



Illinois Department of Transportation

Memorandum

To: *

From: Rich Dotson *RD*

Subject: **Special Provision Changes**

Date: April 26, 2011

The following special provisions have been revised for the August 5, 2011 letting. Please revise your special provision books as indicated.

<u>Interim Special Provisions</u>	
ISP Number	Description
Alphabetic ISP Index (Revised)	Remove existing alphabetic index and insert revised index.
Numerical ISP Index (Revised)	Remove existing numeric index and insert revised index.
105.04 (New)	"Traffic Control Deficiency Deduction (BDE)" New special to update the deduction amount.
109.11 (Delete)	"Monthly Employment Report (BDE)" No longer needed.
109.12 (Delete)	"American Recovery and Reinvestment Act Provisions (BDE)" No longer needed.
400.01 (Revised)	"Preventive Maintenance – Cape Seal (BDE)" Revised information included in plans.
400.02 (Revised)	"Preventive Maintenance – Micro-Surfacing (BDE)" Revised information included in plans.
400.03 (Revised)	"Preventive Maintenance – Slurry Seal (BDE)" Revised information included in plans.
406.06 (Revised)	"Stone Matrix Asphalt (BDE)" Revised to allow recycled materials such as FRAP and RAS.
701.04 (Delete)	"American Recovery and Reinvestment Act Signing (BDE)" No longer needed.

District Special Provisions & General Notes

No Changes

RD:kme\mgr1\winword\progdev\special provisions\interim spec provs\specprovchnngsmemo.doc

Attachment(s)

cc: * J. Miller Team 2 Team 6 Team 10 Galesburg Design
 K. Emert Team 3 Team 7 Team 11 Local Roads (M. Augspurger)
 T. Phillips Team 4 Team 8 Geometrics Materials (H. Shoup)
 Team 1 Team 5 Team 9 Bridge (T. Inglis)

SPECIAL PROVISIONS CHECK LIST

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Designer: _____
 Contract No.: _____

FAP: _____
 Section: _____
 County: _____

√	Dir	File Name	Spec Title	Spec Dates
	BRG\	APSLRP-1.DOC	Approach Slab Repair	E 3/13/97
	DES\	100401.doc	Coarse Aggregate Fill	E 4/29/11
	DES\	100402.doc	Concrete Superstructure Aggregate Optimization	E 8/4/06 R 1/1/07
	DES\	100403b.doc	Coarse Aggregate for Bituminous Courses, Class A	E 6/29/93 R 1/1/07
	DES\	100404.doc	Aggregate Quality	E 7/1/90 R 9/23/96
	DES\	102014.doc	Temperature Control for Concrete Placement	E 8/3/07
	DES\	10500.doc	Construction Station Layout	E 7/30/10
	DES\	10506.doc	Prestage Site Construction Meetings	E 6/1/92
	DES\	10507.doc	Removal of Abandoned Underground Utilities	E 1/15/96 R 11/21/96
	DES\	10507a.doc	Status of Utilities/Utilities To Be Adjusted	E 1-21-05
	DES\	10700a.doc	Nationwide 404 Permit Requirements	E 1/22/01 R 8/2/02
	DES\	10731.doc	Location of Underground State Maintained Facilities	E 8/3/07 R 7/31/09
	DES\	10732.doc	Right-of-Way Restrictions	E 7/1/94
	DES\	10803.doc	Delayed Start of Multiple Contracts	E 11/1/01
	DES\	10805a.doc	Date of Completion	E 3/1/90 R 4/28/08
	DES\	10805b.doc	Date of Completion (Plus Working Days)	E 3/1/90 R 7/1/94
	DES\	110303.doc	PCC Automatic Batching Equipment	E 4/23/10
	DES\	20400.doc	Borrow and Furnished Excavation	E 3/7/00 R 4/27/07
	DES\	20500.doc	Geotechnical Reinforcement	E 6/10/93 R 1/1/07
	DES\	20504.doc	Embankment (Restrictions)	E 1/21/05 R 8/3/07
	DES\	20505.doc	Embankment	E 7/1/90 R 8/3/07
	DES\	20505a.doc	Embankment (Small Embankment)	E 10/1/99 R 1/1/07
	DES\	25000.doc	Seeding, Minor Areas	E 7/1/90 R 1/1/07
	DES\	25006a.doc	Mowing	E 12/11/01 R 4/29/11
	DES\	25006b.doc	Mowing	E 12/11/01 R 1/1/07
	DES\	25300.doc	Tree Whip Mixture	E 8/15/91 R 4/25/08
	DES\	25300b.doc	Seedling Mixture A	E 5/5/00 R 11/1/08
	DES\	28100.doc	Grout for Use With Riprap	E 7/30/10
	DES\	28104.doc	Stone Dumped Riprap*	E 4/15/91 R 1/1/07
	DES\	28106.doc	Stone Riprap	E 11/5/10
	DES\	28303.doc	Aggregate Ditch	E 4/15/91 R 10/15/01
	DES\	30101.doc	Proof Rolling	E 4/23/04 R 1/1/07
	DES\	30103.doc	Subgrade Treatment	E 7/1/90 R 4/28/08
	DES\	30200.doc	Soil Modification	E 7/1/90 R 7/30/10
	DES\	31100.doc	Rock Fill	E 10/15/95 R 4/28/08
	DES\	31101.doc	Subbase Granular Material	E 11/5/04
	DES\	35500d.doc	Temporary Pavement	E 10/1/95 R 4/23/10
	DES\	40600.doc	Clean Existing Pavement Edge Joint	E 1/3/00 R 1/1/07
	DES\	40601.doc	Anti-Strip Additive for Hot-Mix Asphalt	E 7/30/10
	DES\	40602.doc	Hot-Mix Asphalt - Prime Coat	E 4/29/11
	DES\	40604.doc	Placement of Hot-Mix Asphalt Surface Courses	E 3/22/01 R 1/1/07
	DES\	40604a.doc	Hot-Mix Asphalt Surface Course Surface Tests	E 11/1/03 R 1/1/07

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DES\	40613.doc	Payment for Use of Material Transfer Device	E 4/23/10
DES\	40706.doc	Bituminous Prime Coat for Hot-Mix Asphalt Pavement (Full-Depth)	E 8/3/07 R 4/23/10
DES\	40713.doc	Grooved-in Rumble Strip	E 11/16/07 R 7/30/10
DES\	42020.doc	Railroad Approach Pavement	E 10/1/95 R 1/1/07
DES\	42401.doc	Sidewalk Drains	E 3/1/91 R 1/1/07
DES\	42402.doc	Temporary Sidewalks	E 3/1/91 R 2/1/96
DES\	44001.doc	Bridge Wearing Surface Removal	E 7/1/90 R 1/1/07
DES\	44003.doc	Protection of Frames and Lids of Utility Structures	E 3/6/91 R 1/1/07
DES\	44003a.doc	Hot-Mix Asphalt Surface Removal, **** (** mm)	E 3/1/93 R 7/31/09
DES\	44003b.doc	Hot-Mix Asphalt Surface Removal, **** (** mm)	E 2/5/93 R 7/31/09
DES\	44003c.doc	Center Joint Repair System	E 3/1/91 R 1/1/07
DES\	44003d.doc	Pavement Drainage After Cold Milling	E 3/15/96 R 1/1/07
DES\	44003e.doc	Pavement Patching with Hot-Mix Asphalt Surface Removal	E 3/1/97 R 1/1/07
DES\	44003f.doc	Hot-Mix Asphalt Concrete Milling Material	E 11/1/03 R 8/3/07
DES\	44200.doc	Class (*) Patches, Type (**),(***) "	E 1/1/99 R 11/1/07
DES\	44300.doc	Reflective Crack Control Treatment	E 3/1/96 R 1/1/07
DES\	45100.doc	Crack and Joint Sealing	E 6/15/97 R 1/1/07
DES\	48205.doc	Hot-Mix Asphalt Shoulder Resurfacing Required to be Constructed Simultaneously with Mainline Paving	E 4/23/10
DES\	48206.doc	Hot-Mix Asphalt Shoulder Resurfacing Constructed Simultaneously with Mainline Paving	E 1/22/01 R 1/1/07
DES\	50103.doc	Concrete Headwall Removal	E 7/1/90
DES\	50104.doc	Concrete Handrail Removal	E 7/1/90 R 1/1/07
DES\	50300.doc	Bin-Type Retaining Wall	E 7/1/90 R 1/1/07
DES\	50301.doc	Concrete Wearing Surface	E 7/1/90 R 1/1/07
DES\	50302.doc	Surface Filler, Special (Gallon)	E 4/23/10
DES\	50312.doc	Plug Existing Deck Drains	E 1/1/96 R 3/22/01
DES\	50312a.doc	Floor Drain Extension	E 3/22/01
DES\	50317.doc	Bridge Floor Finishing Machine	E 5/1/95 R 1/1/07
DES\	50319.doc	Protective Coat, Special	E 4/23/10
DES\	52100b.doc	Jack and Reposition Bearings	E 11/15/93 R 1/1/09
DES\	52100c.doc	Jacking and Cribbing	E 1/1/94 R 1/1/07
DES\	54200.doc	Seepage Collar	E 12/1/96
DES\	54201.doc	Remove and Relay Pipe Culverts	E 7/1/90 R 1/1/07
DES\	54204.doc	Pipe Culverts	E 7/1/90 R 1/1/07
DES\	54204e.doc	Backfill - Pipe Culverts	E 10/15/95 R 1/1/07
DES\	55000.doc	Storm Sewer, (Water Main Requirements)	E 1/1/11
DES\	55002.doc	Storm Sewer (Special)	E 7/1/90 R 1/1/07
DES\	55007.doc	Backfill, Building Removal	E 8/20/91 R 1/1/07
DES\	55200.doc	Steel Pipe Culvert, Special (Jacked) * inches (* mm)	E 7/1/94 R 1/1/07
DES\	55201.doc	(*Storm Sewer/Pipe Culvert) Jacked in Place, ** inches (** mm)	E 7/1/94 R 1/1/07

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DES\	56100.doc	Steel Casings * inches (* mm)	E 7/1/90 R 1/1/07
DES\	60101.doc	Pipe Underdrain	E 8/1/03
DES\	60200a.doc	Inlets, Type G-1	E 10/1/95 R 1/1/07
DES\	60200b.doc	Inlets, Type G-1, Special	E 10/1/95 R 1/1/07
DES\	60200c.doc	Inlets, Type G-1, Double, Special	E 10/1/95 R 1/1/07
DES\	60200d.doc	Inlet Manhole, Type G-1, 4' (1.2 m) Diameter	E 10/1/95 R 1/1/07
DES\	60200e.doc	Inlet-Manhole, Type G-1, 4' (1.2 m) Diameter, Special	E 10/1/95 R 1/1/07
DES\	60200f.doc	Inlet-Manhole, Type G-1, 5' (1.5 m) Diameter	E 10/1/95 R 1/1/07
DES\	60200g.doc	Inlet-Manhole, Type G-1, 5' (1.5 m) Diameter, Special	E 10/1/95 R 1/1/07
DES\	60200h.doc	Inlet-Manhole, Type G-1, 5' (1.5 m) Diameter, Double, Special	E 10/1/95 R 1/1/07
DES\	60200i.doc	Inlet-Manhole, Type G-1, 8' (2.4 m) Diameter, Double, Special	E 10/1/95 R 1/1/07
DES\	60200j.doc	Manhole to be Adjusted with New Type G-1 Frame and Grate	E 10/1/95 R 1/1/07
DES\	60200k.doc	Temporary Inlet Drainage Treatment	E 1/1/97
DES\	60200l.doc	Inlets, Type G-2	E 11/1/03 R 1/1/07
DES\	60200m.doc	Inlets, Type G-1, Double	E 7/31/09
DES\	60504.doc	Filling Existing Inlets	E 7/1/90 R 7/1/94
DES\	60504a.doc	Filling Existing Culverts	E 10/15/95 R 1/1/07
DES\	60504b.doc	Filling Existing Drainage Structures	E 10/15/95 R 1/1/07
DES\	60608.doc	Island Pavement Constructed on Existing Pavement	E 1/1/97 R 1/1/07
DES\	60612.doc	Drainage Holes	E 7/1/90 R 1/1/07
DES\	63000.doc	Erosion Control Curb	E 4/1/91 R 1/1/07
DES\	63001.doc	Guardrail Aggregate Erosion Control	E 2/1/93 R 1/1/07
DES\	63008.doc	Steel Plate Beam Guardrail, Type A, 6.75 Foot Posts	E 7/31/09
DES\	63104.doc	Traffic Barrier Terminals, Type 1, Special (Flared) or (Tangent)	E 7/31/09
DES\	63107.doc	Traffic Barrier Terminals, Type 6	E 7/31/09
DES\	63111c.doc	Traffic Barrier Terminals	E 2/1/96 R 11/5/04
DES\	63114.doc	Traffic Barrier Terminals, Type 2	E 7/31/09
DES\	63200.doc	Guard Post Removal	E 7/1/90 R 1/1/07
DES\	63500.doc	Flexible Delineator Maintenance	E 5/5/92 R 1/1/94
DES\	63501.doc	Flexible Delineators	E 10/1/95 R 1/1/07
DES\	66704.doc	Permanent Survey Marker, Type 1, Bridge Placement	E 7/1/90 R 3/11/11
DES\	66802.doc	Permanent Survey Ties	E 4/1/91 R 1/1/07
DES\	67005.doc	Equipment Vault for Nuclear Testing Equipment	E 6/24/93 R 7/1/94
DES\	68000.doc	Railroad Track Removal	E 11/1/94 R 1/1/07
DES\	68000a.doc	Railroad Ties Removal and Disposal	E 11/1/94 R 10/1/95
DES\	68300.doc	Mortared Stone Wall	E 3/1/91 R 1/1/07
DES\	70100.doc	Traffic Control Plan	E R
DES\	70106.doc	Speeding Penalty	E 1/21/05
DES\	70108b.doc	Traffic Control and Protection Standard 701331	E 10/15/95 R 7/31/09

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		(Special)	
DES\	70114.doc	Width Restriction Signing	E 11/1/07 R 4/24/09
DES\	70120.doc	Traffic Control and Protection BLR 21 and BLR 21 (Special)	E 4/25/08
DES\	70121.doc	Traffic Control and Protection BLR 22 and BLR 22 (Special)	E 4/25/08 R 7/31/09
DES\	70122.doc	Traffic Control and Protection Standard 701606 (Special)	E 7/31/09
DES\	70300.doc	Pavement Marking Removal/Work Zone Pavement Marking Removal	E 4/29/05
DES\	70400.doc	Temporary Concrete Barrier, State Owned and Temporary Concrete Barrier Terminal Sections, State Owned	E 5/1/91 R 1/1/07
DES\	70400a.doc	Temporary Concrete Barrier Reflectors	E 1/21/05
DES\	78000.doc	Thermoplastic Pavement Marking Equipment	E 7/1/90 R 1/1/07
DES\	78001.doc	Urethane Pavement Marking	E 3/25/05
DES\	78002.doc	Grooving For Recessed Pavement Marking	E 1/1/11
DES\	78007.doc	Preformed Plastic Pavement Markings	E 7/31/09
DES\	78100.doc	Temporary Raised Reflective Pavement Marker	E 10/1/95 R 1/1/07
DES\	81000.doc	Conduit, Pushed or Trenched	E 10/1/91 R 1/1/07
DES\	81500.doc	Trench & Backfill, Special for Conduit Installation Beneath Bituminous Shoulders	E 3/21/94 R 1/1/07
DES\	86300.doc	Terminal Facility	E 3/21/94 R 1/1/07
DES\	87300.doc	Electric Cable in Conduit, Lead-In, No. 18	E 3/21/94 R 10/15/01
DES\	88600.doc	Detector Loop, Special for Traffic Counters	E 3/21/94 R 1/1/07
DES\	88600a.doc	Detector Loops, Type 1	E 3/1/96 R 8/3/07

BDE Special Provisions Checklist

For the August 5 & September 23, 2011 Letting

Contract No.: _____

Letting: _____

Note: Specials that go in every contract have already been marked with an "X" for you.

