

# NOTIFICATION OF ADDENDUM

## ADDENDUM NO. 1

**DATED 1/28/2015**

<b>Control</b>	<b>0016-02-136, ETC.</b>
<b>Project</b>	<b>NH 2015(568)</b>
<b>Highway</b>	<b>IH 35</b>
<b>County</b>	<b>HAYS</b>

Ladies/Gentlemen:

Attached please find an addendum on the above captioned project. Included in the attachment is an addendum notification which details the changes and the respective proposal pages which were added and/or changed.

Except for new bid insert pages, it is unnecessary to return any of the pages attached.

Bid insert pages must be returned with the bid proposal submitted to the Department, unless your firm is submitting a bid using a computer print out. The computer print out must be changed to reflect the new bid item information.

Contractors and material suppliers, etc. who have previously been furnished informational proposals are not being furnished a copy of the addendum. If you have a subcontractor on the above project, please advise them of this addendum. Acknowledgment of this addendum is not requested if your company has been issued a proposal stamped "This Proposal Issued for Informational Purposes."

You are required to acknowledge receipt of this addendum on the Addendum Acknowledgement form contained in your bid proposal by placing a mark in the box next to the respective addendum.

Failure to Acknowledge receipt of this addendum in your bid proposal will result in your bid not being read.

SUBJECT: PLANS AND PROPOSAL ADDENDUMS  
PROJECT: NH 2015(568) CONTROL: 0016-02-136  
COUNTY: HAYS  
LETTING: 02/03/2015  
REFERENCE NO: 0123

**PROPOSAL ADDENDUMS**

- \_ PROPOSAL COVER  
X BID INSERTS (SH. NO.: ALL )  
X GENERAL NOTES (SH. NO.: ALL )  
  
X SPEC LIST (SH. NO.: ALL )  
X SPECIAL PROVISIONS:  
ADDED: 008---070, 360---013, 416---001, 448---002, 464---006, 465---002  
476---003, 545---001, 610---015, 620---001, 624---014, 636---014  
DELETED: 008-006  
  
X SPECIAL SPECIFICATIONS:  
ADDED: 3239, 3267  
  
DELETED:  
  
X OTHER: PLAN SHEET AND OTHER CHANGES

DESCRIPTION OF ABOVE CHANGES  
(INCLUDING PLANS SHEET CHANGES)

PLAN SHEET AND OTHER CHANGES

Title Sheet

Updated Index of Sheets to include the following additional sheets,  
Supplemental Index of Sheets - 1A  
General Notes - 2G-2J  
Project Summary - 5A-5C  
Typical Sections - 8A-8C  
Project Layout - 20A  
IH 35 WBSB DLT Widening - 73-95  
Standards - 96-141

Sheet 1A - Supplemental Index of Sheets

Added all sheets related to IH 35 WBSB Dual Left Turn Lane Widening

Sheet 2, 2A-2J - General Notes & Specification Data Sheets

Updated with new set to include items for SH 80 intersection work.  
DESCRIPTION OF ABOVE CHANGES (CONTINUED)  
(INCLUDING PLANS SHEET CHANGES)

Sheet 3, 3A-3B - E&Q Sheets and Bid Inserts

Revised quantities for bid items, 666-2002, 666-2011, 666-2035  
666-2095, 666-2110, 672-2017, 1122-2037, 1122-2057, 6834-2001.

Added bid items, 104-2011, 104-2029, 104-2036, 105-2015, 132-2019,  
158-2006, 162-2002, 168-2001, 416-2018, 416-2031, 416-2034, 420-2020,  
464-2003, 465-4004, 465-4130, 467-2286, 496-2002, 496-2007, 528-2001,  
529-2002, 529-2004, 531-2004, 531-2005, 531-2017, 536-2002, 545-2091,  
610-2064, 618-2034, 618-2038, 620-2009, 620-2010, 620-2011, 620-2012,  
624-2014, 624-2034, 636-2003, 644-2001, 644-2056, 644-2060, 647-2002,  
666-2029, 666-2041, 666-2047, 666-2053, 668-2116, 668-2136, 672-2012,  
672-2015, 677-2001, 677-2003, 677-2005, 677-2007, 677-2015, 686-2051,  
687-2001, 1122-2002, 1122-2009, 3239-2001, 3239-2003, 3267-2004 &  
3267-2014.

