing, and securing soil retention blankets and turf reinforcement mats for erosion control on roadway slopes or channels as designated in the Contract.

**MATERIALS**

**216.02** Soil retention covering shall be either a soil retention blanket or a turf reinforcement mat as specified in the Contract. It shall be one of the products listed on CDOT's Approved Products List and shall conform to the following:

- (a) *Soil Retention Blanket*. Soil retention blanket shall be composed of degradable natural fibers mechanically bound together between two slowly degrading synthetic or natural fiber nettings to form a continuous matrix and shall conform to the requirements of Tables 216-1 and 216-2. The blanket shall be of consistent thickness with the fiber evenly distributed over the entire area of the mat.

When specified lightweight polypropylene netting shall be 1.5 pounds per 1000 square feet; heavyweight netting shall be 2.9 pounds per 1000 square feet.

When biodegradable blanket is specified, the thread shall be 100 percent biodegradable; polypropylene thread is not allowed.

When photodegradable netting is specified the thread shall be polyester, biodegradable or photodegradable.

Blankets and nettings shall be non-toxic to vegetation and shall not inhibit germination of native seed mix as specified in the Contract. The materials shall not be toxic or injurious to humans. Class 1 blanket shall be an extended term blanket with a typical 24 month functional longevity. Class 2 blanket shall be a long term blanket with a typical 36 month functional longevity. The class of blanket is defined by the physical and performance characteristics.

1. *Soil Retention Blanket (Straw-Coconut)*. Soil Retention Blanket (Straw-Coconut) shall be a machine produced mat consisting of 70 percent certified weed free agricultural straw or Colorado native grass straw and 30 percent coconut fiber. The blanket shall be either biodegradable or photodegradable. Blankets shall be sewn together on a maximum 2 inch centers.

Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave unattached at intersections which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom side shall be lightweight polypropylene. The top side shall be heavyweight or lightweight polypropylene.

2. *Soil Retention Blanket (Excelsior)*. Soil Retention Blanket (Excelsior) blanket shall consist of a machine produced mat of 100 percent curled wood excelsior, 80 percent of which shall be 6 inches or longer in fiber length. It shall be either biodegradable or photodegradable. Blankets shall be sewn together at a maximum of 4 inch centers.

Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave unattached at intersections which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom side shall be lightweight polypropylene. The top side shall be heavyweight or lightweight polypropylene.

3. *Soil Retention Blanket (Coconut)*. Soil Retention Blanket (Coconut) shall be a machine produced mat consisting of 100 percent coconut fiber. It shall be either biodegradable or photodegradable.

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Netting shall be as follows:

When biodegradable netting is specified, the top and bottom netting shall be 100 percent biodegradable organic jute fiber. Netting shall be constructed using a weave which is unattached at the intersections, and which allows the strands of the net to move independently of each other.

When photodegradable netting is specified, the bottom and top side shall be heavyweight polypropylene.

**Table 216-1  
PHYSICAL REQUIREMENTS FOR SOIL RETENTION BLANKET –  
PHOTODEGRADABLE OR BIODEGRADABLE BLANKETS**

Photo/Bio Degradable Class	Minimum Roll Width	Minimum Thickness ASTM D 6525	Acceptable Matrix Fill Material	Min. Mass per Unit Area ASTM D 6475	Size of Net Opening	
					Photo-degradable	Bio-degradable
1	6.5 ft.	250 mils	Straw/Coconut	8 oz/sy	Minimum: 0.50"x0.50" Maximum: 0.75"x0.75"	Minimum: 0.50"x0.50" Maximum: 0.5"x1.0"
1	6.5 ft.	250 mils	Excelsior	8 oz/sy	Minimum: 0.50"x0.50" Maximum: 1.0"x2.0"	NONE
2	6.5 ft.	200 mils	Coconut	8oz/sy	Minimum: 0.50" x0.5" Maximum: 0.75"x0.75"	Minimum: 0.50"x0.50" Maximum: 0.5"x1.0"

**Table 216-2  
PERFORMANCE REQUIREMENTS FOR SOIL RETENTION BLANKET –  
PHOTODEGRADABLE OR BIODEGRADABLE BLANKETS**

Photo/Bio Degradable Class	Slope Application "C" Factor <sup>1</sup> ASTM D 6459	Minimum Tensile Strength MD <sup>2</sup> ASTM D 6818
1	< 0.10@3:1	8.33 lb/in
2	< 0.10@3:1	10.42 lb/in
<b>Notes:</b> <sup>1</sup> "C" Factor calculated as ratio of soil loss from soil retention blanket protected slope (tested at specified or greater gradient, 3H:1V) to ratio of soil loss from unprotected (control) plot in large-scale testing. <sup>2</sup> MD is for machine direction testing (along the length of the roll).		

Blankets shall be tested for physical properties and have published data from an independent testing facility.

Large scale testing of Slope Erosion Protection ("C" factor) shall be performed by an independent testing facility.

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SOIL RETENTION COVERING

(b) *Turf Reinforcement Mat.* Turf reinforcement mat (TRM) shall be a rolled mat consisting of UV stabilized, corrosion resistant, non-degradable synthetic fibers, filaments, or nets processed into a permanent three-dimensional matrix of the thickness specified in Tables 216-3 and 216-4. TRMs shall provide sufficient thickness, strength and void space to permit soil filling and retention, and the development of vegetation within the matrix. The class of TRM is defined by the physical and performance characteristics as specified in the following tables.

**Table 216-3  
PHYSICAL REQUIREMENTS<sup>1</sup> FOR TURF REINFORCEMENT MAT**

Product Class	Minimum Roll Width	Minimum Thickness ASTM D 6525	Acceptable Matrix Fill Material <sup>2</sup>	Size of Net Opening <sup>2</sup>
1	6.5 ft.	250 mils	Excelsior, Straw/Coconut, Coconut, or Polymer fibers	Minimum: 0.50"x0.50" Maximum: 0.75"x0.75"
2	6.5 ft.	250 mils	100% UV Stabilized Synthetic or Coconut Fibers	Maximum 0.50"x 0.50"
3	6.5 ft.	250 mils	100% UV Stabilized Synthetic Fibers	Maximum 0.50"x 0.50"

**Notes:**

<sup>1</sup> For TRMs containing degradable components, all property values shall be obtained on the non-degradable portion of the matting alone.

<sup>2</sup> For TRMs with nets and fill material. Netted TRMs shall be sewn together on a maximum 2 inch centers.

**Table 216-4  
PERFORMANCE REQUIREMENTS FOR TURF REINFORCEMENT MAT**

Product Class	Tensile Strength MD ASTM D 6818	Minimum UV Stability @ 500 Hours ASTM D 4355	Minimum Permissible Shear Stress <sup>1</sup> (Unvegetated) ASTM D 6460
1	125 lbs/ft	80%	1.8 lbs/sf
2	150 lbs/ft	80%	2.5 lbs/sf
3	175 lbs/ft	80%	3.1 lbs/sf

**Notes:**

<sup>1</sup> Permissible shear stress is the minimum shear stress that a product must be able to sustain when placed on a channel un-vegetated without physical damage or excess soil loss. Failure is defined as ½ inch of soil loss during a 30 minute flow event in large scale testing.

TRMs shall be tested for physical properties and have published data from an independent testing facility.

Large scale testing of Permissible Shear Stress will be performed by an independent testing facility.

(c) *Staples.* Staples shall be made of ductile steel wire, 0.165 inches in diameter, 8 inches long and have a 1 inch crown. "T" shaped staples will not be permitted.

A sample of the staples and a Certificate of Compliance (COC) including the manufacturer's product data showing that the product meets the Contract requirements shall be submitted for approval at the

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environmental preconstruction conference. Installation of the blanket will not begin until approval has been received from the Engineer in writing.

- (d) *Earth Anchors*. The mechanical earth anchor shall be composed of a load bearing face plate, a tendon rod or wire rope, and a locking head or percussion anchor. Each element of the anchor shall be composed of corrosion resistant materials. The anchor and wire rope shall have a breaking strength of 9,500 pounds utilizing standard tensile testing and ASTM A1007 - 07. The anchor shall have a minimum 1,000 pounds ultimate holding strength in normal soil and a manufacturer's recommended minimum driven depth of 3.5 feet.

A sample of the anchors and a Certificate of Compliance (COC) including the manufacturer's product data showing that the product meets the Contract requirements shall be submitted for approval at the environmental preconstruction conference. Installation of the blanket will not begin until approval has been received from the Engineer in writing.

**CONSTRUCTION REQUIREMENTS**

**216.03** The Contractor shall install soil retention coverings in accordance with Standard Plan M-216-1 and the following procedure:

- (1) Prepare soil in accordance with subsection 212.06 (a).
- (2) Apply topsoil or soil conditioning as directed in the Contract to prepare seed bed.
- (3) Place seed in accordance with the Contract.
- (4) Unroll the covering parallel to the primary direction of flow.
- (5) Ensure that the covering maintains direct contact with the soil surface over the entirety of the installation area.
- (6) Do not stretch the material or allow it to bridge over surface inconsistencies.
- (7) Staple the covering to the soil such that each staple is flush with the underlying soil.
- (8) Ensure that staples or earth anchors are installed full depth to resist pull out. No bent over staples will be allowed. Install anchor trenches, seams, and terminal ends as shown on the plans.

The Contractor shall install TRMs using the following procedure:

- (1) Place 3 inches of topsoil or soil amended with soil conditioning.
- (2) Apply half of the specified seed at the broadcast rate and rake into soil.
- (3) Install TRM
- (4) Place 1 inch of topsoil or soil amended with soil conditioning into the matrix to fill the product thickness.
- (5) Apply the remaining half of the specified seed at the broadcast rate and rake into soil.
- (6) Install soil retention blanket (Photodegradable or Biodegradable Class 1) over the seeded area and TRM.

When applicable, the covering shall be unrolled with the heavyweight polypropylene netting on top and the lightweight polypropylene netting shall be in contact with the soil.

**216.04 Slope Application.** Soil retention coverings shall be installed on slopes as follows:

The upslope end shall be buried in a trench 3 feet beyond the crest of the slope if possible. Trench depth shall be a minimum of 6 inches unless required by the manufacture to be deeper. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and secured with staples or earth anchors at 1 foot on center.

There shall be an overlap wherever one roll of fabric ends and another begins with the uphill covering placed on top of the downhill covering. Staples shall be installed in the overlap.

There shall be an overlap wherever two widths of covering are applied side by side. Staples shall be installed in the overlap.

Staple checks shall be installed on the slope length at a maximum of every 35 feet. Each staple check shall consist of two rows of staggered staples.



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The down slope end shall be buried in a trench 3 feet beyond the toe of slope. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and secured with staples or earth anchors. If a slope runs into State waters or cannot be extended 3 feet beyond the toe of slope, the end of covering shall be secured using a staple check as described above.

Coverings shall be securely fastened to the soil by installing staples or earth anchors at the minimum rate shown on the Standard Plan M-216-1. Staple or earth anchor spacing shall be reduced where required due to soil type or steepness of slope.

**216.05 Channel Application.** Soil retention coverings shall be installed as follows on a channel application:

Coverings shall be anchored at the beginning and end of the channel across its entire width by burying the end in a trench. Trench depth shall be a minimum of 6 inches, unless a larger depth is specified by the manufacturer recommendations. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil and compacted by foot tamping, and seeded. Fabric shall be brought back over the trench and stapled.

Covering shall be unrolled in the direction of flow and placed in the bottom of the channel first. Seams shall not be placed down the center of the channel bottom or in areas of concentrated flows when placing rolls side by side.

There shall be an overlap wherever one roll of covering ends and another begins with the upstream covering placed on top of the downstream covering. Two rows of staggered staples shall be placed.

There shall be an overlap wherever two widths of covering are applied side by side. Staples shall be placed in the overlap.

The covering shall have a channel check slot every 30 feet along the gradient of the flowline. Check slots shall extend the entire width of the channel. The covering shall be buried in a trench. Before backfilling begins, staples shall be placed across the width of the trench. The trench shall then be backfilled to grade with soil amended with soil conditioning or topsoil, compacted by foot tamping, and seeded. Fabric shall be brought back over trench and continued down the channel.

Coverings shall be securely fastened to the soil by installing staples at the minimum rate shown on the plans. Staple spacing shall be reduced where needed due to soil type or high flows.

**216.06 Maintenance.** The Contractor shall maintain the soil retention coverings until all work on the Contract has been completed and accepted. Maintenance shall consist of the repair of areas where damage is due to the Contractor's operations. Maintenance shall be performed at the Contractor's expense. Repair of those areas damaged by causes not attributable to the Contractor's operations shall be repaired by the Contractor and will be paid for at the contract unit price. Areas shall be repaired to reestablish the condition and grade of the soil and seeding prior to application of the covering.

#### METHOD OF MEASUREMENT

**216.07** Soil retention coverings, including staples, complete in place and accepted, will be measured by the square yard of finished surface, excluding overlap, which is installed and accepted. Earth Anchors will be measured by the actual number of earth anchors complete in place and accepted.

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 REVISION OF SECTION 216  
 SOIL RETENTION COVERING

**BASIS OF PAYMENT**

**216.08** The accepted quantities of soil retention coverings will be paid for at the contract unit price per square yard. The accepted quantities of earth anchors will be paid for at the contract unit price per each installed.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Soil Retention Blanket ( ) (Photodegradable Class _)	Square Yard
Soil Retention Blanket ( ) (Biodegradable Class _)	Square Yard
Turf Reinforcement Mat (Class _)	Square Yard
Earth Anchors	Each

Preparation of seedbed, fertilizing, and seeding will be measured and paid for in accordance with Section 212.

Placing and preparation of seedbed, fertilizing, and seeding of soil under the TRM layer will be measured and paid for in accordance with Section 212.

Topsoil or amended soil and seed placed on the TRM will be measured and paid for in accordance with Sections 207 and 212.

Staples will not be measured and paid for separately, but shall be included in the work.

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Section 250 of the Standard Specifications is hereby deleted for this project and replaced with the following:

**DESCRIPTION**

**250.01** This work consists of protection of the environment, persons, and property from contaminants that may be encountered on the Project. This includes monitoring the work for encounters with contaminants or suspected soil and groundwater contaminants; the management of solid, special, and hazardous waste; and management of visual emissions associated with hazardous waste, when encountered on the project.

**250.02** The Contractor shall furnish all personnel, materials, equipment, laboratory services and traffic control necessary to perform the contamination monitoring, testing, and site remediation when required. Traffic control shall be in accordance with the requirements of Section 630.

Monitoring equipment used to detect flammable gas, oxygen level, and toxic gas shall be capable of detection to meet the following standards:

Instrument Detection		
Constituent	Threshold Limit	Increments
Flammable Gas	1% LEL	1%
Oxygen	19%	0.1%
Toxic Gas	1 PPM	1 PPM
LEL = lower explosive limit PPM = parts per million		

**CONSTRUCTION REQUIREMENTS**

**250.03 General.** Prospective bidders, including subcontractors, are required to review the environmental documents available for this project. These documents are listed in subsection 102.05 as revised for this project.

This project may be in the vicinity of property associated with petroleum products, heavy metal based paint, landfill, buried foundations, abandoned utility lines, industrial area or other sites which can yield hazardous substances or produce dangerous gases. These hazardous substances or gases can migrate within or into the construction area and could create hazardous conditions. The Contractor shall use appropriate methods to reduce and control known landfill, industrial gases, and visible emissions from asbestos encounters and hazardous substances which exist or migrate into the construction area. The Contractor shall follow CDOT's *Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011* for proper handling of asbestos-contaminated soil, and follow all applicable Solid and Hazardous Waste Regulations for proper handling of soils encountered that contain any other substance mentioned above.

Encountering suspected contaminated material, including groundwater, old foundations, building materials, demolition debris, or utility lines that may contain asbestos or be contaminated by asbestos, is possible at some point during the construction of this project. When suspected contaminated material, including groundwater, is encountered or brought to the surface, the procedures under subsection 250.03(d) and 250.05 shall be followed.

Transportation of waste materials on public highways, streets and roadways shall be done in accordance with Title 49, Code of Federal Regulations (CFR). All labeling, manifesting, transportation, etc. of waste materials generated on this project shall be coordinated with the Engineer. All hazardous waste manifests for waste materials generated on this project shall list the Colorado Department of Transportation as the generator of the waste materials except as otherwise noted. If the Contractor contaminates the site, the Contractor shall be listed as the generator on the hazardous waste manifests, permits, and other documents for such material. If the project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator.

If waste materials must be handled in a permitted treatment, storage and disposal (TSD) facility, the facility shall

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be designated in writing by the Engineer. If the waste materials are the result of the Contractor's actions, the Contractor shall designate the facility.

The hazardous waste transportation phase of the work involves insurance required by law and regulations. If the waste materials are determined to be hazardous, the Contractor must submit proof that the transportation company is covered by the appropriate type and amount of insurance required by laws and regulations governing the transportation of hazardous waste.

The Contractor alone bears the responsibility for determining that the work is accomplished in strict accordance with all applicable federal, state and local laws, regulations, standards, and codes governing special waste, petroleum and hazardous substance encounters and releases.

The Contract will list known or suspected areas of contamination. Health and Safety Officer, Monitoring Technician, and Health and Safety Plan shall be required when so stated in the Contract.

(a) *Health and Safety Officer (HSO)*. The Contractor shall designate a HSO, not the project superintendent, who shall have at least two years field experience in chemical related health and safety. The HSO shall be either a certified industrial hygienist (CIH), certified hazardous materials manager (CHMM), professional engineer (PE) licensed in the State of Colorado, certified safety professional (CSP), or registered environmental manager (REM) meeting the criteria set forth in 29 CFR 1926. When asbestos is present or is suspected to be present, the HSO shall have additional training and certification in accordance with the Air Quality Control Commission Regulation No. 8 Part B. The HSO shall meet the minimum training and medical surveillance requirements established by the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) for a supervisory Site Safety Official per 29 CFR 1962.65. The Contractor shall furnish documentation to the Engineer, at the preconstruction conference, that the above requirements have been met. 250.03.

The HSO shall *be* equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d)2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Depth gauging equipment, sampling equipment and sampling containers.
- (4) Personal protective equipment (levels C and D) when required.

The HSO shall recommend and supervise those actions which will minimize the risk of hazardous substance related injury to the workers, Department personnel, the general public, property and the environment. Hazardous substance is defined in 29 CFR 1926.32. The HSO shall prepare written procedures for the monitoring of confined space entry and working in or near excavations, including but not limited to trenches and drill holes associated with this project. The HSO shall conduct or supervise all hazardous substance and solid waste related testing, sampling, monitoring and handling for this project to ensure compliance with applicable statutes and regulations, and other applicable environmental requirements under subsections 107.01 and 107.02.

The HSO shall be available for consultation and assistance with contaminated materials related testing, sampling, and field monitoring as required by the Engineer.

The HSO shall prepare and submit a bound and indexed final site report to the Engineer at the end of the project. This site report shall include a detailed summary of all contaminated materials and contaminated water that were encountered and their final disposition.

During each week the HSO is utilized, the HSO shall prepare a daily diary which shall be submitted to the Contractor and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project

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including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (b) *Monitoring Technician (MT)*. The Contractor shall designate a monitoring technician to be responsible for monitoring of hazardous substances during work on the project. The MT shall have a minimum of two years of actual field experience in assessment and remediation of hazardous substances that may be encountered during highway construction projects. The MT shall be experienced in the operation of monitoring devices, identifying substances based upon experience and observation, and field sampling (for testing) of all media that may be found on the site. Completion of the 40 hour hazardous waste and 8 hour supervisory training required by OSHA and U.S. EPA rules and regulations which complies with the accreditation criteria under the provisions of the proposed 29 CFR 1910.121 is required prior to beginning work. The Contractor shall furnish documentation at the Preconstruction Conference that demonstrates these requirements have been met.

The MT shall be equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d)2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Personal protective equipment (levels C and D) when required.

The MT shall be present on site and perform monitoring as required by 250.03(d) when work is being performed in areas of suspected contamination and on a predetermined basis throughout other work on the project.

The MT shall monitor for compliance with regulations, the project Health and Safety Plan and the Materials Management Plan (if they exist for the project), the Contract, and the environmental documents for the project. The MT shall immediately notify the Contractor, the Engineer and the HSO of any hazardous condition.

During each week the MT is utilized, the MT shall prepare a daily monitoring diary which shall be submitted to the Contractor, HSO and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (c) *Health and Safety Plan (HASP)*. The HSO shall prepare a written HASP for the project, formatted as shown in Appendix B, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, DHHS (NIOSH) Publication Number 85-115, available from the Superintendent of Documents, U.S. Government Printing Office. The Contractor and the HSO shall review the environmental documents listed prior to preparation of the HASP.

Four signed copies of the HASP shall be furnished to the Engineer for acceptance. The Engineer shall have seven calendar days to review and accept or reject the proposed HASP. Within five calendar days after acceptance, the HSO shall distribute signed and stamped (or sealed) copies of the accepted HASP to each emergency response agency servicing the project area, the HASP designated emergency hospital, and five copies to the Engineer. Earth or demolition work shall not occur until after the HASP is accepted and the HASP has been distributed. The HASP shall also be available to the Contractor's employees, their representatives, and officials of OSHA, EPA, Colorado Department of Public Health and Environment (CDPHE), local government health department, Federal Highway Administration, and other appropriate agencies and officials as may be designated by the Engineer. The Engineer will distribute the accepted HASP to appropriate Department personnel. The HASP shall be kept current and shall be revised by the

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HSO as warranted by changes in the field conditions.

All on-site workers (Contractor's, Department's, Utilities', and others) shall be briefed by the HSO on the contents of the HASP and any revisions thereof. The HSO shall conduct briefings (group or individual) to inform new employees, subcontractors, utility companies and other on-site workers of the HASP contents prior to their entry on site. All personnel involved in excavation or other soil disturbing activities shall receive the required two-hour Asbestos Awareness training by a Certified Asbestos Inspector, when asbestos discoveries are anticipated, or discoveries are made. A signature log of all briefing attendees shall be kept and furnished to the Engineer. The Contractor shall provide, as required, eye wash equipment and stations, emergency showers, hand and face washing facilities and first aid equipment.

The Contractor shall provide, as required, decontamination facilities for personnel and equipment employed in the work. The exact procedure for decontamination and frequency shall be included in the accepted HASP. Decontamination facilities shall meet the criteria set forth in the Code of Federal Regulations (29 CFR and 40 CFR).

- (d) *Precautions and Procedures.* The following minimum precautions and procedures shall be followed during the construction of the project:
1. General construction precautions:
    - A. All monitoring and piezometer wells and test borings shall be established or abandoned by the Contractor as regulated by the State Engineer's Office. Copies of all required permits, notification, and abandonment documents shall be submitted to the Engineer prior to payment approval.
    - B. Hazardous substance related activities shall have a work plan for each work phase which shall be coordinated with the Engineer at least three working days prior to commencement of each phase of the work.
    - C. The Contractor shall properly handle all investigation derived waste generated by this project. Documentation shall be submitted to the Engineer of all tests performed for Treatment, Storage and Disposal (TSD) determination; classification of waste; hauling records; TSD acceptance; manifest (if required); etc. in accordance with applicable laws and regulations.
    - D. When the work may involve air emissions, the Contractor shall contact the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division to ascertain if an air pollution emission notice (APEN) or permit is required for this operation. The Contractor shall be responsible for filing the APEN and obtaining said permit, if required. The processing of air pollution permits, if required, in non-attainment areas or where public hearings are required, likely will take more than 90 days.
  2. For construction on a known or potentially contaminated site, the following conditions shall apply, in addition to those listed in subsection 250.03(d)1:
    - A. The HSO shall be on site or readily available by radio, telephone or pager at all times during the work. When on site, the HSO shall have an operational portable or mobile cellular telephone available for immediate use in areas where such service is available. When on site in cellular telephone non-service areas, the HSO shall have available, for immediate use, radio access to a site with telephone service. The HSO shall be notified at least 24 hours prior to the start of confined space entry, storage tank removal, drilling, excavation, trenching, or dewatering operations.
    - B. The HSO shall designate the onsite monitoring equipment for flammable gases, oxygen deficient or enriched atmosphere, and toxic gases, such as but not limited to, a flame ionization detector, photoionization detector, combustible gas indicator, and oxygen meter. This designated equipment shall be on site during all construction operations and be utilized during trenching, drilling, excavating, confined space entry, underground storage tank removal, and other appropriate construction operations. The exact equipment to fulfill this requirement shall be specified in the accepted HASP.

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The HSO shall conduct or supervise the monitoring. The monitoring equipment shall be calibrated as recommended by the manufacturer.

- C. When drilling, trenching, or excavating in the presence of detectable concentrations of explosive gases, the soil shall be wetted and the operating equipment shall be provided with spark proof exhausts.
  - D. The Contractor, through the HSO, is responsible for ensuring that 29 CFR 1926 is fully complied with during the construction of the project.
  - E. Affected excavation operations shall be discontinued and personnel shall be removed from the affected excavation sites where any of the following levels are detected:
    - (1) 20.0 percent or more LEL flammable gas, or 10.0 percent in an underground or confined space,
    - (2) Permissible Exposure Limit (PEL) of any toxic gas,
    - (3) 19.5 percent or less oxygen,
    - (4) 25.0 percent or more oxygen,
    - (5) Greater than 2 mrem/hr. (Beta particle & photon radioactivity),
    - (6) Greater than 15 pCi/L (Gross alpha particle activity), or
    - (7) Other action levels as determined by the HSO.
    - (8) Uncovering of suspect Asbestos Containing Material (ACM), including but not limited to, buried facility components, active or abandoned utility lines, buried foundations and demolition debris, or miscellaneous ACM dispersed in the soil. The Contractor shall follow the procedures outlined in the HASP and 29 CFR 1926 to address these conditions. Work shall resume in these areas when approved by the Engineer.
  - F. Personnel shall be issued and utilize appropriate Health and Safety equipment as determined by the HSO, who shall provide the Engineer with a written explanation of what personal protective equipment (PPE) shall be worn, when, and by which personnel. Except in emergency cases, the Engineer shall be advised by the HSO of changes in the degree of PPE prior to implementation.
  - G. Personnel shall avoid the area immediately downwind of any excavation unless the excavation is monitored and declared safe.
  - H. The operators of excavating, trenching, or drilling equipment shall wear appropriate PPE as required in the HASP.
  - I. Exhaust blowers shall be present at the location where required in the accepted HASP.
  - J. The Contractor shall accomplish the work with employees who have been trained and equipped as required by the HASP and applicable provisions of 29 CFR 1910 and 29 CFR 1926.
  - K. Fire extinguishers, electrical equipment and wiring shall conform to the applicable requirements of 29 CFR 1926 and 49 CFR.
  - L. Smoking shall not be permitted within 50 feet of any excavation.
3. For construction within 1000 feet of a known or potentially contaminated site, the following conditions, in addition to those listed in subsection 250.03(d) 1. shall apply:
- A. The areas under construction shall be checked with a combustible gas indicator before excavation begins to determine if flammable or combustible gas is in the area.
  - B. Excavations, trenches and drill holes shall be monitored by the HSO for flammable gas, toxic gas and oxygen deficiency or enrichment. This shall be carried out continuously unless the presence of flammable, combustible or toxic gas, or oxygen deficiency or enrichment in the area can be ruled out by the HSO. The recommendation to discontinue monitoring must be agreed to by the Engineer and the Contractor. Prior to implementation, this agreement shall be written, and shall contain specific

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conditions that will require re-evaluation of the area.