BDE SPECIAL PROVISIONS
For the August 5 and September 23, 2011 Lettings

The following special provisions indicated by an "x" are applicable to this contract and will be included by the Project Development and Implementation Section of the BD&E. An * indicates a new or revised special provision for the letting.

<u>File Name</u>	<u>#</u>	<u>Special Provision Title</u>	<u>Effective</u>	<u>Revised</u>
80240	1	<input type="checkbox"/> Above Grade Inlet Protection	July 1, 2009	
80099	2	<input type="checkbox"/> Accessible Pedestrian Signals (APS)	April 1, 2003	Jan. 1, 2007
80186	3	<input type="checkbox"/> Alkali-Silica Reaction for Cast-in-Place Concrete	Aug. 1, 2007	Jan. 1, 2009
80213	4	<input type="checkbox"/> Alkali-Silica Reaction for Precast and Precast Prestressed Concrete	Jan. 1, 2009	
80207	5	<input checked="" type="checkbox"/> Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas (NOTE: This special provision was previously named "Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders".)	Nov. 1, 2008	Nov. 1, 2010
80192	6	<input type="checkbox"/> Automated Flagger Assistance Device	Jan. 1, 2008	
80173	7	<input type="checkbox"/> Bituminous Materials Cost Adjustments	Nov. 2, 2006	April 1, 2009
80241	8	<input type="checkbox"/> Bridge Demolition Debris	July 1, 2009	
50261	9	<input type="checkbox"/> Building Removal-Case I (Non-Friable and Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50481	10	<input type="checkbox"/> Building Removal-Case II (Non-Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50491	11	<input type="checkbox"/> Building Removal-Case III (Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50531	12	<input type="checkbox"/> Building Removal-Case IV (No Asbestos)	Sept. 1, 1990	April 1, 2010
80166	13	<input type="checkbox"/> Cement	Jan. 1, 2007	April 1, 2011
80260	14	<input type="checkbox"/> Certification of Metal Fabricator	July 1, 2010	
80198	15	<input type="checkbox"/> Completion Date (via calendar days)	April 1, 2008	
80199	16	<input type="checkbox"/> Completion Date (via calendar days) Plus Working Days	April 1, 2008	
80094	17	<input type="checkbox"/> Concrete Admixtures	Jan. 1, 2003	April 1, 2009
80215	18	<input type="checkbox"/> Concrete Joint Sealer	Jan. 1, 2009	
80226	19	<input type="checkbox"/> Concrete Mix Designs	April 1, 2009	
80261	20	<input type="checkbox"/> Construction Air Quality – Diesel Retrofit	June 1, 2010	
80237	21	<input checked="" type="checkbox"/> Construction Air Quality – Diesel Vehicle Emissions Control	April 1, 2009	July 1, 2009
80239	22	<input checked="" type="checkbox"/> Construction Air Quality – Idling Restrictions	April 1, 2009	
80227	23	<input type="checkbox"/> Determination of Thickness	April 1, 2009	
80177	24	<input type="checkbox"/> Digital Terrain Modeling for Earthwork Calculations	April 1, 2007	
80029	25	<input type="checkbox"/> Disadvantaged Business Enterprise Participation	Sept. 1, 2000	Jan. 1 2011
80272	26	<input type="checkbox"/> Drainage and Inlet Protection Under Traffic	April 1, 2011	
80179	27	<input type="checkbox"/> Engineer's Field Office Type A	April 1, 2007	Jan. 1, 2011
80205	28	<input type="checkbox"/> Engineer's Field Office Type B	Aug. 1, 2008	Jan. 1, 2011
80189	29	<input checked="" type="checkbox"/> Equipment Rental Rates	Aug. 2, 2007	Jan. 2, 2008
80228	30	<input type="checkbox"/> Flagger at Side Roads and Entrances	April 1, 2009	
80249	31	<input type="checkbox"/> Frames and Grates	Jan. 1, 2010	
80265	32	<input type="checkbox"/> Friction Aggregate	Jan. 1, 2011	
80229	33	<input type="checkbox"/> Fuel Cost Adjustment	April 1, 2009	July 1, 2009
80169	34	<input type="checkbox"/> High Tension Cable Median Barrier	Jan. 1, 2007	April 1, 2009
80194	35	<input type="checkbox"/> HMA – Hauling on Partially Completed Full-Depth Pavement	Jan. 1, 2008	
80245	36	<input type="checkbox"/> Hot-Mix Asphalt – Anti-Stripping Additive	Nov. 1, 2009	
80246	37	<input type="checkbox"/> Hot-Mix Asphalt – Density Testing of Longitudinal Joints	Jan. 1, 2010	
80250	38	<input type="checkbox"/> Hot-Mix Asphalt – Drop-Offs	Jan. 1, 2010	
80259	39	<input type="checkbox"/> Hot Mix Asphalt – Fine Aggregate	April 1, 2010	
80109	40	<input type="checkbox"/> Impact Attenuators	Nov. 1, 2003	Nov. 1, 2008
80110	41	<input type="checkbox"/> Impact Attenuators, Temporary	Nov. 1, 2003	Jan. 1, 2007
80252	42	<input type="checkbox"/> Improved Subgrade	Jan. 1, 2010	
80266	43	<input type="checkbox"/> Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≤ 40 MPH	Jan. 1, 2011	Jan. 2, 2011

Contract No.: _____

Letting: _____

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File Name	#		Special Provision Title	Effective	Revised
80230	44	X	Liquidated Damages	April 1, 2009	April 1, 2011
80267	45		Long-Span Guardrail over Culvert	Jan. 1, 2011	
80045	46		Material Transfer Device	June 15, 1999	Jan. 1, 2009
80203	47		Metal Hardware Cast into Concrete	April 1, 2008	April 1, 2009
80165	48		Moisture Cured Urethane Paint System	Nov. 1, 2006	Jan. 1, 2010
80253	49		Movable Traffic Barrier (NOTE: This special provision was previously named "Movable Traffic Barrier System".)	Jan. 1, 2010	Jan. 1, 2011
80262	50		Mulch and Erosion Control Blankets (NOTE: This special provision was previously named "Mulch")	Nov. 1, 2010	April 1, 2011
80180	51	X	National Pollutant Discharge Elimination System / Erosion and Sediment Control Deficiency Deduction	April 1, 2007	Nov. 1, 2009
80208	52		Nighttime Work Zone Lighting	Nov. 1, 2008	
80231	53		Pavement Marking Removal	April 1, 2009	
80254	54		Pavement Patching	Jan. 1, 2010	
80022	55	X	Payments to Subcontractors	June 1, 2000	Jan. 1, 2006
80232	56		Pipe Culverts	April 1, 2009	April 1, 2010
80263	57		Planting Perennial Plants	Jan. 1, 2011	
80210	58		Portland Cement Concrete Inlay or Overlay	Nov. 1, 2008	
80217	59		Post Clips for Extruded Aluminum Signs	Jan. 1, 2009	
80268	60	X	Post Mounting of Signs	Jan. 1, 2011	
80171	61		Precast Handling Holes	Jan. 1, 2007	
80218	62		Preventive Maintenance – Bituminous Surface Treatment	Jan. 1, 2009	April 1, 2009
* 80219	63		Preventive Maintenance – Cape Seal	Jan. 1, 2009	Aug. 1, 2011
* 80220	64		Preventive Maintenance – Micro-Surfacing	Jan. 1, 2009	Aug. 1, 2011
80221	65		Preventive Maintenance – Slurry Seal	Jan. 1, 2009	
80015	66		Public Convenience and Safety	Jan. 1, 2000	
34261	67		Railroad Protective Liability Insurance	Dec. 1, 1986	Jan. 1, 2006
80157	68		Railroad Protective Liability Insurance (5 and 10)	Jan. 1, 2006	
80247	69		Raised Reflective Pavement Markers	Nov. 1, 2009	April 1, 2010
80172	70		Reclaimed Asphalt Pavement (RAP)	Jan. 1, 2007	Jan. 1, 2011
80224	71		Restoring Bridge Approach Pavements Using High-Density Foam	Jan. 1, 2009	
80271	72		Safety Edge	April 1, 2011	
80131	73		Seeding	July 1, 2004	July 1, 2010
80264	74		Selection of Labor	July 2, 2010	
80152	75		Self-Consolidating Concrete for Cast-In-Place Construction	Nov. 1, 2005	July 1, 2010
80132	76		Self-Consolidating Concrete for Precast Products	July 1, 2004	July 1, 2010
80127	77		Steel Cost Adjustment	April 2, 2004	April 1, 2009
* 80255	78		Stone Matrix Asphalt	Jan. 1, 2010	Aug. 1, 2011
80234	79		Storm Sewers	April 1, 2009	April 1, 2010
80143	80	X	Subcontractor Mobilization Payments	April 2, 2005	April 1, 2011
80075	81		Surface Testing of Pavements	April 1, 2002	Jan. 1, 2007
80087	82		Temporary Erosion Control	Nov. 1, 2002	Jan. 1, 2011
80225	83		Temporary Raised Pavement Marker	Jan. 1, 2009	
80256	84		Temporary Water Filled Barrier (NOTE: This special provision was previously named "Temporary Longitudinal Traffic Barrier System".)	Jan. 1, 2010	Jan. 1, 2011
80257	85		Traffic Barrier Terminal, Type 6	Jan. 1, 2010	
* 80273	86		Traffic Control Deficiency Deduction	Aug. 1, 2011	
80269	87		Traffic Control Surveillance	Jan. 1, 2011	
20338	88		Training Special Provisions	Oct. 15, 1975	
80258	89		Truck Mounted/Trailer Mounted Attenuators	Jan. 1, 2010	
80270	90	X	Utility Coordination and Conflicts	April 1, 2011	

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<u>File Name</u>	<u>#</u>	<u>Special Provision Title</u>	<u>Effective</u>	<u>Revised</u>
80071	91	<input type="checkbox"/> Working Days	Jan. 1, 2002	

The following special provisions have been deleted from use:

80243 American Recovery and Reinvestment Act Provisions
80236 American Recovery and Reinvestment Act Signing
80238 Monthly Employment Report

The following special provisions are in the 2011 Supplemental Specifications and Recurring Special Provisions:

<u>File Name</u>	<u>Special Provision Title</u>	<u>New Location</u>	<u>Effective</u>	<u>Revised</u>
80214	Concrete Gutter, Type A	Article 606.07	Jan. 1, 2009	
80178	Dowel Bars	Article 1006.11	April 1, 2007	Jan. 1, 2008
80201	Hot-Mix Asphalt – Plant Test Frequency	Article 1030.05	April 1, 2008	Jan. 1, 2010
80251	Hot-Mix Asphalt – QC/QA Acceptance Criteria	Article 1030.05	Jan. 1, 2010	
80202	Hot-Mix Asphalt – Transportation	Article 1030.08	April 1, 2008	
80196	Mast Arm Assembly and Pole	Article 1077.03	Jan. 1, 2008	Jan. 1, 2009
80182	Notification of Reduced Width	Article 701.06	April 1, 2007	
80069	Organic Zinc-Rich Paint System	Article 1008.05	Nov. 1, 2001	Jan. 1, 2010
80216	Partial Exit Ramp Closure for Freeway/Expressway	Section 701	Jan. 1, 2009	
80209	Personal Protective Equipment	Article 701.12	Nov. 1, 2008	
80119	Polyurea Pavement Marking	Sections 780, 1095 and 1105	April 1, 2004	Jan. 1, 2009
80170	Portland Cement Concrete Plants	Article 1020.11	Jan. 1, 2007	
80211	Prismatic Curb Reflectors	Articles 782.03 and 1097.04	Nov. 1, 2008	
80223	Ramp Closure for Freeway/Expressway	Section 701	Jan. 1, 2009	
80183	Reflective Sheeting on Channelizing Devices	Article 1106.02	April 1, 2007	Nov. 1, 2008
80206	Reinforcement Bars – Storage and Protection	Article 508.03	Aug. 1, 2008	April 1, 2009
80176	Thermoplastic Pavement Marking	Article 1095.01	Jan. 1, 2007	

The following special provisions require additional information from the designer. The additional information needs to be included in a separate document attached to this check sheet. The Project Development and Implementation section will then include the information in the applicable special provision. The Special Provisions are:

- Bridge Demolition Debris
- Building Removal-Case I
- Building Removal-Case II
- Building Removal-Case III
- Building Removal-Case IV
- Completion Date
- Completion Date Plus Working Days
- DBE Participation
- Material Transfer Device
- Railroad Protective Liability Insurance
- Training Special Provisions
- Working Days

**Index for
Supplemental Specifications
and
Recurring Special Provisions**

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2011

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-07) (Revised 1-1-11)

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RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

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BDE Special Provisions

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ALPHABETIC LIST OF DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

Get a copy of the current check list from the Program Development Secretary, indicate which ISP's are to be included in your set of special provisions, fill in any blanks as indicated on the check list, and include with your set of special provisions to be sent to Springfield where they will be inserted.

<u>Standard Spec. No.</u>	<u>PC No.</u>	<u>Item</u>
280.02	28002	Above Grade Inlet Protection
888.00	88800	Accessible Pedestrian Signals (APS)
1020.02	102002	Alkali-Silica Reaction for Cast-in-Place Concrete
1020.03	102003	Alkali-Silica Reaction for Precast and Precast Prestressed Concrete
107.22	10722	Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders
701.00	70100	Automated Flagger Assistance Devices
109.01	10901	Bituminous Materials Cost Adjustment
107.38	10738	Bridge Demolition Debris
107.19a	10719a	Building Removal Case I
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1001.00	100100	Cement
106.08	10608	Certification of Metal Fabricators
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503.19	50319	Concrete Joint Sealer
1020.05c	102005c	Concrete Mix Designs
107.00	10700	Construction Air Quality – Diesel Vehicle Emissions Control
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ALPHABETIC LIST OF DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

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353.00	35300	Determination of Thickness
202.07	20207	Digital Terrain Modeling for Earthwork Calculations
108.06a	10806a	Disadvantaged Business Enterprise Participation
603.02	60302	Drainage and Inlet Protection Under Traffic
670.02	67002	Engineer's Field Office Type A
670.03	67003	Engineer's Field Office Type B
109.04	10904	Equipment Rental Rates
701.13	70113	Flagger at Side Roads and Entrances
609.02	60902	Frames and Grates
1004.01	100401	Friction Aggregate
109.03	10903	Fuel Cost Adjustment
643.00	64300	High Tension Cable Median Barrier
407.08	40708	HMA-Hauling on Partially Completed Full-Depth Pavement
1030.04c	103004c	Hot-Mix Asphalt – Anti-Stripping Additive
406.07	40607	Hot-Mix Asphalt-Density Testing of Longitudinal Joints
701.07a	70107a	Hot-Mix Asphalt Drop-Offs
1003.01	100301	Hot-Mix Asphalt – Fine Aggregate
702.00c	70200c	Impact Attenuators
702.00d	70200d	Impact Attenuators, Temporary
302.04	30204	Improved Subgrade
701.19	70119	Lane Closure, Multilane, Intermittent or Moving Operation, for Speeds ≤ 40 MPH
108.09	10809	Liquidated Damages
630.07	63007	Long-Span Guardrail over Culvert

ALPHABETIC LIST OF DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

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406.00f	40600f	Material Transfer Device
503.02	50302	Metal Hardware Cast into Concrete
1008.27	100827	Moisture Cured Urethane Paint System
1106.02i	110602i	Movable Traffic Barrier
251.00	25100	Mulch and Erosion Control Blankets
105.03	10503	National Pollutant Discharge Elimination System / Erosion and Sediment Control Deficiency Deduction
701.01	70101	Nighttime Work Zone Lighting
783.03	78303	Pavement Marking Removal
701.17	70117	Pavement Patching
109.07	10907	Payments to Subcontractors
542.03	54203	Pipe Culverts
254.00	25400	Planting Perennial Plants
420.00	42000	Portland Cement Concrete Inlay or Overlay
1090.03	109003	Post Clips for Extruded Aluminum Signs
701.14	70114	Post Mounting of Signs
540.02	54002	Precast Concrete Handling Holes
400.04	40004	Preventive Maintenance - Bituminous Surface Treatment
400.01	40001	Preventive Maintenance – Cape Seal
400.02	40002	Preventive Maintenance – Micro-Surfacing
400.03	40003	Preventive Maintenance – Slurry Seal
107.09	10709	Public Convenience and Safety
107.11	10711a	Railroad Protective Liability Insurance
107.11	10711b	Railroad Protective Liability Insurance (5 and 10)
781.03	78103	Raised Reflective Pavement Markers

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420.16	42016	Restoring Bridge Approach Pavements Using High-Density Foam
406.05	40605	Safety Edge
250.00	25000	Seeding
108.00	10800	Selection of Labor
1020.01	102001	Self-Consolidating Concrete for Cast-in-Place Construction
1020.00	102000	Self-Consolidating Concrete for Precast Products
109.00	10900a	Steel Cost Adjustment
406.06	40606	Stone Matrix Asphalt
550.02	55002	Storm Sewers
671.00	67100	Subcontractor Mobilization Payments
406.21	40621	Surface Testing of Pavements
280.04	28004	Temporary Erosion Control
703.00	70300	Temporary Raised Pavement Marker
1106.02k	110602k	Temporary Water Filled Barrier
631.07	63107	Traffic Barrier Terminal, Type 6
105.04	10504	Traffic Control Deficiency Deduction
701.10	70110	Traffic Control Surveillance
108.06	10806	Training Special Provision
701.03	70103	Truck Mounted/Trailer Mounted Attenuators
105.07	10507	Utility Coordination and Conflicts
108.05	10805	Working Days

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NUMERIC DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

Get a copy of the current check list from the Program Development Secretary, indicate which ISP's are to be included in your set of special provisions, fill in any blanks as indicated on the check list, and include with your set of special provisions to be sent to Springfield where they will be inserted.