Sheet 5A-5C - Project Summaries

Added new summary sheets for intersection work.

Sheet 8A-8C - Typical Sections

Added new typical sections sheets for intersection work.

Sheet 20A - Project Layout

Added new project layout sheets for intersection work.

Sheet 73 thru 95 - IH 35 WBSB DLT Widening Details

Added new detail sheets for intersection work.

Sheet 96 thru 141 - IH 35 WBSB DLT Widening Standards

Added new standard sheets for intersection work.

SPEC LIST

Added Special Provisions, 008---070, 360---013, 416---001, 448---002,  
464---006, 465---002, 476---003, 545---001, 610---015, 620---001,  
624---014, 636---014, 643---001, and 687---005.

Deleted Special Provision 008---006.

Added Special Specifications 3239 & 3267.

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	100	2016	002	PREPARING ROW (TREE) (36" TO 48" DIA) DOLLARS and CENTS	EA	4.000	1
	104	2009		REMOVING CONC (RIPRAP) DOLLARS and CENTS	SY	3,467.000	2
	104	2011		REMOVING CONC (MEDIANS) DOLLARS and CENTS	SY	153.000	3
	104	2029		REMOVING CONC (CURB OR CURB & GUT- TER) DOLLARS and CENTS	LF	2,600.000	4
	104	2036		REMOVING CONC (SIDEWALK OR RAMP) DOLLARS and CENTS	SY	200.000	5
	105	2015		REMOVING STAB BASE & ASPH PAV (8"-10") DOLLARS and CENTS	SY	44.000	6
	132	2019		EMBANKMENT (VEHICLE)(ORD COMP)(TY B) DOLLARS and CENTS	CY	480.000	7
	134	2004	006	BACKFILL (TY A OR B) DOLLARS and CENTS	STA	267.000	8
	158	2006		SPEC EXCAV WORK (VEHICLE) DOLLARS and CENTS	CY	958.000	9
	162	2002		BLOCK SODDING DOLLARS and CENTS	SY	2,411.000	10

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	168	2001		VEGETATIVE WATERING  DOLLARS and CENTS	MG	48.000	11
	316	2706	016	ASPH (TIER II)  DOLLARS and CENTS	GAL	80,379.600	12
	316	2718	016	AGGR (TIER II)  DOLLARS and CENTS	CY	1,664.150	13
	354	2036		PLANE CONC PAV(0" TO 1-1/2")  DOLLARS and CENTS	SY	31,341.000	14
	354	2064		PLANE ASPH CONC PAV (2 1/2")  DOLLARS and CENTS	SY	8,895.000	15
	354	2069		PLANE ASPH CONC PAV (0"- 2 1/2")  DOLLARS and CENTS	SY	15,550.000	16
	416	2018	001	DRILL SHAFT (SIGN MTS)(24 IN)  DOLLARS and CENTS	LF	10.000	17
	416	2031	001	DRILL SHAFT (TRF SIG POLE) (30 IN)  DOLLARS and CENTS	LF	8.000	18
	416	2034	001	DRILL SHAFT (TRF SIG POLE) (48 IN)  DOLLARS and CENTS	LF	22.000	19
	420	2020	002	CL C CONC (CRASHWALL)  DOLLARS and CENTS	CY	54.000	20
	432	2039		RIPRAP (MOW STRIP)(4 IN)  DOLLARS and CENTS	CY	368.600	21

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	438	2002		CLEAN AND SEAL EXIST JOINTS DOLLARS and CENTS	LF	224.000	22
	454	2006	003	HEADER TYPE EXPANSION JOINT DOLLARS and CENTS	LF	560.000	23
	464	2003	006	RC PIPE (CL III)(18 IN) DOLLARS and CENTS	LF	116.000	24
	465	4004	002	INLET (COMPL)(PCO)(3FTX5FT) DOLLARS and CENTS	EA	1.000	25
	465	4130	002	INLET COMPL (PCO)(W/EXT)(5FTX5FT) DOLLARS and CENTS	EA	4.000	26
	467	2286		SET (TY II)(18 IN)(RCP)(6:1)(P) DOLLARS and CENTS	EA	4.000	27
	496	2002		REMOV STR (INLET) DOLLARS and CENTS	EA	5.000	28
	496	2007		REMOV STR (PIPE) DOLLARS and CENTS	LF	3.000	29
	500	2001	011	MOBILIZATION DOLLARS and CENTS	LS	1.000	30
	502	2001	033	BARRICADES, SIGNS AND TRAFFIC HAN- DLING DOLLARS and CENTS	MO	5.000	31