- C. When flammable or toxic gas is found in the area, those precautions and procedures in subsection 250.03(d)2 shall apply.
4. The following procedures shall be followed if the level of contamination as documented in the environmental documents referenced in subsection 102.05 as revised for this project is exceeded, or if previously unidentified contaminated air, soil or water, is encountered during the construction of the project:
- A. Work in the immediate area of the release or discovery of contamination shall cease. The Engineer shall be immediately notified.
- B. If no HSO is required by the Contract, the Contractor shall designate an HSO as directed, in accordance with subsection 250.03(a).
- C. The Engineer may direct the HSO to evaluate the material for potential hazardous substance or other contamination or unsafe conditions. This evaluation may include, but is not limited to, on site field monitoring, on site testing, and on or off site laboratory analysis. Removal of storage tanks and surrounding contaminated soils shall be in accordance with applicable laws, regulations and established procedures. If the contaminated material cannot be placed in the embankment or remediated on site, it must be removed to an appropriate TSD facility, as designated in writing by the Engineer. The HSO shall supervise the necessary testing required to make appropriate TSD determinations. Disposal of the unsuitable material shall be considered as remediation work as described in subsection 250.03(d)4.D and 250.03(d)4.E.
- D. If this site is determined to be contaminated with petroleum products, hazardous substances or other solid waste in excess of that indicated in the above listed site investigation documents, a thorough Site Investigation and Waste Management Plan shall be accomplished under the supervision of the HSO. The Site Investigation and Waste Management Plan shall be submitted to the Engineer for approval and shall determine the extent of contamination and propose at least three types of remedial action for the contaminated area as required by applicable statutes and regulations. The HSO shall be available to assist the Engineer in explaining this study to the regulatory agencies. When requested by the Engineer, the Contractor shall prepare a Remediation Plan based on the selected remedial method, and shall submit this to the Engineer for approval. The time required for the Engineer's review of the Remediation Plan, including all necessary drawings, calculations, specifications, and other documentation will not exceed four weeks after a complete submittal is received. This work shall not be done unless authorized in writing by the Engineer.
- E. If the site is determined to be contaminated with petroleum products; hazardous chemicals, materials, or wastes; or other solid wastes, and is required to be remediated, the HSO or other qualified individuals will supervise the Remediation Plan implementation as concurred to by the regulatory agencies, as directed. Hazardous Waste generated by remedial activities shall list the Colorado Department of Transportation as the hazardous waste generator on the required paperwork for projects on State Highways and their associated frontage roads. If this project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator. If the waste disturbed or produced was caused by Contractor negligence, the Contractor shall be listed as the hazardous waste generator. Remediation work shall be done only when authorized by the Engineer in writing.

**250.04 Heavy Metal Based Paint Management.** When the work includes the removal of paint or items covered with paint which may contain lead, chromium or other heavy metals, the requirements of this subsection shall apply in addition to the requirements of subsection 250.03.



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The requirements of the HASP shall be in accordance with OSHA Publication Number 3142, *Working with Lead in the Construction Industry*.

Paint Removal and Waste Disposal work shall be performed in accordance with 29 CFR 1926.62, State and local air quality regulations, the Steel Structures Painting Council (SSPC) Guide for Containing Debris Generated During Paint Removal Operations, the *Industrial Lead Paint Removal Handbook* (SSPC 91-18), and the references contained therein.

The following minimum precautions and procedures shall be followed unless modified in the approved HASP or its updates:

- (a) The Contractor shall contact the CDPHE, Air Pollution Control Division to ascertain if an air pollution permit is required for the cleaning or demolition work. If an air pollution permit is required, the Contractor shall obtain the permit. The Contractor shall furnish the Engineer with a copy of the permit application and the permit issued prior to starting cleaning or demolition activities. A copy of the Air Pollution Emission Notice [APEN] shall be provided to the Engineer, if such notice is required under the Colorado Air Quality Control Commission's regulations. The processing of air pollution permits in non-attainment areas, or where public hearings are required, likely will take more than 90 days.
- (b) The Contractor shall contain paint chips, corrosion residues, and spent abrasives, herein referred to as waste materials, resulting from the cleaning or demolition operations. The Contractor shall not deposit or release waste material into the water, air or onto the ground below or adjacent to the structure. The Contractor shall conduct cleaning operations to minimize the waste materials produced. Prior to beginning the work, the Contractor shall submit to the Engineer for acceptance, a detailed methods statement for capturing, testing, and disposing of the removed materials. The Engineer will have seven calendar days to review, and accept or reject this methods statement.
- (c) Abrasives utilized for blast cleaning shall be low-dusting and low waste. Unless approved otherwise, vacuum blasting or wheel blasting shall be used.
- (d) The HSO shall sample and test the waste material for lead, chromium, and other paint associated heavy metals using the Toxicity Characteristic Leaching Procedure (TCLP) Test, Method 1311 of the EPA publication, Test Methods for Evaluating Solid Waste 846. Sample collection methodology and frequency shall be recommended by the HSO and accepted by the Engineer with an adequate number of samples taken to be representative of all waste material collected. If the waste material does not pass the TCLP test, it shall be disposed of in a permitted TSD facility as designated in writing by the Engineer. The waste materials handling decision shall be documented by a report (five copies) submitted to the Engineer. This documentation shall include a description of sample collection methodology, testing performed, test results and comparison of test results with hazardous waste requirements. The waste material shall not be held at an unpermitted TSD facility site in excess of Resource Conservation and Recovery Act (RCRA) temporary storage time limits.
- (e) When an item coated with paint is removed, all loose paint shall be removed and collected from the item within 24 hours of the time it is removed or placed onto the ground. All loose paint shall be removed and collected from a painted item before it is removed from the site. The Contractor shall contain loose paint until it is removed and collected. Loose paint is defined as that which can be removed by manual scraping methods. Over waterways, the Contractor shall capture all paint debris by the method specified in the methods statement. The paint debris shall be collected on a daily basis and shall be stored in a properly labeled, tightly sealed container and placed in a secured location at the end of each working day.
- (f) All painted steel components which are not designated to be salvaged shall be recycled. Contractor possession of the steel for future use shall be considered a form of recycling. Prior to transport of the components off-site, the Contractor shall obtain a letter from the recipients of the painted steel components stating that they have been fully informed of the contents of the paint and are capable of handling the paint. If the Contractor is to maintain future possession of the steel, the Contractor shall supply this letter. If there will

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be more than one recipient of the painted material, one letter shall be obtained from each recipient. The Contractor shall provide a copy of each letter to the Engineer. If the painted steel components will be recycled by melting, the letter from the recipient is not required. The Contractor shall submit a letter stating the destination of the painted steel components and that they will be melted.

- (g) When the work consists of the removal of a bridge or components of a bridge coated with paint which has been assumed to contain lead, chromium, other heavy metals, or a combination thereof the Contractor shall capture paint debris which is dislodged during removal operations. The Contractor may choose any method for dismantling the bridge, subject to the following required construction sequence limitations:
- (1) The concrete deck shall be removed prior to removal of the steel superstructure.
  - (2) If the methods statement indicates that girders will be dropped to the ground during dismantling, all debris from the concrete deck removal operation shall be removed from the area below the bridge before any girders are dropped into this area.
  - (3) Girders may be cut and dropped only if the span is located entirely over land.

**250.05 Material Handling.** This work consists of the additional handling of groundwater and soils to be excavated for construction of the project which are suspected or known to be contaminated. This work also includes stockpiling or containerization, analytical sampling and testing, and final disposition of contaminated groundwater and soils requiring special handling.

The Contractor shall maintain vertical trench walls for the work in the specified areas of known or potential contamination, as shown on the plans. Shoring may be necessary to meet this requirement. The Contractor shall confine the removal of contaminated groundwater and soils encountered as a result of the excavation activities in the specified areas to the vertical and horizontal limits of structure excavation specified in the Contract. The Contractor shall be responsible for any contaminated materials generated beyond the limits of excavation. This shall include any sampling, analysis, and disposal required, and the costs thereof. The Contractor shall be listed as the generator of any such material. The limits of excavation shall be determined as 18 inches outside of structures, including sewers, water lines, inlets, manholes, and other underground structures to be constructed, or as directed.

Specific areas of known or potential contamination have been identified in the project plans. There is the potential of encountering contaminated groundwater and soil, which has not been summarized in the plans or specifications, at unknown locations on the site. Suspected contaminated soil and groundwater shall be handled by one of three methods as follows:

- (a) *Materials Handling (Stockpile & Containerization).* When recommended by the HSO and authorized by the Engineer, material shall be stockpiled or containerized for analysis and characterization for proper handling and disposal, or both. Sampling and testing of materials shall be as described in the Contract. If analysis indicates that soil samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the associated soils will not require any special handling and will become the property of the Contractor and may be used on site, subject to other requirements of the Contract. Health and safety monitoring and strict fugitive dust control shall be conducted during the placement of these soils. If analysis indicates that groundwater samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the groundwater shall be handled in accordance with subsection 107.25.

Stockpiled and containerized materials shall be secured in compliance with the following provisions until they are determined to be uncontaminated:

1. The Contractor shall not store the material for more than 90 days.
2. The Contractor shall prevent any runoff from infiltrating the ground or running out of the containment area.

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3. Soils and groundwater containing different contaminants shall be placed in separate containers or stockpiles.
  4. The Contractor shall prevent the dispersion of materials or the dilution or mixing of containers and stockpiles.
  5. The ground surface on which the contaminated soils will be placed shall be covered with plastic sheeting which will withstand the placement and removal of stockpiled materials without breaching.
  6. The ground surface shall be graded to drain toward the edge of the soil piles and the berm or trench around them shall be covered by plastic sheeting.
  7. Proper security shall be provided in accordance with 40 CFR.
- (b) *Solid Waste Disposal.* Soils determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall haul this material to a solid waste disposal facility.
- (c) *Contaminated Groundwater Disposal.* Groundwater determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall prepare a dewatering plan proposing at least three types of treatment and/or disposal options of contaminated groundwater as required by applicable statutes and regulations. One of the treatment options shall include permitting and onsite treatment prior to discharge or disposal. The dewatering plan shall be submitted to the Engineer for approval four weeks before dewatering activities begin.
- (d) *Hazardous Waste Disposal.* Soils and groundwater that are designated or suspected to be hazardous shall be containerized *immediately* upon excavation or upon discovery. Hazardous material shall be labeled and transported to a permitted treatment, storage and disposal (TSD) facility or to a hazardous waste disposal facility approved by the Engineer.
- (e) *Additional Requirements.* Stockpiled or containerized material characterized as uncontaminated, contaminated or hazardous shall be stored and disposed of in a manner consistent with current established federal, state, and local regulations for waste materials.

Materials with contaminants not specifically regulated shall be disposed of by the Contractor as directed, in consultation with CDPHE. All areas where wastes are generated shall be reviewed by the HSO to identify potential contaminant sources that may result in a contaminated waste stream.

Contaminated groundwater and soils, which have been identified as solid waste or hazardous waste, requiring disposal according to federal, state, and local regulations, shall be transported in accordance with 49 CFR by the Contractor to an appropriately permitted treatment facility, landfill, incinerator or asphalt plant or other facility approved to accept the waste. CDPHE and the landfill or other treatment or disposal facility shall be notified by the HSO of the material to be disposed of and the corresponding analytical test results prior to shipment. Potentially contaminated water collected from the lined trench of a stockpile shall be treated as required by Colorado Wastewater Discharge Permit System (CDPS) permits, 29 CFR and 40 CFR and reimbursed separately in accordance with Contract requirements.

**250.06 Sample delivery.** This work consists of the collection, containerization and delivery of material samples for analysis to the testing facility designated in the Contract.

Environmental Protection Agency (EPA) protocol and standards shall be followed in the collection, containerization and transport of samples to be analyzed, including the documentation of the proper chain of custody of all samples. The Contractor shall collect sufficient sample material to perform the required analysis and is responsible for ensuring that appropriate climate control has been provided for sample transport. Sample delivery shall be made within the maximum allowable holding time for each sample type, not to exceed 24 hours,

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excluding weekends. The time period required for sample collection and delivery to the testing facility will not be considered an excusable delay. The analysis to be completed and turnaround time shall be approved by the Engineer.

The Contractor shall provide the Engineer with a copy of documentation indicating that proper chain of custody requirements have been followed for all samples.

Quality control samples shall be provided by the Contractor in accordance with the quality control requirements of the testing facility designated in the Contract (quality control requirements are available from the Engineer). The Contractor shall prepare, label and transport these samples to the testing facility in conjunction with the delivery of other samples authorized for analysis by the Engineer, at no additional cost.

The Engineer may request splits of samples, in advance of collection, which shall be provided at no additional cost by the Contractor.

**250.07 Asbestos-Containing Material Management.** Environmental documents or plans listed in the special provisions should include known or suspected locations that could involve encounters with ACM during excavation and other soil disturbing construction activities. Unexpected discoveries of ACM may be made during excavation and soil disturbing construction activities. Asbestos contaminated soil, shall be properly managed or remediated, in accordance with subsection 250.07(a).

All asbestos related activities shall be performed by Colorado certified asbestos professionals, contractors, or consultants. Certifications are issued by the Colorado Department of Public Health and Environment (CDPHE), Indoor Air Quality Unit. A Colorado Certified Asbestos professional shall manage the management and disposal of asbestos contaminated soil and other ACM. The Indoor Air Quality Unit within CDPHE is the only unit that certifies such professionals. The Contractor shall furnish a copy of the license to the Engineer.

- (a) *Regulatory Compliance.* Asbestos contaminated soil management is governed by 6 CCR 1007-2, Section 5, which includes and references regulatory compliance with Asbestos Hazard Emergency Response Act (AHERA) Colorado *Regulation 8*; Inspection and reporting protocol and demolition standards are governed by AHERA; Demolition and notification standards are governed by National Emission Standards for Hazardous Air Pollutants (NESHAPS); Colorado Regulation 8 governs all asbestos activities, demolition, permitting, and certification of Certified Asbestos Professionals in the State of Colorado. Colorado Regulation 8 is more stringent than AHERA and NESHAPS and supersedes federal regulations. Conflicting regulatory requirements between AHERA and NESHAPS, if not specifically addressed in Colorado Regulation 8, shall be addressed and approved protocol negotiated with CDPHE. The Contractor shall conform to all current regulations, policy directives, or both, issued by the EPA, CDPHE, and the Department.
- (b) *Asbestos Management and Visual Inspections* Asbestos management must be performed by a certified asbestos professional. Final Inspections of the area of asbestos contaminated soil removal shall be performed by an Asbestos Consultant to determine what, if any, controls must be instituted to allow future activity in the excavation area. All final visual inspections shall be conducted only when soil is dry.
- (c) *Permitting and Notification.* The CDPHE requires notification of any soil disturbing activity where asbestos is known, suspected, or discovered. A 24-hour notification to CDPHE is required prior to any soil disturbing activity of an unplanned asbestos discovery. A 10 working day notification to CDPHE is required prior to any soil disturbing activity in an area with known or potential material suspected of containing asbestos in or on the soil or asbestos-contaminated soil. Removal of asbestos-containing material on a facility component, that is located on or in soil that will be disturbed, with asbestos quantities above the following trigger levels must be permitted and abated in accordance with the requirements of Air Quality Control Commission Regulation No. 8 (5 CCR 1001-10, Part B):

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- (1) 260 linear feet on pipes,
- (2) 160 square feet on other surfaces, or
- (3) The volume of a 55-gallon drum.

All permit applications shall be submitted to the Colorado Department of Public Health and Environment a minimum of 10 days prior to start of work for approval. The permit application and notification shall be submitted simultaneously. The Contractor shall obtain all required State and local permits and shall be responsible for all associated fees. Permit application, notification, and waiver request forms shall be submitted to:

Colorado Department of Public Health and Environment Permit Coordinator/APCD - SS - B1 4300  
Cherry Creek Drive South Denver, CO 80246-1530 Phone: (303) 692-3100 Fax: (303) 782-0278

Application and waiver forms are available on the CDPHE website: [asbestos@state.co.us](mailto:asbestos@state.co.us)

- (d) *CDOT's Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011.* Asbestos contaminated soil shall be managed in accordance with 6 CCR 1007-2, Section 5, Asbestos Waste Management Regulations. Regulations apply only upon discovery of asbestos materials during excavation and soil disturbing activities on construction projects, or when asbestos encounters are expected during construction. The contractor shall comply with procedures detailed in the CDPHE's Asbestos-Contaminated Soil Guidance Document and CDOT's approved *Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011*, including the following minimum requirements:
- (1) Immediate actions and implementation of interim controls to prevent visible emissions, exposure, and asbestos contamination in surrounding areas.
  - (2) Soil Characterization.
  - (3) Training required for all personnel involved in excavation and other soil disturbing activities, once asbestos is encountered during construction or on projects where asbestos encounters are expected. Asbestos Awareness Training shall be given by a qualified and certified Asbestos Building Inspector with a minimum of six months experience inspecting asbestos contaminated soil.
  - (4) Assessment for the presence and extent, within the proposed area of disturbance, of asbestos discoveries, whether expected or unexpected, by a Certified Asbestos Inspector.
  - (5) Investigation and sampling required for risk assessment and management. Investigation, if required, shall be conducted by a Certified Asbestos Inspector.
  - (6) Risk assessment and determinations for further management or abatement.
    - (i) Risk assessment and determinations must be made by a Certified Asbestos Inspector, and coordinated with the Engineer.
    - (ii) Soil remediation is not necessarily required, depending on the circumstances.
  - (7) Submit 24-hour Notification of Unplanned Asbestos Discovery.
  - (8) Submit 10-day Notification of Planned Asbestos Management.
  - (9) Submit 24-hour Notification of Unplanned Asbestos Discovery.
  - (10) Submit 10-day Notification of Planned Asbestos Management.

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- (e) *Risk Assessment and Determinations for Further Management Or Remediation.* Risk assessment and determinations for further management or remediation must be closely coordinated with the Project Engineer and Project Manager of the Statewide Management Plan.

**250.08 Methamphetamine Lab Sites.** Demolition of former Methamphetamine (meth) labs is enforced by the Governing Authority, which varies from county to county. The Contractor shall demolish all buildings that are identified as former meth labs, as listed in public listings by the Governing Authority. The Contractor shall provide evidence of demolition to the Governing Authority, obtain receipt of such evidence by the Governing Authority, and shall submit these to Engineer immediately following demolition.

Septic tank removal at known meth lab sites shall undergo preliminary assessment by an Industrial Hygienist or Certified Industrial Hygienist to determine proper removal and disposal. Work shall proceed in accordance with the recommendations of the Hygienist.

#### METHOD OF MEASUREMENT

**250.09** Environmental Health and Safety Management will not be measured, but will be paid for on a lump sum basis. This will include all work, materials, and hourly time charges by the HSO and other personnel required to accomplish the following:

- (1) Preparation, submittal and briefing of the initial HASP
- (2) Preparation and submittal of the Waste Management Plan
  1. Preparation and Submittal of the Dewatering Plan
  2. Preparation and Submittal of the Remediation Plan
- (3) Procedures and equipment specified in subsections 250.03 - 250.07
- (4) PPE (Levels C and D) for Contractor's personnel for any contamination identified in the preconstruction investigations
- (5) Preparation and submittal of the final site report

The quantity to be measured for Health and Safety Officer will be the total number of hours that the Health and Safety Officer is actually used, as authorized, for the following work:

- (1) Field monitoring necessary to ensure the safety of workers on the site;
- (2) Hours in excess of the items listed under Environmental Health and Safety Management;
- (3) Hours that are necessary due to unforeseen site conditions; and
- (4) Hours of additional consultation or field work that is requested by the Engineer.

Equipment specified in subsection 250.03(a), preparation and submittal of the daily HSO diary, travel to and from the project site, and PPE (Levels C and D) required for use by the HSO will not be measured and paid for separately, but shall be included in the hourly cost of the HSO.

The quantity to be measured for Monitoring Technician will be the total number of hours that Monitoring Technician is actually used as authorized. Equipment specified in subsection 250.03(b), supervision of the MT, preparation and submittal of the daily monitoring diary, travel to and from the project site, and PPE required for use by the MT (Levels C & D) will not be measured and paid for separately, but shall be included in the hourly cost of the MT.

Solid stockpiled materials will be measured by the cubic yard computed from cross sections by the average end area or other requirements acceptable method. Disposal of solid waste and solid hazardous waste materials will be measured by the cubic yard in the disposal container.

Materials Sampling and Delivery will be measured by the actual number of samples collected, containerized and transported to the testing facility indicated in the Contract.

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Additional environmental health and safety management work required and authorized by the Engineer, but not included in the items listed above, will be considered extra work to be paid for in accordance with subsection 109.04, unless such work is caused by the Contractor's action.

**BASIS OF PAYMENT**

**250.10** Partial payment for Environmental Health and Safety Management, as determined by the Engineer, will be made as the work progresses. The Contractor shall submit a schedule of environmental related Health and Safety Management work before the first partial payment is made. The schedule shall indicate the environmental related Health and Safety Management time for each work item that requires Contractor environmental related Health and Safety Management effort and the total time for the project.

The accepted quantity for Health and Safety Officer will be the number of hours actually used and approved for payment by the Engineer and will be paid for at the contract unit bid price.

The accepted quantity for Monitoring Technician will be the number of hours of onsite monitoring as approved by the Engineer and will be paid at the Contract unit price.

Environmental Health and Safety Management, Health and Safety Officer and Monitoring Technician bid items shall include vehicles, phone charges, supplies, printing, postage, office support, and all other miscellaneous costs associated with the work.

Payment for Groundwater Handling (Containerization & Analysis) will be paid for in accordance with subsection 109.04. Payment for Soil Handling (Stockpile) will be made at the contract unit price for all excavated material required to be stockpiled for analysis. The contract unit price will be full compensation for furnishing all materials, labor, equipment and incidentals necessary to complete this work, and all handling of the material prior to disposal. This includes haul, stockpile, and security. Payment for this work will be in addition to any payment made under other bid items for excavation, embankment or backfill on the project, or waste disposal of this material.

Payment for Solid Waste Disposal and Solid Hazardous Waste Disposal will be made at the appropriate contract unit price for the disposal of material determined to be either solid waste or solid hazardous waste. The contract unit prices will be full compensation for furnishing all materials, labor, equipment, tools, storage containers for transport, containerization of material for up to 60 days, and incidentals necessary to complete this work. This includes all handling of the material, loading for disposal, unloading for disposal, and borrow material required for replacement of excavated material disposed of offsite. It does not include stockpiling or containerization required for analysis which is included in the item Materials Handling (Stockpile & Containerization) paid for as described above. Payment for waste disposal fees and transport of hazardous waste will be made as shown below. Payment for this work will be in addition to any payment made under other bid items for excavation, embankment, backfill or material handling (stockpile & containerization) on the project.

- (1) *Solid Waste*. Transport costs to the disposal facility and disposal fees will be included in the contract unit price for this work.
- (2) *Solid Hazardous Waste*. Transport, Disposal and /or Treatment costs will be paid for by planned force account in accordance with subsection 109.04.
- (3) *Liquid Hazardous Waste*. Transport, Disposal and /or Treatment costs will be paid for by planned force account in accordance with subsection 109.04.

The cost of shoring required to limit the removal of contaminated materials to the specified limits shall be included in the bid unit prices for any excavation to be performed. Such shoring ordered by the Engineer in areas other than the specified areas of known or potential contamination, as shown in the plans, will be paid for in accordance with subsection 109.04.

Payment for Materials Sampling and Delivery will be made at the contract unit price for each material sample collected, containerized and transported to the laboratory testing facility as designated in the Contract. The Contract unit price will be full compensation for furnishing all materials, labor, equipment, tools and incidentals



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necessary to complete this work including required sampling kits, containers, sample splits and quality control samples.

The Contractor shall be responsible for damage caused by Contractor negligence to the environment, persons, or property. Expenditures associated with actions of the Contractor shall be borne by the Contractor at no cost to the project.

Contaminated groundwater containerized, treated or disposed under the requirements of this specification will be paid for by planned force account in accordance with subsection 109.04.

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

<b>Pay Item</b>	<b>Pay Unit</b>
Environmental Health and Safety Management	Lump Sum
Health and Safety Officer	Hour
Monitoring Technician	Hour
Materials Sampling and Delivery	Each
Materials Handling (Stockpile)	Cubic Yard
Solid Waste Disposal	Cubic Yard



REVISION OF SECTION 401  
COMPACTION OF HOT MIX ASPHALT

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, delete the first paragraph and replace with the following:

**401.17 Compaction.** The hot mix asphalt shall be compacted by rolling. Both steel wheel and pneumatic tire rollers will be required. The number, weight, and type of rollers furnished shall be sufficient to obtain the required density while the mixture is in a workable condition. Compaction shall begin immediately after the mixture is placed and be continuous until the required density is obtained. When the mixture contains unmodified asphalt cement (PG 58-28 or PG 64-22) or modified (PG 58-34), and the surface temperature falls below 185 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat. If the mixture contains modified asphalt cement (PG 76-28, PG 70-28 or PG 64-28) and the surface temperature falls below 230 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat.

Warm Mix Asphalt compaction requirements shall conform to CP 59.

In subsection 401.17, delete the third paragraph and replace with the following:

SMA shall be compacted to a density of 93 to 97 percent of the daily theoretical maximum specific gravity, determined according to CP 51. All other HMA shall be compacted to a density of 92 to 96 percent of the daily theoretical maximum specific gravity, determined according to CP 51. If more than one theoretical maximum specific gravity test is taken in a day, the average of the theoretical maximum specific gravity results will be used to determine the percent compaction. Field density determinations will be made in accordance with CP 44 or 81.