<u>Standard Spec. No.</u>	<u>PC No.</u>	<u>Item</u>
105.03	10503	National Pollutant Discharge Elimination System / Erosion and Sediment Control Deficiency Deduction
105.04	10504	Traffic Control Deficiency Deduction
105.07	10507	Utility Coordination and Conflicts
106.08	10608	Certification of Metal Fabricator
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107.01	10701	Construction Air Quality – Diesel Retrofit
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107.11b	10711b	Railroad Protective Liability Insurance (5 and 10)
107.19a	10719a	Building Removal Case I
107.19b	10719b	Building Removal Case II
107.19c	10719c	Building Removal Case III
107.19d	10719d	Building Removal Case IV
107.22	10722	Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders
107.37	10737	Construction Air Quality – Idling Restrictions
107.38	10738	Bridge Demolition Debris
108.00	10800	Selection of Labor
108.05	10805	Working Days
108.05a	10805a	Completion Date (Via Calendar Days)
108.05b	10805b	Completion Date (Via Calendar Days) Plus Working Days
108.06	10806	Training Special Provision

NUMERIC DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

<u>Standard Spec. No.</u>	<u>PC No.</u>	<u>Item</u>
108.06a	10806a	Disadvantaged Business Enterprise Participation
108.09	10809	Liquidated Damages
109.00a	10900a	Steel Cost Adjustment
109.01	10901	Bituminous Materials Cost Adjustments
109.03	10903	Fuel Cost Adjustment
109.04	10904	Equipment Rental Rates
109.07	10907	Payments to Subcontractors
202.07	20207	Digital Terrain Modeling for Earthwork Calculations
250.00	25000	Seeding
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302.04	30204	Improved Subgrade
353.00	35300	Determination of Thickness
400.01	40001	Preventive Maintenance – Cape Seal
400.02	40002	Preventive Maintenance – Micro-Surfacing
400.03	40003	Preventive Maintenance – Slurry Seal
400.04	40004	Preventive Maintenance – Bituminous Surface Treatment
406.00f	40600f	Material Transfer Device
406.05	40605	Safety Edge
406.06	40606	Stone Matrix Asphalt
406.07	40607	Hot-Mix Asphalt – Density Testing of Longitudinal Joints
406.21	40621	Surface Testing of Interstate Pavements
407.08	40708	HMA-Hauling on Partially Completed Full-Depth Pavement

NUMERIC DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

<u>Standard Spec. No.</u>	<u>PC No.</u>	<u>Item</u>
420.00	42000	Portland Cement Concrete Inlay or Overlay
420.16	42016	Restoring Bridge Approach Pavements Using High-Density Foam
503.02	50302	Metal Hardware Cast Into Concrete
503.19	50319	Concrete Joint Sealer
540.02	54002	Precast Concrete Handling Holes
542.03	54203	Pipe Culverts
550.02	55002	Storm Sewers
603.02	60302	Drainage and Inlet Protection Under Traffic
609.02	60902	Frames and Grates
630.07	63007	Long-Span Guardrail over Culvert
631.07	63107	Traffic Barrier Terminal, Type 6
643.00	64300	High Tension Cable Median Barrier
670.02	67002	Engineers Field Office Type A
670.03	67003	Engineers Field Office Type B
671.00	67100	Subcontractor Mobilization Payments
701.00	70100	Automated Flagger Assistance Devices
701.01	70101	Nighttime Work Zone Lighting
701.03	70103	Truck Mounted/Trailer Mounted Attenuators
701.07a	70107a	Hot-Mix Asphalt – Drop-Offs
701.10	70110	Traffic Control Surveillance
701.13	70113	Flagger at Side Roads and Entrances
701.14	70114	Post Mounting of Signs
701.17	70117	Pavement Patching
701.19	70119	Lane Closure, Multilane, Intermittent or Moving Operations, for Speeds ≤ 40 MPH

NUMERIC DESIGN INTERIM SPECIAL PROVISIONS (ISP's)

<u>Standard Spec. No.</u>	<u>PC No.</u>	<u>Item</u>
702.00c	70200c	Impact Attenuators
702.00d	70200d	Impact Attenuators, Temporary
703.00	70300	Temporary Raised Pavement Marker
781.03	78103	Raised Reflective Pavement Markers
783.03	78303	Pavement Marking Removal
888.00	88800	Accessible Pedestrian Signals (APS)
1001.00	100100	Cement
1003.01	100301	Hot-Mix Asphalt – Fine Aggregate
1004.01	100401	Friction Aggregate
1008.27	100827	Moisture Cured Urethane Paint System
1020.00	102000	Self-Consolidating Concrete for Precast Products
1020.01	102001	Self-Consolidating Concrete for Cast-in-Place Construction
1020.02	102002	Alkali-Silica Reaction for Cast-in-Place Concrete
1020.03	102003	Alkali-Silica Reaction for Precast and Precast Prestressed Concrete
1020.05b	102005b	Concrete Admixtures
1020.05c	102005c	Concrete Mix Designs
1030.04c	103004c	Hot-Mix Asphalt – Anti-Stripping Additive
1031.00	103100	Reclaimed Asphalt Pavement (RAP)
1090.03	109003	Post Clips for Extruded Aluminum Signs
1106.02i	110602i	Movable Traffic Barrier
1106.02k	110602k	Temporary Water Filled Barrier

BDE Special Provisions

10504

105.04

Designer Note: Insert into all contracts involving Traffic Control and Protection.

TRAFFIC CONTROL DEFICIENCY DEDUCTION (BDE)

Effective: August 1, 2011

Revise the third sentence of the third paragraph of Article 105.03(b) of the Standard Specifications to read:

“The daily monetary deduction will be \$2,500.”

Designer Note: Insert into all contracts using cape seal. Use of this special provision shall be according to the Bureau of Design and Environment Manual, Chapter 52.

Districts are encouraged to use the CA 20 gradation as it has proven to perform well for A-1 surface treatments.

The designer must specify the aggregate gradation for the A-1 bituminous surface treatment. Districts are encouraged to use the CA 20 gradation as it has proven to perform well for A-1 surface treatments.

The designer must specify the proper friction aggregate for the micro-surfacing layer on the plans using the following note:

“The aggregates for the micro-surfacing shall meet the friction aggregate requirements for Mixture __ in Article 1004.03(a).”

Insert either “C” or “D” into the note to indicate which mixture is to be used according to the ADT volume on the project. ADT ≤ 5,000 shall use Mixture C and ADT > 5,000 shall use Mixture D.

Include the following information in the Traffic Control Plan Special Provision:

- Contractor shall post the roadway with “LOOSE GRAVEL” and SPEED LIMIT 35” signs in accordance with applicable articles of Division 700 of the Standard Specifications. These signs shall be placed at the start of the work, near intersecting roadways and then at an average spacing of 0.5 mi (0.8 km). The signs may be removed as soon as the sweeping operation has been completed.

Include Special Provision on Temporary Flexible Raised Pavement Marker with this work.

PREVENTIVE MAINTENANCE - CAPE SEAL (BDE)

Effective: January 1, 2009

Revised: August 1, 2011

Description. This work shall consist of constructing a single bituminous surface treatment (A-1) and a micro-surfacing on existing hot-mix asphalt (HMA) surfaces.

Materials. Materials shall be according to the following.

- (a) A-1 Surface Treatment. Materials shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(1) Seal Coat Aggregate (Note 1)	1003, 1004.03
(2) Bituminous Materials (Note 2)	1032

Note 1. The seal coat aggregate shall be either fine or coarse aggregate.

When fine aggregate is used, it shall be stone sand (other than limestone and dolomite), wet bottom boiler slag, slag sand, or steel slag sand. The aggregate quality shall be Class C. The aggregate gradation shall be FA 1 (Special) or FA 4 (Special) as specified on the plans at shall meet the following.

When fine aggregate is used, it shall be stone sand (other than limestone and dolomite), wet bottom boiler slag, slag sand, or steel slag sand. The aggregate quality shall be Class C. The aggregate gradation shall be FA 1 (Special) or FA 4 (Special) as specified on the plans at shall meet the following.

FINE AGGREGATE GRADATIONS						
Grad. No.	Sieve Size and Percent Passing					
	3/8 in. (9.5 mm)	No. 4 (4.75 mm)	No. 8 (2.36 mm)	No. 16 (1.18 mm)	No. 40 (425 um)	No. 200 (75 um)
FA 1 (Special)	100	90 ± 10	62.5 ± 17.5	32.5 ± 7.5	7.5 ± 7.5	1.5 ± 1
FA 4 (Special)	100	--	--	2 ± 2	--	1.5 ± 1

When coarse aggregate is used, it shall be crushed gravel, crushed stone, wet bottom boiler slag, crushed slag, crushed sandstone, or crushed steel slag. The aggregate quality shall be Class C and the aggregate shall have a maximum of 25 percent chert by weight (mass). The aggregate gradation shall be CA 15, CA 16, or CA 20 as specified on the plans.

Note 2. The bituminous material shall be either a CRSP or an HFP polymer modified emulsified asphalt meeting the requirements of Article 1032.06(f)(2) of the Standard Specifications.

- (b) Micro-Surfacing. Materials shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(1) Mineral Filler (Note 1)	1001
(2) Water	1002
(3) Coarse Aggregate (Note 2)	1004.03
(4) Latex-Modified Emulsified Asphalt (Note 3)	
(5) Additives (Note 4)	

Note 1. The mineral filler shall be Type 1 portland cement.

Note 2. The coarse aggregate material shall be selected from the table in Article 1004.03(a) of the Standard Specifications based upon the friction aggregate mixture specified. The quality of the aggregate shall be Class B and the gradation shall be as shown in the table below.

Sieve Size	% Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 ± 5
No. 8 (2.36 mm)	77 ± 13
No. 16 (1.18 mm)	57 ± 13
No. 30 (600 µm)	40 ± 10
No. 50 (330 µm)	24 ± 6
No. 100 (150 µm)	15 ± 6
No. 200 (75 µm)	10 ± 5

To assure the material is totally crushed, 100 percent of the parent aggregate shall be larger than the largest stone in the gradation to be used.

The blending, alternate use, and/or substitutions of aggregates from different sources for use in this work will not be permitted without the approval of the Engineer. Any blending shall be by interlocked mechanical feeders. The blending shall be uniform, compatible with the other components of the mix, and the equipment shall be approved by the Engineer.

If blending aggregates, the blend shall have a washed gradation performed every other day or a minimum of three tests per week. Testing shall be completed before the aggregate receives final acceptance for use in the mix. All gradation tests shall be conducted according to the aggregate gradation control system (AGCS).

Aggregates shall be screened at the stockpile prior to delivery to the paving machine to remove oversized material or contaminants.

Note 3. CSS-1h Latex Modified Emulsified Asphalt. The emulsified asphalt shall be a quick-traffic latex modified asphalt emulsion containing a minimum of 3.0 percent latex solids by weight of asphalt binder. The latex shall be milled or blended into the emulsifier solution prior to the emulsification process. The CSS-1h latex modified emulsified asphalt shall be according to the following.

Test (AASHTO T 59)	Result
Viscosity, Saybolt Furol, 77 °F (25 °C), SFS	20-100
Storage Stability Test, 24 hours, %	1 max.
Particle Charge Test	Positive
Sieve Test, No. 20 (850 µm), retained on sieve, %	0.10 max.
Distillation Test, Residue from distillation test to 347 ± 9 °F (175 ± 5 °C), %	62 min.

Tests on residue from distillation	Result
Penetration, 77 °F (25 °C), 100 grams, 5 seconds, (AASHTO T 49), dmm	40-90
Ductility, 77 °F (25 °C), 50 mm/min, (AASHTO T 51), mm	400 min.
Solubility in trichloroethylene, (AASHTO T 44), %	97.5 min.
Softening Point, (AASHTO T 53), °F (°C)	135 (57) min.
Absolute Viscosity, 140 °F (60 °C), (AASHTO T 202), Poises (Pa · sec)	8,000 (800) min.

Note 4. Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

(c) Crack/Joint Sealant. The crack/joint sealant shall be a fiber-modified asphalt binder mixed at the jobsite or premixed.

(1) Jobsite-Mixed Sealant. The sealant shall consist of an asphalt binder and fibers, and be according to the following.

a. Asphalt Binder. The asphalt binder shall be PG 58-28, PG 58-22, or PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.

- b. Fibers. Fibers shall be short cut polypropylene fibers meeting the properties listed below. The fiber may be accepted on certification from the manufacturer that it meets the specified requirements.

Property	Value
Length, in. (mm)	0.3 - 0.5 (8 - 12)
Denier	13-16
Crimps	None
Tensile Strength, min., psi (kPa)	40,000 (275,000)
Specific Gravity (typical)	0.91
Moisture Regain @ 70 °F (21 °C) and 65% RH (typical), %	0.1

- c. Percent Fibers. The sealant shall contain a minimum of 8.0 percent of fibers by weight (mass).
- d. Sealant Heating. The sealant shall be heated in the kettle at temperatures between 255 and 285 °F (124 and 141 °C).
- (2) Premixed Sealant. The sealant shall be packaged and consist of an asphalt binder, fibers, and other modifiers meeting the following requirements. The sealant and its components may be accepted on certification from the manufacturer that it meets the specified requirements.

- a. Asphalt Binder. The asphalt binder shall be PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.
- b. Fibers. Fibers shall be short cut polyester fibers meeting the following.

Property	Value
Length, in. (mm)	0.25 ± 0.02 (6.3 ± 0.5)
Denier	3 - 6
Crimps	None
Tensile Strength, min., psi (kPa)	70,000 (482,000)
Specific Gravity (typical)	1.32 - 1.40
Elongation at Break, %	35 - 38
Melt Temperature, °F (°C)	475 - 490 (246 - 254)

- c. Percent Fibers. The sealant shall contain 5.0 ± 0.5 percent of fibers by weight (mass).