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	ITEM NO	DESC CODE	S.P. NO.				
	528	2001		COLORED TEXTURED CONC (4") DOLLARS and CENTS	SY	137.000	32
	529	2002		CONC CURB (TY II) DOLLARS and CENTS	LF	600.000	33
	529	2004		CONC CURB & GUTTER (TY II) DOLLARS and CENTS	LF	616.000	34
	531	2004		CONC SIDEWALKS (6") DOLLARS and CENTS	SY	58.000	35
	531	2005		CURB RAMPS (TY 1) DOLLARS and CENTS	EA	1.000	36
	531	2017		CURB RAMPS (TY 21) DOLLARS and CENTS	EA	1.000	37
	533	2006	014	SHOULDER TEXTURING (MILLED)(ASPHALT) DOLLARS and CENTS	LF	27,001.000	38
	536	2002		CONC MEDIAN DOLLARS and CENTS	SY	33.100	39
	540	2001	031	MTL W-BEAM GD FEN (TIM POST) DOLLARS and CENTS	LF	6,000.000	40
	540	2011	031	MTL BEAM GD FEN TRANS (THRIE-BEAM) DOLLARS and CENTS	EA	7.000	41

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	ITEM NO	DESC CODE	S.P. NO.				
	540	2044	031	DOWNSTREAM ANCHOR TERMINAL(DAT)SECTION  DOLLARS CENTS and	EA	12.000	42
	540	2046	031	MTL BM GD FEN TRANS (NON-SYM)  DOLLARS CENTS and	EA	7.000	43
	542	2001		REMOVING METAL BEAM GUARD FENCE  DOLLARS CENTS and	LF	6,250.000	44
	542	2002		REMOVING TERMINAL ANCHOR SECTION  DOLLARS CENTS and	EA	14.000	45
	542	2003		RM MTL BM GD FEN TRANS (THRIE-BEAM)  DOLLARS CENTS and	EA	8.000	46
	544	2001	001	GUARDRAIL END TREATMENT (INSTALL)  DOLLARS CENTS and	EA	12.000	47
	544	2003	001	GUARDRAIL END TREATMENT (REMOVE)  DOLLARS CENTS and	EA	14.000	48
	545	2091	001	CRASH CUSH ATTEN (INSTL)(R)(W)(TL2)  DOLLARS CENTS and	EA	2.000	49
	610	2064	015	RELOCATE RD IL ASM (TRANS-BASE)  DOLLARS CENTS and	EA	1.000	50
	618	2034		CONDT (PVC) (SCHD 80) (2")  DOLLARS CENTS and	LF	50.000	51

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	ITEM NO	DESC CODE	S.P. NO.				
	618	2038		CONDT (PVC) (SCHD 80) (3") and DOLLARS CENTS	LF	50.000	52
	620	2009	001	ELEC CONDR (NO. 6) BARE and DOLLARS CENTS	LF	50.000	53
	620	2010	001	ELEC CONDR (NO. 6) INSULATED and DOLLARS CENTS	LF	50.000	54
	620	2011	001	ELEC CONDR (NO. 8) BARE and DOLLARS CENTS	LF	50.000	55
	620	2012	001	ELEC CONDR (NO. 8) INSULATED and DOLLARS CENTS	LF	100.000	56
	624	2014	014	GROUND BOX TY D (162922) W/APRON and DOLLARS CENTS	EA	4.000	57
	624	2034	014	REMOVE EXISTING GROUND BOXES and DOLLARS CENTS	EA	4.000	58
	636	2003	014	ALUMINUM SIGNS (TY O) and DOLLARS CENTS	SF	7.000	59
	644	2001		IN SM RD SN SUP&AM TY10BWG(1)SA(P) and DOLLARS CENTS	EA	6.000	60
	644	2056		RELOCATE SM RD SN SUP & AM TY 10BWG and DOLLARS CENTS	EA	4.000	61
	644	2060		REMOVE SM RD SN SUP & AM and DOLLARS CENTS	EA	1.000	62