In subsection 401.17, second to last paragraph, delete the first sentence and replace with the following:

After production paving work has begun, a new Roller Pattern shall be demonstrated when a change in the compaction process is implemented.

REVISION OF SECTION 401  
COMPACTION PAVEMENT TEST SECTION (CTS)

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, delete the fifteenth paragraph and replace with the following:

Two sets of random cores shall be taken within the last 200 tons of the CTS. Each set shall consist of seven random cores. The Engineer will determine the coring locations using a stratified random sampling process. The locations of these cores will be such that one set can serve as a duplicate of the other. One set of these cores shall be immediately submitted to the Engineer. This set will be used for determining acceptance of the CTS and determining density correction factors for nuclear density equipment. Densities of the random samples will be determined by cores according to CP 44. Density correction factors for nuclear density equipment will be determined according to CP 81. Coring shall be performed under CDOT observation. Coring will not be measured and paid for separately but shall be included in the work. For SMA, a CTS is not used. The Contractor shall follow the requirements for the demonstration control strip in accordance with the Revision of Section 403, Stone Matrix Asphalt Pavement.

REVISION OF SECTION 401  
COMPOSITION OF MIXTURES – VOIDS ACCEPTANCE

Section 401 of the Standard Specifications is hereby revised for this project as follows:

Subsection 401.02(a) shall include the following:

On projects with voids acceptance of hot mix asphalt, mix designs based on a theoretical rejection of baghouse fines may be used when necessary to meet CDOT mix design requirements if the following additional requirements are met. Written approval for use of theoretical rejection of baghouse fines mixture design shall be obtained before production of project material.

- (1) Price adjustment for the hot mix asphalt shall be made based on voids acceptance criteria as prescribed in the latest version of the Standard Special Provision, Revision of Sections 105 and 106, Conformity to the Contract of Hot Mix Asphalt (Voids Acceptance). All costs associated with theoretical rejection of baghouse fines mix design, production, and acceptance shall be at the Contractor's expense.
- (2) The Contractor shall submit a separate Quality Control (QC) plan for handling the rejection of baghouse fines. The plan shall identify the plan, equipment, and procedures that will be used for the rejection of baghouse fines. The plan shall include detailed information on baghouse control systems and actual data demonstrating consistent system functionality. The QC plan shall be approved in writing prior to production.
- (3) The Contractor shall demonstrate that the material can be produced in accordance with one of the two procedures listed below. The Contractor shall supply project aggregate material for use in establishing acceptance testing equipment correction factors. Aggregate samples that have been produced according to CP-L 5117 to represent plant-produced material shall be provided by the mix design lab.
  - (i) The Contractor shall produce a minimum of 3000 tons of material. This material shall be placed on non thru lanes or offsite in locations approved by the Engineer. A minimum of 3 samples will be tested for AC content, air voids and VMA. QL's for each element will be determined in accordance with the contract documents. If the QL is equal to or greater than 65 for VMA and Asphalt Cement Content and the QL for the element of air voids is equal to or greater than 70, full production may commence. This material may be considered a separate process and price adjustment will be in accordance with subsection 105.05 or;
  - (ii) The Contractor shall construct a 500-ton test strip on the main line on the project. Tonnage other than 500 tons may be produced only if approved. Three samples in the last 200 tons will be tested for volumetric properties. After construction of the test section, production shall be halted until the testing is complete and element QL's are calculated. If the QL is equal to or greater than 65 for VMA and Asphalt Cement Content and the QL for the element of air voids is equal to or greater than 70, full production may commence. If the TQL is less than 65 or the QL for the element of air voids is less than 70, the material shall be removed and replaced at the Contractor's expense.

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 REVISION OF SECTION 401  
 RECLAIMED ASPHALT PAVEMENT

Section 401 of the Standard Specifications is hereby revised for this project as follows:

Subsection 401.02(b) shall include the following:

Reclaimed Asphalt Pavement (RAP) is allowed in hot mix asphalt (HMA) up to a maximum binder replacement of 23 percent for all lifts, provided all specifications for HMA are met. Fine Aggregate Angularity requirements shall apply only to the virgin fraction of the fine aggregate. The RAP shall not contain clay balls, vegetable matter, or other deleterious substances, and must meet the uniformity requirements as outlined below.

HMA Project Verification Testing for asphalt content and gradation will be performed at the frequencies listed in the Field Materials Manual in accordance with CP-L 5120.

The Contractor shall have an approved mix design for the amount of RAP to be used. The AC content of the RAP utilized in the Contractor RAP mix design shall be the average AC content determined in accordance with 1B or 1C, below, or alternatively, a minimum of five samples of the Contractors RAP stockpile may be sampled and the average AC content of the RAP be determined using AASHTO T-164, Method A or B, or in accordance with 1C below. The Contractor shall determine the total binder replaced by the binder in the RAP pursuant to the following equation:

$$\text{Total Binder Replaced} = (A \times B) \times 100/E$$

Where:

A = RAP % Binder Content \*

B = RAP % in Mix \*

E = Total Effective Binder Content \*

\* in decimal format (i.e. 2% is 0.02)

The Total Binder Replaced by the binder in the RAP shall not exceed 23 percent of the effective binder content of either the mix design or the produced mix.

The use of RAP shall be controlled in accordance with subsections 105.05 and 106.05. If the Contractor elects to use RAP, the following additional conditions shall apply:

1. The Contractor shall have an approved Quality Control (QC) Plan that details how the RAP will be processed and controlled. The QC plan shall address the following:
  - A. RAP Processing Techniques. This requires a schematic diagram and narrative that explains the processing (crushing, screening, and rejecting) and stockpile operation for this specific project.
  - B. Control of RAP Asphalt Binder Content (AASHTO T-164, Method A or B). RAP Asphalt Binder Content may also be determined in accordance with CP-L 5120, provided an RAP AC content correction factor is determined through correlation testing with AASHTO T-164, Method A or B. The correction factor shall be determined by performing correlation testing on the first five samples of the RAP AC content, then at a frequency of one for every five AC content tests thereafter. The correction factor shall be determined by calculating the average difference in AC content between CP-L 5120 and AASHTO T-164, Method A or B, and applying the correction to the AC content determined in accordance with CP-L 5120 :  
 Frequency: 1/1000 tons of processed RAP material (minimum five tests)
  - C. (Alternate) The Contractor may propose a RAP asphalt content correction factor to be used in conjunction with CP-L 5120. The proposed CP-L 5120 RAP asphalt content correction factor shall be used with all RAP asphalt contents tested for the mixture design and quality control sampling and testing. The methodology of the proposed CP-L 5120 RAP asphalt content correction factor shall be outlined in detail in the approved RAP QC Plan. At a minimum, the proposed CP-L 5120 correction factor shall identify the principal source locations of the RAP aggregate, gradation of the material tested, and specific ignition oven serial number used in all the RAP asphalt content testing. The RAP source

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 REVISION OF SECTION 401  
 RECLAIMED ASPHALT PAVEMENT

locations, material gradation, and specific equipment used shall substantiate the CP-L 5120 asphalt content correction factor used for the testing. The substantiation must be from data gathered from historical information or specific asphalt content correction data obtained from tests performed on similar virgin aggregate sources, virgin material gradations, and the specific equipment used.

- D. Control of RAP Gradation (CP31 or AASHTO T-30):  
 Frequency: 1/1000 tons of processed RAP material (minimum three tests)
  - E. Process Control Charts shall be maintained for binder content and each screen listed in subsection 401.02(b), during addition of any RAP material to the stockpile. The Contractor shall maintain separate control charts for each RAP stockpile. The control charts shall be displayed and shall be made available, along with RAP AC extraction testing laboratory reports to the Engineer upon request
2. The processed RAP must be 100 percent passing the 31.5 mm (1¼ inch) sieve. The aggregate obtained from the processed RAP shall be 100 percent passing the 25.0 mm (1 inch) sieve. The aggregate and binder obtained from the processed RAP shall be uniform in all the measured parameters in accordance with the following:

**UNIFORMITY\***

Parameter	Standard Deviation
Binder Content	0.5
Percent Passing 19 mm (¾")	4.0
Percent Passing 12.5 mm (½")	4.0
Percent Passing 9.5 mm (⅜")	4.0
Percent Passing 4.75 mm (#4)	4.0
Percent Passing 2.36 mm (#8)	4.0
Percent Passing 600 µm (#30)	3.0
Percent Passing 75 µm (#200)	1.5
*Uniformity is the Maximum allowable Standard Deviation of test results of processed RAP.	

- 3. If RAP millings generated are incorporated in the same project, in accordance with CPL 5145 the Contractor shall pave with a virgin mix design until sufficient amount of processed RAP has been stockpiled and tested to allow full production of a RAP HMA mix.

REVISION OF SECTION 401  
TEMPERATURE SEGREGATION

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.16 delete the twelfth (last) paragraph and replace it with the following:

The Engineer may evaluate the HMA for low density due to temperature segregation any time industry best practices, as detailed on Form 1346, are not being followed or the Engineer suspects temperature segregation is occurring. The Engineer will first meet with the Contractor to discuss the paving practices that are triggering the temperature investigation. Areas across the mat, excluding the outside 1 foot of both edges of the mat, that are more than 25 °F cooler than other material across the width may be marked for density testing. Material for temperature comparison will be evaluated in 3-foot intervals behind the paver across the width of the mat. The material shall be marked and tested in accordance with CP 58. If four or more areas within a lot of 500 tons have densities of less than 93 percent of the material's maximum specific gravity for SMA mixes or less than 92 percent of the material's maximum specific gravity for all other HMA mixes, a 5 percent price disincentive will be applied to the 500 ton lot. The 500 ton count begins when the Engineer starts looking for cold areas, not when the first cold area is detected. This price disincentive will be in addition to those described in Sections 105 and 106. Only one area per delivered truck will be counted toward the number of low density areas. Temperature segregation checks will be performed only in areas where continuous paving is possible.

REVISION OF SECTION 401  
TOLERANCES FOR HOT MIX ASPHALT (VOIDS ACCEPTANCE)

Section 401 of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.02(b) delete Table 401-1, including the footnotes, and replace with the following:

**Table 401-1**  
**Tolerances for Hot Bituminous Pavement**

<b>Element</b>	<b>Tolerance</b>
Asphalt Cement Content	$\pm 0.3 \%$
Voids in the Mineral Aggregate (VMA)	$\pm 1.2 \%$
Air Voids	$\pm 1.2 \%$

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REVISION OF SECTIONS 401 AND 412  
SAFETY EDGE

Sections 401 and 412 of the Standard Specifications are hereby revised for this project as follows:

Subsection 401.10 shall include the following:

The paver shall include an approved longitudinal paver wedge system to create a sloped safety edge as shown on the plans. The wedge system shall be attached to the screed and shall compact the HMA to a density at least as dense as the compaction imparted to the rest of the HMA layer by the paving screed. The system shall provide a sloped Safety Edge equal to 32 degrees plus or minus 5 degrees measured from the pavement surface cross slope extended. The use of a single plate strike off is not permitted. The system shall be adjustable to accommodate varying paving thicknesses. The Engineer may allow the Contractor to use handwork for short sections or to saw cut the sloped Safety Edge after paving operations are completed in areas such as transitions at driveways, intersections, interchanges.

The Contractor shall submit the proposed system for approval at the Preconstruction Conference. The Engineer may require proof that the system has been used on previous projects with acceptable results or may require a test section constructed prior to the beginning of work to demonstrate that it creates an acceptable wedge shape and compaction. Paving shall not begin until the system is approved in writing by the Engineer. The Safety Edge may be constructed on each lift of HMA or on the full specified plan depth on the final lift. The finished shape of the Safety Edge shall extend for the full depth of the asphalt pavement or for the top 5 inches whichever is less.

Subsection 401.22 shall include the following:

All costs associated with the construction of the Safety Edge will not be paid for separately, but shall be included in the work.

Subsection 412.07 shall include the following:

The Contractor shall use an approved longitudinal paver wedge system to create a sloped Safety Edge. The Contractor shall modify the paver screed to create a Safety Edge that meets the final cross-section shown on the plans. The system shall provide a sloped Safety Edge equal to 32 degrees plus or minus 5 degrees measured from the pavement surface cross slope extended. There may be areas where it is not possible to place the Safety Edge in conjunction with mainline paving but where the Safety Edge is required, such as transitions at driveways, intersections, interchanges, etc. In these areas the Engineer may allow the Contractor to use handwork for short sections or to saw cut the sloped Safety Edge after paving operations are completed.

The Contractor shall submit the proposed system for approval at the Preconstruction Conference. The Engineer may require proof that the system has been used on previous projects with acceptable results or may require a test section constructed prior to the beginning of work to demonstrate that it creates an acceptable wedge shape. Paving shall not begin until the system is approved in writing by the Engineer. The finished shape of the Safety Edge shall extend for the full depth of the concrete pavement or for the top 5 inches whichever is less.



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REVISION OF SECTIONS 401 AND 412  
SAFETY EDGE

Subsection 412.23 shall include the following:

Concrete Safety Edge will be measured by the actual number of linear feet that are installed and accepted.

Subsection 412.24 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Concrete Safety Edge	Linear Foot

Payment for concrete safety edge will be full compensation for all work and materials required to complete the item.

REVISION OF SECTION 412  
PORTLAND CEMENT CONCRETE PAVEMENT FINISHING

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 412.12(a) and replace it with the following:

- (a) *Hand Finishing.* Hand finishing should be minimized wherever possible. The Engineer shall be notified prior to hand finishing work and the proposed hand finished work shall be addressed in the Quality Control Plan for concrete finishing. Unless otherwise specified, hand finishing methods will be permitted only under the following conditions. Hand finished concrete shall be struck off and screeded with a portable screed that is at least 2 feet longer than the maximum width of the slab to be struck off. It shall be sufficiently rigid to retain its shape. Concrete shall be thoroughly consolidated by hand vibrators. Hand finishing shall not be allowed after concrete has been in-place for more than 30 minutes or when initial set has begun unless otherwise approved by the Engineer. Finishing tools made of aluminum shall not be used.

The Contractor shall provide a Quality Control Plan (QCP) to ensure that proper hand finishing is accomplished in accordance with current Industry standards in the concrete pavement placement. It shall also identify the Contractor's method for ensuring that the provisions of the QCP are met. The QCP shall be submitted to the Engineer at the Preconstruction Conference. Paving operations shall not begin until the Engineer has approved the QCP. The QCP shall identify and address issues affecting the quality of finished concrete pavement including but not limited to:

- (1) Timing of hand finishing operations
- (2) Methodology to place and transport concrete
- (3) Equipment and tools to be utilized
- (4) Qualifications and training of finishers and supervisors

When the Engineer determines that any element of the approved QCP is not being implemented or that hand finished concrete is unacceptable, work shall be suspended. The Contractor shall supply a written plan to address improperly placed material and how to remedy future hand finishing failures and bring the work into compliance with the QCP. The Engineer will review the plan for acceptability prior to authorizing the resumption of operations.

REVISION OF SECTIONS 412, 601 AND 711  
LIQUID MEMBRANE-FORMING COMPOUNDS  
FOR CURING CONCRETE

Sections 412, 601 and 711 of the Standard Specifications are hereby revised for this project as follows:

In subsection 412.14, first paragraph, delete the second sentence and replace with the following:

The impervious membrane curing compound shall meet the requirements of ASTM C 309, Type 2 and shall be volatile organic content (VOC) compliant.

In subsection 601.13 (b), first paragraph, delete the second sentence and replace with the following:

A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be used on surfaces where curing compound is allowed, except that Type 1 curing compound shall be used on exposed aggregate or colored concrete, or when directed by the Engineer.

In subsection 601.16 (a) 1., delete the first sentence and replace with the following:

1. Membrane Forming Curing Compound Method. A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be uniformly applied to the surface of the deck, curbs and sidewalks at the rate of 1 gallon per 100 square feet.

Delete subsection 711.01 and replace with the following:

**711.01 Curing Materials.** Curing materials shall conform to the following requirements:

Burlap Cloth made from Jute or Kenaf	AASHTO M 182
Liquid Membrane-Forming Compounds for Curing Concrete	ASTM C 309
Sheet Materials for Curing Concrete	AASHTO M 171*
*Only the performance requirements of AASHTO M171 shall apply.	

Straw used for curing shall consist of threshed straw of oats, barley, wheat, or rye. Clean field or marsh hay may be substituted for straw when approved by the Engineer. Old dry straw or hay which breaks readily in the spreading process will not be accepted.

REVISION OF SECTIONS 412 AND 705  
PERFORMED COMPRESSION SEALS

Sections 412 and 705 of the Standard Specifications are hereby revised for this project as follows:

Subsection 412.13 shall include the following:

Transverse and untied longitudinal joints shall be sawed and sealed as shown in the following diagram for preformed compression seals. Installation shall conform to subsection 412.18, as revised for this project, and the compression seal and lubricant materials shall conform to subsection 705.01, as revised for this project.

Subsection 412.18 shall include the following:

Before installation of the preformed compression seal the following shall be completed:

- (1) Repair of defective pavement slabs and repair and proper curing of cracks or spalls in accordance with subsection 412.16.
- (2) Corrective work for tining.
- (3) Corrective work for smoothness in accordance with subsection 412.17(c).

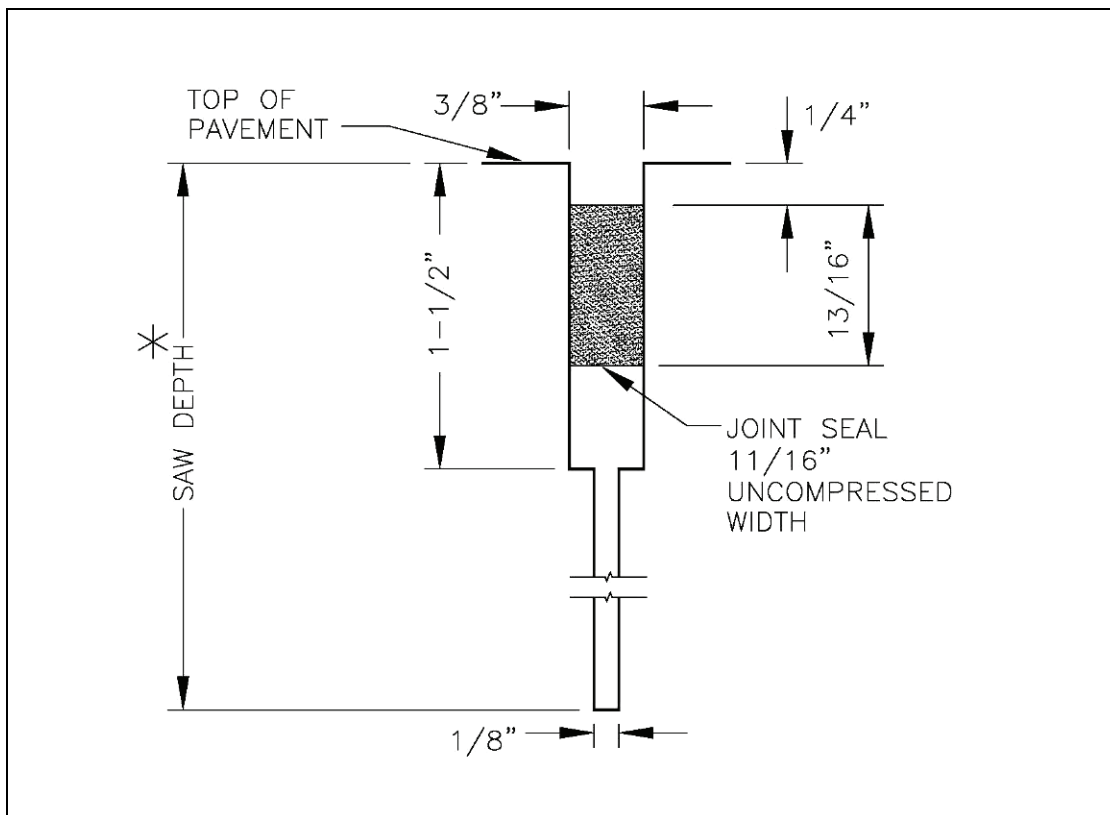
Air temperature at the time of installation shall be from 40 to 80 °F or as recommended by the manufacturer. The joint shall be air cleaned with oil free air at 100 psi minimum just before seal installation. The preformed compression seal shall have an uncompressed width of  $1\frac{1}{16}$  inch. Installation shall be in conformance with the following diagram and shall follow the manufacturers recommendations. A machine shall be used for installation which results in proper depth of the seal without damage or twisting of the seal. Elongation during installation shall not exceed 5 percent.

Subsection 705.01 shall include the following:

- (c) *Preformed Compression Seals.* Preformed compression seals shall conform to AASHTO M 220. The lubricant adhesive used for installation of the preformed compression seal shall conform to ASTM D 2835. The Contractor shall provide the Engineer with certified test reports that indicate conformance of the preformed compression seals and lubricant adhesive with these specifications before installation begins.

2  
 REVISION OF SECTIONS 412 AND 705  
 PREFORMED COMPRESSION SEALS

**JOINT SHAPE AND JOINT FILLER DETAILS FOR  
 TRANSVERSE SAWED CONTRACTION JOINT AND  
 UNTIED LONGITUDINAL CONTRACTION JOINT**



\* Saw Depth  
 T/4 for transverse sawed contraction joint  
 T/3 for untied longitudinal contraction joint  
 Where:  
 T = pavement thickness

Tolerances of all joint width dimensions: 0 to + $1/16$  inch

Installation of preformed compression joint seals shall be in accordance with manufacturer's recommendations.

The joint locations, spacing, and general notes on the standard for concrete pavement joints for this project shall apply.

All materials and installation required for compression joint seals will be included in the work.

All other joints shall be constructed in accordance with standard specifications.

REVISION OF SECTION 518  
BRIDGE EXPANSION DEVICE

Section 518 of the Standard Specifications is hereby revised for this project as follows:

In subsection 518.04, delete the fifth paragraph and replace with the following:

All structural steel elements of the bridge expansion device, including cover plates, shall be galvanized after fabrication in accordance with Section 509, whether or not they are in contact with the elastomeric seals.

In subsection 518.05 (b), delete the third paragraph and replace with the following:

All structural steel elements of the bridge expansion device, including cover plates, shall be galvanized after fabrication in accordance with Section 509, whether or not they are in contact with the elastomeric seals.

1  
 REVISION OF SECTION 601  
 CLASS B, BZ, D, DT AND P CONCRETE

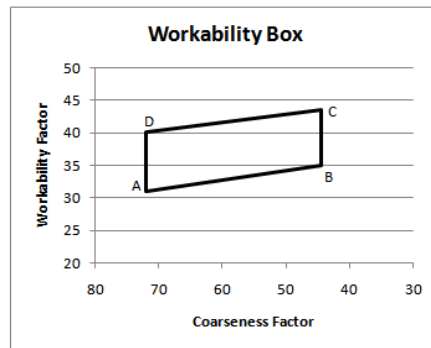
Section 601 of the Standard Specifications is hereby revised for this project as follows:

Subsection 601.02 shall include the following:

Deviations from the Standard Class B, Class BZ, Class D, DT and P concrete may be made under the following conditions:

- (1) The minimum cement content may be reduced from that specified in Table 601-1 if lab test results show that the permeability of the mix does not exceed 2,500 Coulombs at an age of not more than 56 days as determined by ASTM C1202.
- (2) The maximum cement content may be increased from that specified in Table 601-1 if lab test results show that the unrestrained shrinkage is less than 0.050 percent when tested by CP-L 4103.
- (3) The maximum amount of fly ash substituted for ASTM C150 cement or the maximum pozzolan content when ASTM C595 or C1157 cement is used may exceed the limits in subsection 601.05 if lab test results show that the permeability of the mix does not exceed 2,500 Coulombs at an age of not more than 56 days as determined by ASTM C1202 and the salt scaling resistance is less than 3 as determined by ASTM C672.
- (4) Except for Class DT, the concrete mix may use an Optimized Gradation (OG). When an OG is used aggregate proportions must be a result of an optimized combined aggregate gradation (CAG) developed by an approved mix design technique such as Shilstone or KU Mix. The amount of aggregate in the CAG passing the 19 mm (¾ inch) sieve and retained on the 12.5 mm (½ inch) sieve shall be a minimum of 8 percent for the trial mix design. The coarseness factor (CF) and workability factor (WF) must plot within the workability box (ABCD) depicted graphically by the following 4 coordinate points:
  - a. Point A > (CF,WF) 72, 31
  - b. Point B > (CF,WF) 44.5, 35
  - c. Point C > (CF,WF) 44.5, 43.5
  - d. Point D > (CF,WF) 72, 40

Figure 601-1



$$CF = (S / T) \times 100$$

Where:

S = Percent Cumulative Retained on 9.5 mm (3/8 inch) Sieve

T = Percent Cumulative retained on 2.36 mm (No. 8) Sieve

WF is the percent passing the 2.36 mm (No. 8) sieve. Increase workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used in excess of 564 pounds per cubic yard in the mix design. Decrease workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used below 564 pounds per cubic yard in the mix design. The Contractor shall not adjust the workability factor if the amount of cementitious material is 564 pounds per cubic yard.

- (5) Aggregate gradings not obtained through an OG may be used if lab test results show that the unrestrained shrinkage is less than 0.050 percent when tested by CP-L 4103.

REVISION OF SECTION 601  
CLASS B, BZ, D, DT AND P CONCRETE

Concrete with any of the above deviations shall be known as Class ( ) Non Standard concrete (Class \_\_-NS concrete). For example Class B-NS. Non Standard concrete may be substituted for the equivalent standard concrete. Non Standard concrete shall be tested, accepted, measured and paid for as standard concrete or the pay item specifying standard concrete.