The sealant, in its final form, shall meet the following requirements when sampled and heated to the manufacturer's recommended maximum heating temperature according to ASTM D 5167.

Test	Value
Cone Penetration @ 77 °F (25 °C), ASTM D 5329	10 - 35 dmm
Softening Point, ASTM D 36	175 °F (79 °C) min.
Maximum Heating Temperature	400°F (204 °C)
Application Temperature	350°F (177 °C) min.

Equipment. Equipment shall be according to the following.

- (a) A-1 Surface Treatment. Equipment shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(1) Self-Propelled Pneumatic-Tired Roller (Note 1)	1101.01
(2) Mechanical Sweeper (Note 2)	1101.03
(3) Aggregate Spreaders (Note 3)	1102.04
(4) Pressure Distributor (Note 4)	1102.05
(5) Heating Equipment	1102.07

Note 1. There shall be a minimum of two rollers, with the final number of rollers determined by the rollers' abilities to maintain proper spacing with the aggregate spreader as directed by the Engineer.

Note 2. The mechanical sweeper shall be power driven and self-propelled with the broom located between the axles. The mechanical sweeper shall not use a cantilever-mounted broom and the broom rotation shall not be operated by forward movement.

Note 3. The aggregate spreader shall be a self-propelled mechanical type with the receiving hopper in the rear and shall pull the aggregate truck. The spreader shall be fitted with an automated system which provides positive interconnected control of the aggregate flow with the forward speed of the spreader. The automated system shall provide uniform and consistent aggregate application at the rate specified.

The Engineer will check the spread roll of the aggregate spreader for straightness each day before operations begin. Should the surface of the spread roll vary off a straight line along its longitudinal dimension by more than 1/16 in. (1.5 mm), the Engineer will inspect the application of aggregate for corrugations and, should these occur, the machine shall be repaired or replaced. The forward speed of the spreader during calibration shall be the same as is to be used during construction. The equipment required for aggregate spreader calibration may consist of several sheets of canvas, each being exactly 1 sq yd (0.8 sq m), and a weight scale. By making several runs at different gate openings over the sheets of canvas, placed to cover the full width applied by the spreader, and carefully measuring the aggregate on each canvas sheet, the gate opening at the pre-established speed required to apply aggregate at the specified rate may be determined.

Note 4. The pressure distributor shall have a minimum capacity of 3000 gal (11,500 L). The application rate control shall be automated and shall control the application rate regardless of ground speed or spray bar width. The computer shall have the capability of recording the application rate, gallons sprayed, square yards, and feet traveled. The pressure distributor shall be capable of maintaining the asphalt emulsion at the specified temperature. The spray bar nozzles shall produce a uniform triple lap application fan spray, and the shutoff shall be instantaneous, with no dripping. The pressure distributor shall be capable of maintaining the specified application rate within ± 0.015 gal/sq yd (± 0.070 L/sq m) for each load. The spray-bar nozzles shall be turned to make the same angle with the longitudinal axis of the spray bar as recommended by the manufacturer.

Application rates shall be determined by the procedures listed in ASTM D 2995, except the sample may be taken on three 8 x 12 in. (200 x 300 mm) metal plates. The three plates shall be positioned as directed by the Engineer.

(b) Micro-Surfacing. Equipment shall be according to the following.

- (1) Micro-Surfacing Mixing Machine. The machine shall be either a continuous (self-loading) machine or a non-continuous (self-contained) machine depending on the size of the project as described below. Both types of machines shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive and water to maintain an adequate supply to the proportioning controls.

Machines that are the continuous (self-loading) type shall be an automatic-sequenced, self-propelled, continuous-flow mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade, double-shafted mixer and to discharge the mixed product on a continuous-flow basis. The machine shall be equipped to allow the operator to have full control of the forward and reverse speeds during applications of the material and be equipped with opposite-side driver stations to assist in alignment.

Non-continuous (self-contained) machines will be allowed on projects with a length of 2 lane-miles (3.2 lane-km) or less. For mainline paving, the Contractor shall have at least three self-contained machines in continuous operation to ensure appropriate production rates. Self-contained machines will also be allowed on shoulders, ramps, short applications as bridge decks, or where the material can be placed in a single loading capacity of the machine.

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the Engineer prior to construction. Each new or different aggregate requires a new calibration. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 30 days have lapsed. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine metering devices. Prior to the calibration process, portable scales used to calibrate the mixing machine for emulsion and aggregate shall be checked with 25 lb and 50 lb weights, respectively. Results from the standard weight checks shall be furnished to the Engineer. No machine will be allowed to work on the project until the calibration has been completed and/or accepted.

- (2) Micro-Surfacing Spreader. The mixture shall be agitated and spread uniformly in the surfacing box by means of twin-shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

A secondary strike-off shall be provided to improve surface texture on the surface course. The secondary strike-off shall have the same adjustments as the spreader box and shall not bounce, wobble, or chatter.

When required on the plans, before the final surface course is placed, preliminary micro-surfacing material may be required to fill ruts, utility cuts, depressions in the existing surface, etc. Ruts of 1/2 in. (13 mm) or greater in depth shall be filled independently with a rut-filling spreader box, either 5 or 6 ft (1.5 or 1.8 m) in width. For irregular or shallow rutting of less than 1/2 in. (13 mm) in depth, a full-width scratch-coat pass may be used as directed by the Engineer utilizing either a stiff primary rubber or else a metal primary strike off. Ruts that are in excess of 1 1/2 in. (38 mm) in depth may require multiple placements with the rut-filling spreader box to restore the cross-section. All rut-filling level-up material should cure under traffic for a minimum of 24 hours before additional material is placed on top of the level up.

- (3) Micro-Surfacing Proportioning Devices. Individual volume or weight controls for proportioning each material to be added to the mix (i.e. aggregate, mineral filler, emulsified asphalt, additive, and water) shall be provided and properly marked. These proportioning devices are used in material calibration and determining the material output at any time. Calibration records, conversion formulas, and daily run sheets including the beginning and final numbers shown on the proportioning devices shall be submitted to the Engineer for approval. During production any deviations from the original JMF shall be approved by the Engineer.

(c) Crack/Joint Sealing. Equipment shall be according to the following.

- (1) Air Compressor. The air compressor shall be capable of producing a minimum pressure of 90 psi (620 kPa) at the end of the discharge hose. The air stream shall discharge onto the pavement through an appropriate air lance. The tool lubricator shall be bypassed and a filter installed on the discharge valve to keep water and oil out of the line.
- (2) Oil Kettle. The crack sealant shall be heated in an oil jacketed double wall kettle equipped with an agitator (reversing rotary auger action) and separate thermometers for the oil bath and mixing chamber. The unit shall also be equipped with a reversible hydraulic 2 in. (50 mm) hot asphalt pump and a recirculating pump to circulate the oil bath.

CONSTRUCTION REQUIREMENTS

Weather Limitations. Placement of the A-1 bituminous surface treatment shall be done between May 1 and August 31, with the micro-surfacing being placed according to the timeframe specified herein. Bituminous materials shall be applied only when the temperature of the air in the shade is above 55 °F (13 °C). No work shall be started if local conditions indicate that rain is imminent.

The A-1 bituminous surface treatment may be done between September 1 and September 15 provided both of the following conditions are met:

- (a) The temperature of the air in the shade is above 70 °F (20 °C) and the temperature of the surface to which the asphalt will be applied is 70 °F (20 °C) or above, and
- (b) The National Weather Service forecast for the area does not show any rain or any temperatures below 55 °F (13 °C) for the day the work is to be done or for the following five days.

Mix Design. A Contractor provided laboratory shall develop the mix design for the micro-surfacing mixture, shall verify the functioning of the set regulating additives, and shall present certified test results for the Engineer's approval. This laboratory shall be recognized by the International Slurry Surfacing Association (ISSA) as being capable of performing mix designs. The Engineer will verify the laboratory tests required in ISSA A143 have been conducted.

Proportions for the mix design shall be within the following limits.

Mineral Aggregate, dry weight (mass) lb/sq yd (kg/sq m)	15-50 (8-30)
Latex Emulsified Asphalt Residue, % by wt. of Aggregate	5.5-10.5
Latex Base Modifier	As required with % by weight (mass) of binder min. of 3.0
Mix Set Additive	As required
Mineral Filler, % by weight (mass) of aggregate	0.25 - 3 depending on weather conditions

The amount of mineral filler needed shall be determined by the laboratory mix design and will be considered as part of the aggregate gradation.

The amount and type of latex shall be determined by the laboratory performing the mix design. The minimum amount required shall be based on asphalt weight content and shall be certified by the emulsion supplier.

Compatibility of the aggregate, latex-modified emulsified asphalt, mineral filler, and other additives shall be verified by the mix design. The materials shall meet the following requirements for ISSA A143.

ISSA Test No.	Description	Specification
ISSA TB-139	Wet Cohesion @ 30 minutes min. (Set) @ 60 minutes min. (Traffic)	12 kg-cm min. 20 kg-cm min. or Near Spin
ISSA TB-109	Excess Asphalt by LWT Sand Adhesion	50 gm/sq ft (538 gm/sq m) max.
ISSA TB-114	Wet Stripping	Pass (90% min.)
ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak Six-day Soak	50 gm/sq ft (538 gm/sq m) max. 75 gm/sq ft (807 gm/sq m) max.
ISSA TB-147	Lateral Displacement	5% max.
	Specific Gravity after 1,000 Cycles of 25 lb (11.34 kg)	2.10 max.
ISSA TB-144	Classification Compatibility	11 Grade Points min. (AAA, BAA)
ISSA TB-113	Mix Time @ 77 °F (25 °C)	Controllable to 120 seconds min.

The mixing test and set-time test shall be checked at the highest temperatures expected during construction.

The mix design shall report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect). The report shall clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive usage, and latex-modified asphalt emulsion based on the dry weight of the aggregate.

For the aggregate blend in the mix design, test results for AASHTO T 176 shall be provided with the mix information to the Engineer. Aggregate test values below 65 shall require review and approval from the Engineer.

Before the work commences, the Contractor shall submit to the Engineer a complete mix design covering the specific materials to be used on the project. The percentages of each individual material required shall be shown in the laboratory report. The Engineer shall approve the mix design prior to its use. After approval, no substitutions will be permitted, unless approved by the Engineer, and the Contractor shall maintain continuous control of the latex-modified emulsified asphalt to dry aggregate proportioning to conform to the approved mix design within a tolerance of ± 2 gal/ton (± 8 L/metric ton).

Micro-Surfacing Test Strip. For projects over 100,000 sq yd (83,600 sq m), at least one day prior to starting the project the Contractor shall designate a mutually agreeable location and apply a test strip of micro-surfacing using the aggregate indicated in the mix design. The Engineer will evaluate the micro-surfacing application rate and cure time.

Surface Preparation. Pavement markings shall be removed according to Article 783.03(a) of the Standard Specifications. Only very small particles of tightly adhering existing markings may remain in place.

When specified in the plans, pavement markers shall be removed according to Article 783.03(b) of the Standard Specifications.

Bumps greater than or equal to 1/2 in. (13 mm) shall be removed by grinding. The Contractor shall determine bump grinding locations in the presence of the Engineer by using a 16 ft (5 m) straightedge with the scratcher bolts set to 1/2 in. (13 mm). All locations marked by the scratcher bolts shall be ground using either a grinding machine consisting of multiple saws or a cold-milling machine with a double- or triple-wrap milling head.

Joints and cracks 3/16 in. (5 mm) or wider shall be cleaned of loose and unsound material and sealed. The sealant shall be applied only when the joints and cracks are clean and dry and the ambient temperature is 40-85 °F (4-29 °C). The sealant shall be applied using a pressurized wand delivery system with such devices as necessary to seal the cracks/joints and form a nominal 0.125 in. (3 mm) thick by 3 in. (75 mm) wide overseal band centered so that the center of the 3 in. (75 mm) wide band is within 1 in. (25 mm) of the crack. The sealant shall be allowed to cure before opening to traffic. When approved by the Engineer, the sealer may be dusted with fine sand, portland cement, or mineral filler to prevent tracking.

Prior to applying the A-1 bituminous surface treatment, the pavement surface shall be cleaned.

Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the cape seal by a suitable method. The surface preparation shall be approved by the Engineer prior to application of the A-1 bituminous surface treatment. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted.

Calibration. The working day prior to starting construction of the A-1 bituminous surface course, the pressure distributor and aggregate spreader shall be calibrated and adjusted according to the manufacturer's recommendations. At least three days prior to starting the work the Contractor shall provide the Engineer with a copy of the manufacturer's recommendations for the equipment to be used. All calibrations and adjustments shall be made in the presence of the Engineer on a level surface at a location approved by the Engineer. The Contractor shall maintain proper calibration and adjustment of the equipment and the Engineer reserves the right to check application rates as the work progresses. Should the equipment fail to consistently

apply the specified rates, the work shall be stopped and the Contractor shall recalibrate and readjust the equipment.

Application. The cape seal shall be applied as shown on the plans and the following.

(a) A-1 Bituminous Surface Treatment. The bituminous material and aggregate shall be applied according to the following.

(1) Application Rates. Based upon the aggregate gradation to be used, the Contractor shall determine the application rates of bituminous material and seal coat aggregate. The application rates along with the seal coat gradations shall be submitted to the Engineer for approval prior to the start of work. Application rates shall be according to the following table for the aggregate type shown on the plans, and shall result in aggregate embedment between 50 and 70 percent behind the roller. Changes in the application rate of greater than 15 percent shall be resubmitted to the Engineer for approval.

Aggregate Type	Bituminous Material Rate	Aggregate Rate
CA 15	0.38 – 0.46 gal/sq yd (1.7 – 2.1 L/sq m)	22 – 30 lb/sq yd (12 – 16 kg/sq m)
CA 16	0.36 – 0.40 gal/sq yd (1.6 – 1.8 L/sq m)	18 – 26 lb/sq yd (8 – 14 kg/sq m)
CA 20	0.36 – 0.40 gal/sq yd (1.6 – 1.8 L/sq m)	18 – 26 lb/sq yd (8 – 14 kg/sq m)
FA 1 (Special)	0.26 – 0.30 gal/sq yd (1.2 – 1.4 L/sq m)	16 – 20 lb/sq yd (9 – 11 kg/sq m)
FA 4 (Special)	0.28 – 0.36 gal/sq yd (1.3 – 1.6 L/sq m)	18 – 24 lb/sq yd (10 – 13 kg/sq m)

(2) Preparation of Bituminous Material. The temperature of the bituminous material at the time of application shall be such that it will spray uniformly without clogging the spraying nozzles and shall be applied within the temperature ranges of 150 – 190 °F (65 – 90 °C).

(3) Preparation of Aggregate. The aggregate shall be stockpiled near the jobsite according to Article 1003.01(e) or 1004.01(e) of the Standard Specifications. The aggregate used shall contain no free moisture. Slightly damp aggregate may be used with the approval of the Engineer.

(4) Application of Bituminous Material. The bituminous material shall be applied with a pressure distributor. The entire length of the spray bar shall be set at the height above the surface recommended by the manufacturer for even distribution of the bituminous material.

The distributor shall be operated in a manner such that missing or overlapping of transverse joints is avoided. To prevent overlapping of successive applications of bituminous material at transverse joints, heavy paper shall be spread over the previously applied bituminous material and aggregates. In order to obtain a uniform application of the bituminous material, the distributor shall be traveling at the speed required for the specified rate of application when the spray bar crosses the paper.

Adjacent construction, such as concrete pavement, curb and gutter, bridge floors, raised reflective pavement markers, and bridge handrails, shall be protected by shields, covers or other means. If bituminous material is applied to adjacent construction, the Contractor shall remove such material to the satisfaction of the Engineer.

The emulsified asphalt shall not be applied when the wind conditions will inhibit uniform coverage from the fans of asphalt being applied.