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	ITEM NO	DESC CODE	S.P. NO.				
	647	2002		RELOCATE LRSA  DOLLARS and CENTS	EA	1.000	63
	658	2240	006	INSTL DEL ASSM (D-SW)SZ 1(FLX)GF2  DOLLARS and CENTS	EA	240.000	64
	662	2113		WK ZN PAV MRK SHT TERM (TAB) TY W  DOLLARS and CENTS	EA	5,295.000	65
	662	2115		WK ZN PAV MRK SHT TERM (TAB) TY Y-2  DOLLARS and CENTS	EA	1,765.000	66
	666	2002		REFL PAV MRK TY I (W) 4" (BRK)(090MIL)  DOLLARS and CENTS	LF	18,610.000	67
	666	2011		REFL PAV MRK TY I (W) 4" (SLD)(090MIL)  DOLLARS and CENTS	LF	42,696.000	68
	666	2029		REFL PAV MRK TY I (W) 8" (DOT)(090MIL)  DOLLARS and CENTS	LF	69.000	69
	666	2035		REFL PAV MRK TY I (W) 8" (SLD)(090MIL)  DOLLARS and CENTS	LF	5,344.000	70
	666	2041		REFL PAV MRK TY I (W) 12"(SLD)(090MIL)  DOLLARS and CENTS	LF	358.000	71
	666	2047		REFL PAV MRK TY I (W) 24"(SLD)(090MIL)  DOLLARS and CENTS	LF	315.000	72
	666	2053		REFL PAV MRK TY I (W) (ARROW) (090MIL)  DOLLARS and CENTS	EA	17.000	73

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	ITEM NO	DESC CODE	S.P. NO.				
	666	2071		REFL PAV MRK TY I(W)(ENTR GORE)(090MIL) DOLLARS and CENTS	EA	5.000	74
	666	2074		REFL PAV MRK TY I(W)(EXIT GORE)(090MIL) DOLLARS and CENTS	EA	4.000	75
	666	2095		REFL PAV MRK TY I (W) (WORD) (090MIL) DOLLARS and CENTS	EA	10.000	76
	666	2110		REFL PAV MRK TY I (Y) 4" (SLD)(090MIL) DOLLARS and CENTS	LF	36,526.000	77
	668	2116		PREFAB PAV MRK TY C (W) (WORD) DOLLARS and CENTS	EA	8.000	78
	668	2136		PREFAB PAV MRK (TY C)(MULTI)(SHIELD) DOLLARS and CENTS	EA	8.000	79
	672	2012	034	REFL PAV MRKR TY I-C DOLLARS and CENTS	EA	198.000	80
	672	2014	034	REFL PAV MRKR TY I-R DOLLARS and CENTS	EA	112.000	81
	672	2015	034	REFL PAV MRKR TY II-A-A DOLLARS and CENTS	EA	2.000	82
	672	2017	034	REFL PAV MRKR TY II-C-R DOLLARS and CENTS	EA	771.000	83
	677	2001		ELIM EXT PAV MRK & MRKS ( 4") DOLLARS and CENTS	LF	360.000	84

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	ITEM NO	DESC CODE	S.P. NO.				
	677	2003		ELIM EXT PAV MRK & MRKS ( 8") DOLLARS and CENTS	LF	290.000	85
	677	2005		ELIM EXT PAV MRK & MRKS (12") DOLLARS and CENTS	LF	44.000	86
	677	2007		ELIM EXT PAV MRK & MRKS (24") DOLLARS and CENTS	LF	24.000	87
	677	2015		ELIM EXT PAV MRK & MRKS (SYMBOL) DOLLARS and CENTS	EA	6.000	88
	686	2051		INS TRF SIG PL AM(S) 1 ARM (50') DOLLARS and CENTS	EA	1.000	89
	687	2001	005	PED POLE ASSEMBLY DOLLARS and CENTS	EA	1.000	90
	1122	2002	001	ROCK FILTER DAMS (INSTALL) (TY 2) DOLLARS and CENTS	LF	227.000	91
	1122	2009	001	ROCK FILTER DAMS (REMOVE) DOLLARS and CENTS	LF	227.000	92
	1122	2037	001	TEMPORARY SEDIMENT CONTROL FENCE INSTLL DOLLARS and CENTS	LF	1,282.000	93
	1122	2057	001	TEMPORARY SEDIMENT CONTROL FENCE REMOVE DOLLARS and CENTS	LF	1,282.000	94