Subsection 601.05 shall include the following in the second paragraph:

- (8) Concrete with an OG shall indicate the gradation proportions that results in a combined aggregate gradation corresponding to compliance within the specified CF and WF box and shall include the following charts used to perform aggregate gradation analysis:
- (i) Coarseness Factor
  - (ii) Workability Factor
  - (iii) 0.45 power
  - (iv) Combined gradation

Delete Subsection 601.06 (10) and (11) and replace with the following:

- (10) Weights of fine and coarse aggregates or combined weight when an OG is pre-blended  
(11) Moisture of fine and coarse aggregates or combined moisture when an OG is pre-blended

Subsection 601.17 shall include the following:

(g) *Water to cementitious material content (w/cm) ratio.* When a Non Standard concrete is used the maximum w/cm ratio is the w/cm ratio that was used in the in the laboratory trial mix for the Concrete Mix Design. The w/cm ratio shall be determined for each batch of Non Standard concrete by the Contractor and provided to the Engineer for approval prior to placement. If an adjustment to the mix is made after the Engineer's approval, the w/cm shall be determined and submitted to the Engineer prior to the continuation of placement. Any Non Standard concrete that is placed without the Engineer's approval shall be removed and replaced at the Contractor's expense.



1  
 REVISION OF SECTION 601  
 CLASS H AND HT BRIDGE DECK CONCRETE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.02 delete Class H and HT from Table 601-1 and replace with the following:

<b>H</b>	4500 at 56 days	500 to 640	5 – 8	0.42 – 0.44
<b>HT</b>	4500 at 56 days	500 to 640	5 – 8	0.42 – 0.44

In subsection 601.02 delete Class H and HT and replace with the following:

Class H concrete is used for bare concrete bridge decks. Additional requirements are:

- (1) Type A or dual rated Type A and F chemical admixtures may be used.
- (2) Set retarding and accelerating admixtures shall not be used. These include Type B, C, D, E, and G chemical admixtures.
- (3) The concrete mix shall consist of a minimum of 55 percent sizes No. 57, No. 6, or No. 67 coarse aggregate by weight of total aggregate.
- (4) The permeability of the laboratory trial mix shall not exceed 2000 coulombs at 56 days when tested by ASTM C 1202
- (5) The cracking tendency of the laboratory trial mix shall not exhibit a crack before 15 days when tested by AASHTO T334.
- (6) Class H concrete shall contain a minimum of 20 percent pozzolan by weight of total cementitious material.
- (7) The sulfate exposure is Class 0 except when substituted for Class B or D concrete.

Class HT concrete is used for deck resurfacing and repairs on bare concrete bridge decks. Additional requirements are:

- (1) Type A or dual rated Type A and F chemical admixtures may be used.
- (2) Set retarding and accelerating admixtures shall not be used. These include Type B, C, D, E, and G chemical admixtures.
- (3) The concrete mix shall consist of a minimum of 50 percent size No. 7 or No. 8 coarse aggregate by weight of total aggregate.
- (4) The permeability of the laboratory trial mix shall not exceed 2000 coulombs at 56 days when tested by ASTM C 1202
- (5) The cracking tendency of the laboratory trial mix shall not exhibit a crack before 15 days when tested by AASHTO T334.
- (6) Class HT concrete shall contain a minimum of 20 percent pozzolan by weight of total cementitious material.
- (7) The sulfate exposure is Class 0

In subsection 601.07 delete the second paragraph and (a) and replace with the following:

For Class H and HT concrete, adding water after the initial mixing shall not occur. All water shall be added at the plant. Slump adjustment shall be through the addition of an approved Type A or dual rated Type A and F water reducing admixture.

Silica fume, when used, shall be added to the mix during initial batching.

- (a) *Mixing General.* The concrete shall be deposited in place within 90 minutes after batching when concrete is delivered in truck mixers or agitating trucks, and within 60 minutes when delivered in non agitating trucks.

REVISION OF SECTION 601  
CLASS H AND HT BRIDGE DECK CONCRETE

Except for Class H and HT concrete, the 90 minute time limit for mixer or agitating trucks may be extended to 120 minutes if:

- (1) No water is added after 90 minutes.
- (2) The concrete temperature prior to placement is less than 90 °F

Except for Class H and HT concrete, the 90 minute time limit for mixer or agitating trucks may be extended to 180 minutes if:

- (1) No water is added after 90 minutes.
- (2) The concrete temperature prior to placement is less than 90 °F.
- (3) The approved concrete mix contains a Type D water reducing and retarding chemical admixture.

In subsection 601.15 delete (b) and (c) and replace with the following:

- (b) *Test Slab.* At least fourteen working days prior to initial placement of Class H, Class HT or Class S50 concrete on or in a deck, the Contractor shall place, finish and cure a test slab according to the project specifications, using the same personnel, methods and equipment (including the concrete pump, if used) that will be used on the bridge deck. The test slab shall be the same width as the bridge deck. When the bridge deck width is greater than 40 feet, the Contractor may reduce the test slab width to a minimum of 40 feet. The test slab shall have a length of at least 30 feet and shall have a thickness a minimum of the bridge deck thickness. Placement of Class H, HT or S50 Concrete in the deck shall not occur until approval is given by the Engineer. Approval to place concrete on the deck will be based on satisfactory placement, consolidation, finishing and curing of the test slab and cores, and will be given or denied within two working days of receiving the cores from the Contractor.

A minimum of one day after construction of the test slab, the Contractor shall core four full-depth 4 inch diameter cores, one from each quadrant of the test slab, and submit them to the Engineer for visual inspection of degree of consolidation. . If an additional test slab is deemed necessary by the Engineer, it will be placed at the Contractor's expense.

Additional test slabs shall be placed as necessary to verify changes in design or procedures at the Contractor's expense.

Test slabs that are placed as acceptable work in segments of concrete pavement, or as approach slabs, or other locations acceptable to the Engineer, will be paid for as the pay item for that element of the Contract.

- (c) *Placing.* Concrete shall be placed in accordance with the requirements of subsection 601.12 except for the following:

Concrete shall be placed in such manner as to require as little handling as possible and at sufficient depth to provide adequate material for screeding and finishing operations. The concrete shall be discharged as near its final location as practicable. The pattern of placement shall be such that lateral flow will be minimized. Concrete shall be placed against the leading edge of fresh concrete where practicable.

For Class H, HT and S50 Concrete maintain environmental conditions on the entire bridge deck so the evaporation rate is less than 0.2 pounds per square foot per hour. The temperature of Class H, HT and S50 Concrete immediately before placement shall be a minimum of 55°F and a maximum of 70°F. This may require placing the deck at night, in the early morning or on another day. The evaporation rate (as determined in the American Concrete Institute Manual of Concrete Practice 305R, Chapter 2) is a function of air temperature, concrete temperature, wind speed and relative humidity. The effects of any fogging required by the Engineer will not be considered in the estimation of the evaporation rate.

Just prior to and at least once every hour during placement of the Class H, HT and S50 Concrete and until the water cure method is applied, the Contractor will measure, record and report to the Engineer the air temperature, concrete temperature, wind speed, and relative humidity on the bridge deck. The Contractor will

REVISION OF SECTION 601  
CLASS H AND HT BRIDGE DECK CONCRETE

take and report to the Engineer the air temperature, wind, and relative humidity measurements approximately 12 inches above the surface of the deck. With this information, the Engineer will determine the evaporation rate.

When the evaporation rate is equal to or above 0.2 pounds per square foot per hour, take actions (such as cooling the concrete, installing wind breaks, sun screens, etc.) to create and maintain an evaporation rate less than 0.2 pounds per square foot per hour on the entire bridge deck.

Fogging using hand-held equipment may be required by the Engineer during unanticipated delays in the placing, finishing or curing operations. If fogging is required by the Engineer, the Contractor shall not allow water to drip, flow or puddle on the concrete surface during fogging, placement of absorptive material, or at any time before the concrete has achieved final set.

Longitudinal joints for a Class HT concrete overlay will be allowed only at the locations of lane lines and must be approved by the Engineer.

If placing Class H, HT and S50 Concrete is delayed and the concrete has taken its initial set, stop the placement, saw the nearest construction joint approved by the Engineer, and remove all concrete beyond the construction joint.

Transverse joints may be utilized when the Engineer determines that the work is not progressing in a satisfactory manner, or when required by change in weather conditions. The Engineer may approve transverse joint locations to accommodate phased overlay construction.

Delete subsection 601.16 and replace with the following:

**601.16 Curing Concrete Bridge Decks.** Except for Class H and HT concrete, the minimum curing period shall be 120 hours. For Class H and HT concrete the minimum curing period shall be 168 hours. The concrete surface shall be kept moist at all times by fogging with an approved atomizing nozzle or applying a monomolecular film coating to retard evaporation until the curing material is in place.

Except for when Class H & HT Concrete is used; Concrete bridge decks, including bridge curbs and bridge sidewalks shall be cured as follows:

- (a) Decks placed from May 1 to September 30 shall be cured by the membrane forming curing compound method followed by the water cure method as follows:
1. Membrane Forming Curing Compound Method. A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be uniformly applied to the surface of the deck, curbs and sidewalks at the rate of 1 gallon per 100 square feet. The curing compound shall be applied as a fine spray using power operated spraying equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Before and during application the curing compound shall be kept thoroughly mixed by recirculation or a tank agitator. The application shall be within 20 feet of the deck finishing operation. When the finishing operation is discontinued, all finished concrete shall be coated with curing compound within ½ hour. The curing compound shall be thoroughly mixed within one hour before use.
  2. Water Cure Method. The water cure method shall be applied as soon as it can be without marring the surface. The surface of the concrete, including bridge curbs and bridge sidewalks, shall be entirely covered with wet burlap and polyethylene sheeting. Prior to being placed, the burlap shall be thoroughly saturated with water. The wet burlap and polyethylene sheeting shall extend at least twice the thickness of the bridge deck beyond the edges of the slab and shall be weighted to remain in contact with the surface. The wet burlap and polyethylene sheeting shall remain in contact and be kept wet for the entire curing period.
- (b) Decks placed between November 1 and March 31 shall be cured by application of a membrane forming curing compound followed by the blanket method as follows:

REVISION OF SECTION 601  
CLASS H AND HT BRIDGE DECK CONCRETE

1. Membrane Forming Curing Compound Method. This method shall be applied in accordance with subsection 601.16(a)1 above.
  2. Blanket Method. Curing blankets with a minimum R-Value of 0.5 shall be placed on the deck as soon as they can be without marring the surface. Blankets shall be loosely laid (not stretched) and adjacent edges suitably overlapped with continuous weights along the lapped joints. The blankets shall remain in place for a minimum of five days after placement.
- (c) Decks placed in April or October may be cured in accordance with either subsection 601.16(a) or 601.16(b) above.
- (d) For decks above an elevation of 8,000 feet above mean sea level, the Engineer may modify the time of year requirements for the cure methods defined in subsection 601.16(a) and 601.16(b) above.
- (e) Class H, Class HT and Class S50 concrete shall be cured as follows:
- Water Cure Method. The water cure method shall be applied as soon as it can be without marring the surface. The surface of the concrete, including bridge curbs and bridge sidewalks, shall be entirely covered with wet burlap and polyethylene sheeting. Prior to being placed, the burlap shall be thoroughly saturated with water. The wet burlap and polyethylene sheeting shall extend at least twice the thickness of the bridge deck beyond the edges of the slab and shall be weighted to remain in contact with the surface. The wet burlap and polyethylene sheeting shall remain in contact and be kept wet for the entire curing period
- (f) When the ambient temperature is expected to fall below 40 °F during the curing period, the Contractor shall maintain the internal concrete temperature above 50 °F during the curing period. The Contractor shall provide suitable measures such as straw, additional burlap, or other suitable blanketing materials, and/or housing and artificial heat to maintain the concrete temperatures between 50°F and 75°F as measured on the upper and lower surfaces of the concrete. Enclose the area underneath the deck and heat so that the temperature of the surrounding air is as close as possible to the temperature of the concrete and between 50°F and 75°F. When artificial heating is used to maintain the concrete, provide adequate ventilation to limit exposure to carbon dioxide. Maintain wet burlap and polyethylene cover during the curing period. Heating may be stopped after the first 72 hours if the time of curing is lengthened to account for periods when the ambient air temperature is below 40°F. For every day the ambient air temperature is below 40°F, an additional day of curing with a minimum ambient air temperature of 50°F will be required. After completion of the required curing period, remove the curing and protection so that the temperature of the concrete during the first 24 hours does not fall more than 25°F.

Internal concrete temperature shall be determined by using thermocouples. Thermocouple wire, connectors, and hand held thermometer will be supplied by the Contractor. The Contractor shall install the thermocouples at locations designated by the Engineer.

During the curing period, the Contractor shall monitor the enclosure at intervals acceptable to the Engineer. The Contractor shall monitor concrete temperature, and the structural integrity of the enclosure. Artificial heat sources shall not be placed in such a manner as to endanger formwork or expose any area of concrete to drying due to excessive temperatures.

If the internal concrete temperature at any location in the bridge deck concrete falls below 32 °F during the first 24 hours of the curing period, the Engineer may direct the Contractor to core the areas in question at the locations indicated by the Engineer. The Engineer will take immediate possession of the cores. The Engineer will submit the cores to a petrographer for examination in accordance with ASTM C 856. Concrete damaged by frost, as determined by the petrographer, shall be removed and replaced at the Contractor's expense. All costs associated with coring, transmittal of cores, and petrographic examination shall be borne by the Contractor regardless of the outcome of the petrographic examination.

February 3, 2011

REVISION OF SECTION 601  
CONCRETE BATCHING

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.06, delete (13) and (17) and replace with the following:

- (13) Gallons of water added by truck operator, the time the water was added and the quantity of concrete in the truck each time water is added.
- (17) Water to cementitious material ratio.

February 3, 2011

## REVISION OF SECTIONS 601 CONCRETE FINISHING

Section 601 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.12 (a) delete the fifth paragraph and replace it with the following:

Water shall not be added to the surface of the concrete to assist in finishing operations.

Hand finishing should be minimized wherever possible. The hand finishing methods shall be addressed in the Quality Control Plan for concrete finishing. Hand finished concrete shall be struck off and screeded with a portable screed that is at least 2 feet longer than the maximum width of the surface to be struck off. It shall be sufficiently rigid to retain its shape. Concrete shall be thoroughly consolidated by hand vibrators. Hand finishing shall not be allowed after concrete has been in-place for more than 30 minutes or when initial set has begun. Finishing tools made of aluminum shall not be used.

The Contractor shall provide a Quality Control Plan (QCP) to ensure that proper hand finishing is accomplished in accordance with current Industry standards. It shall identify the Contractor's method for ensuring that the provisions of the QCP are met. The QCP shall be submitted to the Engineer at the Preconstruction Conference. Concrete placement shall not begin until the Engineer has approved the QCP. The QCP shall identify and address issues affecting the quality finished concrete including but not limited to:

- (1) Timing of hand finishing operations
- (2) Methodology to place and transport concrete
- (3) Equipment and tools to be utilized
- (4) Qualifications and training of finishers and supervisors

When the Engineer determines that any element of the approved QCP is not being implemented or that hand finished concrete is unacceptable, work shall be suspended. The Contractor shall supply a written plan to address improperly placed material and how to remedy future hand finishing failures and bring the work into compliance with the QCP. The Engineer will review the plan for acceptability prior to authorizing the resumption of operations.

In subsection 601.14(a) delete the fourth paragraph.

1  
 REVISION OF SECTION 601  
 CONCRETE SLUMP ACCEPTANCE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Delete the fifth paragraph of Subsection 601.05 and replace with the following:

Except for Class BZ concrete, the slump of the delivered concrete shall be the slump of the approved concrete mix design plus or minus 2.0 inch. The laboratory trial mix must produce an average compressive strength at least 115 percent of the required field compressive strength specified in Table 601-1. When entrained air is specified in the Contract for Class BZ concrete, the trial mix shall be run with the required air content.

Delete Subsection 601.17 (b), 601.17 (d) and Table 601-3 and replace with the following:

(b) *Slump*. Slump acceptance, but not rejection, may be visually determined by the Engineer. Any batch that exceeds the slump of the approved concrete mix design by 2.0 inches will be retested. If the slump is exceeded a second time, that load is rejected. If the slump is greater than 2 inches lower than the approved concrete mix design, the load can be adjusted with a water reducer, or by adding water (if the w/cm allows) and retested.

Portions of loads incorporated into structures prior to determining test results which indicate rejection as the correct course of action shall be subject to reduced payment or removal as determined by the Engineer.

(d) *Pay Factors*. The pay factor for concrete which is allowed to remain in place at a reduced price shall be according to Table 601-3 and shall be applied to the unit price bid for Item 601, Structural Concrete.

If deviations occur in air content and strength within the same batch, the pay factor for the batch shall be the product of the individual pay factors.

**Table 601-3  
 PAY FACTORS**

Percent Total Air		Strength		
Deviations From Specified Air (Percent)	Pay Factor (Percent)	Below Specified Strength (psi) [ < 4500 psi Concrete]	Pay Factor (Percent)	Below Specified Strength (psi) [ ≥ 4500 psi Concrete]
0.0-0.2	98	1-100	98	1-100
0.3-0.4	96	101-200	96	101-200
0.5-0.6	92	201-300	92	201-300
0.7-0.8	84	301-400	84	301-400
0.9-1.0	75	401-500	75	401-500
Over 1.0	Reject	Over 500	Reject	
			65	501-600
			54	601-700
			42	701-800
			29	801-900
			15	901-1000
			Reject	Over 1000

REVISION OF SECTION 601  
STRUCTURAL CONCRETE STRENGTH ACCEPTANCE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.17 (c), delete the first paragraph and replace with the following:

- (c) *Strength (When Specified)*. The concrete will be considered acceptable when the running average of three consecutive strength tests per mix design for an individual structure is equal to or greater than the specified strength and no single test falls below the specified strength by more than 500 psi. A test is defined as the average strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions prior to testing. If the compressive strength of any one test cylinder differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two test cylinders.



1  
REVISION OF SECTIONS 601 AND 701  
CEMENTS AND POZZOLANS

Sections 601 and 701 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.03, first paragraph, the following shall be added to the table:

High-Reactivity Pozzolans      701.04

Subsection 601.03 shall include the following:

Pozzolans shall consist of Fly Ash, Silica Fume and High-Reactivity Pozzolan.

In subsection 601.04, delete the third and fourth paragraphs and replace with the following

Cementitious material requirements are as follows:

**Class 0 requirements for sulfate resistance shall be one of the following:**

- (1) ASTM C 150 Type I, II or V
- (2) ASTM C 595 Type IL, IP, IP(MS), IP(HS) or IT
- (3) ASTM C 1157 Type GU, MS or HS
- (4) ASTM C 150 Type III cement if it is allowed, as in Class E concrete

**Class 1 requirements for sulfate resistance shall be one of the following:**

- (1) ASTM C 150 Type II or V; Class C fly ash shall not be substituted for cement.
- (2) ASTM C 595 Type IP(MS) or IP(HS).
- (3) ASTM C 1157 Type MS or HS; Class C fly ash shall not be substituted for cement.
- (4) When ASTM C 150 Type III cement is allowed, as in Class E concrete, it shall have no more than 8 percent  $C_3A$ . Class C fly ash shall not be substituted for cement.
- (5) ASTM C 595 Type IL; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (6) ASTM C 595 Type IT; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012.

**Class 2 requirements for sulfate resistance shall be one of the following:**

- (1) ASTM C 150 Type V with a minimum of a 20 percent substitution of Class F fly ash by weight
- (2) ASTM C 150 Type II or III with a minimum of a 20 percent substitution of Class F fly ash by weight. The Type II or III cement shall have no more than 0.040 percent expansion at 14 days when tested according to ASTM C 452
- (3) ASTM C 1157 Type HS; Class C fly ash shall not be substituted for cement.
- (4) ASTM C 150 Type II, III, or V plus High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012

REVISION OF SECTIONS 601 AND 701  
CEMENTS AND POZZOLANS

- (5) ASTM C 1157 Type MS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (6) A blend of portland cement meeting ASTM C 150 Type II or III with a minimum of 20 percent Class F fly ash by weight, where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.
- (7) ASTM C 595 Type IP(HS).
- (8) ASTM C 595 Type IL plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (9) ASTM C 595 Type IT; having less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.

**Class 3 requirements for sulfate resistance shall be one of the following:**

A blend of portland cement meeting ASTM C 150 Type II, III, or V with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

- (1) ASTM C 1157 Type HS having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (2) ASTM C 1157 Type MS or HS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (3) ASTM C 150 Type II, III, or V plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (4) ASTM C 595 Type 1L plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (5) ASTM C 595 Type IP(HS) or IT having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (6) ASTM C 595 Type IL with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

When fly ash or High-Reactivity Pozzolan is used to enhance sulfate resistance, it shall be used in a proportion greater than or equal to the proportion tested in accordance to ASTM C1012, shall be the same source and it shall have a calcium oxide content no more than 2.0 percent greater than the fly ash or High-Reactivity Pozzolan tested according to ASTM C 1012.

In subsection 601.05 delete the first paragraph and replace with the following:

**601.05 Proportioning.** The Contractor shall submit a Concrete Mix Design for each class of concrete being placed on the project. Concrete shall not be placed on the project before the Concrete Mix Design Report has been reviewed and approved by the Engineer. The Concrete Mix Design will be reviewed and approved following the procedures of CP 62. The Concrete Mix Design will not be approved when the laboratory trial mix data are the results from tests performed more than two years in the past or aggregate data are the results from tests performed more than two years in the past. The concrete mix design shall show the weights and sources of all ingredients including cement, pozzolan, aggregates, water, additives and the water to cementitious material ratio

3  
REVISION OF SECTIONS 601 AND 701  
CEMENTS AND POZZOLANS

(w/cm). When determining the w/cm, the weight of cementitious material (cm) shall be the sum of the weights of the cement, fly ash, silica fume and High-Reactivity Pozzolan.

In subsection 601.05, delete the 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup> paragraphs and replace with the following:

The Concrete Mix Design Report shall include Certified Test Reports showing that the cement, fly ash, High-Reactivity Pozzolan and silica fume meet the specification requirements and supporting this statement with actual test results. The certification for silica fume shall state the solids content if the silica fume admixture is furnished as slurry.

For all concrete mix designs with ASTM C150 cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IL cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IP, IP(MS), IP(HS) or IT cements; fly ash or High-Reactivity Pozzolan shall not be substituted for cement.

For all concrete mix designs with ASTM C1157 cements, the total pozzolan content including pozzolan in cement shall not exceed 30 percent by weight of the cementitious material content.

When the Contractor's use of fly ash or High-Reactivity Pozzolan results in delays to the project, when it is necessary to make changes in admixture quantities, the source, or the Contractor performs, the cost of such delays and corrective actions shall be borne by the Contractor.

The Contractor shall submit a new Concrete Mix Design Report meeting the above requirements when a change occurs in the source, type, or proportions of cement, fly ash, High-Reactivity Pozzolan, silica fume or aggregate. When a change occurs in the source of approved admixtures, the Contractor shall submit a letter stamped by the Concrete Mix Design Engineer approving the changes to the existing mix design. The change will need to be approved by the Engineer prior to use.

In subsection 601.06, second paragraph, delete (9) and replace with the following:

(9) Type, brand, and amount of cement, fly ash and High-Reactivity Pozzolan

In subsection 601.06, delete (a) and replace with the following:

(a) *Portland Cement, Fly Ash, High-Reactivity Pozzolan and Silica Fume.* These materials may be sacked or bulk. No fraction of a sack shall be used in a batch of concrete unless the material is weighed.

All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be sealed and vented to preclude dusting during operation. The discharge chute shall be so arranged that cement will not lodge in it or leak from it.

Separate storage and handling equipment shall be provided for the fly ash, silica fume and High-Reactivity Pozzolan. The fly ash, silica fume, and High-Reactivity Pozzolan may be weighed in the cement hopper and discharged with the cement.

REVISION OF SECTIONS 601 AND 701  
CEMENTS AND POZZOLANS

In subsection 701.01 delete and replace the second paragraph with the following:

All concrete, including precast, prestressed and pipe shall be constructed with one of the following hydraulic cements, unless permitted otherwise.

ASTM C 150 Type I

ASTM C 150 Type II

ASTM C 150 Type V

ASTM C 595 Type IL

ASTM C 595 Type IP

ASTM C 595 Type IP(MS)

ASTM C 595 Type IP(HS)

ASTM C 595 Type IT

ASTM C 1157 Type GU, consisting of no more than 15 percent limestone

ASTM C 1157 Type MS, consisting of no more than 15 percent limestone

ASTM C 1157 Type HS, consisting of no more than 15 percent limestone

In subsection 701.02 add the following after the first paragraph:

Blending of pozzolans according to ASTM D5370 is permitted to meet the requirements of ASTM C 618.

Add subsection 701.04 immediately following subsection 701.03 as follows:

**701.04 High-Reactivity Pozzolans.** High-Reactivity Pozzolans (HRP) shall conform to the requirements of AASHTO M321. HRPs are but not limited to metakaolin, rice hull ash, zirconium fume, ultra-fine fly ash, and fume from the production of 50 percent ferrosilicon (with SiO<sub>2</sub> less than 85 percent).

HRPs shall meet the following optional requirement of AASHTO M321: The sulfate expansion at 14 days shall not exceed 0.045 percent

HRP shall be from a preapproved source listed on the Department's Approved Products List. The HRP intended for use on the project shall have been tested and accepted prior to its use. Certified Test Reports showing that the HRP meets the specification requirements and supporting this statement with actual test results shall be submitted to the Engineer.

The HRP shall be subject to sampling and testing by the Department. Test results that do not meet the physical and chemical requirements may result in the suspension of the use of HRP until the corrections necessary have been taken to ensure that the material conforms to the specifications.

REVISION OF SECTION 612  
DELINEATORS

Section 612 of the Standard Specifications is hereby revised for this project as follows:

In subsection 612.02(a) 1, delete the last sentence, and replace with the following:

Posts shall conform to the requirements shown on the plans, and reflectors shall conform to the requirements in subsections 713.07 and 713.10.

In subsection 612.02(a) 2.B, delete the first paragraph, and replace with the following:

- B. Base Anchoring. The posts shall be designed to facilitate a permanent installation that resists overturning, twisting, and displacement from wind and impact forces. It shall have an anchoring depth of 18 to 24 inches. Actual depth shall be as recommended by the manufacturer. If soil conditions prohibit anchoring depth to less than 18 inches, installation shall be in accordance with manufacturer's recommendations.

REVISION OF SECTION 612  
FLEXIBLE DELINEATORS

Section 612 of the Standard Specifications is hereby revised for this project to include the following:

Delete subsection 612.02 (a) 2, and replace with the following:

2. Flexible delineators shall be manufactured and supplied by:

Shur-Tite Products  
PO Box 2283  
Round Rock TX 78680  
Contact: David Riker  
512-218-9500 (office)  
512-388-0417 (FAX)  
512-971-0340 (Cell)

Ground-mounted delineator shall be Shur-Flex Driveable Delineator. Guardrail post mounted delineator shall be the Shur-Tite Guardrail Post Flat Mount Delineator or the Shur-Tite Guardrail Post Clamp Mount Delineator, as called for in the Contract. Surface mounted delineators shall be the Shur-Flex Surface Mount Delineators.