- (5) Application of Aggregates. The seal coat aggregates shall be spread evenly with an aggregate spreader over the entire surface being treated. When treating one-half of the pavement width at a time, an inside strip of uncovered emulsified asphalt 3 in. (75 mm) wide shall be left during construction of the first half to provide center joint overlap when the second half of the treatment is placed. In all cases, the aggregate shall be applied ahead of the truck or spreader wheels. Hand spreading will be permitted only when approved by the Engineer and, when so permitted, the aggregate shall be spread uniformly and at the approximate rate specified. Any ridges of aggregate left by the aggregate spreader shall be smoothed out with hand brooms immediately behind the aggregate spreader.

All equipment involved in the work shall operate as close to each other as practical. The aggregate shall cover the asphalt emulsion within 30 seconds of applications. At no time shall the aggregate spreader trail the pressure distributor by more than 150 ft (45 m) to ensure proper asphalt/aggregate adhesion.

Each aggregate truck shall be equipped with a suitable hitch for connection to the aggregate spreader while unloading. The trucks shall avoid contact between the truck body or bed and the aggregate spreader. The body or bed of the truck shall be modified, if necessary, to empty cleanly and completely into the receiving hopper of the aggregate spreader. No aggregate shall be allowed to spill onto the road surface when the truck is emptying into this hopper.

The aggregate shall be rolled following spreading. A maximum time of five minutes will be allowed between the spreading of aggregate and completion of the initial rolling of the aggregate. The rollers shall proceed in a longitudinal direction at a speed less than or equal to 5 mph (8 km/h). Each roller shall travel over the aggregate a minimum of two times. The entire surface shall be rolled immediately with a self-propelled pneumatic-tired roller. Rolling shall proceed in a longitudinal direction beginning at the edges and progressing toward the center, overlapping on successive trips by at least 1/2 the width of the roller. The aggregate shall then be rolled with a separate pneumatic-tired roller until the aggregate is properly seated in the bituminous material.

The Contractor shall use the appropriate sweeping equipment to perform an initial sweeping after a minimum of two hours curing and not less than one hour before sunset on the day the A-1 surface treatment is placed. The initial sweeping shall remove excess aggregate by lightly sweeping each pavement lane. The sweeping shall be sufficient to prevent migration of loose aggregate back onto any part of the pavement.

The Contractor shall sweep the pavement surface as needed to remove excess aggregate.

- (b) Micro-Surfacing. This method shall consist of applying the surface mix within a maximum of 12 calendar days of placing the A-1 bituminous surface treatment. The Contractor shall sweep the pavement surface immediately prior to applying the micro-surfacing.

The surface shall be prewetted by water fogging ahead of the spreader box when road conditions require, as determined by the Engineer. The rate of fogging shall be adjusted during the day based on pavement temperature, surface texture, and dryness.

- (1) Application. The micro-surfacing shall be applied over the entire width of each lane in a single pass at a rate of 24 lb/sq yd (13 kg/sq m). The application rate shall be verified from daily readings taken from the proportioning devices during the progress of the work.

The paving mixture shall be spread to leave a uniform surface. A sufficient amount of material shall be carried at all times in all parts of the spreader box to ensure complete coverage. Overloading of the spreader shall be avoided. No lumps or uncoated aggregate will be permitted in the finished surface.

Adjustments to the mix design may be required during construction, based on field conditions. The percent of mineral filler in the mix design may be increased or decreased by less than 0.3 percent when the slurry seal is being placed if it is found to be necessary for better consistency or set times. The Engineer will give final approval for all adjustments.

- (2) Mix Consistency. The finished product shall be uniform in color and composition. No streaks, such as those caused by oversized aggregate, shall be left in the finished surface. If excess streaking develops, the job will be stopped until the Contractor proves to the Engineer that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 1/2 in. (13 mm) wide and 4 in. (100 mm) long, or 1 in. (25 mm) wide and 3 in. (75 mm) long, in any 30 sq yd (25 sq m) area. No transverse ripples or longitudinal streaks of 0.25 in. (6 mm) in depth will be permitted, when measured by placing a 10 ft (3 m) straightedge over the surface.
- (3) Mix Stability. The micro-surfacing shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess water or emulsified asphalt and free of segregation of the emulsified asphalt and aggregate fines from the coarser aggregate. Under no circumstances shall water be sprayed directly into the lay-down box while placing micro-surfacing material.
- (4) Joints and Edges. The Contractor shall devise a joint plan according to ISSA A143 and submit to the Engineer for approval. When practical, the surface course joint shall be at least 10 in. (255 mm) away from the nearest edge of any subsequent permanent pavement markings.

Micro-surfacing edges shall be parallel with the existing pavement edges. If the existing pavement edge cannot be used to give a straight edge, a stringline or other guide will be required. Edge lines shall not vary by more than ± 2 in. (± 50 mm) horizontally in any 100 ft (30 m) of length.

A smooth, neat seam shall be provided where two passes meet. Excess material shall be immediately removed from the ends of each run. Any damage to, or irregularities in, the micro-surfacing shall be repaired, as directed by the Engineer.

All repairs shall be made with a paver box, except areas designated as hand work areas.

- (5) Hand Work. Those areas inaccessible to the spreader box and other areas approved by the Engineer shall be designated as hand work areas. Adjustments to the additive will be permitted to provide a slower setting time when hand spreading is needed. If hand spreading is necessary, the mixture shall be poured in a small windrow along one edge of the surface to be covered and then spread uniformly by a hand squeegee or lute. Hand work areas shall have an appearance consistent with that being placed with a spreader box.

Clean-Up. All areas, such as manholes, gutters, and intersections, shall have the cape seal removed as specified by the Engineer. The Contractor shall, on a daily basis, remove any debris associated with the performance of the work.

Sampling and Testing. The Contractor shall check yield of the application after the first 1000 ft (300 m), and throughout each day's paving, with a minimum of three tests per day. Yield check results shall be furnished to the Engineer daily.

The Contractor shall submit a daily "run sheet" for each day's work as soon as all the data is available. The run sheet shall provide a breakdown of the actual meter numbers and quantities of all materials actually used each day, as well as the respective locations.

Opening to Traffic. The A-1 bituminous surface treatment portion shall be opened to traffic according to Article 701.17(c)(4) of the Standard Specifications.

The micro-surfacing shall be opened to traffic within one hour of its application.

Curing. The micro-surfacing shall cure for a minimum of seven days before placement of the permanent pavement markings.

Method of Measurement. Crack/joint sealing will be measured for payment in feet (meters), measured along the crack.

Pavement marking removal and pavement marker removal will be measured for payment according to Article 783.05 of the Standard Specifications.

The cape seal will be measured for payment in place and the area computed in square yards (square meters). The width for measurement will be the width of the top surface as shown on the plans or as directed by the Engineer.

Basis of Payment. Crack/joint sealing will be paid for at the contract unit price per foot (meter) for FIBER-MODIFIED ASPHALT CRACK SEALING.

Bump removal will be paid for at the contract unit price per each for BUMP REMOVAL.

Pavement marking removal and pavement marker removal will be paid for according to Article 783.06 of the Standard Specifications.

Cape seal will be paid for at the contract unit price per square yard (square meter) for CAPE SEAL, of the gradation type and friction aggregate mixture specified.

Designer Note: Insert into all contracts using micro-surfacing. Use of this special provision shall be according to the Bureau of Design and Environment Manual, Chapter 52.

The designer must specify the friction aggregate mixture and the following information on the plans using the following note:

“The aggregates for the surface lift of micro-surfacing shall meet the friction aggregate requirements for Mixture __ in Article 1004.03(a).”

Insert either “C” or “D” into the note to indicate which mixture is to be used according to the ADT volume on the project. ADT ≤ 5,000 shall use Mixture C, and ADT > 5,000 shall use Mixture D

PREVENTIVE MAINTENANCE - MICRO-SURFACING (BDE)

Effective: January 1, 2009

Revised: August 1, 2011

Description. This work shall consist of micro-surfacing hot-mix asphalt (HMA) surfaces.

Materials. Materials shall be according to the following.

- (a) Micro-Surfacing. Materials shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(1) Mineral Filler (Note 1)	1001
(2) Water	1002
(3) Coarse Aggregate (Note 2)	1004.03
(4) Bituminous Material (Prime Coat)	1032.06
(5) Latex-Modified Emulsified Asphalt (Note 3)	
(6) Additives (Note 4)	

Note 1. The mineral filler shall be Type 1 portland cement.

Note 2. The coarse aggregate material shall be selected from the table in Article 1004.03(a) of the Standard Specifications based upon the friction aggregate mixture specified. The quality of the aggregate shall be Class B and the gradation shall be as shown in the table below.

Sieve Size	Type II % Passing	Type III % Passing ^{1/}
3/8 in. (9.5 mm)	100	100
#4 (4.75 mm)	95 ± 5	80 ± 10
#8 (2.36 mm)	77 ± 13	57 ± 13
#16 (1.18 mm)	57 ± 13	39 ± 11
#30 (600 µm)	40 ± 10	26 ± 8
#50 (330 µm)	24 ± 6	18 ± 7
#100 (150 µm)	15 ± 6	12 ± 6
#200 (75 µm)	10 ± 5	10 ± 5

1/ Rut filling mixes shall be constructed using a Type III gradation. All surface mixes shall be constructed using a Type II gradation.

- 1/ Rut filling mixes shall be constructed using a Type III gradation. All surface mixes shall be constructed using a Type II gradation.

To assure the material is totally crushed, 100 percent of the parent aggregate shall be larger than the largest stone in the gradation to be used.

The blending, alternate use, and /or substitutions of aggregates from different sources for use in this work will not be permitted without the approval of the Engineer. Any blending shall be by interlocked mechanical feeders. The blending shall be uniform, compatible with the other components of the mix, and the equipment shall be approved by the Engineer.

If blending aggregates, the blend shall have a washed gradation performed every other day or a minimum of three tests per week. Testing shall be completed before the aggregate receives final acceptance for use in the mix. All gradation tests shall be conducted according to the aggregate gradation control system (AGCS).

Aggregates shall be screened at the stockpile prior to delivery to the paving machine to remove oversized material or contaminants.

Note 3. CSS-1h Latex Modified Emulsified Asphalt. The emulsified asphalt shall be a quick-traffic latex modified asphalt emulsion containing a minimum of 3.0 percent latex solids by weight of asphalt binder. The latex shall be milled or blended into the emulsifier solution prior to the emulsification process. The CSS-1h latex modified emulsified asphalt shall be according to the following.

Test (AASHTO T 59)	Result
Viscosity, Saybolt Furol, 77 °F (25 °C), SFS	20-100
Storage Stability Test, 24 hours, %	1 max.
Particle Charge Test	Positive
Sieve Test, No. 20 (850 µm), retained on sieve, %	0.10 max.
Distillation Test, Residue from distillation test to 347 ± 9 °F (175 ± 5 °C), %	62 min.

Tests on residue from distillation	Result
Penetration, 77 °F (25 °C), 100 grams, 5 seconds, (AASHTO T 49), dmm	40-90
Ductility, 77 °F (25 °C), 50 mm/min, (AASHTO T 51), mm	400 min.
Solubility in trichloroethylene, (AASHTO T 44), %	97.5 min.
Softening Point, (AASHTO T 53), °F (°C)	135 (57) min.
Absolute Viscosity, 140 °F (60 °C), (AASHTO T 202), Poises (Pa · sec)	8,000 (800) min.

Note 4. Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

- (b) Crack/Joint Sealant. The crack/joint sealant shall be a fiber-modified asphalt binder mixed at the jobsite or premixed.

(1) Jobsite-Mixed Sealant. The sealant shall consist of an asphalt binder and fibers, and be according to the following.

- a. Asphalt Binder. The asphalt binder shall be PG 58-28, PG 58-22, or PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.
- b. Fibers. Fibers shall be short cut polypropylene fibers meeting the properties listed below. The fiber may be accepted on certification from the manufacturer that it meets the specified requirements.

Property	Value
Length, in. (mm)	0.3 - 0.5 (8 - 12)
Denier	13 - 16
Crimps	None
Tensile Strength, min., psi (kPa)	40,000 (275,000)
Specific Gravity (typical)	0.91
Moisture Regain @ 70 °F (21 °C) and 65% RH (typical), %	0.1

- c. Percent Fibers. The sealant shall contain a minimum of 8.0 percent of fibers by weight (mass).
- d. Sealant Heating. The sealant shall be heated in the kettle at temperatures between 255 and 285 °F (124 and 141 °C).

(2) Premixed Sealant. The sealant shall be packaged and consist of an asphalt binder, fibers, and other modifiers meeting the following requirements. The sealant and its components may be accepted on certification from the manufacturer that it meets the specified requirements.

- a. Asphalt Binder. The asphalt binder shall be PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.
- b. Fibers. Fibers shall be short cut polyester fibers meeting the following.

Property	Value
Length, in. (mm)	0.25 ± 0.02 (6.3 ± 0.5)
Denier	3 - 6
Crimps	None
Tensile Strength, minimum, psi (kPa)	70,000 (482,000)
Specific Gravity (typical)	1.32 - 1.40
Elongation at Break, %	35 - 38
Melt Temperature, °F (°C)	475 - 490 (246 - 254)

- c. Percent Fibers. The sealant shall contain 5.0 ± 0.5 percent of fibers by weight (mass).

The sealant, in its final form, shall meet the following requirements when sampled and heated to the manufacturer's recommended maximum heating temperature according to ASTM D 5167.

Test	Value
Cone Penetration @ 77 °F (25 °C), ASTM D 5329	10-35 dmm
Softening Point, ASTM D 36	175 °F (79 °C) min.
Maximum Heating Temperature	400°F (204 °C)
Application Temperature	350°F (177 °C) min.

Equipment. Equipment shall be according to the following.

(a) Micro-Surfacing. Equipment shall be according to the following.

- (1) Micro-Surfacing Mixing Machine. The machine shall be either a continuous (self-loading) machine or a non-continuous (self-contained) machine depending on the size of the project as described below. Both types of machines shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive and water to maintain an adequate supply to the proportioning controls.

Machines that are the continuous (self-loading) type shall be an automatic-sequenced, self-propelled, continuous-flow mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade, double-shafted mixer and to discharge the mixed product on a continuous-flow basis. The machine shall be equipped to allow the operator to have full control of the forward and reverse speeds during applications of the material and be equipped with opposite-side driver stations to assist in alignment.

Non-continuous (self-contained) machines will be allowed on projects with a length of 2 lane-miles (3.2 lane-km) or less. For mainline paving, the Contractor shall have at least three self-contained machines in continuous operation to ensure appropriate production rates. Self-contained machines will also be allowed on shoulders, ramps, short applications such as bridge decks, or where the material can be placed in a single loading capacity of the machine.

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the Engineer prior to construction. Each new or different aggregate requires a new calibration. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 30 days have lapsed. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine metering devices. Prior to the calibration process, portable scales used to calibrate the mixing machine for emulsion and aggregate shall be checked with 25 lb and 50 lb weights, respectively. Results from the standard weight checks shall be furnished to the Engineer. No machine will be allowed to work on the project until the calibration has been completed and/or accepted.

- (2) Micro-Surfacing Spreader. The mixture shall be agitated and spread uniformly in the surfacing box by means of twin shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

A secondary strike-off shall be provided to improve surface texture on the surface course. The secondary strike-off shall have the same adjustments as the spreader box and shall not bounce, wobble, or chatter.

When required on the plans, before the final surface course is placed, preliminary micro-surfacing material may be required to fill ruts, utility cuts, depressions in the existing surface, etc. Ruts of 1/2 in. (13 mm) or greater in depth shall be filled independently with a rut-filling spreader box, either 5 or 6 ft (1.5 or 1.8 m) in width. For irregular or shallow rutting of less than 1/2 in. (13 mm) in depth, a full-width scratch-coat pass may be used as directed by the Engineer utilizing either a stiff primary rubber or else a metal primary strike off. Ruts that are in excess of 1 1/2 in. (38 mm) in depth may require multiple placements with the rut-filling spreader box to restore the cross-section. All rut-filling level-up material should cure under traffic for a minimum of 24 hours before additional material is placed on top of the level up.