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	3239	2001		TOM (ASPHALT) PG 76-22  and  DOLLARS CENTS	TON	7.600	95
	3239	2003		TOM (AGGREGATE) SAC A  and  DOLLARS CENTS	TON	98.400	96
	3267	2004		D-GR HMA(SQ) TY-A PG64-22  and  DOLLARS CENTS	TON	1,349.100	97
	3267	2014		D-GR HMA(SQ) TY-B PG70-22  and  DOLLARS CENTS	TON	440.800	98
	3269	2002		PFC (ASPHALT) PG76-22  and  DOLLARS CENTS	TON	760.750	99
	3269	2006		PFC (AGGREGATE)(PG76 MIX) SAC-A  and  DOLLARS CENTS	TON	11,870.350	100
	6834	2001	002	PORTABLE CHANGEABLE MESSAGE SIGN  and  DOLLARS CENTS	DAY	280.000	101

**GENERAL NOTES:**

**Basis of Estimate**

Item	Description	**Rate	Basis	Quantity
162	<b>Block Sodding</b>	1 CY/6 SY	**	2,411 SY
168	<b>Vegetative Watering</b>	20 GAL/SY	2,411 SY	48 MG
316	<b>Surface Treatments</b> <b>Seal Coat: (Tier I, or II)</b> Asphalt Aggregate (Ty D or L,GR 4 or 5)	0.42 GAL/SY 1CY/115 SY	191,380 SY 191,380 SY	80,379.60 GAL 1,664.15 TON
3239	<b>Thin Overlay Mix (TOM) (One Inch)</b> TOM (ASPHALT) PG 76-22 TOM (AGGREGATE) SAC A	7.9 LB/SY/IN 102.1 LB/SY/IN	1,927 SY 1,927 SY	7.6 TON 98.4 TON
3267	<b>Dense Graded Hot Mix Asphalt (Small Quantity)</b> D-GR HMA(SQ) TY-A PG64-22 [10 IN] D-GR HMA(SQ) TY-B PG70-22 [4 IN]	110 LB/SY/IN 110 LB/SY/IN	2,452.9 SY 2,003.5 SY	1,349.1 TON 440.8 TON
3269	<b>Permeable Friction Course (PFC)</b> PFC Aggregate (PG76MIX) SAC B PFC Asphalt PG 76-22	82.7 LB/SY/IN 5.3 LB/SY/IN	191,380 SY 191,380 SY	11,870.35 TON 760.75 TON

\*\* For Informational Purposes Only

**GENERAL**

References to manufacturer’s trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

Do not place surface treatments or pavement when in the Engineer’s professional judgment, the apparent general weather conditions are unsuitable for overlay operations.

Remove and replace, at the Contractor's expense, and as directed, all defective work, which was caused by the Contractor's workforce, materials, or equipment.

Perform work during good weather unless otherwise directed. If work is performed at Contractor’s option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Accrue contract time charges through the Contractor’s completion of the final punchlist.

Meet weekly with the Engineer to notify him/her of planned work for the upcoming week. Provide a three-week “look ahead,” as well as all work performed over the past week.

Blade the side slopes to remove all grass from the area of construction before placing flexible base on that portion of the roadway to be widened, leveled-up, seal coated/surfaced treated, or Hot Mix Asphaltic Concrete Pavement (HMACP) overlaid. Blade the sod back onto the side slopes after the proposed items of work have been completed. Consider subsidiary to pertinent Items.

Equip all construction equipment used in roadway work with a permanently mounted 360° revolving or strobe warning light with amber lens. Light will have a minimum lens height and diameter of 5 inches and mounting height of not less than 6 feet above the roadway surface and be visible from all sides. Attach at each side of the rear end of the construction equipment an approved orange warning flag mounted not less than 6 feet above the roadway surface.

Overhead and underground utilities may exist in the vicinity of the project. The exact location of underground utilities is not known.

If working near power lines, comply with the appropriate sections of Local Legal Requirements, Texas State Law, and Federal Regulations relating to the type of work involved.