Subsection 612.03 shall include the following:

Flexible delineators shall be installed in accordance with manufacturer recommendations.

In subsection 612.03, delete the first sentence of the third paragraph and replace with the following:

The length of each reflector strip shall be as recommended by the manufacturer.

In subsection 612.04, delete the second sentence.

Subsection 612.05 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Delineator (Flexible) (Square Base)	Each
Delineator (Flexible) (Flat Mounted)	Each
Delineator (Flexible) (Clamp Mounted)	Each
Delineator (Flexible) (Surface Mounted)	Each

Payment will be full compensation for all work, materials, and equipment required to install the delineators.

REVISION OF SECTIONS 613 AND 715  
LED ROADWAY LUMINAIRE

Sections 613 and 715 of the Standard Specifications are hereby revised for this project as follows:

In subsection 613.02, delete (e) and replace with the following:

- (e) *Luminaire*. A complete luminaire includes the housing, lens, Light Emitting Diode (LED) luminaire, luminaire housing, driver or power generator, slip-fitting clamp or approved manufacturer mounting, all necessary internal wiring, and photoelectric control. Luminaires shall operate at either 120 VAC, 60 Hz or 277 VAC, 60 Hz. Luminaires shall meet electrical utility company requirements.

In subsection 613.02 (i), delete (4), (6), (7) and (8) and replace with the following:

- (4) Luminaire manufacturer's product information including data in Illuminating Engineering Society of North America (IESNA) format, IESNA photometric distribution type for vertical and lateral distribution (example: B2-U0-G1, Type III), and a photograph or line drawing
- (6) Luminaire Lumen Range
- (7) LED Driver or Power Supply
- (8) Lighting Control Centers and Photoelectric Control Devices

Subsection 613.02 shall include the following:

- (j) *LED Luminaire Warranty*. The Contractor shall ensure that the LED Roadway Luminaire has a minimum warranty of 10 years for all parts, materials and shipping required to repair or replace the luminaire. The Contractor shall provide the manufacturer's warranty to the Engineer prior to installing the luminaire.

The warranty shall cover all failures including:

- (1) Failure in luminaire housing, wiring, connections, drivers and photoelectric control devices.
- (2) More than 10 percent decrease in lumen output
- (3) Significant change in color

The warranty shall begin upon the date the Contractor receives the luminaire. The bill of lading shall be provided to the Engineer prior to final payment of the lighting.

- (k) *Technical Support*. During the warranty period, technical support shall be available from the manufacturer via telephone within 24 hours of the time the call is made from the Contractor, and this support shall be made available from factory certified personnel or factory certified installers at no additional charge to the Department.

In subsection 613.06, delete the first paragraph and replace with the following:

**613.06 Luminaires and Lamps.** Roadway Luminaires shall be mounted on the mast arm by a slip-fitter clamp or other approved device. Luminaires shall be adjusted vertically and horizontally to provide the required orientation and maximum light distribution on the roadway and to meet Illuminating Engineering Society of North America (IESNA) TM-15 upright rating of U0.

In subsection 613.06, delete the fourth paragraph and replace with the following:

Luminaires of the specified type and lumen output shall be installed as shown on the plans. The type and lumen output shall be marked on each luminaire or pole in accordance American National Standards Institute (ANSI) specifications. ANSI approved tags shall be provided and installed by the Contractor.

REVISION OF SECTIONS 613 AND 715  
LED ROADWAY LUMINAIRE

Subsection 613.12 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Luminaire (LED) (___ Lumens)	Each

In subsection 715.04 (a), delete 2. and 4. and replace with the following:

2. Optical Chamber. The luminaire distribution shall be equal to or less than an Illuminating Engineering Society of North America (IES) TM15-11 Backlight Uplight and Glare (BUG) ratings listed below in Table 715-1 based on initial lumens or Light Loss Factor (LLF) = 1.0. Roadway luminaires with a U value greater than U0 shall not be accepted. The optical chamber shall be completely sealed from the housing, or the housing shall be completely sealed. A seamless one piece memory-retentive gasket shall seal the optical chamber or housing against the luminaire lens door. All wires entering the optical chamber shall be gasketed at their point of entry. Socket mountings, rivets used in the construction or support of the reflector system, and all other penetrations into the optical chamber shall be completely sealed. The optical chamber shall be water tight when the luminaire door is closed.

**Table 715-1  
BACKLIGHT, UPLIGHT AND GLARE (BUG) VALUES**

Luminaire Mounting Location	Minimum Initial Luminaire Lumen Range	Backlight (B) Rating Maximum	Uplight (U) Rating Maximum	Glare (G) Rating Maximum
Non median-mounted	Less than 5,000	B2	U0	G1
	5,000 – 22,000	B3	U0	G2
	Above 22,000*	B3	U0	G3
Median-mounted	Less than 5,000	B3	U0	G1
	5,000 – 22,000	B4	U0	G2
	Above 22,000*	B4	U0	G3
*By special application only.				

4. Electrical Components. All components shall be Underwriters Laboratory (UL) listed for wet locations or by an Occupational Safety & Health Administration Nationally Recognized Testing Laboratories (OSHA NRTL). Luminaires shall operate from 120 to 277 VAC as specified on the plans or adaptable to the type of power distribution system to be used. All internal wiring and quick disconnects shall be rated for at least 600 VAC and insulated for 302°F. The dimmable driver shall be easily removable from the luminaire housing without the use of tools. The following components shall be in accordance with corresponding sections of ANSI C136.37:
  - (1) Wiring and grounding.
  - (2) Terminal blocks for incoming AC lines.
  - (3) Photocontrol receptacle.
  - (4) Latching and hinging



REVISION OF SECTIONS 613 AND 715  
LED ROADWAY LUMINAIRE

In subsection 715.04, delete (b) through (e) and replace with the following:

- (b) *Roadway Luminaires*. Roadway luminaires shall be LED type with integral driver, flat lens, aluminum housing, and be UL Listed for wet locations. All luminaires for the project shall be the same type and design unless the plans specify otherwise.
- (1) The luminaire and all components shall be UL or Intertek Testing Services (ETL) listed for Wet Location and shall have minimum Ingress Protection Rating of IP66.
  - (2) Light source shall be comprised of LED modules connected to a non-integrated driver and ready for connection to a production line luminaire. Luminaires utilizing integrated driver LED light sources, screw-based or panel retrofit products shall not be accepted.
  - (3) The luminaire shall have a Type II or III distribution for non-median mounted luminaires, and Type II, III, IV or V for median mounted luminaires.
  - (4) Transmissive optical components shall be applied in accordance with LED manufacturer's Original Equipment Manufacturer (OEM) design guidelines to ensure suitability for the environment in which the luminaire is installed.
  - (5) Luminaires shall utilize an adjustable slipfitter-type mounting system for installation on 1.25-inch (1.66-inch o.d.) to 2-inch (2.375-inch o.d.) outside diameter pipe tenons. Slipfitter shall consist of a two-piece clamp and four 9/16-inch hex bolts. Slipfitter shall allow for a vertical tilt adjustment of  $\pm 5$  percent in order to mount luminaire plumb for a U0 rating. Luminaires shall be equipped with integrated leveling bubble.
  - (6) Access to all internal parts requiring replacement shall not require tools (i.e. "tool-less entry").
  - (7) The luminaire housing shall be constructed of aluminum alloy.
  - (8) Power Supply/Driver shall be provided in compliance with subsection 715.05(a). Driver must be internal and thermally separated from LED compartment.
  - (9) Dimming photocell receptacle shall conform to (d) below.
  - (10) Luminaire finish shall be corrosion resistant Super triglycidyl isocyanurate (TGIC) polyester powdercoat. Color shall be gray.
    - (i) Powder coat: Super TGIC polyester powder coat 2.5 mil nominal thickness.
    - (ii) Finish shall exceed a rating of 6 per ASTM D1654 after 1000hrs of testing per ASTM B117.
    - (iii) The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.
  - (11) Effective Projected Area (EPA) for wind-loading calculations shall be no greater than 1.2 square feet.
  - (12) Luminaire weight shall not exceed 45 pounds.
  - (13) Luminaire shall be tested in accordance with IES LM79 and TM21 certifying photometric performance and rated life, respectively. LM79 (performance) and TM21 (predicted life at 55°C) testing shall both be for the same luminaire's operating drive current as specified.
  - (14) Luminaire shall have a maximum Backlight rating as shown in Table 715-1, an Uplight rating of U0, and a maximum Glare rating as shown in Table 715-1.
  - (15) Luminaire system efficacy shall be no less than 68 luminaire lumens per input watt.
  - (16) Luminaire shall have an external label per ANSI C136.15 and internal label per ANSI C136.22.

REVISION OF SECTIONS 613 AND 715  
LED ROADWAY LUMINAIRE

- (c) *Light Sources.* LED luminaires shall not be retrofit to existing luminaire housing; the Contractor shall replace housing along with the luminaire as a single unit. Light sources shall be compatible with dimmable drivers supplied with the luminaires in which they are to be installed. All light sources of a similar type shall be provided by the same manufacturer.

LED light sources shall meet or exceed the following requirements:

(1) CCT, CRI and Flux:

- (i) Correlated Color Temperature (CCT) – All LED light sources shall emit white light and have a CCT no less than 2700K nominal and no greater than 4000K nominal in accordance with ANSI C78.277.
- (ii) Color Rendering Index (CRI) – All LED light sources shall have a minimum Color Rendering Index (CRI) of 70 per the LM79 test results.
- (iii) Luminous Flux – LED light sources shall not exceed the junction temperature recommended by the LED manufacturer. Luminous flux differences between LEDs shall not exceed 10 percent.

- (2) LEDs shall have a minimum rated life of 70,000 hours per IES TM-21 at 55°C at the normal operating driver current for the specific luminaire. The lumen output shall be maintained at 70 percent of initial rated lumens (L70) or greater at the rated life of the luminaire.

- (3) LEDs shall be temperature rated for operation and storage within the range of -40°C to +50°C, and shall withstand low and high frequency vibration (ANSI C136.31 Vibration Level 3G) over the rated life of the light source.

(4) Cooling System

- (i) Mechanical design of protruding external surfaces (e.g. heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.
- (ii) The cooling system must be passive utilizing heat sinks, convection or conduction.
- (iii) Fans, diaphragms, pumps, or liquids shall not be acceptable.

(d) *Photocontrol Receptacle.*

Each roadway luminaire shall be furnished with a multi-contact twist-lock outdoor lighting dimming receptacle per ANSI C136.41.

REVISION OF SECTIONS 613 AND 715  
LED ROADWAY LUMINAIRE

Delete subsection 715.05 and replace with the following:

**715.05 LED Drivers.** Led drivers shall conform to the following:

- (1) Dimming signal protocols are 0-10VDC or Digital Addressable Lighting Interface (DALI).
- (2) Operating voltage shall be 120/277-volt at 50/60 Hz, and shall operate normally with input voltage fluctuations of  $\pm 10$  percent, consistent with NEMA SSI-1-2010, Electronic Drivers for LED Devices, Arrays or Systems.
- (3) Minimum Power Factor (PF) shall be 0.90 at full input power and across specified voltage range.
- (4) Maximum Total Harmonic Distortion (THD) shall be 20 percent at full input power and across specified voltage range.
- (5) Factory-set drive current shall be 530mA or less unless approved by Engineer. If higher drive currents are proposed, the submittal must be accompanied with IES LM79 and TM21 test results for higher operating drive current.
- (6) Drivers shall be Restriction of Hazardous Substances (RoHS) compliant.
- (7) Rated case temperature shall conform to subsection 715.04 (c) 3.
- (8) All electronics of the power supply and the LEDs shall be protected from all electrical surges with an elevated electrical immunity rating, including but not limited to lightning strikes and stray current in rebar and concrete. Surge protection shall be integral to the LED power supply.
- (9) Luminaire, including driver, shall consume no more than 4 watts in the off state power.
- (10) Electrical immunity (including surge protection)
  - (i) Luminaire shall meet the "Elevated" requirements per IEEE C62.41.2 -2002. Manufacturer shall indicate whether failure of the electrical immunity system can possibly result in disconnect of power to luminaire.
- (11) Electromagnetic interference: Shall comply with Federal Communications Commission (FCC) 47 Code of Federal Regulations (CFR) part 15 non-consumer radio frequency interference (RFI) and/or electromagnetic interference (EMI) standards.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

Section 614 of the Standard Specifications is hereby revised for this project to include the following:

**DESCRIPTION**

This work consists of the construction of an accessible pedestrian signal at locations as shown on the plans.

**MATERIALS**

The Accessible Pedestrian Signal (APS) shall be an audible-tactile pedestrian signal system and shall consist of all electronic control equipment, mounting hardware, push buttons and signs designed to provide both a pushbutton with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions.

The APS shall meet the following requirements:

- (1) 2009 Manual of Uniform Traffic Control Devices (MUTCD), Chapter 4E – Pedestrian Control Features.
- (2) NEMA TS 2 Section 2.1 requirements for Temperature and Humidity, Transient Voltage Protection and Mechanical Shock and Vibration.
- (3) IEC 61000-4-4; 4-5 Transient Suppression requirements.
- (4) FCC Title 47, Part 15, Class A, Electronic Noise requirements.

The APS pushbutton enclosure shall meet the NEMA 250 – Type 4X enclosure requirement. Upon installation the APS shall have the following functional requirements:

(a) *APS functional requirements.* The APS shall have the following functional features:

- (1) The APS shall be programmable and adjustable. Programming and adjustments shall be made using a laptop computer or vendor supplied programmer. No additional hardware or equipment shall be required. The APS shall be fully compatible with the three latest versions of the Windows operating platform. The programmable features shall be:
  - A. Push-button locator tone
  - B. Walk and Wait audible message
  - C. Audible push-button informational message
  - D. Audible crossing beacon
  - E. Vibrating tactile arrow
  - F. Independent minimum and maximum volume limits for the Locator Tone, Walk and Audible Beacons features.
- (2) All audible features shall emanate from the pedestrian pushbutton housing. The APS shall utilize digital audio technology, having a minimum 12-bit sample at a 16k Hz sample rate. Total harmonic distortion shall be less than 3 percent at 75 decibels. The APS shall provide independent ambient sound adjustment for the Locator Tone feature. The APS shall allow for Locator Tone volume to be set below the ambient noise level. The system shall have, at a minimum, three programmable locator tones. All sound levels shall adjust automatically utilizing an internally mounted, interval ambient sensing microphone, in accordance with the MUTCD.
- (3) The APS shall monitor the Walk condition for conflict operation. As a standalone unit, the APS shall disable the Walk functionality should a conflict be detected.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

- (4) The APS system shall log cumulative call data. The data shall be date and time stamped, and shall be accessible via laptop.
- (5) The system shall have a programmable Extended Push Activation feature with the ability to extend the Walk time and provide an informational audible message. Activation shall be programmable from one to six seconds.
- (6) The system shall provide a programmable audible Wait message when the button is pushed. The message shall only annunciate once per actuation.

*(b) Power Control Unit (PCU):*

- (1) The PCU shall be mounted in the pedestrian signal head and shall be powered by the activation of Walk or Don't Walk using 120 Volts Alternating Current (VAC).
- (2) The PCU shall utilize separate power inputs for Walk and Don't Walk. The PCU shall not require more than four wires from the PCU to the corresponding push button.
- (3) The voltage at the push button shall not exceed 24 VAC.

*(c) Push Button Assembly (PBA):*

- (1) The PBA shall be a single assembly containing an ADA compliant, vibro-tactile, directional arrow button, weatherproof audible speaker and informational sign with optional placard braille messages. The PBA shall housing shall not incorporate any plastic or polycarbonate parts.
- (2) The PBA tactile arrow shall be 2 inches in length and shall be field adjustable to two directions.
- (3) The pushbutton shall utilize Piezo switch technology rated at greater than twenty million operations. Vibro-tactile operation shall pulse at 20 Hz with a minimum 0.003-inch displacement against a 2 pound applied force.
- (4) The PBA assembly shall be capable of mounting on a curved or flat surface utilizing either machine screws or bolts or banding type mounting hardware. The PBA shall accommodate mounting to a minimum 2-inch diameter pole.

### CONSTRUCTION REQUIREMENTS

Prior to start of the installation of the APS, The Contractor shall submit a sample unit for testing. Installation of the APS shall not begin until written approval of the sample has been received from the Engineer. If the unit fails to pass testing, the Contractor shall repair or replace the subsequent units at his expense.

A field test of a single APS shall be performed in the presence of the Engineer. All repairs or replacements required to ensure a fully operational system shall be at the Contractor's expense.

The APS shall be installed in accordance with manufacturer's recommendations.

### METHOD OF MEASUREMENT

The Accessible Pedestrian Signal (APS) will be measured as the actual number that are installed and accepted.

REVISION OF SECTION 614  
ACCESSIBLE PEDESTRIAN SIGNAL

**BASIS OF PAYMENT**

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Accessible Pedestrian Signal	Each

Payment will be full compensation for all work, materials and equipment required to install a fully operational APS in accordance with these specifications.

The sample APS will not be measured and paid for separately, but shall be included in the work.

Testing will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 614  
PEDESTRIAN PUSH BUTTON POST ASSEMBLY

Section 614 of the Standard Specifications is hereby revised for this project as follows:

Subsection 614.01 shall include the following:

This work consists of the installation of a pedestrian push button and steel post assembly at locations as shown on the plans.

Subsection 614.02 shall include the following:

Post for pedestrian push button shall be tubular steel, Schedule 80.

Concrete for foundation shall be Class B.

Pedestrian push button and sign shall meet all ADA requirements.

Wiring for pedestrian push button shall conform to manufacturer recommendations.

Subsection 614.02 shall include the following:

Steel posts and slip base assembly shall be galvanized in accordance with Section 509, unless painting is called for on the plans. Painting shall be in accordance with Section 522, Duplex Coating System. The post and slip base shall be constructed as shown on the plans.

Subsection 614.13 shall include the following:

Pedestrian Push Button Post Assembly will be measured as the actual number that are installed and accepted.

614.14 shall include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Pedestrian Push Button Post Assembly	Each

Wiring will not be measured and paid for separately, but shall be included in the work.

1  
 REVISION OF SECTIONS 614 AND 713  
 SIGN PANEL SHEETING

Sections 614 and 713 of the Standard Specifications are hereby revised for the project as following:

Delete subsection 614.04 and replace with the following:

**614.04 Sign Panels.** Sign panel materials shall conform to Section 713 and to the details shown on the plans. Sign panels shall be produced in accordance with the retroreflective sheeting manufacturer's recommendations. Layout and font design shall conform to the "Standard Highway Signs" published by FHWA. Font selection for guide sign legends shall conform to the most recent version of the "CDOT Sign Design Manual". Sign layouts for special signs shall be in accordance with the detailed sign layouts proved in the plans or by the Engineer.

Silk screen and digital process figures shall be in accordance with the plans and series figures described in the current editions of "Standard Highway Signs", published by the FHWA, and the "Colorado Supplement to Standard Highway Signs".

All exposed lockbolt fastener heads on the faces of the sign panels shall be covered with material matching the background of the panel.

All sign panels shall be identified with the month and year that the sign was manufactured. The date shall be located on the lower right side of the back of the sign panel and shall be approximately ¼ inch high. The date shall be stamped or adhered onto the sign panel material for a permanent record. This work will be paid for as part of the Item.

In subsection 713.01, delete Table 713-1 and replace with the following:

**Table 713-1**

Application	Aluminum		Steel
	ASTM Designation	Allow No.	ASTM Designation
Sign panels	B 449 <sup>1</sup> B 921 <sup>1</sup>	6061-T6 5052-H36 5052-H38	A 653 <sup>2</sup>
Traffic controller cabinets	B 209	6061-T6	A 709 Grade 36
Clip bolts	B 211	2024-T4	
Locknuts or steel nuts and bolts	B 211	2014-T4	A 307
Clips and backing angles	B 221	6061-T6	
<sup>1</sup> In lieu of ASTM treatment, aluminum sign blanks shall receive a Class 2 anodized coating prior to the placement of retroreflective sheeting. <sup>2</sup> Steel sheets shall have a Z600 zinc coating in accordance with ASTM A 653 and a light phosphate coating. Phosphate coating of 3.5 oz./sq. ft. will be required for application with reflective sheeting. Nuts and bolts shall be galvanized or cadmium plated.			

Delete subsection 713.04 and replace with the following:

**713.04 Sign Message Materials.** The legend, border, and overlay shall be used in accordance with the sheeting manufacturer's recommendation. Retroreflective sheeting background material shall be approved in the Department's Approved Product List; and the retroreflective sheeting background material shall be the type as specified on the plans. At a minimum, ASTM 4956 Type IV shall be used for ground mount signs. ASTM D4956 Type XI shall be used for Class III overhead signs.



REVISION OF SECTIONS 614 AND 713  
SIGN PANEL SHEETING

For Class III overhead signs, the legend and borders shall be ASTM D4956 Type XI sheeting.

All reflective sheeting shall be sealed at the seams and edges as recommended by the manufacturer.

Delete subsection 713.06 and replace with the following:

**713.06 (unused)**

REVISION OF SECTION 625  
CONSTRUCTION SURVEYING

Section 625 of the Standard Specifications is hereby revised for this project as follows:

Subsection 625.01 shall include the following:

If the Revision of Section 102 Project Plans and Other Data states 3D modeling data is available, the Contractor may choose to perform 3D Engineered Construction Surveying (3DECS).

3DECS is the use of global positioning and or robotic instruments to guide construction equipment operations by comparing 3D model information in real time. For 3DECS, either the construction equipment is fed modeling information and makes automatic adjustments (machine control) or the equipment operator is fed the information and makes manual adjustments.

In subsection 625.04, delete the first paragraph and replace with the following:

The Contractor shall perform all construction surveying and staking necessary for construction of the project. Construction surveying and staking shall be based on the Primary Horizontal and Vertical Control established by the Department. Bid items which require stakes to be set by the Contractor's Surveyor are shown on the Surveyor Tabulation Sheet of the plans and shall be in accordance with the CDOT Survey Manual Chapter 6.

For projects in which the Contractor uses 3D Engineered Surveying the following applies:

- (a) All surveying shall be based on the Primary Horizontal and Vertical Control established by the Department.
- (b) The Contractor shall provide construction stakes for the control points of the project centerline or Engineer approved offset line (i.e. POT, POC, PCC, PC, PT, TS, ST, SC, CS per the Survey Manual) and angle points, all of which shall be established from primary control monuments and their assigned coordinates as shown on the plans.
- (c) Staking for the project centerline or offset, shall be established from the project centerline control points as shown on the plans in order to provide a method of machine control equipment checks, inspection, and field verification.
- (d) The maximum staking interval for the project centerline shall be 500 feet on tangents and 100 feet on curves or as specified on the survey tabulation sheet. All project centerline control points as shown on the plans shall be staked.
- (e) Within the first week of the Contractor utilizing 3DECS, the Contractor shall check their 3DECS system and verify on writing to CDOT that the accuracy of the system complies with the contract requirements.

At no cost to the Department, the Contractor shall revert to traditional surveying and disband using 3DECS should the Engineer determine the existence of contractor quality or accuracy issues related to 3DECS.

Subsection 625.06 shall include the following:

3D Engineered surveying accuracy and tolerances shall be the same as the staking accuracy and tolerances stated in the CDOT Survey Manual.

Subsection 625.13 shall include the following:

All costs associated with 3DECS surveying will not be measured and paid for separately, but shall be included in the work.

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 REVISION OF SECTION 627  
 PREFORMED PLASTIC PAVEMENT MARKING

Section 627 of the Standard Special Provisions is hereby revised for this project as follows:

In subsection 627.08, delete the fourth, fifth and sixth paragraphs and replace with the following:

The air and surface temperature shall be a minimum 40 °F or per manufacturer recommendation.

In subsection 627.08, delete the fourteenth paragraph and replace with the following:

The preformed plastic pavement marking shall be inlaid on new and existing pavements as shown in the Contract. The material shall be capable of use for patching worn areas of the same type according to the manufacturer's recommendations.

The Contractor shall not perform wet cutting of pavement unless otherwise directed. Application and removal of temporary pavement marking associated with wet-cutting of pavement shall be at the Contractor's expense.

In subsection 627.08 (a), delete the first paragraph and replace with the following:

- (a) *Inlaid Preformed Plastic Pavement Marking.* The grooved width for inlaid preformed plastic pavement marking is called for in the Contract, grooved width shall be the pavement marking width plus 1 inch, with a tolerance of  $\pm \frac{1}{4}$  inch. The depth of the grooves shall be 130 mils  $\pm$  5 mils. Groove position shall be a minimum of 2 inches from the edge of the pavement marking to the longitudinal pavement joint.

Grooving shall not be performed on bridge decks with Polyester Polymer Concrete Overlays.

In subsection 627.13, delete the following pay items

Pay Item	Pay Unit
Preformed Plastic Pavement Marking (___ mils)	Square Foot
Preformed Plastic Pavement Marking (Type ___)	Square Foot
Preformed Plastic Pavement Marking (Word-Symbol) (Type ___)	Square Foot
Preformed Plastic Pavement Marking (Xwalk-Stop Line) (Type ___)	Square Foot

Section 627.13 shall include the following:

Pay Item	Pay Unit
Preformed Plastic Pavement Marking (Word-Symbol) (Type I) (Inlaid)	Square Foot
Preformed Plastic Pavement Marking (Xwalk-Stop Line) (Type I) (Inlaid)	Square Foot

In subsection 627.13 delete the second and third paragraphs.

REVISION OF SECTION 627  
PREFORMED PLASTIC PAVEMENT MARKING

Preformed Plastic Pavement Marking 60 mil (Xwalk-Stop Line)	Square Foot
Preformed Thermoplastic Pavement Marking (Word-Symbol)	Square Foot
Preformed Thermoplastic Pavement Marking (Xwalk-Stop Line)	Square Foot

REVISION OF SECTIONS 627 AND 713  
MODIFIED EPOXY PAVEMENT MARKING

Sections 627 and 713 of the Standard Specifications are hereby revised for this project as follows:

In subsection 627.05, delete the seventh paragraph and replace with the following:

Modified epoxy pavement marking shall be applied to the road surface according to the modified epoxy manufacturer's recommended methods at the application rate or coverage shown below. Glass beads shall be applied into the modified epoxy pavement marking by means of a low pressure, gravity drop bead applicator.