- (3) **Micro-Surfacing Proportioning Devices.** Individual volume or weight controls for proportioning each material to be added to the mix (i.e. aggregate, mineral filler, emulsified asphalt, additive, and water) shall be provided and properly marked. These proportioning devices are used in material calibration and determining the material output at any time. Calibration records, conversion formulas, and daily run sheets including the beginning and final numbers shown on the proportioning devices shall be submitted to the Engineer for approval. During production any deviations from the original JMF shall be approved by the Engineer.

(b) **Crack/Joint Sealing.** Equipment shall be according to the following.

- (1) **Air Compressor.** The air compressor shall be capable of producing a minimum pressure of 90 psi (620 kPa) at the end of the discharge hose. The air stream shall discharge onto the pavement through an appropriate air lance. The tool lubricator shall be bypassed and a filter installed on the discharge valve to keep water and oil out of the line.
- (2) **Oil Kettle.** The crack sealant shall be heated in an oil jacketed double wall kettle equipped with an agitator (reversing rotary auger action) and separate thermometers for the oil bath and mixing chamber. The unit shall also be equipped with a reversible hydraulic 2 in. (50 mm) hot asphalt pump and a recirculating pump to circulate the oil bath.

CONSTRUCTION REQUIREMENTS

General. The paving mixture shall be capable of filling up to 1 1/2 in. (38 mm) wheel ruts in one pass, be capable of field regulation of the setting time, and be suitable for nighttime placement. The compatibility of all ingredients of the mix, including the mix set additive, shall be certified by the emulsified asphalt manufacturer.

Weather Limitations. Placement of the micro-surfacing shall be done between May 1 and October 15, and when the temperature is at least 50 °F (10 °C) and rising and the forecast for the next 24 hours is above 40 °F (5 °C).

Mix Design. A Contractor provided laboratory shall develop the mix design for the micro-surfacing mixture, shall verify the functioning of the set regulating additives, and shall present certified test results for the Engineer's approval. This laboratory shall be recognized by the International Slurry Surfacing Association (ISSA) as being capable of performing mix designs. The Engineer will verify the laboratory tests required in ISSA A143 have been conducted.

Proportions for the mix design shall be within the following limits.

Mineral Aggregate, dry weight (mass) lb/sq yd (kg/sq m)	15-50 (8-30)
Latex Emulsified Asphalt Residue, % by wt. of Aggregate	5.5-10.5
Latex Base Modifier	As required with % by weight (mass) of binder, min. of 3.0
Mix Set Additive	As required
Mineral Filler, % by weight (mass) of Aggregate	0.25 - 3 depending on weather conditions

The amount of mineral filler needed shall be determined by the laboratory mix design and will be considered as part of the aggregate gradation.

The amount and type of latex shall be determined by the laboratory performing the mix design. The minimum amount required shall be based on asphalt weight content and shall be certified by the emulsion supplier.

Compatibility of the aggregate, latex-modified emulsified asphalt, mineral filler, and other additives shall be verified by the mix design. The materials shall meet the following requirements for ISSA A143.

ISSA Test No.	Description	Specification
ISSA TB-139	Wet Cohesion @ 30 minutes min. (Set) @ 60 minutes min. (Traffic)	12 kg-cm min. 20 kg-cm min. or Near Spin
ISSA TB-109	Excess Asphalt by LWT Sand Adhesion	50 gm/sq ft (538 gm/sq m) max.
ISSA TB-114	Wet Stripping	Pass (90% min.)
ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak Six-day Soak	50 gm/sq ft (538 gm/sq m) max. 75 gm/sq ft (807 gm/sq m) max.
ISSA TB-147	Lateral Displacement	5% max.
	Specific Gravity after 1,000 Cycles of 25 lb (11.34 kg)	2.10 max.
ISSA TB-144	Classification Compatibility	11 Grade Points min. (AAA, BAA)
ISSA TB-113	Mix Time @ 77 °F (25 °C)	Controllable to 120 seconds Min.

The mixing test and set-time test shall be checked at the highest temperatures expected during construction.

The mix design shall report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect). The report shall clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive usage, and latex-modified asphalt emulsion based on the dry weight of the aggregate.

For the aggregate blend in the mix design, test results for AASHTO T 176 shall be provided with the mix information to the Engineer. Aggregate test values below 65 shall require review and approval from the Engineer.

Before the work commences, the Contractor shall submit to the Engineer a complete mix design covering the specific materials to be used on the project. The percentages of each individual material required shall be shown in the laboratory report. The Engineer shall approve the mix design prior to its use. After approval, no substitutions will be permitted, unless approved by the Engineer, and the Contractor shall maintain continuous control of the latex-modified emulsified asphalt to dry aggregate proportioning to conform to the approved mix design within a tolerance of ± 2 gal/ton (± 8 L/metric ton).

Test Strip. For projects over 100,000 sq yd (83,600 sq m), at least one day prior to starting the project the Contractor shall designate a mutually agreeable location and apply a test strip of micro-surfacing using the aggregate indicated in the mix design. The Engineer will evaluate the micro-surfacing application rate and cure time.

Surface Preparation. Pavement markings shall be removed according to Article 783.03(a) of the Standard Specifications. Only very small particles of tightly adhering existing markings may remain in place.

When specified in the plans, pavement markers shall be removed according to Article 783.03(b) of the Standard Specifications.

Bumps greater than or equal to 1/2 in. (13 mm) shall be removed by grinding. The Contractor shall determine bump grinding locations in the presence of the Engineer by using a 16-ft (5-m) straightedge with the scratcher bolts set to 1/2 in. (13 mm). All locations marked by the scratcher bolts shall be ground using either a grinding machine consisting of multiple saws or a cold-milling machine with a double- or triple-wrap milling head.

Joints and cracks 3/16 in. (5 mm) or wider shall be cleaned of loose and unsound material and sealed. The sealant shall be applied only when the joints and cracks are clean and dry, and the ambient temperature is 40-85 °F (4-29 °C). The sealant shall be applied using a pressurized wand delivery system with such devices as necessary to seal the cracks/joints and form a nominal 0.125 in. (3 mm) thick by 3 in. (75 mm) wide overseal band centered so that the center of the 3 in. (75 mm) wide band is within 1 in. (25 mm) of the crack. The sealant shall be allowed to cure before opening to traffic. When approved by the Engineer, the sealant may be dusted with fine sand, portland cement, or mineral filler to prevent tracking.

Micro-Surfacing. The micro-surfacing shall be applied as shown on the plans and the following.

- (a) Preparation. Prior to applying the micro-surfacing, the pavement surface shall be cleaned. On highly oxidized surfaces, a prime coat shall be applied at a rate of 0.05-0.10 gal/sq yd (0.22-0.45 L/sq m) according to Article 406.05(b) of the Standard Specifications. Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the micro-surfacing by a suitable method. The surface preparation shall be approved by the Engineer prior to the application of the micro-surfacing. No dry aggregate either spilled from the lay-down machine or existing on the road will be permitted.

The Contractor shall apply the micro-surfacing according to the following methods.

- (1) Micro-Surfacing Rut Filling. This method shall consist of filling each of the two wheelpath ruts in a lane using the specially designed rutbox and the rutfill (Type III) mix. It shall be the Contractor's responsibility to determine and estimate the quantities of rutfill mix required for rut filling. This work is then followed by one pass of micro-surfacing as described below.

- (2) Micro-Surfacing, Single Pass. This method shall consist of applying the surface mix over the entire width of each lane in one pass at an application rate of 20 lb/sq yd (11 kg/sq m).

Determinations of application rates shall be from daily readings taken from the material control devices during the progress of the work.

The pavement surface shall be prewetted by water fogging ahead of the spreader box when road conditions require, as determined by the Engineer. The rate of fogging shall be adjusted during the day based on pavement temperature, surface texture, and dryness.

The paving mixture shall be spread to fill minor cracks and shallow potholes and leave a uniform surface. Care shall be taken when rut filling to restore the designed profile of the pavement cross section. Excess crowning (over-filling) of rut areas shall be avoided. A sufficient amount of material shall be carried at all times in all parts of the spreader box to ensure complete coverage. Overloading of the spreader shall be avoided. No lumps or uncoated aggregate will be permitted in the finished surface.

Adjustments to the mix design may be required during construction, based on field conditions. The percent of mineral filler in the mix design may be increased or decreased by less than 0.3 percent when the slurry seal is being placed if it is found to be necessary for better consistency or set times. The Engineer will give final approval for all adjustments.

- (b) Mix Consistency. The finished product shall be uniform in color and composition. No streaks, such as those caused by oversized aggregate, shall be left in the finished surface. If excess streaking develops, the job will be stopped until the Contractor proves to the Engineer that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 1/2 in. (13 mm) wide and 4 in. (100 mm) long, or 1 in. (25 mm) wide and 3 in. (75 mm) long, in any 30 sq yd (25 sq m) area. No transverse ripples or longitudinal streaks of 0.25 in. (6 mm) in depth will be permitted, when measured by placing a 10 ft (3 m) straightedge over the surface.
- (c) Mix Stability. The micro-surfacing shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess water or emulsified asphalt and free of segregation of the emulsified asphalt and aggregate fines from the coarser aggregate. Under no circumstances shall water be sprayed directly into the lay-down box while placing micro-surfacing material.
- (d) Joints and Edges. The Contractor shall devise a joint plan according to ISSA A143 and submit to the Engineer for approval. When practical, the surface course joint shall be at least 10 in. (255 mm) away from the nearest edge of any subsequent permanent pavement markings.

Micro-surfacing edges shall be parallel with the existing pavement edges. If the existing pavement edge cannot be used to give a straight edge, a stringline or other guide will be required. Edge lines shall not vary by more than ± 2 in. (50 mm) horizontally in any 100 ft (30 m) of length.

A smooth, neat seam shall be provided where two passes meet. Excess material shall be immediately removed from the ends of each run. Any damage to, or irregularities in, the micro-surfacing shall be repaired, as directed by the Engineer. All repairs shall be made with a paver box, except areas designated as hand work areas.

- (e) **Hand Work.** Those areas inaccessible to the spreader box and approved by the Engineer shall be designated as hand work areas. Adjustments to the additive will be permitted to provide a slower setting time when hand spreading is needed. If hand spreading is necessary, the mixture shall be poured in a small windrow along one edge of the surface to be covered and then spread uniformly by a hand squeegee or lute. Hand work areas shall have an appearance consistent with that being placed with a spreader box.

Clean-Up. All areas, such as manholes, gutters, and intersections, shall have the micro-surfacing mix removed as specified by the Engineer. The Contractor shall, on a daily basis, remove any debris associated with the performance of the work.

Sampling and Testing. The Contractor shall check yield of the application after the first 1000 ft (300 m), and throughout each day's paving, with a minimum of three tests per day. Yield check results shall be furnished to the Engineer daily.

The Contractor shall submit a daily "run sheet" for each day's work as soon as all the data is available. The run sheet shall provide a breakdown of the actual meter numbers and quantities of all materials actually used each day, as well as the respective locations.

Opening to Traffic. The micro-surfacing shall be opened to traffic within one hour of its application.

Curing. The micro-surfacing shall cure for a minimum of 7 days before placement of the permanent pavement markings.

Method of Measurement. This work will be measured for payment as follows.

- (a) **Contract Quantities.** The requirements for the use of contract quantities shall conform to Article 202.07(a) of the Standard Specifications.
- (b) **Measured Quantities.** Crack/Joint sealing will be measured for payment in feet (meters), measured along the crack.

Pavement marking removal will be measured for payment according to Article 783.05 of the Standard Specifications.

The micro-surfacing will be measured according to the following for the method of application provided in the plans.

- (1) **Micro-Surfacing Rut Filling.** Micro-surfacing rut filling will be measured for payment in place in feet (meters) along the wheel path or filled rut.
- (2) **Micro-surfacing, Single Pass.** Micro-surfacing, single pass will be measured for payment in place and the area computed in square yards (square meters). The width for measurement will be the width of the top surface as shown on the plans or as directed by the Engineer.

Prime coat, when required, will be measured for payment according to Article 406.13(b) of the Standard Specifications.

Basis of Payment. Crack/joint sealing will be paid for at the contract unit price per foot (meter) of FIBER-MODIFIED ASPHALT CRACK SEALING.

Bump removal will be paid for at the contract unit price per each for BUMP REMOVAL.

Pavement marking removal and pavement marker removal will be paid for according to Article 783.06 of the Standard Specifications.

Rut filling will be paid for at the contract unit price per foot (meter) for MICRO-SURFACING RUT FILLING.

Micro-surfacing, single pass will be paid for at the contract unit price per square yard (square meter) for MICRO-SURFACING, SINGLE PASS, of the gradation type and friction aggregate mixture specified.

Prime coat, when required, will be paid for according to Article 406.14 of the Standard Specifications.

Designer Note: Insert into all contracts using slurry seal. Use of this special provision shall be according to the Bureau of Design and Environment Manual, Chapter 52.

The designer must include the following note on the plans.

“Aggregates for the slurry seal shall meet the friction aggregate requirements for Mixture C.”

PREVENTIVE MAINTENANCE - SLURRY SEAL (BDE)

Effective: January 1, 2009

Description. This work shall consist of slurry sealing existing hot-mix asphalt (HMA) surfaces.

Materials. Materials shall be according to the following.

- (a) Slurry Seal. Materials shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(1) Mineral Filler (Note 1)	1001
(2) Water.....	1002
(3) Coarse Aggregate (Note 2).....	1004.03
(4) Bituminous Material (Prime Coat)	1032.06
(5) Emulsified Asphalt (Note 3)	
(6) Additives (Note 4)	

Note 1. The mineral filler shall be Type 1 portland cement.

Note 2. The coarse aggregate material shall be selected from the table in Article 1004.03(a) of the Standard Specifications based upon the friction aggregate mixture specified. The quality of the aggregate shall be Class B and the gradation shall be as shown in the table below.

Sieve Size	% Passing
3/8 in. (9.5 mm)	100
#4 (4.75 mm)	95 ± 5
#8 (2.36 mm)	77 ± 13
#16 (1.18 mm)	57 ± 13
#30 (600 µm)	40 ± 10
#50 (330 µm)	24 ± 6
#100 (150 µm)	15 ± 6
#200 (75 µm)	10 ± 5

To assure the material is totally crushed, 100 percent of the parent aggregate shall be larger than the largest stone in the gradation to be used.

The blending, alternate use, and/or substitutions of aggregates from different sources for use in this work will not be permitted without the approval of the Engineer. Any blending shall be by interlocked mechanical feeders. The blending shall be uniform, compatible with the other components of the mix, and the equipment shall be approved by the Engineer.

If blending aggregates, the blend shall have a washed gradation performed every other day or a minimum of three tests per week. Testing shall be completed before the aggregate receives final acceptance for use in the mix. All gradation tests shall be conducted according to the aggregate gradation control system (AGCS).

Aggregates shall be screened at the stockpile prior to delivery to the paving machine to remove oversized material or contaminants.

Note 3. The emulsified asphalt shall be a quick-traffic, asphalt emulsion conforming to the requirements of AASHTO M 208 for CSS-1h, and the following.

AASHTO Test No.	Quality	Specification
AASHTO T 59 ^{1/}	Residue after Distillation	60% Minimum

1/ When using a latex-modified emulsion, the distillation temperature shall be 347 ± 9 °F (175 ± 5 °C).

AASHTO Test No.	Tests on Residue	Specification
AASHTO T 49	Penetration at 77 °F (25 °C)	40 - 90 dmm ^{2/}

2/ Climatic conditions should be considered when establishing this range.

The cement mixing test will be waived for this emulsion.

If a latex-modified emulsion is used, the latex shall be milled or blended into the emulsifier solution prior to the emulsification process.