In the event of unforeseen utility adjustment, the Contractor will prosecute their work in such a manner and sequence as to facilitate the adjustments to be made. If in the opinion of the Engineer, the Contractor is delayed by virtue of the adjustment of these utilities, an extension of working time may be granted, if necessary.

Be aware that an Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 48 hours before commencing any work that might affect present ITS Infrastructure. Use caution if working in these areas to avoid damaging or interfering with existing facilities. Repair any damage to this system within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Failure of the Contractor to repair damage to any infrastructure that conveys any corridor information to TxDOT/CTECC will result in the Contractor being billed for the full cost of emergency repairs.

Superelevate all curves to conform to the slope(s) of the existing curves, as directed. Consider subsidiary to the pertinent Items.

Match existing cross slopes, as directed. Consider subsidiary to the pertinent Items.

Provide a smooth, clean sawcut along the existing asphalt pavement structure, as directed. Consider subsidiary to the pertinent Items.

Remove all construction debris and surplus material generated by the construction work within the project limits. Perform this work as directed. Consider subsidiary to the pertinent Items.

Trim vegetation around signs and other obstructions. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment due to the Construction of the Roadway, as directed. Consider subsidiary to pertinent Items.

Protect all areas of the right of way, which are not included in the actual limits of the proposed construction areas, from destruction. Exercise care to prevent damage to trees, vegetation, and

other natural surroundings. Areas not to be disturbed will be as directed. Restore any area disturbed because of the Contractor's operations to a condition as good as, or better than, before the beginning of work.

Damage to existing pipes and SET's due to Contractor operations shall be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist.

The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

The Project Superintendent will be capable of speaking English and will be available to contact at all times when work is being performed, including subcontractor work. The Superintendent will be available and on-call 24 hours a day.

The latest roadway start-work date is May 1st, 2015.

Measure all minimum vertical clearances for all structures (including, but not limited to, signal mast arms, span wires, and overhead sign bridge structures) within the limits of the project for all roadway alignments in all directions of travel. Coordinate with the Engineer to take these measurements and obtain prior to opening roadways to traffic unless otherwise approved. The Engineer will report all minimum vertical clearance information to the District Permit Office.

During evacuation periods for Hurricane events the Contractor will cooperate with Department for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts. In addition, the Contractor's assistance may be requested outside of the Project Limits.

When directed, designate an official backer/spotter or "dump-man" who shall wear specially marked clothing and a specially marked hard hat which specifically identifies them as the backer/spotter and identifies that they are the person who is directing the backing operations. They shall be identified to all project personnel, Contractor and TxDOT, when dumping the various project materials, throughout the course of the project.

**For work near, along, or in the Railroad ROW:**

Place "Construction Fencing" or other type of "delineation" just inside TxDOT ROW along Railroad / TxDOT ROW when work is near an area of 25 feet, horizontally, from the near rail of the Railroad. If work is to be performed inside the Railroad ROW, then the Contractor will coordinate with the Railroad for a Railroad Flagger. Consider this work subsidiary to other Items of the project.

**Storm Water Pollution Prevention Plan (SW3P)/Water Pollution Abatement Plan (WPAP) notes**

For projects in the recharge zone or contributing zone of Williamson, Travis and Hays Counties, plans must include the sheet titled "TCEQ Requirements for Recharge Zone of the Edwards Aquifer" or "TCEQ Requirements for Contributing Zone of the Edwards Aquifer." Compliance with the notes on these sheets is required for TCEQ construction approval. The Engineer will be the sole judge as to the timing of all installations. Work will not progress until the Engineer has approved each installation.

In the event that significant contamination is encountered based on odors, visual evidence, or vapor monitoring, immediately contact the Engineer in accordance with Item 4.3 of the General Provisions of the STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES. The Engineer may suspend work wholly or in part to determine the coordination/management for the testing, removal and disposal of hazardous materials that might be necessary according to all applicable rules, laws and regulations.

Restrict construction vehicles from traversing or utilizing existing roadways, unprotected construction areas, and areas with vegetative cover.

Maintain vehicles at designated maintenance sites, unless otherwise approved.

Transport any soils contaminated during construction of the proposed project from the site and properly dispose of off-site, off the recharge zone, and off any area draining to the recharge zone of the Edwards Aquifer.