In subsection 627.05, delete the last paragraph and replace with the following:

Modified epoxy pavement marking and beads shall be applied within the following limits:

	Application Rate or Coverage	
	Per Gallon of Modified Epoxy Pavement Marking Minimum	Maximum
18 mil marking	85 sq. ft.	90 sq. ft.
Beads	23 lbs.	

Subsection 627.05 shall include the following:

Modified epoxy Pavement Marking shall conform to subsection 713.17.

Subsection 627.13 shall include the following:

Pay Item	Pay Unit
Modified Epoxy Pavement Marking	Gallon

Delete subsection 713.17 and replace with the following:

**713.17 Modified Epoxy Pavement Marking Material.** Only modified epoxy pavement marking material that is on the Department's Approved Products List may be used. Batches or lots of approved products will be accepted on the project by Certificate of Compliance (COC) in accordance with subsection 106.12. The COC shall confirm that the material meets all CDOT requirements and is the same material that was preapproved in the product evaluation process.

- (a) *Formulation.* Modified epoxy pavement marking material shall be a two component, 100 percent solids, material formulated to provide simple volumetric mixing ratio of two volumes of component A and one volume of component B unless otherwise recommended by the material manufacturer.
- (b) *Composition.* The component A of both white and yellow shall be within the following limits:

**Resin / Pigment Components (% by Weight)**

Pigment	WHITE:	YELLOW:
TiO <sub>2</sub> , ASTM D476, Type II	18-25	10-17
Organic Yellow		6-10
Epoxy Resin	75-82	73-84

The pigment for yellow modified epoxy shall contain no lead or other material such that the cured epoxy could be considered a hazardous waste under EPA or CDPHE regulations. The Contractor shall submit to the Engineer a manufacturer's certification of compliance with this requirement.

- (c) *Epoxide Number.* The epoxide number of the modified epoxy's resin shall be the manufacturer's target value ± 50 as determined by ASTM D 1652 for white and yellow component A on pigment free basis.
- (d) *Amine Number.* The amine number on the curing agent (component B) shall be the manufacturers target value ± 50 per ASTM D 2071.

REVISION OF SECTIONS 627 AND 713  
MODIFIED EPOXY PAVEMENT MARKING

(e) *Toxicity.* Upon heating to application temperature, the material shall not produce fumes which are toxic or injurious to persons or property.

(f) *Color.* The modified epoxy material, without drop-on beads, shall correspond following requirements:

White – Federal Standard No. 595B-17925. The Yellowness Index (YI) of white shall not exceed 8.0 per ASTM E-313-10 initially.

After 72 QUV exposure per ASTM G-154 with a UVA-340 Lamp at an irradiance of 0.89 W/m<sup>2</sup>/nm with alternating cycles of 4 hours U.V @ 140° F, and 4 hours humidity @ 122° F the YI shall not exceed 15 when measured per ASTM E-313.

The YI, after 500-hour QUV testing as above, shall not exceed 27.

Yellow – Materials for pavement markings shall meet the initial daytime chromaticity that fall within the box created by the following corner points:

Initial Daytime Chromaticity Coordinates (Corner Points)

	1	2	3	4
x	0.530	0.510	0.455	0.472
y	0.456	0.485	0.444	0.400

After 72-hour QUV exposure per ASTM G-154 with a UVA-340 Lamp at an irradiance of 0.89 W/m<sup>2</sup>/nm with alternating cycles of 4 hours U.V @ 140° F, and 4 hours humidity @ 122° F the Yellow shall fall within the initial chromaticity coordinates stated above.

(g) *Drying Time.* The modified epoxy pavement marking material shall have a setting time to a no-tracking condition of not more than 25 minutes at a temperature of 73° F and above.

(h) *Curing.* The modified epoxy material shall be capable of fully curing under the constant surface temperature condition of 35° F and above.

(i) *Adhesion to Concrete.* The catalyzed modified epoxy pavement marking material, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified (4000 psi minimum) concrete surface that there shall be a 100 percent concrete failure in the performance of this test

(j) *Hardness.* The modified epoxy pavement marking materials, when tested according to ASTM D 2240, shall have a minimum Shore D Hardness value of 80. Samples shall be allowed to cure at room temperature, 75 ± 2 °F for a minimum of 72 hours and a maximum of 168 hours prior to performing the indicated test.

(k) *Abrasion Resistance.* The abrasion resistance shall be evaluated on Taber Abrader with a 1000 gram load and CS-17 wheels. The duration of the test shall be 1000 cycles. The wear index shall be calculated based on ASTM test method C-501 and the wear index for the catalyzed material shall not be more than 60. The tests shall be run on cured samples of material which have been applied at film thickness of 15 ± ½ mils to code S-16 stainless steel plates. The samples shall be allowed to cure at 75 ± 2 °F for a minimum of 72 hours prior to performing the indicated tests.

(l) *Tensile Strength.* When tested according to ASTM D 638, the modified epoxy pavement marking materials shall have a tensile strength of not less than 6000 psi. The Type IV Specimens shall be cast in a suitable mold and pulled at the rate of ¼ inch per minute by a suitable dynamic testing machine. The samples shall be allowed to cure at room temperature (75 ± 2 °F) for a minimum of 72 hours and a maximum of 168 hours prior to performing the indicated tests.

(m) *Compressive Strength.* When tested according to ASTM D 695, the catalyzed modified epoxy pavement marking materials shall have a compressive strength of not less than 12,000 psi. The cast sample shall be conditioned at room temperature, 75 ± 2 °F, for a minimum of 72 hours and a maximum of 168 hours prior to performing the tests. The rate of compression of these samples shall be no more than ¼ inch per minute.

REVISION OF SECTIONS 630 AND 713  
RETROREFLECTIVE SHEETING

Section 630 and 713 of the Standard Specifications is hereby revised for this project as follows:

In subsection 630.02, delete the sixth and seventh paragraphs, including Table 630-1, and replace them with the following:

Retroreflective sheeting for all signs requiring an orange background shall be Fluorescent.

**Table 630-1  
RETROREFLECTIVE SHEETING TYPES**

Sheeting	Type IV	Type VI (Roll-up sign material)	Fluorescent <sup>1</sup>
Application	Work Zone	Work Zone	Work Zone
All Orange Construction Signs			X
Orange Construction Signs that are used only during daytime hours for short term or mobile operations		X <sup>4</sup>	X
Barricades (Temporary)	X		X
Vertical Panels	X		X
Flaggers Stop/Slow Paddle	X		X
Drums and Tubular Markers <sup>2</sup>	X <sup>6</sup>		X
Non-orange Fixed Support signs with prefix "W"	X		
Special Warning Signs			X
STOP sign (R1-1) YIELD sign (R1-2) WRONG WAY sign (R5-1a) DO NOT ENTER sign (R5-1) EXIT sign (E5-1a)	X		
DETOUR sign (M4-9) or (M4-10)			X
All other fixed support signs <sup>3</sup>	X		X
All other signs used only during working hours	X		X
All other signs that are used only during daytime hours for short term or mobile operations	X	X <sup>5</sup>	X

- 1 Fluorescent sheeting shall be of a brand that is on the CDOT Approved Products List.
- 2 Drum and Tubular Marker sheeting shall be manufactured for flexible devices, and sheeting materials shall conform to Section 713.
- 3 Fixed support signs are defined as all signs that must remain in use outside of working hours. They shall be mounted in accordance with Standard Plan S-630-1.
- 4 RS 24 only.
- 5 White only.
- 6 For projects advertised prior to September 1, 2017, Type IV or Fluorescent sheeting will be permitted. For projects advertised on or after September 1, 2017, only Fluorescent sheeting will be permitted.

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 REVISION OF SECTIONS 630 AND 713  
 RETROREFLECTIVE SHEETING

In subsection 630.07 (b), delete the first sentence of the second paragraph and replace it with the following:

Tubular Markers shall be retroreflectorized as shown in Table 630-1.

Delete Subsection 713.10(b) and replace with the following:

(b) *Retroreflective Sheeting*. Reflective sheeting for traffic control devices shall be listed on the CDOT Approved Products List, and conform to the requirements of ASTM D 4956.

1. Retroreflective Quality Requirements

A. Drums and Tubular Markers. Retroreflective sheeting shall conform to ASTM D4956 Type IV, with the following modifications:

The Minimum Coefficient of Retroreflection ( $R_A$ ) shall conform to the following minimum values.

Observation Angle	Entrance Angle	Minimum Coefficient of Retroreflection ( $R_A$ ) [cd/ft <sup>2</sup> (cd/lx.m <sup>2</sup> )]	
		White	Fluorescent Orange
0.2°	-4°	500	200
0.2°	30°	200	80
0.5°	-4°	225	90
0.5°	30°	85	34

2. Daytime Color

A. Drums and Tubular Markers. All fluorescent orange sheeting shall meet the color requirements of ASTM D4956, with the following modifications:

The chromaticity coordinates and total luminance factor shall conform to the requirements as described in 23 CFR Part 655 Appendix to Subpart F.

The Fluorescence Luminance Factor ( $Y_F$ ) shall conform to the following minimum values.

Color	$Y_F$ Initial Requirement	$Y_F$ Minimum Requirement
Fluorescent Orange	20	15



REVISION OF SECTION 702  
BITUMINOUS MATERIALS

Section 702 of the Standard Specifications is hereby deleted for this project and replaced with the following:

**702.01 Asphalt Cements.**

(a) *Superpave Performance Graded Binders.* Superpave Performance Graded Binders shall conform to the requirements listed in Table 702-1. (Taken from AASHTO M 320)

Asphalt cement shall not be acid modified or alkaline modified.

Asphalt cement shall not contain any used oils that have not been re-refined. Modifiers that do not comply with environmental rules and regulations including 40 CFR Part 261.6(a) (3) (IV), and part 266/Subpart C shall not be added. Modifiers shall not be carcinogenic.

The supplier of the PG binder shall be certified in accordance with CP 11.



REVISION OF SECTION 702  
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Acceptance Samples of the PG binder will be taken on the project in accordance with the Schedule in the Field Materials Manual.

The Department will test for acid modification and alkaline modification during the binder certification process. Thereafter, the Department will randomly test for acid modification and alkaline modification.

(b) *Damp proofing.* Asphalt for damp proofing shall conform to the requirements of ASTM D 449, and the asphaltic primer shall conform to the requirements of ASTM D 41.

**702.02 Emulsified Asphalts.** Emulsified asphalts shall conform to AASHTO M 140 or M 208 for the designated types and grades. Emulsified asphalt and aggregate used for surface seals shall be sampled and will be tested for information only in accordance with CP-L 2213.

Emulsified asphalt (HFMS-2S) with a residual penetration greater than 300 dmm shall conform to all properties listed in AASHTO M 140, Table 1 except that ductility shall be reported for information only.

(a) *Emulsion for Tack and Fog Coats.* Emulsions for tack and fog coats shall conform to the requirements listed in Table 702-2 or 702-3, prior to dilution.

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 REVISION OF SECTION 702  
 BITUMINOUS MATERIALS

**Table 702-2  
 TACK AND FOG COAT EMULSIONS**

Property	CSS-1h	SS-1h	AASHTO Test No.
Viscosity, at 25 °C, Saybolt-Furol, s	min	20	T 59
	max	100	
Storage stability, 24 hr, % max <sup>1</sup>	1.0	1.0	T 59
Particle charge test	Positive		T 59
Sieve test, % max	0.10	0.10	T 59
Oil Distillate by volume, % max	3.0	3.0	T-59
Residue by distillation/ evaporation, % min <sup>3</sup>	57 <sup>3</sup>	57 <sup>3</sup>	T 59/ CP-L 2212 <sup>2</sup>
<b>Tests on residue:</b>			
Penetration, 25 °C, 100g, 5s, min, dmm	40	40	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	120	120	
Ductility, 25 °C, 5 cm/min, cm, min	40	40	T 51
Solubility, in trichloroethylene% min	97.5	97.5	T 44
<p><sup>1</sup>If successful application is achieved in the field, the Engineer may wave this requirement.</p> <p><sup>2</sup> CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability.</p> <p><sup>3</sup> For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.</p>			

- (b) *Emulsion for Chip Seals* Polymerized emulsions for chip seals shall conform to the requirements listed in Table 702-3. Emulsion for chip seals shall be an emulsified blend of polymerized asphalt, water, and emulsifiers. The asphalt cement shall be polymerized prior to emulsification and shall contain at least 3 percent polymer by weight of asphalt cement. The emulsion standing undisturbed for a minimum of 24 hours shall show no white, milky separation but shall be smooth and homogeneous throughout. The emulsion shall be pumpable and suitable for application through a distributor.

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REVISION OF SECTION 702  
BITUMINOUS MATERIALS

**Table 702-3  
POLYMERIZED EMULSIONS FOR CHIP SEALS**

Property	CRS-2	CRS-2P	CRS-2R	HFMS-2P	AASHTO Test No.
<b>Tests on Emulsion:</b>					
Viscosity, at 50 °C, Saybolt-Furol, s	min	50	50	50	T 59
	max	450	450	450	
Storage stability, 24 hr, % max	1.0	1.0	1.0	1.0	T 59
Particle charge test	Positive	Positive	Positive		T 59
Sieve test, % max	0.10	0.10	0.10	0.10	T 59
Demulsibility <sup>1</sup> , % min	40	40	40		T 59
Oil Distillate by volume, % max or range	3.0	3.0	3.0	3.0	T-59
Residue by distillation/ evaporation, % min <sup>3</sup>	65 <sup>3</sup>	65 <sup>3</sup>	65 <sup>3</sup>	65 <sup>3</sup>	T 59/ CP-L 2212 <sup>2</sup>
<b>Tests on residue:</b>					
Penetration, 25 °C, 100g, 5s, min, dmm	70	70	70	70	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	150	150	150	150	
Ductility, 25 °C, 5 cm/min, cm, min	40			75	T 51
Ductility, 4 °C, 5 cm/min, cm, min			40		
Solubility, in trichloroethylene% min <sup>4</sup>	97.5 <sup>4</sup>	97.5 <sup>4</sup>	97.5 <sup>4</sup>	97.5 <sup>4</sup>	T 44
Elastic Recovery, 25 °C min				58	T 301
Float Test, 60 °C, s min				1200	T 50
Toughness, in-lbs, min		70	90		CP-L 2210
Tenacity, in-lbs, min		45	45		CP-L 2210

<sup>1</sup>If successful application is achieved in the field, the Engineer may waive this requirement.

<sup>2</sup> CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability.

<sup>3</sup> For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.

<sup>4</sup> Solubility may be determined on the base asphalt cement prior to polymer modification.

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 REVISION OF SECTION 702  
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(c) *Emulsion for Slurry Seals and Micro-Surfacing.* Emulsions for slurry seals and micro-surfacing shall conform to the requirements listed in Table 702-4. The modified emulsion shall contain a minimum of 3 percent polymer, SBR latex, or natural latex by weight.

**Table 702-4**  
**SLURRY SEAL AND MICRO-SURFACING EMULSIONS**

Property	CQS-1hL	CQS-1hP	AASHTO Test No.
Viscosity, at 25 °C, Saybolt-Furol, s	15	15	T 59
min			
max	100	100	
Storage stability, 24 hr, % max <sup>1</sup>	1.0	1.0	T 59
Particle charge test	Positive	Positive	T 59
Sieve test, % max	0.10	0.10	T 59
Oil Distillate by volume, % max	0.5	0.5	T-59
Residue by distillation/ evaporation, % min <sup>3</sup>	62 <sup>3</sup>	62 <sup>3</sup>	T 59/ CP-L 2212 <sup>2</sup>
Penetration, 25 °C, 100g, 5s, min, dmm	40	40	T 49
Penetration, 25 °C, 100g, 5s, max, dmm	150	150	
Ductility, 25 °C, 5 cm/min, cm, min	50	50	T 51
Solubility, in trichloroethylene% min	97.5	97.5	T 44

<sup>1</sup>If successful application is achieved in the field, the Engineer may wave this requirement.

<sup>2</sup> CP-L 2212 is a rapid evaporation test for determining percent residue of an emulsion and providing material for tests on residue. CP-L 2212 is for acceptance only. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test in conformance with AASHTO T-59 to determine acceptability.

<sup>3</sup> For polymerized emulsions the distillation and evaporation tests will in be in conformance with AASHTO T-59 or CP-L 2212 respectively with modifications to include 205 ± 5 °C (400 ± 10 °F) maximum temperature to be held for 15 minutes.

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 REVISION OF SECTION 702  
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- (d) *Emulsion for Prime Coat.* Emulsion for prime coat shall conform to the requirements of Table 702-5. Circulate before use if not used within 24 hours.

**Table 702-5  
 ASPHALT EMULSION FOR PRIME COAT (AEP)**

Property	Requirement	AASHTO Test No.
Viscosity, Saybolt Furol, at 50 °C (122 °F), s	20-150	T 59
% Residue	65% min.	T 59 to 260 °C (500 °F)
Oil Distillate by Volume, %	7% max.	T59
<b>Tests on Residue from Distillation:</b>		
Solubility in Trichloroethylene, %	97.5 min.	T 44

- (e) *Recycling Agent.* Recycling Agent for Item 406, Cold Bituminous Pavement (Recycle), shall be either a high float emulsified asphalt (polymerized) or an emulsified recycling agent as follows:

1. High Float Emulsified Asphalt (Polymerized). High Float Emulsified Asphalt (Polymerized) for Cold Bituminous Pavement (Recycle) shall be an emulsified blend of polymer modified asphalt, water, and emulsifiers conforming to Table 702-6 for HFMS-2sP. The asphalt cement shall be polymerized prior to emulsification, and shall contain at least 3 percent polymer.

The emulsion standing undisturbed for a minimum of 24 hours shall show no white, milky separation, and shall be smooth and homogeneous throughout.

The emulsion shall be pumpable and suitable for application through a pressure distributor.

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**Table 702-6**  
**HIGH FLOAT EMULSIFIED ASPHALT**  
**(POLYMERIZED) (HFMS-2sP)**

Property	Requirement		AASHTO Test
	Minimum	Maximum	
<b>Tests on Emulsion:</b>			
Viscosity, Saybolt Furol at 50 °C (122 °F), sec	50	450	T 59
Storage Stability test, 24 hours, %		1	T 59
Sieve test, %		0.10	T 59
% Residue <sup>1</sup>	65		T 59
Oil distillate by volume, %	1	7	T 59
<b>Tests on Residue:</b>			
Penetration, 25 °C (77 °F), 100g, 5 sec	150	300 <sup>2</sup>	T 49
Float Test, 60 °C (140 °F), sec	1200		T 50
Solubility in TCE, %	97.5		T 44
Elastic Recovery, 4 °C (39.2 °F), %	50		T 301
<sup>1</sup> 400 ± 10° F maximum temperature to be held for 15 minutes. <sup>2</sup> When approved by the Engineer, Emulsified Asphalt (HFMS-2sP) with a residual penetration greater than 300 dmm may be used with Cold Bituminous Pavement (Recycle) to address problems with cool weather or extremely aged existing pavement. Emulsified Asphalt (HFMS-2sP) with a residual penetration greater than 300 dmm shall meet all properties listed in Table 702-4 except that Elastic Recovery shall be reported for information only.			



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 REVISION OF SECTION 702  
 BITUMINOUS MATERIALS

2. *Emulsified Recycling Agent.* Emulsified Recycling Agent for use in Cold Bituminous Pavement (Recycle) shall conform to the requirements in Table 702-7.

**Table 702-7**  
**EMULSIFIED RECYCLING AGENT**

Property	Requirement		Test
	Minimum	Maximum	
<b>Tests on Emulsion:</b>			
Viscosity @ 25 °C, SFS	20	200	ASTM D 244
Pumping Stability	Pass		GB Method <sup>1</sup>
			ASTM D 244 <sup>2</sup>
Sieve Test, %w		0.1	
Cement Mixing, %w		2.0	ASTM D 244
Particle Charge	Positive		ASTM D 244
Conc. Of Oil Phase	64		ASTM D 244 <sup>3</sup>
<b>Tests on Residue:</b>			
Viscosity @ 60 °C , CST	2000	4000	ASTM D 2170
Flash Point, COC, °C (° F)	232		ASTM D 92
Maltenes Dist. Ratio <sup>4</sup> $\frac{PC+A_1}{S+A_2}$	0.3	0.6	ASTM D 2006
PC/S Ratio	0.4		ASTM D 2006
Asphaltenes, % max.		11.0	ASTM D 2006
<p><sup>1</sup>Pumping stability is determined by charging 450 ml of emulsion into a one liter beaker and circulating the emulsion through a gear pump (Roper 29.B22621) having a 6.3 mm (1/4 inch) inlet and outlet. The emulsion passes if there is no significant separation after circulating ten minutes.</p> <p><sup>2</sup>Test procedure identical with ASTM D 244 except that distilled water shall be used in place of 2 percent sodium oleate solution.</p> <p><sup>3</sup>ASTM D 244 Evaporation Test for percent of residue is modified by heating 50 gram sample to 149°C (300 °F) until foaming ceases, then cooling immediately and calculating results.</p> <p><sup>4</sup>In the Maltenes Distribution Ratio Test by ASTM Method D 2006.</p> <p>PC = Polar Compounds S = Saturates                      A<sub>1</sub> = First Acidaffin A<sub>2</sub> = Second Acidaffins</p>			

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 REVISION OF SECTION 702  
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(f) Asphalt Rejuvenating Agents. Asphalt rejuvenating agents (ARA) shall be composed of a petroleum resin-oil base uniformly emulsified with water and shall conform to the physical and chemical requirements of Table 702-8 or ASTM D 4552.

**Table 702-8**  
**ASPHALT REJUVENATING AGENT**

Property	Test Method	Requirement
Viscosity, S.F., @ 25 °C (77 °F), s	ASTM D 244	20-40
<sup>1</sup> Residue, % min.	ASTM D 244	60-65
<sup>2</sup> Miscibility Test	ASTM D 244	No coagulation
<sup>3</sup> Sieve Test, % max.	ASTM D 244	0.10
Particle Charge Test	ASTM D 244	Positive
<b>ASTM D244 (Mod):</b>		
Viscosity, 60 °C (140 °F), mm <sup>2</sup> /s	ASTM D 445	100 - 200
Flash Point, COC, °C, min.	ASTM D 92	196
Asphaltenes, % max.	ASTM D2006	1.0
<sup>4</sup> Maltenes Dist. Ratio $\frac{PC+A_1}{S+A_2}$	ASTM D 2006	0.3-0.6
Saturated Hydrocarbons, %	ASTM D 2006	21-28
<p><sup>1</sup> ASTM D244 Modified Evaporation Test for percent of residue is made by heating 50-gram sample to 149 °C (300 °F) until foaming ceases, then cooling immediately and calculating results.</p> <p><sup>2</sup> Test procedure identical with ASTM D244 except that 0.02 Normal Calcium Chloride solution shall be used in place of distilled water.</p> <p><sup>3</sup> Test procedure identical with ASTM D244 except that distilled water shall be used in place of 2% sodium oleate solution.</p> <p><sup>4</sup> In the Maltenes Distribution Ratio Test by ASTM Method D4124:</p> <p>PC = Polar Compounds    S = Saturates                      A<sub>1</sub> = First Acidaffin    A<sub>2</sub> = Second Acidaffins</p>		

11  
 REVISION OF SECTION 702  
 BITUMINOUS MATERIALS

For hot-in-place recycling ARA-1P is an acceptable alternative to ARA. ARA-1P shall meet the requirements below:

Emulsified Polymer Modified Asphalt Rejuvenating Agent (ARA-1P) for use in hot-in-place recycling of bituminous pavements shall be modified with a minimum of 1.5 percent styrene-butadiene solution polymer. The finished product shall conform to the physical requirements listed in Table 702-9 below.

**Table 702-9  
 ARA-1P**

Property	Test Method	Min	Max
<b>Test on Emulsion</b>			
Viscosity, Saybolt-Furol @ 77 °F, s	ASTM D 244		100
Residue @ 350 °F, %	ASTM D 244 Mod	60	
Sieve Test, %	ASTM D 244		0.10
Oil distillate, %	ASTM D 244		2.0
<b>Test on Residue</b>			
Penetration @ 39.2 °F, 100g, 5s, dmm	ASTM D-5 Modified	150	250
Asphaltenes, %	ASTM D 4124		15

**702.03 (unused)**

**702.04 Hot Poured Joint and Crack Sealant.** Hot poured material for filling joints and cracks shall conform to the requirements of ASTM D 6690, Type II or Type IV. The concrete blocks used in the Bond Test shall be prepared in accordance with CP-L 4101.

Sealant material shall be supplied pre-blended, pre-reacted, and prepackaged. If supplied in solid form the sealant material shall be cast in a plastic or other dissolvable liner having the capability of becoming part of the crack sealing liquid. The sealant shall be delivered in the manufacturer's original sealed container.

Each container shall be legibly marked with the manufacturer's name, the trade name of the sealer, the manufacturer's batch or lot number, the application temperature range, the recommended application temperature, and the safe heating temperature.

The sealant shall be listed in CDOT's Approved Products List prior to use.

REVISION OF SECTION 703  
AGGREGATES FOR HOT MIX ASPHALT

Section 703 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 703.04 and replace with the following:

**703.04 Aggregates for Hot Mix Asphalt.** Aggregates for hot mix asphalt (HMA) shall be of uniform quality, composed of clean, hard, durable particles of crushed stone, crushed gravel, natural gravel, or crushed slag. Excess of fine material shall be wasted before crushing. A percentage of the aggregate retained on the 4.75 mm (No. 4) sieve for Gradings S, SX and SG— and on the 2.36 mm (No. 8) sieve for Gradings SF and ST—shall have at least two mechanically induced fractured faces when tested in accordance with Colorado Procedure 45. This percentage will be specified in Table 403-1, as revised for the project in Section 403. The angularity of the fine aggregate shall be a minimum of 45.0 percent when determined according to AASHTO T 304. Grading SF mixes, when determined by RME, may not require fine aggregate angularity of 45.0 percent. Aggregate samples representing each aggregate stockpile shall be non-plastic if the percent of aggregate passing the 2.36 mm (No. 8) sieve is greater than or equal to 10 percent by weight of the individual aggregate sample. Plasticity will be determined in accordance with AASHTO T 90. The material shall not contain clay balls, vegetable matter, or other deleterious substances.