Note 4. Additives may be added to the emulsion mix or any of the component materials to provide control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

(b) Crack/Joint Sealant. The crack/joint sealant shall be a fiber-modified asphalt binder mixed at the jobsite or premixed.

(1) Jobsite-Mixed Sealant. The sealant shall consist of an asphalt binder and fibers, and be according to the following.

a. Asphalt Binder. The asphalt binder shall be PG 58-28, PG 58-22, or PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.

b. Fibers. Fibers shall be short cut polypropylene fibers meeting the properties listed below. The fiber may be accepted on certification from the manufacturer that it meets the specified requirements.

Property	Value
Length, in. (mm)	0.3 - 0.5 (8 - 12)
Denier	13 - 16
Crimps	None
Tensile Strength, min., psi (kPa)	40,000 (275,000)
Specific Gravity (typical)	0.91
Moisture Regain @ 70 °F (21 °C) and 65% RH (typical), %	0.1

- c. Percent Fibers. The sealant shall contain a minimum of 8.0 percent of fibers by weight (mass).
 - d. Sealant Heating. The sealant shall be heated in the kettle at temperatures between 255 and 285 °F (124 and 141 °C).
- (2) Premixed Sealant. The sealant shall be packaged and consist of an asphalt binder, fibers, and other modifiers meeting the following requirements. The sealant and its components may be accepted on certification from the manufacturer that it meets the specified requirements.
- a. Asphalt Binder. The asphalt binder shall be PG 64-22 and meet the requirements of Article 1032.05 of the Standard Specifications.
 - b. Fibers. Fibers shall be short cut polyester fibers meeting the following.

Property	Value
Length, in. (mm)	0.25 ± 0.02 (6.3 ± 0.5)
Denier	3 - 6
Crimps	None
Tensile Strength, min., psi (kPa)	70,000 (482,000)
Specific Gravity (typical)	1.32 - 1.40
Elongation at Break, %	35 - 38
Melt Temperature, °F (°C)	475 - 490 (246 - 254)

- c. Percent Fibers. The sealant shall contain 5.0 ± 0.5 percent of fibers by weight (mass).

The sealant, in its final form, shall meet the following requirements when sampled and heated to the manufacturer's recommended maximum heating temperature according to ASTM D 5167.

Test	Value
Cone Penetration @ 77 °F (25 °C), ASTM D 5329	10-35 dmm
Softening Point, ASTM D 36	175 °F (79 °C) min.
Maximum Heating Temperature	400°F (204 °C)
Application Temperature	350°F (177 °C) min.

Equipment. Equipment shall be according to the following.

- (a) Slurry Seal. Equipment shall be according to the following.

- (1) Slurry Seal Mixing Machine. The machine shall be either a continuous (self-loading) machine or a non-continuous (self-contained) machine depending on the size of the project as described below. Both types of machines shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive and water to maintain an adequate supply to the proportioning controls.

Machines that are the continuous (self-loading) type shall be an automatic-sequenced, self-propelled, continuous-flow mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade, double-shafted mixer and to discharge the

mixed product on a continuous-flow basis. The machine shall be equipped to allow the operator to have full control of the forward and reverse speeds during applications of the material and be equipped with opposite-side driver stations to assist in alignment.

Non-continuous (self-contained) machines will be allowed on projects with a length of 2 lane-miles (3.2 lane-km) or less. For mainline paving, the Contractor shall have at least three self-contained machines in continuous operation to ensure appropriate production rates. Self-contained machines will also be allowed on shoulders, ramps, short applications such as bridge decks, or where the material can be placed in a single loading capacity of the machine.

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the Engineer prior to construction. Each new or different aggregate requires a new calibration. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 30 days have lapsed. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine metering devices. Prior to the calibration process, portable scales used to calibrate the mixing machine for emulsion and aggregate shall be checked with 25 lb and 50 lb weights, respectively. Results from the standard weight checks shall be furnished to the Engineer. No machine will be allowed to work on the project until the calibration has been completed and/or accepted.

- (2) Slurry Seal Spreader. The mixture shall be agitated and spread uniformly in the surfacing box by means of twin shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.
 - (3) Slurry Seal Proportioning Devices. Individual volume or weight controls for proportioning each material to be added to the mix (i.e. aggregate, mineral filler, emulsified asphalt, additive, and water) shall be provided and properly marked. These proportioning devices are used in material calibration and determining the material output at any time. Calibration records, conversion formulas, and daily run sheets including the beginning and final numbers shown on the proportioning devices shall be submitted to the Engineer for approval. During production any deviations from the original JMF shall be approved by the Engineer.
- (b) Crack/Joint Sealing. Equipment shall be according to the following.
- (1) Air Compressor. The air compressor shall be capable of producing a minimum pressure of 90 psi (620 kPa) at the end of the discharge hose. The air stream shall discharge onto the pavement through an appropriate air lance. The tool lubricator shall be bypassed and a filter installed on the discharge valve to keep water and oil out of the line.
 - (2) Oil Kettle. The crack sealant shall be heated in an oil jacketed double wall kettle equipped with an agitator (reversing rotary auger action) and separate thermometers for the oil bath and mixing chamber. The unit shall also be equipped with a reversible hydraulic 2-in. (50-mm) hot asphalt pump and a recirculating pump to circulate the oil bath.

CONSTRUCTION REQUIREMENTS

General. The slurry seal shall be capable of field regulation of the setting time. The compatibility of all ingredients of the mix, including the mix set additive, shall be certified by the emulsified asphalt manufacturer.

Weather Limitations. Placement of the slurry seal shall be done between May 1 and October 15, and when the temperature is at least 50 °F (10 °C) and rising and the forecast for the next 24 hours is above 40 °F (5 °C).

Mix Design. A Contractor provided laboratory shall develop the mix design for the paving mixture, shall verify the functioning of the set regulating additives, and shall present certified test results for the Engineer's approval. This laboratory shall be recognized by the International Slurry Surfacing Association (ISSA) as being capable of performing mix designs. The Engineer will verify the laboratory tests required in ISSA A105 have been conducted.

Proportions for the mix design shall be within the following limits.

Mineral Aggregate, dry weight (mass) lb/sq yd (kg/sq m)	15 - 25 (8 - 15)
Emulsified Asphalt Residue, % by wt. of Aggregate	7.5 - 13.5
Latex Base Modifier (if required)	As required with % by weight (mass) of binder, min. of 5.0
Mix Set Additive	As required
Mineral Filler, % by weight (mass) of Aggregate	0.5 - 2.0 depending on weather conditions

The amount of mineral filler needed shall be determined by the laboratory mix design and will be considered as part of the aggregate gradation.

The amount and type of latex shall be determined by the laboratory performing the mix design. The minimum amount required shall be based on asphalt weight content and shall be certified by the emulsion supplier.

Compatibility of the aggregate, emulsified asphalt, mineral filler, and other additives shall be verified by the mix design. The materials shall meet the following requirements for ISSA A105.

ISSA Test No.	Description	Specification
ISSA TB-139	Wet Cohesion @ 30 minutes min. (Set) @ 60 minutes min. (Traffic)	12 kg-cm min. 20 kg-cm min. or Near Spin
ISSA TB-109	Excess Asphalt by LWT Sand Adhesion	50 gm/sq ft (538 gm/sq m) max.
ISSA TB-114	Wet Stripping	Pass (90% min.)
ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak	75 gm/sq ft (807 gm/sq m) max.
ISSA TB-113	Mix Time @ 77 °F (25 °C)	Controllable to 180 seconds, min.

The mixing test and set-time test shall be checked at the highest temperatures expected during construction.

The mix design shall report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect). The report shall clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive usage, and asphalt emulsion based on the dry weight of the aggregate.

For the aggregate blend in the mix design, test results for AASHTO T 176 shall be provided with the mix information to the Engineer. Aggregate test values below 45 shall require review and approval from the Engineer.

Before the work commences, the Contractor shall submit to the Engineer a complete mix design covering the specific materials to be used on the project. The percentages of each individual material required shall be shown in the laboratory report. The Engineer shall approve the mix design prior to its use. After approval, no substitutions will be permitted unless approved by the Engineer, and the Contractor shall maintain continuous control of the emulsified asphalt to dry aggregate proportioning to conform to the approved mix design within a tolerance of ± 2 gal/ton (± 8 L/metric ton).

Test Strip. For projects over 100,000 sq yd (83,600 sq m), at least one day prior to starting the project the Contractor shall designate a mutually agreeable location and apply a test strip of slurry seal using the aggregate indicated in the mix design. The Engineer will evaluate the slurry seal application rate and cure time.

Surface Preparation. Pavement markings shall be removed according to Article 783.03(a) of the Standard Specifications. Only very small particles of tightly adhering existing markings may remain in place.

When specified in the plans, pavement markers shall be removed according to Article 783.03(b) of the Standard Specifications.

Bumps greater than or equal to 1/2 in. (13 mm) shall be removed by grinding. The Contractor shall determine bump grinding locations in the presence of the Engineer by using a 16-ft (5-m) straightedge with the scratcher bolts set to 1/2 in. (13 mm). All locations marked by the scratcher bolts shall be ground using either a grinding machine consisting of multiple saws or a cold-milling machine with a double- or triple-wrap milling head.

Joints and cracks, 3/16 in. (5 mm) or wider, shall be cleaned of loose and unsound material and sealed. The sealant shall be applied only when the joints and cracks are clean and dry, and the ambient temperature is 40 - 85 °F (4 - 29 °C). The sealant shall be applied using a pressurized wand delivery system with such devices as necessary to seal the cracks/joints and form a nominal 0.125 in. (3 mm) thick by 3 in. (75 mm) wide overseal band centered so that the center of the 3 in. (75 mm) wide band is within 1 in. (25 mm) of the crack. The sealant shall be allowed to cure before opening to traffic. When approved by the Engineer, the sealant may be dusted with fine sand, portland cement, or mineral filler to prevent tracking.

Slurry Sealing. The slurry seal shall be applied as follows.

- (a) Preparation. Prior to applying the slurry seal, the pavement surface shall be cleaned. On highly oxidized surfaces, a prime coat shall be applied at a rate of 0.05-0.10 gal/sq yd (0.22-0.45 L/sq m) according to Article 406.05(b) of the Standard Specifications. Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the slurry seal by a suitable method. The surface preparation shall be approved by the Engineer prior to application of the slurry seal. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted.

The pavement surface shall be prewetted by water fogging ahead of the spreader box when road conditions require, as determined by the Engineer. The rate of fogging shall be adjusted during the day based on pavement temperature, surface texture, and dryness.

- (b) Application. The slurry seal shall be applied over the entire width of each lane in a single pass at a rate 20 lb/sq yd (11 kg/sq m). The application rate shall be verified from daily readings taken from the proportioning devices during the progress of the work.

The paving mixture shall be spread to fill minor cracks and shallow potholes and leave a uniform surface. A sufficient amount of material shall be carried at all times in all parts of the spreader box to ensure complete coverage. Overloading of the spreader shall be avoided. No lumps or uncoated aggregate will be permitted in the finished surface.

Adjustments to the mix design may be required during construction, based on field conditions. The percent of mineral filler in the mix design may be increased or decreased by less than 0.3 percent when the slurry seal is being placed if it is found to be necessary for better consistency or set times. The Engineer will give final approval for all adjustments.

- (c) Mix Consistency. The finished product shall be uniform in color and composition. No streaks, such as those caused by oversized aggregate, shall be left in the finished surface. If excess streaking develops, the job will be stopped until the Contractor proves to the Engineer that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 1/2 in. (13 mm) wide and 4 in. (100 mm) long, or 1 in. (25 mm) wide and 3 in. (75 mm) long, in any 30 sq yd (25 sq m) area. No transverse ripples or longitudinal streaks of 0.25 in. (6 mm) in depth will be permitted, when measured by placing a 10 ft (3 m) straightedge over the surface.
- (d) Mix Stability. The slurry seal shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess water or emulsified asphalt and free of segregation of the emulsified asphalt and aggregate fines from the coarser aggregate. Under no circumstances shall water be sprayed directly into the lay-down box while placing slurry seal material.
- (e) Joints and Edges. The Contractor shall devise a joint plan according to ISSA A105 and submit it to the Engineer for approval. When practical, the surface course joint shall be at least 10 in. (255 mm) away from the nearest edge of any subsequent permanent pavement markings.

Slurry seal edges shall be parallel with the existing pavement edges. If the existing pavement edge cannot be used to give a straight edge, a stringline or other guide will be required. Edge lines shall not vary by more than ± 2 in. (50 mm) horizontally in any 100 ft (30 m) of length.

A smooth, neat seam shall be provided where two passes meet. Excess material shall be immediately removed from the ends of each run. Any damage to, or irregularities in, the slurry seal shall be repaired, as directed by the Engineer. All repairs shall be made with a paver box, except areas designated as hand work areas.

- (f) Hand Work. Those areas inaccessible to the spreader box and approved by the Engineer shall be designated as hand work areas. Adjustments to the additive will be permitted to provide a slower setting time when hand spreading is needed. If hand spreading is necessary, the mixture shall be poured in a small windrow along one edge

of the surface to be covered and then spread uniformly by a hand squeegee or lute. Hand work areas shall have an appearance consistent with that being placed with a spreader box.

Clean-Up. All areas, such as manholes, gutters, and intersections, shall have the slurry seal mix removed as specified by the Engineer. The Contractor shall, on a daily basis, remove any debris associated with the performance of the work.

Sampling and Testing. The Contractor shall check yield of the application after the first 1000 ft (300 m), and throughout each day's paving, with a minimum of three tests per day. Yield check results shall be furnished to the Engineer daily.

The Contractor shall submit a daily "run sheet" for each day's work as soon as all the data is available. The run sheet shall provide a breakdown of the actual meter numbers and quantities of all materials actually used each day, as well as the respective locations.

Opening to Traffic. The slurry seal shall be opened to traffic within two hours of its application.

Curing. The slurry seal shall cure for a minimum of 7 days before placement of the permanent pavement markings.

Method of Measurement. This work will be measured for payment as follows.

(a) Contract Quantities. The requirements for the use of contract quantities shall conform to Article 202.07(a) of the Standard Specifications.

(b) Measured Quantities. Crack/Joint sealing will be measured for payment in feet (meters), measured along the crack.

Pavement marking removal will be measured for payment according to Article 783.05 of the Standard Specifications.

The slurry seal will be measured for payment in place and the area computed in square yards (square meters). The width for measurement will be the width of the top surface as shown on the plans or as directed by the Engineer.

Prime coat, when required, will be measured for payment according to Article 406.13(b) of the Standard Specifications.

Basis of Payment. Crack/joint sealing will be paid for at the contract unit price per foot (meter) of FIBER-MODIFIED ASPHALT CRACK SEALING.

Bump removal will be paid for at the contract unit price per each for BUMP REMOVAL.

Pavement marking removal and pavement marker removal will be paid for according to Article 783.06 of the Standard Specifications.

Slurry seal will be paid for at the contract unit price per square yard (square meter) for ASPHALTIC EMULSION SLURRY SEAL, of the friction aggregate mixture specified.

Prime coat, when required, will be paid for according to Article 406.14 of the Standard Specifications.

Designer Note: Insert into contracts where use of a Stone Matrix Asphalt mix has been selected. Consult Implementation and Project Engineer prior to use. Additional cost will have to be programmed as this mix is generally more expensive.

STONE MATRIX ASPHALT (BDE)

Effective: January 1, 2010

Revised: August 1, 2011

Description. This work shall consist of constructing polymer modified 1/2 in. (12.5 mm) stone matrix asphalt (SMA) surface course and binder course. Work shall be according to Sections 406, 407 and 1030 of the Standard Specifications, except as modified herein.

Materials.

Add the following to the end of the first paragraph of Article 1003.03(a) of the Standard Specifications:

“Fine aggregate for SMA shall consist of stone sand, slag sand, or steel slag sand.”

Add the following to the end of the first paragraph of Article 1003.03(c) of the Standard Specifications.

“The fine aggregate gradation for SMA shall be FA/FM 20.”

Add the following to the end of Article 1004.03(a) of the Standard Specifications:

“(1) For SMA surface course, the coarse aggregate shall be crushed aggregate meeting the friction requirement specified.

(2) For SMA binder course, the coarse aggregate shall be crushed aggregate. Steel slag will not be permitted in the binder course.”

Revise Article 1004.03(b) of the Standard Specifications to read:

“(b) Quality. For surface courses and binder courses when used as surface course, the coarse aggregate shall be Class B quality or better. For SMA surface and binder courses the coarse aggregate shall be Class B Quality or better. For Class A (seal or cover coat), other binder courses, and surface course IL-9.5L (Low ESAL), the coarse aggregate shall be Class C quality or better. For All Other courses, the coarse aggregate shall be Class D quality or better.”

Revise Article 1004.03(c) of the Standard Specifications to read:

“(c) Gradation. The coarse aggregate gradations shall be as listed in the following table.

Use	Size/Application	Gradation No.
Class A-1, 2, & 3	3/8 in. (10 mm) Seal	CA 16
Class A-1	1/2 in. (13 mm) Seal	CA 15
Class A-2 & 3	Cover	CA 14
HMA High ESAL	IL-25.0 IL-19.0 IL-12.5 IL-9.5	CA 7 ^{1/} or CA 8 ^{1/} CA 11 ^{1/} CA 16 and/or CA 13 CA 16
HMA Low ESAL	IL-19.0L IL-9.5L	CA 11 ^{1/} CA 16
HMA All Other	Stabilized Subbase or Shoulders	CA 6 ^{2/} , CA 10, or CA 12
SMA	1/2 in. (12.5 mm) Binder & Surface	3/

- 1/ CA 16 or CA 13 may be blended with the gradations listed.
- 2/ CA 6 will not be permitted in the top lift of shoulders.
- 3/ No individual coarse aggregate gradation is specified. The coarse aggregates used shall be capable of being combined with stone sand, slag sand, or steel slag sand meeting the FA/FM 20 gradation and mineral filler to meet the approved mix design and the mix requirements noted herein.”

Add the following to Article 1004.03 of the Standard Specifications:

“(d) Flat and Elongated Particles. For SMA the coarse aggregate shall meet the criteria for Flat and Elongated Particles listed in Illinois Modified AASHTO M 325.

(e) Absorption. For SMA the coarse aggregate shall also have water absorption ≤ 2.5 percent.”

Add the following to Article 1011.01 of the Standard Specifications:

“(c) Additional requirements for SMA. Mineral filler for use in SMA shall be free from organic impurities and have a Plasticity Index ≤ 4 .”

Revise Article 1030.02(g) of the Standard Specifications to read:

“(g) Performance Graded Asphalt Binder (Notes 2 & 4) 1032”

Add the following to Article 1030.02 of the Standard Specifications:

“(h) Fibers (Note 5)”

Add the following notes to Article 1030.02 of the Standard Specifications:

“ Note 4. The asphalt cement shall be an SBS PG 76-28 when the SMA is used on a full depth asphalt pavement and a SBS PG76-22 when used as an overlay.

Note 5. A stabilizing additive such as cellulose or mineral fiber shall be added to the SMA mixture according to Illinois Modified AASHTO M 325. The stabilizing additive shall meet the Fiber Quality Requirements listed in Illinois Modified AASHTO M 325. Prior to approval and use of fibers, the Contractor shall submit a notarized certification by the producer of these materials stating they meet these requirements.”

Mix Design.

Add the following below the referenced AASHTO standards in Article 1030.04 of the Standard Specifications:

“The SMA mixture shall be designed according to the following additional Illinois Modified AASHTO references listed below, except as modified herein.

AASHTO M 325	Standard Specification for Designing Stone Matrix Asphalt (SMA)
AASHTO R 46	Standard Practice for Designing Stone Matrix Asphalt (SMA)
AASHTO T 305	Determination of Draindown Characteristics in Uncompacted Mixtures”

Revise Article 1030.04(a)(1) of the Standard Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.”

“High ESAL, MIXTURE COMPOSITION (% PASSING) ^{1/}										
Sieve Size	IL-25.0 mm		IL-19.0 mm		IL-12.5 mm		IL-9.5 mm		SMA ^{4/}	
	min	max	min	max	min	max	min	max	min	max
1 1/2 in. (37.5 mm)		100								
1 in. (25 mm)	90	100		100						
3/4 in. (19 mm)		90	82	100		100				100
1/2 in. (12.5 mm)	45	75	50	85	90	100		100	90	99
3/8 in. (9.5 mm)						89	90	100	50	85
#4 (4.75 mm)	24	42 ^{2/}	24	50 ^{2/}	28	65	28	65	20	40
#8 (2.36 mm)	16	31	20	36	28	48 ^{3/}	28	48 ^{3/}	16	24 ^{5/}
#16 (1.18 mm)	10	22	10	25	10	32	10	32		
#50 (300 μm)	4	12	4	12	4	15	4	15		
#100 (150 μm)	3	9	3	9	3	10	3	10		
#200 (75 μm)	3.0	6.0	3.0	6.0	4.0	6.0	4.0	6.0	8.0	11.0 ^{6/}
Ratio Dust/Asphalt Binder		1.0		1.0		1.0		1.0		

1/ Based on percent of total aggregate weight.

2/ The mixture composition shall not exceed 40 percent passing the #4 (4.75 mm) sieve for binder courses with Ndesign ≥ 90.

3/ The mixture composition shall not exceed 40 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign ≥ 90.

4/ The maximum percent passing the 20 μm sieve shall be ≤3 percent.

5/ When establishing the Adjusted Job Mix Formula (AJMF) the #8 (2.36 mm) sieve shall not be adjusted above 24 percent.

6/ Additional minus No. 200 (0.075 mm) material required by the mix design shall be mineral filler.”

Add the following to Article 1030.04(b) of the Standard Specifications:

“(4) SMA Mixtures. The mix design shall meet the SMA Mixture Specifications for SGC listed in AASHTO M 325 except as listed below:

ESAL's (million)	Ndesign	Design Air Voids Target %	Voids in the Mineral Aggregate (VMA), % min.
≤ 10	50 ^{1/}	4.0	16.0
> 10	80 ^{2/}	4.0	17.0

- 1/ Coarse aggregate shall be limestone, dolomite, crushed gravel, diabase, granite, quartzite, sandstone, or steel slag.
- 2/ Coarse aggregate shall be crushed gravel, diabase, granite, quartzite, sandstone, or steel slag.”

Plant Requirements.

Add the following to Article 1102.01(a) of the Standard Specifications:

“(13) Requirements for SMA.

- a. Mineral Filler. When producing SMA, the mineral filler system shall accurately proportion the large amounts of mineral filler required for the mixture. Alteration or adjustment of the current system may be required. Mineral filler shall not be stored in the same silo as collected dust.

Only dust collected during the production of SMA may be returned to the SMA mixture. Any additional minus No. 200 (0.075 mm) material needed to produce the SMA shall be mineral filler meeting the requirements stated herein. Mineral filler shall not be collected dust.

- b. Stabilizing Additive. Adequate dry storage shall be provided for the stabilizing fiber additive. A separate feed system shall be provided to proportion the fiber into the mixture uniformly and in desired quantities. The feed system shall be interlocked with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes. The proportion of fibers shall be controlled at all times within ± ten percent of the amount of fibers required. The fiber system shall provide in-process monitoring consisting of either a digital display of output or a printout of the feedrate, in pounds per minute. Flow indicators or sensing devices for the fiber system shall be provided and interlocked with plant controls so mix production shall be interrupted if fiber introduction fails, or if the output rate is not within the specified tolerances.
 1. Batch Plant. Stabilizing additive shall be pneumatically added through a separate inlet directly into the weigh hopper above the pugmill. The addition of fiber shall be timed to occur during the hot aggregate charging of the hopper. Adequate mixing time will be required to ensure proper blending of the aggregate and fiber additive. Both the wet and dry mixing times shall

each be increased a minimum of five seconds beyond the standard mixing time. The actual mixing time increase shall be determined by the Engineer based on individual plant characteristics. If concentrations of mastic (fiber, AC and fines) are visible behind the paver the batch size shall be reduced in ten percent increments until the problem is alleviated.

2. Drum Mix Plant. Stabilizing additive shall be introduced using specialized equipment to mix the asphalt cement with loose fiber at the time of introduction into the drum mixer. This equipment shall be approved by the Engineer. Care shall be taken to ensure the loose fiber does not become entrained in the exhaust system of the plant.

A manufacturer's representative for the fiber and fiber equipment shall be present for the fiber system calibration and mixture startup and shall be available at all times during production and lay-down of the mix.

- c. Hot-mix Storage. SMA mixtures containing steel slag coarse aggregate shall have a combined silo storage time plus haul time not less than 1 1/2 hours.
- d. Production Rate. The Bureau of Materials and Physical Research will establish the maximum production rate for SMA based items such as the plant's ability to (1) add mineral filler consistently within 0.3 percent of the target by total weight of mix and (2) thoroughly disperse the stabilizing additive."

QC/QA.

Revise Article 1030.05(d)(4) of the Standard Specifications to read:

- “(4) Control Limits. Target values shall be determined by applying adjustment factors to the AJMF where applicable. The target values shall be plotted on the control charts within the following control limits.

CONTROL LIMITS					
Parameter	High ESAL Low ESAL		SMA		All Other
	Individual Test	Moving Avg. of 4	Individual Test	Moving Avg. of 4	Individual Test
% Passing: ^{1/}					
1/2 in. (12.5 mm)	± 6 %	± 4 %	± 6 %	± 4 %	± 15 %
3/8 in. (9.5 mm)			± 4%	± 3%	
No. 4 (4.75 mm)	± 5 %	± 4 %	± 5 %	± 4 %	± 10 %
No. 8 (2.36 mm)	± 5 %	± 3 %	± 4%	± 2%	
No. 30 (600 μm)	± 4 %	± 2.5 %	± 4 %	± 2.5 %	
Total Dust Content No. 200 (75 μm)	± 1.5 %	± 1.0 %			± 2.5 %
Asphalt Binder Content	± 0.3 %	± 0.2 %	± 0.2%	± 0.1%	± 0.5 %
Voids	± 1.2 %	± 1.0 %	± 1.2%	± 1.0%	± 1.2 %

1/ Based on washed ignition oven

DENSITY CONTROL LIMITS		
Mixture Composition	Parameter	Individual Test
IL-9.5, IL-12.5	Ndesign ≥ 90	92.0 – 96.0 %
IL-9.5,IL-9.5L, IL-12.5	Ndesign < 90	92.5 – 97.4 %
IL-19.0, IL-25.0	Ndesign ≥ 90	93.0 – 96.0 %
IL-19.0, IL-19.0L, IL-25.0	Ndesign < 90	93.0 – 97.4 %
SMA	Ndesign = 50 & 80	93.5 – 97.4 %
All Other	Ndesign = 30	93.0 ^{1/} - 97.4 %

1/ 92.0 percent when placed as first lift on an unimproved subgrade.”

Replace the first and second paragraphs of Article 1030.06(a) of the Standard Specifications with the following:

- “(a) High ESAL, Low ESAL and SMA Mixture.

During the mixture start-up for High or Low ESAL mixture the Contractor shall follow the QC/QA document “Hot-Mix Asphalt QC/QA Start-Up Procedures”. At the start of High or Low ESAL mixture production, QC/QA mixture start-up will be required for the following situations: at the beginning of production of a new mixture design, at the beginning of each production season, and at every plant utilized to produce mixtures, regardless of the mix.

For SMA, a preliminary test strip shall be constructed according to the document “Off-Site Preliminary Test Strip and Modified Start-Up Procedures” at an off-site location approved by the Engineer to determine mix properties, density and laydown characteristics. At the start of SMA production, a modified start-up shall be performed on the jobsite. The modified start-up shall not begin until the Engineer has reviewed, evaluated, and approved the mixture based on the results from the off-site preliminary test strip.”

Revise the table in Article 1030.06(a) of the Standard Specifications to read:

Parameter	Adjustment
1/2 in. (12.5 mm)	± 5.0 %
No. 4 (4.75 mm)	± 4.0 %
No. 8 (2.36 mm)	± 3.0 %
No. 30 (600 µm)	1/
No. 200 (75 µm)	1/
Asphalt Binder Content	± 0.3 % ^{2/}

1/ In no case shall the target for the amount passing be greater than the JMF.

2/ For SMA, the asphalt binder content shall not be adjusted by more than 0.2 percent.”

Transportation.

Add the following after the first paragraph of Article 1030.08 of the Standard Specifications:

“(d) The mixture being placed is SMA.”

Construction Requirements.

Add the following paragraph after the first paragraph of Article 406.06(b) of the Standard Specifications:

“Additional temperature requirements for SMA. SMA mixture shall be placed on a dry surface when the temperature of the roadbed is above 50 °F (10 °C). The mixture shall be placed at a minimum mixture temperature of 310° F (154° C) when using SBS PG76-28 and 300 °F (149 °C) when using SBS PG76-22. The mixture temperature shall be measured immediately behind the paver screed.”

Revise the last sentence of the third paragraph of Article 406.06(e) of the Standard Specifications to read:

“In no case shall the speed of the paver exceed 50 ft (15 m) per minutes for High and Low ESAL mixes or 30 ft (9 m) per minute for SMA.”

Revise Table 1 in Article 406.07(a) of the Standard Specifications to read:

"TABLE 1 - MINIMUM ROLLER REQUIREMENTS FOR HMA				
	Breakdown Roller (one of the following)	Intermediate Roller	Final Roller (one or more of the following)	Density Requirement
Level Binder: (When the density requirements of Article 406.05(c) do not apply.)	P ^{3/}	--	V _S , P ^{3/} , T _B , T _F , 3W	To the satisfaction of the Engineer.
Binder and Surface ^{1/} Level Binder ^{1/} : (When the density requirements of Article 406.05(c) apply.)	V _D , P ^{3/} , T _B , 3W	P ^{3/}	V _S , T _B , T _F	As specified in Articles: 1030.05(d)(3), (d)(4), and (d)(7).
SMA ^{4/}	T _B ^{5/}	--	T _F	
Bridge Decks ^{2/}	T _B	--	T _F	As specified in Articles: 582.05 and 582.06.

- 1/ If the average delivery at the job site is 85 ton/hr (75 metric ton/hr) or less, any roller combination may be used provided it includes a steel wheeled roller and the required density and smoothness is obtained.
- 2/ One T_B may be used for both breakdown and final rolling on bridge decks 300 ft (90 m) or less in length, except when the air temperature is less than 60 °F (15 °C).
- 3/ A vibratory roller (V_D) may be used in lieu of the pneumatic-tired roller on mixtures containing polymer modified asphalt binder.
- 4/ Pneumatic-tired and vibratory rollers will not be allowed. Rollers shall be operated at a uniform speed not to exceed 3 mph (5 km/h) with the drive roll nearest the paver.
- 5/ The Contractor shall provide a minimum of two steel-wheeled tandem rollers for breakdown (T_B). The breakdown rollers shall maintain an effective rolling distance of not more than 150 ft (45 m) behind the paver."

Prepaving Conference. A prepaving conference shall be held a minimum of one week prior to the start of mix production. Those in attendance shall include the QC Manager, Construction Supervising Field Engineer, Resident Engineer, Mixture Control Engineer, BMPR representative, fiber supplier representative, asphalt binder supplier representative, as well as plant, paver and roller operators.

Basis of Payment. This work will be measured and paid for according to Article 406.13 and 406.14 of the Standard Specifications at the contract unit price per metric ton (ton) for POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, of the N design specified; and POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, of the N design specified.

The preliminary test strip will be paid for at the contract unit price per each for PRELIMINARY TEST STRIP, which price shall include the 272 metric tons (300 tons) of mix as well as the appropriate testing, provided the bituminous mixture is placed within the JMF tolerances.