The aggregate for Gradings ST, S, SX and SG shall have a percentage of wear of 45 or less when tested in accordance with AASHTO T 96.

**Table 703-4  
MASTER RANGE TABLE FOR HOT MIX ASPHALT**

Sieve Size	Percent by Weight Passing Square Mesh Sieves				
	Grading SF**	Grading ST	Grading SX	Grading S	Grading SG
37.5 mm (1½")					100
25.0 mm (1")				100	90 – 100
19.0 mm (¾")			100	90 – 100	
12.5 mm (½")		100	90 – 100	*	*
9.5 mm (⅜")	100	90 – 100	*	*	*
4.75 mm (#4)	90 – 100	*	*	*	*
2.36 mm (#8)	*	28 – 58	28 – 58	23 – 49	19 – 45
1.18 mm (#16)	30 – 54				
600 µm (#30)	*	*	*	*	*
300 µm (#50)					
150 µm (#100)					
75 µm (#200)	2 – 12	2 – 10	2 – 10	2 – 8	1 – 7

\* These additional Form 43 Specification Screens will initially be established using values from the As Used Gradation shown on the Design Mix.  
\*\*SF applications are limited and the CDOT Pavement Design Manual should be referenced, prior to use.

Aggregates for stone matrix asphalt (SMA) shall be of uniform quality, composed of clean, hard, durable particles of crushed stone, crushed gravel, or crushed slag. A minimum of 90 percent of the particles retained on the 4.75 mm (No. 4) sieve shall have at least two mechanically induced fractured faces when tested in accordance with Colorado Procedure 45. The particles passing the 4.75 mm (No. 4) sieve shall be the product of crushing rock larger than 12.5 mm (½ inch) and shall be non-plastic when tested in accordance with AASHTO T 90.

REVISION OF SECTION 703  
AGGREGATES FOR HOT MIX ASPHALT

Additionally, each source of aggregate for SMA shall meet the following requirements:

- (1) No more than 30 percent when tested in accordance with AASHTO T 96 Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- (2) No more than 12 percent when tested in accordance with AASHTO T 104 Soundness of Aggregate by Use of Sodium Sulfate.

The aggregate for Hot Mix Asphalt (HMA) shall meet the requirements of Table 703-4A when tested in accordance with CP-L 4211 Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus. The Contractor shall be assessed a price reduction of \$1000 for each production sample of the combined aggregate with a value greater than 20 according to CP-L 4211.

**Table 703-4A**  
**AGGREGATE DEGRADATION BY ABRASION**  
**IN THE MICRO-DEVAL CP-L 4211**

	<b>Not to exceed</b>
Combined Aggregate (Mix Design)	18
Combined Aggregate (1/10,000 tons, or fraction thereof during production)	20

REVISION OF SECTION 703  
 CLASSIFICATION FOR AGGREGATE BASE COURSE

Section 703 of the Standard Specifications is hereby revised for this project as follows:

In subsection 703.03 delete Table 703-3 and replace with the following:

**Table 703-3**  
**CLASSIFICATION FOR AGGREGATE BASE COURSE**

Sieve Size	Mass Percent Passing Square Mesh Sieves						
	LL not greater than 35			LL not greater than 30			
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
150mm (6")			100				
100mm (4")		100					
75mm (3")		95-100					
60mm (2 1/2")	100						
50mm (2")	95-100			100			
37.5mm (2")				90-100	100		
25mm (1")					95-100	100	100
19mm (3/4")				50-90		95-100	
4.75mm (#4)	30-65			30-50	30-70	30-65	
2.36mm (#8)						25-55	20-85
75 µm (#200)	3-15	3-15	20 max	3-12	3-15	3-12	5-15
NOTE: Class 3 material shall consist of bank or pit run material.							

July 28, 2011

REVISION OF SECTION 703  
CONCRETE AGGREGATES

Section 703 of the Standard Specifications is hereby revised for this project as follows:

Delete the second paragraph of subsection 703.00 and Table 703-1.

Delete subsections 703.01 and 703.02 and replace with the following:

**703.01 Fine Aggregate for Concrete.** Fine aggregate for concrete shall conform to the requirements of AASHTO M 6, Class A. The minimum sand equivalent, as tested in accordance with Colorado Procedure 37 shall be 80 unless otherwise specified. The fineness modulus, as determined by AASHTO T 27, shall not be less than 2.50 or greater than 3.50 unless otherwise approved.

**703.02 Coarse Aggregate for Concrete.** Coarse aggregate for concrete shall conform to the requirements of AASHTO M 80, Class A aggregates, except that the percentage of wear shall not exceed 45 when tested in accordance with AASHTO T 96.

February 18, 2016

REVISION OF SECTION 709  
EPOXY COATED REINFORCING BARS

Section 709 of the Standard Specifications is hereby revised for this project as follows:

In subsection 709.01, delete the last row of the table and replace with the following

Epoxy Coated Reinforcing Bars	AASHTO A 775
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Delete the first sentence of subsection 709.03 and replace with the following:

Tie bars for longitudinal and transverse joints shall conform to AASHTO A 775 and shall be grade 40, epoxy-coated, and deformed.



February 3, 2011

REVISION OF SECTION 712  
WATER FOR MIXING OR CURING CONCRETE

Section 712 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 712.01 and replace it with the following:

**712.01 Water.** Water used in mixing or curing concrete shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetation, or other substance injurious to the finished product. Concrete mixing water shall meet the requirements of ASTM C1602. The Contractor shall perform and submit tests to the Engineer at the frequencies listed in ASTM C1602. Potable water may be used without testing. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, and other foreign materials.

REVISION OF SECTION 713  
REFLECTORS FOR DELINEATORS AND MEDIAN BARRIER

Section 713 of the Standard Specifications is hereby revised for this project as follows:

In subsection 713.10(a) 1., delete A. and replace with the following

- A. Delineator and Median Barrier Reflectors. The specific intensity of each delineator and median barrier reflector shall be at least equal to the following minimum values when tested in accordance with AASHTO T 257, with an observation angle of 0.1 degrees.

Entrance Angle Degrees	Specific Intensity Candlepower per Foot-Candle				
	Crystal	Yellow	Blue	Red	Green
0	115	70	48	25	62
20	45	25	26	10	34

AFFIRMATIVE ACTION REQUIREMENTS  
EQUAL EMPLOYMENT OPPORTUNITY

**A. AFFIRMATIVE ACTION REQUIREMENTS**

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area are as follows:

**Goals and Timetable for Minority Utilization**

<b>Timetable - Until Further Notice</b>			
<b>Economic Area</b>	<b>Standard Metropolitan Statistical Area (SMSA)</b>	<b>Counties Involved</b>	<b>Goal</b>
157 (Denver)	2080 Denver-Boulder	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson.....	13.8%
	2670 Fort Collins	Larimer.....	6.9%
	3060 Greeley	Weld.....	13.1%
	Non SMSA Counties	Cheyenne, Clear Creek, Elbert, Grand, Kit Carson, Logan, Morgan, Park, Phillips, Sedgwick, Summit, Washington & Yuma.....	12.8%
158  (Colo. Spgs. - Pueblo)	1720 Colorado Springs	El Paso, Teller.....	10.9%
	6560 Pueblo	Pueblo.....	27.5%
	Non SMSA Counties	Alamosa, Baca, Bent, Chaffee, Conejos, Costilla, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Lincoln, Mineral, Otero, Prowers, Rio Grande, Saguache.....	19.0%
159 (Grand Junction)	Non SMSA	Archuleta, Delta, Dolores, Eagle, Garfield, Gunnison, Hinsdale, La Plata, Mesa, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan, San Miguel	10.2%
156 (Cheyenne - Casper WY)	Non SMSA	Jackson County, Colorado.....	7.5%
<b>GOALS AND TIMETABLES FOR FEMALE UTILIZATION</b>			
Until Further Notice.....6.9% -- Statewide			

AFFIRMATIVE ACTION REQUIREMENTS  
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These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Par 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this specification, and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the Invitation for Bids and on the plans. In cases where the work is in two or more counties covered by differing percentage goals, the highest percentage will govern.

AFFIRMATIVE ACTION REQUIREMENTS  
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**B. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS**

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these Specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d. "Minority" includes:
    - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
    - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractor toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance Programs Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

AFFIRMATIVE ACTION REQUIREMENTS  
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5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following;
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.
  - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source of community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
  - d. Provide immediate written notification to the Director when the union with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
  - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the Contractor's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

AFFIRMATIVE ACTION REQUIREMENTS  
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- g. Review, at least annually, the Contractor's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and Contractor's activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligation.

AFFIRMATIVE ACTION REQUIREMENTS  
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8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goal and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).



AFFIRMATIVE ACTION REQUIREMENTS  
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**C. SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES.**

1. *General.*

- a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract. Provisions (Form FHWA 1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of Title 23, U.S.C., as established by Section 22 of the Federal-Aid highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract provisions.
- b. The Contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.
- c. The Contractor and all his/her subcontractors holding subcontracts not including material suppliers, of \$10,000 or more, will comply with the following minimum specific requirement activities of equal employment opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The Contractor will include these requirements in every subcontract of \$10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. *Equal Employment Opportunity Policy.* The Contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program;

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include; employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training.

3. *Equal Employment Opportunity Officer.* The Contractor will designate and make known to the State highway agency contracting officers and equal employment opportunity officer (herein after referred to as the EEO Officer) who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. *Dissemination of Policy.*

- a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum;

- (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the Contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

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- (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official, covering all major aspects of the Contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the Contractor.
  - (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official in the Contractor's procedures for locating and hiring minority group employees.
- b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:
- (1) Notices and posters setting forth the Contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
  - (2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. *Recruitment.*

- a. When advertising for employees, the Contractor will include in all advertisements for employees the notation; "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
- b. The Contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Contractor for employment consideration.

In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended.)

- c. The Contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

6. *Personnel Actions.* Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed;

- a. The Contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

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- b. The Contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
- c. The Contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
- d. The Contractor will promptly investigate all complaints of alleged discrimination made to the Contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform every complainant of all of his avenues of appeal.

7. *Training and Promotion.*

- a. The Contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
- b. Consistent with the Contractor's work force requirements and as permissible under Federal and State regulations, the Contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.
- c. The Contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
- d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. *Unions.* If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women with the unions, and to effect referrals by such unions of minority and female employees. Actions by the Contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

- a. The Contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
- b. The Contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.
- c. The Contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Contractor, the Contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

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- d. In the event the union is unable to provide the Contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the Contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such Contractor shall immediately notify the State highway agency.

9. *Subcontracting.*

- a. The Contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.
- b. The Contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

10. *Records and Reports.*

- a. The Contractor will keep such records as are necessary to determine compliance with the Contractor's equal employment opportunity obligations. The records kept by the Contractor will be designed to indicate:
- (1) The number of minority and nonminority group members and women employed in each work classification on the project.
  - (2) The Progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractors who rely in whole or in part on unions as a source of their work force).
  - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
  - (4) The progress and efforts being made in securing the services of minority group subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.
- c. The Contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391.

## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

1. **Overview.** The Disadvantaged Business Enterprise (DBE) Program is a federally-mandated program that seeks to ensure non-discrimination in the award of U.S. Department of Transportation (DOT)-assisted contracts and to create a level playing field on which DBEs can compete fairly for DOT-assisted contracts. In order to be awarded a Contract, the lowest apparent bidder must show that it has committed to DBE participation sufficient to meet the goal or has otherwise made good faith efforts to do so.

CDOT will monitor the progress of the Contractor throughout the project to ensure that the Contractor's DBE commitments are being fulfilled. Modifications to the commitments, substitutions and terminations must be approved by CDOT. If the amount of the contract increases during the performance of the contract, the Contractor must make good faith efforts to obtain additional participation to meet the contract goal. CDOT may reduce the final payment to the Contractor if the Contractor has failed to fulfill the commitments or make good faith efforts to meet the contract goal.

For general assistance regarding the DBE program and compliance, contact CDOT's Civil Rights and Business Resource Center (CRBRC) at (303)757-9234 or the Regional Civil Rights Manager. For project specific issues, contact the Engineer or Regional Civil Rights Manager.

All forms referenced herein can be found on the CDOT website in the forms library:  
<http://www.coloradodot.info/library/forms/cdot-forms-by-number>.

2. **Contract Assurance.** By submitting a proposal for this Contract, the bidder agrees to the following assurance and shall include it verbatim in all subcontracts including those with non-DBE firms:

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as CDOT deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments; (2) Assessing sanctions; (3) Liquidated damages; and/or (4) Disqualifying the contractor from future bidding as non-responsible.

3. **Contract Goal.** The contract goal is a percentage of the contract that the CDOT Regional Civil Rights Office has established for participation by DBEs. The contract goal is unique for each contract and is set forth in the Project Special Provision, Disadvantaged Business Enterprise Contract Goal.

(a) *Pre-award Calculation.* For pre-award, the dollar value of the contract goal is calculated by multiplying the lowest responsible bidder's proposal amount less any force account items by the percentage set forth in the Project Special Provision, Disadvantaged Business Enterprise Contract Goal.

(b) *Final Calculation.* At the end of the project, the dollar value of the contract goal is calculated by multiplying the total earnings amount by the contract goal percentage less any waiver granted to the Contractor. Total earnings amount means the amount of the Contract earned by the Contractor, including approved changes and force account work performed, but not including incentives or deductions.

4. **Good Faith Efforts.** Good faith efforts means all necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts of the Contractor should include, but are not limited to, reaching out to DBEs that could perform subcontracting opportunities on the project, unbundling work the prime would self-perform to create opportunities for DBEs, negotiating in good faith with DBEs and not refusing to utilize a DBE for price alone, and other efforts to obtain DBE participation on the contract. For additional guidance on making good faith efforts see 49 CFR Part 26 Appendix A.
5. **Pre-award Process.** When CDOT has established a DBE contract goal for a project, it may not award the contract until it determines the bidder has demonstrated good faith efforts to meet the contract goal. At pre-award, good faith efforts may be evidenced by either (1) documenting sufficient commitments to DBEs to

## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

meet the contract goal or (2) documenting adequate good faith efforts to meet the goal even though it did not obtain enough participation to do so. A commitment is a portion of the Contract, identified by dollar amount and work area, designated by the bidder or Contractor for participation by a particular DBE. A commitment may be made to a firm at any tier. A commitment is not a subcontract, however the Contractor must have received a quote from a DBE in order to claim a commitment to a DBE.

- (a) *Anticipated Participation Plan.* With its proposal, the bidder shall submit a Form 1414, Anticipated DBE Participation Plan listing its commitments obtained from DBEs, even if such commitments do not meet the contract goal. If the bidder has not obtained any DBE commitments, it shall still submit Form 1414 documenting zero anticipated participation. If the Contract Goal is greater than zero, failure to submit a signed Form 1414 shall result in rejection of the proposal and the bidder deemed non-responsive. The bidder shall ensure that commitments, and the estimated DBE eligible participation resulting therefrom, have been properly calculated prior to submitting its proposal. If the bidder is a DBE seeking credit for self-performance, the bidder shall include itself in Form 1414 and list the work to be self-performed and amount that the bidder intends to count for DBE credit.
- (b) *Utilization Plan.* Within five days of bid opening, the low responsible bidder shall submit a Utilization Plan (UP) to CDOT. The bidder will receive notice from CDOT to submit a Utilization Plan (UP) via B2GNow. In order to complete the UP the bidder shall obtain and upload in B2G a Form 1415, Commitment Confirmation from each DBE listed on Form 1414. If the total eligible participation submitted by the bidder on the Form 1414 did not meet the contract goal, the bidder shall also request a waiver of the goal by submitting a Form 1416, Good Faith Effort Report, in the UP in B2G.

In completing the Form 1415, the bidder shall complete Section 1 of the Form 1415 and the DBE shall complete Section 2 of Form 1415. The commitment confirmations shall be consistent with the commitment listed on Form 1414. If a commitment is made to second tier or lower DBE subcontractor, the Contractor is still ultimately responsible for the fulfillment of the commitment and shall sign the Form 1415. The bidder shall contact the CRBRC if any issues arise which may require the bidder to alter a commitment. The bidder shall not terminate a commitment listed on Form 1414 without following the procedures outlined below.

If the bidder is submitting a Form 1416, the bidder shall include any supporting documentation that the bidder would like considered by CDOT as evidence of good faith efforts. If a non-DBE was selected in lieu of a DBE, the bidder shall include all quotes from the non-DBE and DBE firms.

- (c) *Pre-award Good Faith Effort Review.* The CRBRC will evaluate the documentation submitted in the UP to ensure that each commitment is valid and all eligible participation has been properly calculated. CDOT may investigate or request additional information in order to confirm the accuracy of a commitment. If the bidder's 1414 claimed that the contract goal was met but CDOT determines that the total estimated eligible participation of the commitments does not meet the contract goal, CDOT will return the UP to the Contractor. The Contractor will be given two business days to amend the UP and return it to CDOT. CDOT may require the Contractor to complete Form 1416 and provide documentation of good faith efforts.

When required, CDOT will review Form 1416 and all supporting documentation submitted by the bidder. A bidder will be deemed to not have made good faith efforts if the bidder lists a DBE for a work area for which the DBE is not certified and the bidder cannot establish a reasonable basis for its determination. CDOT will only consider commitments made after submission of the bid if the bidder demonstrates that (1) good faith efforts were made prior to submission of the bid and (2) there is a reasonable justification for not obtaining the commitments prior to submission of the bid. If the CRBRC determines that the bidder did not demonstrate good faith efforts to meet the contract goal, it will provide the bidder with written notice of its determination and an opportunity to appeal.

- (d) *Approval.* If CDOT determines that the bidder has met the contract goal or made good faith efforts to do so, the CRBRC will approve the UP. If CDOT determines the bidder did not meet the contract goal but made good faith efforts to do so, CDOT may grant a waiver to the Contractor and amend the contract goal.

## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

- 6. Utilization Plan Modifications.** The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which it is listed unless the Contractor obtains CDOT's written consent to terminate, reduce or modify the commitment. Unless CDOT grants such consent, the Contractor will not be entitled to payment for the work or materials. During the performance of the Contract, the Contractor shall use Form 1420, DBE Participation Plan Modification Request to communicate all requests for termination, reduction, substitution, and waivers to CDOT. One Form 1420 may include multiple requests and must be submitted at the time of the occurrence or, if that is not possible, within a reasonable time of the occurrence requiring termination, reduction, substitution or waiver. Failure to carry out the requirements of this section is a material breach of the Contract and may result in the termination of the Contract or other remedies established by CDOT.
- (a) *Terminations and Reductions.* A termination occurs when a Contractor no longer intends to use a DBE for fulfillment of a commitment. A reduction occurs when the scope of the commitment changes and constitutes a partial termination. Terminations and reductions include, but are not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces, those of an affiliate, a non-DBE firm or with another DBE firm.

CDOT cannot approve a termination or reduction unless the Contractor has good cause to terminate or reduce the commitment. Good cause includes: the DBE fails or refuses to execute a written contract; the DBE fails or refuses to perform the work of its subcontract consistent with normal industry standards, provided that such failure is not the result of bad faith or discriminatory actions of the Contractor or one of its subcontractors; the DBE fails to meet reasonable, nondiscriminatory bond requirements; the DBE becomes bankrupt, insolvent, or exhibits credit unworthiness; the DBE is ineligible to work because of suspension or debarment proceedings or other state law; the DBE is not a responsible contractor; the DBE voluntarily withdraws from the project and provides written notice to CDOT, the DBE is ineligible to receive DBE credit for the work required; the DBE owner dies or becomes disabled and is unable to complete the work; the DBE ceases business operations or otherwise dissolves; or other documented good cause that compels termination. Good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

The Contractor shall provide the DBE notice of the Contractor's intent to terminate or reduce the commitment and the reason for such termination or reduction, with a copy to the CDOT engineer and Regional Civil Rights Office (RCRO). In the notice of intent, the Contractor shall provide the DBE at least five calendar days to respond to the notice and inform CDOT and the Contractor of the reasons, if any, why it objects to the proposed termination or reduction and any reasons that it shall not be approved. The Contractor is not required to provide the five days written notice in cases where the DBE in question has provided written notice that it is withdrawing from the subcontract or purchase order. The notice period may be reduced by CDOT if required by public necessity.

Following the notice period, the contractor shall submit a Form 1420 to request approval of termination or reduction. If the RCRO determines that the Contractor had good cause for termination, the RCRO will approve the termination or reduction. If the RCRO does not agree, the RCRO may reject the termination and require the Contractor to make additional good faith efforts with the DBE.

- (b) *Substitutions.* When a commitment is terminated or reduced (including when a DBE withdraws), the Contractor shall make good faith efforts to find another DBE to substitute for the original DBE. These good faith efforts shall be directed at finding another DBE to perform at least the same amount, but not necessarily the same type, of work under the contract as the participation that was terminated or reduced up to the contract goal. To make a substitution, the Contractor shall request the addition of a new DBE and provide a Form 1415, Commitment Confirmation with the request. If the Contractor has not obtained substitute participation, the RCRO may require the Contractor to submit evidence of good faith efforts to substitute. The contractor shall have seven days to submit such information. This period may be extended at the discretion of the RCRO.

## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

- (c) *Commitment Modifications.* If the contractor seeks modifying the work to be performed under a DBE commitment, it shall submit a revised Form 1415 with the request for the modification. Increases in work included in the original 1415 do not need CDOT approval.
- (d) *Change Orders.* The Contractor is required to make good faith efforts to meet the goal on the total earnings amount. Therefore, if CDOT issues a change which increases or adds new work items, the Contractor shall ensure that it has obtained sufficient DBE participation to meet the Contract Goal on the increased amount or has made good faith efforts to do so. If the Contractor determines that additional DBE participation cannot be obtained, the Contractor shall request a waiver of the participation. The Contractor shall include its justification for not obtaining additional participation and, at its discretion, CDOT may require additional information regarding the efforts of the Contractor.

**7. Counting.** In order for work performed by a DBE to count as DBE credit toward the contract goal, the following criteria must be met:

- (a) *DBE Certified to Perform the Work.* The DBE must be certified by the Colorado Unified Certification Program (UCP) in the work to be performed. DBEs are certified in particular areas of work which are designated by a six digit North American Industry Classifications System code plus a descriptor. Each DBE's work codes can be found in its profile on the Colorado UCP DBE Directory at [www.coloradodbe.org](http://www.coloradodbe.org).

The DBE must be certified to perform the work, and not under suspension, upon submission of the commitment and upon execution of the DBE's subcontract. When a commitment has been made, but upon review of the sublet request the DBE is no longer certified in the work code which covers the work to be performed, the Contractor may not use the DBE's participation toward the contract goal. The Contractor shall terminate the DBE commitment and seek substitute DBE participation. However, a DBE's work will continue to count as eligible participation if the DBE was certified upon approval of the sublet request but the certification status changes during the performance of the work. Suppliers must be certified upon execution of the purchase order.

- (b) *Work Included in Commitment or Verified via Form 205.* The work performed by the DBE must be reasonably construed by CDOT to be included in the work area and work code identified by the Contractor in an approved commitment or verified via Form 205. While a Form 205 is not usually required for suppliers, if no commitment has been made to the DBE, the Contractor shall submit the Form 205 and a copy of the supplier quote to CDOT. This work shall not count against the Contractor's thirty percent as required under *CDOT Standard Special Provisions for Road and Bridge Construction* subsection 108.01.

If the Contractor intends to use a DBE for work that was not listed in the original commitment, the Contractor shall submit a request for modification. Unapproved work will not count toward the contract goal. A DBE commitment cannot be modified to include work for which the DBE was not certified at the time of the approval of the original commitment unless such work is in addition to the original commitment.

- (c) *Work Performed by DBE.* The work must be actually performed by the DBE with its own forces. For purposes of this specification, work performed by the DBE with its own forces includes work by temporary employees, provided such employees are under the control of the DBE, the cost of supplies and materials obtained by the DBE for its work on the Contract, provided that such supplies are not purchased or leased from the Contractor or a subcontractor that is subletting to the DBE, the cost any equipment leased by the DBE, provided that such equipment is not leased from the Contractor or a subcontractor that is subletting to the DBE.

When a DBE subcontracts part of the work, the value of the subcontracted work shall be counted toward the goal only if the subcontractor is a DBE and meets the criteria of this standard special provision. Performance by non-DBE subcontractors, including non-DBE trucking firms and owner-operators, shall be deducted from the DBE's participation.



## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

- (d) *Payment Received for Work.* The DBE must receive payment, including the release of its retainage, in order for the work to count.
- (e) *Special Calculations for Suppliers.* When a DBE supplies goods or materials for a project, the DBE may be classified as a manufacturer, dealer or broker. The DBE's status as a manufacturer, dealer or broker is determined on a contract-by-contract basis by CDOT, based upon the actual work performed, in accordance with 49 CFR Part 26.53(e). When a DBE is deemed to be acting as a manufacturer, one hundred percent of the commitment will count as eligible participation. When a DBE is deemed to be acting as a regular dealer (i.e. non-manufacturer supplier), only sixty percent of the commitment will count as eligible participation. When a DBE is deemed to be acting as a broker, only the reasonable brokerage fee will count as eligible participation.
- (f) *Reasonable Service Fees.* For a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, the fees and commissions charged by the DBE shall count toward the contract goal, provided CDOT determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. In the case of DBE temporary employment placement agencies, only the placement fee for a temporary employee that will be specifically and exclusively used for work on the contract shall count as DBE credit; the hourly fee does not count toward the contract goal unless the firm is also certified in the work to be performed.
- (g) *Joint Venture Calculation.* When a DBE is a participant in a joint venture, the DBE must apply to CDOT to determine how much of the work performed by the joint venture will count toward the contract goal. The DBE shall complete Form 893, Information for Determining DBE Participation when a Joint Venture Includes a DBE. To ensure sufficient time for review, Form 893 shall be submitted to CDOT no less than ten days before the submission of the proposal or, if requested during the contract, the point at which the DBE will begin work.
- (h) *Commercially Useful Function.* If CDOT determines that a DBE has not performed a commercially useful function (CUF) on the project, no participation by such DBE shall count toward the contract goal. CUF means responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing and supervising the work. CDOT will monitor performance during the Contract to ensure each DBE is performing a CUF. If CDOT determines that a DBE is not performing a CUF, no work performed by such DBE shall count as eligible participation. The DBE, Contractor, and any other involved third parties may also be subject to additional enforcement actions.

When determining whether a DBE is performing a CUF, CDOT will consider the amount of work subcontracted, industry practices, the amount the firm is to be paid compared to the work performed and eligible participation claimed, and any other relevant factors. With respect to material and supplies used on the Contract, in order to perform a CUF the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.

With respect to trucking, in order to perform a CUF, the DBE trucking firm must own and operate at least one fully licensed, insured and operational truck used on the Contract. Additionally, the DBE trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the Contract. CDOT only permits a DBE trucking firm to count the work performed with trucks it owns, insures and operates using drivers it employs or with trucks it leases from another DBE firm including owner operators who are certified DBEs. The DBE who leases trucks from another DBE receives credit for the transportation services the lessee DBE provides on the contract.

A DBE does not perform a CUF when its role is limited to that of an extra participant in a transaction, contract or project through which funds are passed in order to obtain the appearance of DBE participation. CDOT will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant. If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, CDOT will

## DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

presume that the DBE is not performing a CUF. The DBE may present evidence to rebut this presumption.

- (i) *Joint Checks.* All joint checks must be approved by CDOT before they are used in payment to a DBE. A joint check is a check issued by the Contractor or one of its subcontractors to a DBE firm and a material supplier or other third party for materials or services to be incorporated into the work. Joint checks used in payments to DBEs will be monitored closely to ensure (1) the DBE is performing a CUF and (2) the joint checks are not being used in a discriminatory manner. The Contractor shall request approval for the use of a joint check in a written letter signed by the DBE and the Contractor, stating the reason for the joint checks and the approximate number of checks that will be needed. Failure to receive approval of a joint check may result in CDOT not counting such payment as participation by the DBE.

## 8. Contract Finalization

- (a) *Form 1432, Commercially Useful Function Questionnaire.* In order to finalize the project, the Contractor must submit a Form 1432, Commercially Useful Function Questionnaire for each DBE that performed work or provided supplies toward meeting the contract goal. The Form 1432 must be signed by the DBE, Contractor and Engineer.
- (b) *Payment Reduction.* The Contractor's retainage will not be released until CDOT has determined whether the Contractor will be subject to a payment reduction. The Contractor will be subject to a payment reduction for any termination or reduction which was not approved. Additionally, the Contractor will be subject to a payment reduction for the portion of the contract goal that was not met and was not waived. The contractor will not be subject to duplicate reduction for the same offense. CDOT may adjust the payment reduction wherein the Contractor demonstrates that its failure to obtain DBE participation was due to circumstances outside of its control.

- 9. **Other Enforcement.** As it determines necessary, CDOT may conduct reviews or investigations of participants. All participants, including, but not limited to, DBE firms and applicants for DBE certification, complainants, and contractors using DBE firms to meet contract goals, are required to cooperate fully and promptly with compliance reviews, certification reviews, investigations, and other requests for information.

Participants shall not intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by the DBE program or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the DBE program. Failure to comply with this paragraph shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a contractor which uses DBE firms to meet goals, findings of non-responsibility for future contracts and/or suspension and debarment).

If CDOT determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by CDOT to be unallowable, or if the Contractor engages in repeated violations, falsification or misrepresentation, CDOT may refuse to count any fraudulent or misrepresented DBE participation; withhold progress payments to the Contractor commensurate with the violation; suspend or reduce the Contractor's prequalification status; refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; or seek any other available contractual remedy.

May 2, 2013

## FASTER MONTHLY EMPLOYMENT REPORT

This project is partly or wholly funded with Funding Advancements for Surface Transportation and Economic Recovery (FASTER) legislation funds received from the higher vehicle registration fees and the State government. CDOT is recording the number of jobs supported by this project and the actual amount of Disadvantaged Business Enterprise (DBE) payments made.

The Contractor shall report the number of jobs supported, created, or sustained on this project using a *FASTER Monthly Employment Report*, Form 1405. The data specified below shall be reported on Form 1405. The Contractor shall ensure that each subcontractor also submits the required employment information to the Contractor in time for the Contractor to fulfill this reporting obligation. The completed Monthly Employment Report shall be submitted by email on Form 1405 to the following e-mail address:  
[dot\\_programs\\_projectanalysis@state.co.us](mailto:dot_programs_projectanalysis@state.co.us)

A copy shall be given to the Engineer.

To report the actual monthly amount of DBE payments made, the Contractor shall submit the actual dollar value paid to DBE firms, including the Contractor itself, if applicable. The data shall be reported on Form 1405. The dollar amount shall be a cumulative monthly total of all payments made to DBE firms for the reporting month.

Monthly Employment Reports shall be submitted by the 25<sup>th</sup> of each month. *Failure to submit the completed forms* shall be grounds for a determination by the Engineer that no further progress payments are to be made until the Contractor has submitted all outstanding forms.

The Monthly Employment Report and the instructions may be found on the CDOT Forms website at

<http://www.coloradodot.info/business/designsupport/construction-specifications/2011-Specs/standard-special-provisions/mics/faster.docx/view> The Contractor shall review the instructions regularly for any changes to the reporting requirements. <http://internal/centralfiles/FormsCatalog.htm>

The Monthly Employment Report shall be completed and submitted each month from the Notice to Proceed through project acceptance.

Making the Monthly Employment Report does not relieve the Contractor and subcontractors from any other reporting requirements.

January 06, 2017

**U.S. DEPT. OF LABOR DAVIS BACON MINIMUM WAGES  
COLORADO HIGHWAY CONSTRUCTION  
GENERAL DECISION NUMBER - CO170018**

**NOTICE**

This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT's Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions, unless such use is first approved by the Standards and Specification Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use this standard special provision on all federal-aid projects with contracts exceeding \$2000, except for non-ARRA projects on roadways classified as local roads or rural minor collectors, which are exempt. Projects on local roads, rural minor collectors, and enhancement projects funded with ARRA funds are not exempt.

<b>Decision Nos. CO170018</b> dated January 06, 2017 supersedes <b>Decision Nos. CO160018</b> dated January 08, 2016.		<b>Modifications</b>			<b>ID</b>
		<b>MOD Number</b>	<b>Date</b>	<b>Page Number(s)</b>	
When work within a project is located in two or more counties and the minimum wages and fringe benefits are different for one or more job classifications, the higher minimum wages and fringe benefits shall apply throughout the project.					
General Decision No. CO170018 applies to the following counties: El Paso, Pueblo, and Teller counties.					
General Decision No. CO170018 <b>The wage and fringe benefits listed below reflect collectively bargained rates.</b>					
Code	Classification	Basic Hourly Rate	Fringe Benefits	Last Mod	
	<b>ELECTRICIAN:</b>				
1199	El Paso, Teller	30.00	14.95		
1200	Pueblo	28.00	11.84		
	<b>POWER EQUIPMENT OPERATOR:</b>				
	<b>Drill Rig Caisson</b>				
1201	Smaller than Watson 2500 and similar	24.73	9.15		
1202	Watson 2500 similar or larger	25.04	9.15		
	<b>Crane</b>				
1203	50 tons and under	24.88	9.15		
1204	51 - 90 tons	25.04	9.15		
1205	91 - 140 tons	25.19	9.15		
General Decision No. CO170018 <b>The wage and fringe benefits listed below do not reflect collectively bargained rates.</b>					
	<b>CARPENTER:</b>				
1206	Excludes Form Work	24.15	6.25		
	<b>Form Work Only</b>				
1207	El Paso, Teller	19.06	5.84		
1208	Pueblo	19.00	5.88		
	<b>CEMENT MASON/CONCRETE FINISHER:</b>				
1209	El Paso, Teller	17.36	3.00		
1210	Pueblo	17.74	3.00		

General Decision No. CO170018				
<b>The wage and fringe benefits listed below do not reflect collectively bargained rates.</b>				
<b>Code</b>	<b>Classification</b>	<b>Basic Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Last Mod</b>
1211	<b>FENCE ERECTOR</b>	13.02	3.20	
1212	<b>GUARDRAIL INSTALLER</b>	12.89	3.20	
	<b>HIGHWAY/PARKING LOT STRIPING:</b>			
1213	Painter	12.62	3.21	
	<b>IRONWORKER:</b>			
	<b>Reinforcing</b> (Excludes Guardrail Installation)			
1214	El Paso, Teller	20.49	1.65	
1215	Pueblo	16.69	5.45	
1216	<b>Structural</b> (Excludes Guardrail Installation)	18.22	6.01	
	<b>LABORER:</b>			
1217	Asphalt Raker	17.54	3.16	
1218	Asphalt Shoveler	21.21	4.25	
1219	Asphalt Spreader	18.58	4.65	
	<b>Common or General</b>			
1220	El Paso	17.05	3.69	
1221	Pueblo	16.29	4.25	
1222	Teller	16.88	3.61	
1223	Concrete Saw (Hand Held)	16.29	6.14	
1224	Landscape and Irrigation	12.26	3.16	
1225	Mason Tender - Cement/Concrete	16.29	4.25	
1226	Pipelayer	18.72	3.24	
1227	Traffic Control (Flagger)	9.55	3.05	
1228	Traffic Control (Sets Up/Moves Barrels, Cones, Installs signs, Arrow Boards and Place Stationary Flags), (Excludes Flaggers)	12.43	3.22	
1229	<b>PAINTER (Spray Only)</b>	16.99	2.87	

General Decision No. CO170018				
<b>The wage and fringe benefits listed below do not reflect collectively bargained rates.</b>				
<b>Code</b>	<b>Classification</b>	<b>Basic Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Last Mod</b>
	<b>POWER EQUIPMENT OPERATOR:</b>			
1230	Asphalt Laydown	22.67	8.72	
1231	Asphalt Paver	21.50	3.50	
	<b>Asphalt Roller</b>			
1232	El Paso	24.42	6.96	
1233	Pueblo	23.67	9.22	
1813	Teller	24.42	6.96	
1234	Asphalt Spreader	22.67	8.72	
	<b>Backhoe/Trackhoe</b>			
1235	El Paso	23.31	5.61	
1236	Pueblo	21.82	8.22	
1237	Teller	23.32	5.50	
1238	Bobcat/Skid Loader	15.37	4.28	
1239	Boom	22.67	8.72	
	<b>Broom/Sweeper</b>			
1240	El Paso, Teller	23.43	8.04	
1241	Pueblo	23.47	9.22	
	<b>Bulldozer</b>			
1242	El Paso	26.56	7.40	
1243	Pueblo, Teller	26.11	6.92	
1244	Drill	17.59	3.45	
1245	Forklift	15.91	4.68	
	<b>Grader/Blade</b>			
1246	El Paso	22.83	8.72	
1247	Pueblo	23.25	6.98	
1248	Teller	23.22	8.72	
1249	Guardrail/Post Driver	16.07	4.41	

General Decision No. CO170018				
<b>The wage and fringe benefits listed below do not reflect collectively bargained rates.</b>				
Code	Classification	Basic Hourly Rate	Fringe Benefits	Last Mod
	<b>POWER EQUIPMENT OPERATOR (con't.):</b>			
	<b>Loader (Front End)</b>			
1250	El Paso	23.61	7.79	
1251	Pueblo	21.67	8.22	
1252	Teller	23.50	7.64	
	<b>Mechanic</b>			
1253	El Paso	22.35	6.36	
1254	Pueblo	24.02	8.43	
1255	Teller	22.16	6.17	
	<b>Oiler</b>			
1256	El Paso	23.29	7.48	
1257	Pueblo	23.13	7.01	
1258	Teller	22.68	7.11	
	<b>Roller/Compactor (Dirt and Grade Compaction)</b>			
1259	El Paso	16.70	3.30	
1260	Pueblo, Teller	18.43	4.62	
1261	Rotomill	16.22	4.41	
1262	Scraper	24.28	4.83	
	<b>Screed</b>			
1263	El Paso, Teller	25.22	5.74	
1264	Pueblo	23.67	9.22	
1265	Tractor	13.13	2.95	



General Decision No. CO170018				
<b>The wage and fringe benefits listed below do not reflect collectively bargained rates.</b>				
<b>Code</b>	<b>Classification</b>	<b>Basic Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Last Mod</b>
	<b>TRUCK DRIVER:</b>			
	<b>Distributor</b>			
1266	El Paso, Teller	17.98	3.97	
1267	Pueblo	18.35	3.85	
	<b>Dump Truck</b>			
1268	El Paso, Teller	16.85	4.83	
1269	Pueblo	16.87	4.79	
1270	Lowboy Truck	17.25	5.27	
1271	Mechanic	26.69	3.50	
1272	Multi-Purpose Specialty & Hoisting Truck	17.27	3.71	
1273	Pickup and Pilot Car	13.93	3.68	
1274	Semi/Trailer Truck	16.00	2.60	
1275	Truck Mounted Attenuator	12.43	3.22	
	<b>Water Truck</b>			
1276	El Paso	17.24	4.15	
1277	Pueblo	20.93	4.98	
1278	Teller	17.31	4.07	

**WELDERS** - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

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In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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**WAGE DETERMINATION APPEALS PROCESS**

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program.

If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7).

Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

**END OF GENERAL DECISION NO. CO170018**

1  
ON THE JOB TRAINING

This training special provision is an implementation of 23 U.S.C. 140 (a). The Contractor shall meet the requirements of the FHWA 1273 for all apprentices and trainees.

As part of the Contractor's Equal Employment Opportunity Affirmative Action Program, training shall be provided on projects as follows:

1. The Contractor shall provide on the job training aimed at developing full journey workers in the skilled craft identified in the approved training plan. The Contractor shall provide at a minimum, required training hours listed in the Project Special Provisions for each project.
2. The primary objective of this specification is to train and upgrade women and minority candidates to full journey worker status. The Contractor shall make every reasonable effort to enroll and train minority and women workers. This training commitment shall not be used to discriminate against any applicant for training whether or not the applicant is a woman or minority.
3. The Contractor may employ temporary workers from CDOT supportive services providers to meet OJT requirements. Information pertaining to supportive services providers may be obtained by calling the CDOT OJT Coordinator at the number shown on the link <http://www.coloradodot.info/business/equal-opportunity/training.html>
4. An employee shall not be employed or utilized as a trainee in a skilled craft in which the employee has achieved journey status.
5. The minimum length and type of training for each skilled craft shall be as established in the training program selected by the Contractor and approved by the Department and the Colorado Division of the Federal Highway Administration (FHWA), or the U. S Department of Labor (DOL), Office of Apprenticeship or recognized state apprenticeship agency. To obtain assistance or program approval contact:

CDOT Center for Equal Opportunity  
4201 East Arkansas Avenue  
Denver, CO 80222  
[eo@dot.state.co.us](mailto:eo@dot.state.co.us)  
1-800-925-3427

6. The Contractor shall pay the training program wage rates and the correct fringe benefits to each approved trainee employed on the project and enrolled in an approved program. The minimum trainee wage shall be no less than the wage for the Guardrail Laborer classification as indicated in the wage decision for the project.
7. The CDOT Regional Civil Rights Manager must approve all proposed apprentices and trainees for the participation to be counted toward the project goal and reimbursement. Approval must occur before training begins. Approval for the apprentice or trainee to begin work on a CDOT project will be based on:
  - A. Evidence of the registration of the trainee or apprentice into the approved training program.
  - B. The completed Form 838 for each trainee or apprentice as submitted to the Engineer.
8. Before training begins, the Contractor shall provide each trainee with a copy of the approved training program, pay scale, pension and retirement benefits, health and disability benefits, promotional opportunities, and company policies and complaint procedures.
9. Before training begins, the Contractor shall submit a copy of the approved training program and CDOT Form 1337 to the Engineer. Progress payments may be withheld until this is submitted and approved and may be withheld if the approved program is not followed.

2  
ON THE JOB TRAINING

10. On a monthly basis, the Contractor shall provide to the Engineer a completed On the Job Training Progress Report (Form 832) for each approved trainee or apprentice on the project. The Form 832 will be reviewed and approved by the Engineer before reimbursement will be made. The Contractor will be reimbursed for no more than the OJT Force Account budget. At the discretion of the Engineer and if funds are available, the Engineer may increase the force account budget and the number of reimbursable training hours through a Change Order. The request to increase the force account must be approved by the Engineer prior to the training.
11. Upon completion of training, transfer to another project, termination of the trainee or notification of final acceptance of the project, the Contractor shall submit to the Engineer a "final" completed Form 832 for each approved apprentice or trainee.
12. All forms are available from the CDOT Center for Equal Opportunity, through the CDOT Regional Civil Rights Manager, or on CDOT's website at <http://www.coloradodot.info/business/bidding/Bidding%20Forms/Bid%20Winner%20Forms>
13. Forms 838 and 832 shall be completed in full by the Contractor. Reimbursement for training is based on the number of hours of on the job training documented on the Form 832 and approved by the Engineer. The Contractor shall explain discrepancies between the hours documented on Form 832 and the corresponding certified payrolls.
14. The OJT goal (# of training hours required) for the project will be included in the Project Special Provisions and will be determined by the Regional Civil Rights Manager after considering:
  - A. Availability of minorities, women, and disadvantaged for training;
  - B. The potential for effective training;
  - C. Duration of the Contract;
  - D. Dollar value of the Contract;
  - E. Total normal work force that the average bidder could be expected to use;
  - F. Geographic location;
  - G. Type of work; and
  - H. The need for additional journey workers in the area
  - I. The general guidelines for minimum total training hours are as follows:

Contract dollar value	Minimum total training hours to be provided on the project
Up to 1 million	0
>1 - 2 million	320
>2 - 4 million	640
>4 - 6 million	1280
>6 - 8 million	1600
>8 - 12 million	1920
>12 - 16 million	2240
>16 - 20 million	2560
For each increment of \$5 million, over \$20 million	1280

3  
ON THE JOB TRAINING

15. The number of training hours for the trainees to be employed on the project shall be as shown in the Contract. The trainees or apprentices employed under the Contract shall be registered with the Department using Form 838, and must be approved by the Regional Civil Rights Manager before training begins for the participation to be counted toward the OJT project goal. The goal will be met by an approved trainee or apprentice working on that project; or, if a Contractor's apprentice is enrolled in a DOL approved apprenticeship program and registered with CDOT using Form 838 and working for the Contractor on a non-CDOT project. The hours worked on the non-CDOT project may be counted toward the project goal with approved documentation on Form 832. Training hours will be counted toward one project goal.
16. Subcontractor trainees who are enrolled in an approved Program may be used by the Contractor to satisfy the requirements of this specification.
17. The Contractor will be reimbursed \$2.00 per hour worked for each apprentice or trainee working on a CDOT project and whose participation toward the OJT project goal has been approved.
18. The Contractor shall have fulfilled its responsibilities under this specification if the CDOT Regional Civil Rights Manager has determined that it has provided acceptable number of training hours.
19. Failure to provide the required training will result in the following disincentives: A sum representing the number of training hours specified in the Contract, minus the number of training hours worked as certified on Form 832, multiplied by the journey worker hourly wages plus fringe benefits  $[(A \text{ hours} - B \text{ hours worked}) \times (C \text{ dollar per hour} + D \text{ fringe benefits})] = \text{Disincentives Assessed}$ . Wage rate will be determined by averaging the wages for the crafts listed on Form 1337. The Engineer will provide the Contractor with a written notice at Final Acceptance of the project informing the Contractor of the noncompliance with this specification which will include a calculation of the disincentives to be assessed.

## PARTNERING PROGRAM

The Colorado Department of Transportation actively encourages partnering and invites the Contractor and his subcontractors and suppliers to participate in a voluntary partnering agreement for this project.

The following information summarizes the partnering process. More information is available through the Resident Engineer listed in the project special provisions.

This partnership will be structured to draw on the strengths of each organization to identify and achieve mutual goals. The objectives are effective and efficient Contract performance with reciprocal cooperation, and completion within budget, on schedule, and in accordance with the Contract.

This partnership will be bilateral in make-up and all costs associated with this partnership will be agreed to by both parties and will be shared equally. The Contractor shall assume full responsibility for all costs associated with partnering during the implementation of the partnering process. CDOT will reimburse the Contractor for the agreed amount.

The CDOT Program Engineer or the Resident Engineer will contact the Contractor within ten days after the award of this project to ask if the Contractor wants to implement this partnership initiative. If the Contractor agrees, the Contractor's on-site project manager shall meet with CDOT's Resident Engineer to plan a partnering development and team building workshop. At this planning session, arrangements shall be made to determine the facilitator and the workshop, attendees, agenda, duration, and location.

The workshop shall be held prior to the commencement of any major work item and preferably before the preconstruction conference. The following persons shall attend the workshop: CDOT's Resident Engineer, Project Engineer, and key project personnel; the Contractor's on-site project manager and key project supervision personnel; and the subcontractors' key project supervision personnel. The following personnel shall also be invited to attend as needed: project design engineer, key local government personnel, suppliers, design consultants, CDOT maintenance foreman, CDOT environmental manager, key railroad personnel, and key utility personnel. The Contractor and CDOT shall also have Regional or District managers and Corporate or State level managers on the partnering team.

Follow-up workshops may be held periodically throughout the duration of the Contract as agreed by the Contractor and the Engineer at the initial workshop. A closeout workshop shall be held to evaluate the effectiveness of the partnership.

The establishment of a partnership charter, which identifies the workshop participants' mutual goals on the project, will not change the legal relationship of the parties to the Contract or relieve either party from any terms of the Contract.

REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS

Attached is Form FHWA 1273 titled *Required Contract Provisions Federal-Aid Construction Contracts*. As described in Section I. General, the provisions of Form FHWA 1273 apply to all work performed under the Contract and are to be included in all subcontracts with the following modification:

For TAP (Transportation Alternatives Program) funded Recreational Trails projects, Section I (4) regarding convict labor and all of Section IV of the FHWA 1273 do not apply.

Except for Local Agency projects, the Contractor and all subcontractors who are subject to Davis-Bacon Related Acts (DBRA) requirements, shall submit all payrolls and Contractor Fringe Benefit Statements electronically via LCPtracker, utilizing the following web link:

<https://prod.lcptracker.net/WebForms/login.aspx>

The Contractor and subcontractors shall submit a Contractor Fringe Benefit Statement, either for each individual, or for groups of people, for all employees who perform work on the project and whose wages are covered by the Davis-Bacon Related Acts. Other approved deductions shall be noted within the LCPtracker system, and supporting documentation shall be attached. If for any reason the fringe benefits are altered during the life of the project, the Contractor, subcontractor, or both shall submit a revised Contractor Fringe Benefit Statement to accurately reflect the changes.

Each construction subcontractor shall submit their payrolls directly into LCP Tracker for approval by the Contractor.

The Contractor shall submit and approve their own payrolls in LCPtracker.

The Engineer will approve or reject weekly payrolls for the Contractor.

## REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

FHWA-1273 -- Revised May 1, 2012

### REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

#### ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

#### I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's

immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

#### II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the



## REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

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d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

### 6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

### 10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

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a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt.

Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

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(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

### 2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

### 3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm>

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or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or

the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable

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predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to

journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

### V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As

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used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

**3. Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

### VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

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evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

### VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

### VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more

places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

### IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

### X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA



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approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

**1. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering

into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

\* \* \* \* \*

**2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

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b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**2. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of

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Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

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**ATTACHMENT A - EMPLOYMENT AND MATERIALS  
PREFERENCE FOR APPALACHIAN DEVELOPMENT  
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS  
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the

use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

SPECIAL CONSTRUCTION REQUIREMENTS  
FIRE PROTECTION PLAN

- (a) *Fire Protection Plan.* Prior to start of work, the Contractor shall submit a Fire Control Plan in writing to the Engineer for approval. The plan shall include the following:
- (1) The name and contact information of a Fire Control Coordinator who shall be assigned to the project.
  - (2) A list of numbers to call in case of a fire, including 911 (or the equivalent in the area).
  - (3) A complete list, including storage locations, of all tools and equipment the Contractor will use in the event of a fire within project limits.
  - (4) Methods that will be employed if a fire is encountered or started during construction activities within the project limits.
  - (5) Specific fire prevention precautions, and the required firefighting equipment, for every activity which has the potential for starting a fire. At a minimum the plan shall address prevention planning related to use of heavy equipment, vehicles, hand tools, storage and parking areas.
  - (6) Specific precautions for fueling operations.
  - (7) Provisions for field safety meetings. The Contractor shall conduct field safety meetings (also known as toolbox or tailgate meetings) at least once per week. The Contractor shall encourage participation by all persons working at the project site. Participants shall discuss specific fire prevention precautions for construction activities.
- (b) *Equipment and Procedures.*
- (1) Fire Boxes. Fire boxes shall contain tools and equipment that shall be used exclusively for controlling or suppressing fires which occur due to construction activities on project sites. Each fire box shall contain, as a minimum, the following:
    - (1) five round-pointed shovels,
    - (2) two double-bitted axes,
    - (3) three pulaskis or mattocks, and
    - (4) two backpack pumps
  - (2) Welding. If welding at field locations is required, the welding shall be done at a location where all flammable material has been cleared away for a distance of 16 feet around the area.
  - (3) Spark Arrestors. All diesel and gasoline powered engines, both mobile and stationary, shall be equipped with serviceable spark arrestors.
  - (4) Power Saws. Each gasoline power saw shall be provided with a spark screen and a muffler in good condition. Spill-proof metal safety cans shall be used for refueling.
  - (5) Storage and Parking Areas. Batch plant areas, equipment service areas, parking areas, gas and oil drum storage areas, and explosive storage areas shall be cleared of all flammable materials for a distance of 50 feet. Small stationary engine sites shall be cleared of all flammable material for distance of 17 feet. Other mitigation methods may be used as approved by the Engineer

SPECIAL CONSTRUCTION REQUIREMENTS  
FIRE PROTECTION PLAN

- (c) *Fire Control Coordinator Responsibilities.* The Fire Control Coordinator shall:
- (1) Implement the Fire Control Plan.
  - (2) Monitor, manage, and adjust the Fire Control Plan as needed as construction work progresses.
  - (3) Document in a letter to the Engineer changes to the Fire Control Plan.
  - (4) Immediately contact firefighting authorities when a fire is started due to construction activities within project limits.
  - (5) Coordinate fire control and suppression activities until authorities arrive, including the evacuation of staff.
  - (6) When the Fire Control Coordinator cannot be on the project site, he shall designate a person who is on site to serve as the Fire Control Coordinator. The Fire Control Coordinator, or his designee, shall be on site at all times that work is being performed.
- (d) *Costs.* All costs associated with the preparation and implementation of the Plan and compliance with all fire protection provisions and requirements will not be measured and paid for separately, but shall be included in the work.