Collect wastewater generated on-site by chemical toilets and transport off the recharge zone and dispose of properly.

Transport any soils contaminated during construction off of the proposed project, away from the site, and properly dispose of off-site.

Collect wastewater generated on-site by chemical toilets, transport and dispose of off-site, in a proper manner.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes over bermed impervious liners as to not allow any leakage into underlying soils. Additionally, the containment will be sized to capture 150% of the total volume of fluids stored on-site within the storage area.

**For all work over or near Bodies of Water (Lakes, Rivers, Ponds, Creeks, etc.):**

Keep on hand Synthetic Absorbent Booms (Petroleum Sorbent Booms, Petroleum Socks, Absorbant Socks, etc.) and Absorbent Pads (Eversoak Sorbents, Industrial Absorbent Pads,

Calicorp Absorbent Pads, etc.), both types, for spilled petroleum products, in enough quantity to mitigate a petroleum-type spill due to Contract work.

**Safety Contingency & Item 502**

The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

**ITEM 4 – SCOPE OF WORK**

Final cleanup will include the removal of excess material considered detrimental to vegetation growth along the front slope of the ditch. Materials such as surface aggregates and other materials, as specified by the Engineer, will be removed at the Contractor’s expense.

**ITEM 5 – CONTROL OF THE WORK**

Mark and maintain 100-foot station intervals for the duration of the project, as directed. Consider subsidiary to pertinent Items.

**ITEM 6 - CONTROL OF MATERIALS**

Article 6.5. Give a minimum of 24 hours of notice for materials, which require Inspection at the Plant.

**ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES**

Do not park equipment or make stockpiles where driver sight distance to businesses and side street intersections is obstructed, especially after work hours. If it is necessary to park where drivers’ views are blocked, make every effort to flag traffic accordingly. Give the travelling public first priority.

Maintain positive drainage for permanent, as well as, temporary drainage for the duration of the project. This work is the sole responsibility of the Contractor. No direct payment will be made for this work. The Engineer will have the final authority in determining/approving the adequacy of any temporary/permanent drainage features installed.

**ITEM 8 – PROSECUTION AND PROGRESS**

Article 8.3.

Working days will be computed and charged in accordance with Article 8.3.A.1. Five-Day Workweek.

Article 8.3C. Work is allowed to be performed during the nighttime, with prior approval.

In accordance with Article 8.11, disincentives for failure to substantially complete the milestone will be applied.

Milestone 1 consists of completing the intersection work at IH 35 and SH 80 (IH 35 westbound-to-southbound (WBSB) displaced left turn (DLT)) and opening it to traffic.

The road-user cost liquidated damages for Milestone 1 is \$2,400 per day.

Substantially complete Milestone 1 in 39 working days.

The time charges for Milestone 1 will begin upon May 18, 2015.

The time charges for Milestone 1 will end upon July 31, 2015.

The number of working days for final acceptance will be three (3) working days after the substantial completion of the project.

#### **ITEM 9 – MEASUREMENT AND PAYMENT**

Provide full-time, off-duty, uniformed, certified peace officers in officially marked vehicles, as part of traffic control operations, as directed.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

No payment will be made for peace officers unless the Contractor completes the proper Department tracking form. Submit invoices that agree with the tracking form for payment at the end of each month, when approved services were provided. Request the tracking form from the Department.

No payment for officers used for moving equipment without prior written approval.

Cancel "Off-Duty" Peace Officers and their Motor Vehicle Units when the Scheduled lane closures are canceled. Failure to cancel the Off Duty Officers and their respective Motor Vehicle Units will not be cause for payment, by TxDOT, for "Show Up" time.

#### **ITEM 100 - PREPARING RIGHT OF WAY (TREE) (36" TO 48" DIA) EA**

Do not burn brush.

Use hand methods or other means to remove objectionable material and obstructions, if doing work by mechanical methods is impractical. Consider subsidiary to the pertinent Items.

#### **ITEM 132 - EMBANKMENT**

Work to correct unstable material (e.g. dry, wet, loose, etc.) to a depth of 6" below existing subgrade elevation, prior to beginning any embankment placement. Consider subsidiary to the various bid Items. Any work to correct unstable material below the 6" depth, below existing subgrade elevation, will be paid as extra work. However, there will be no payment to correct failures, in the subgrade areas, that were constructed under this contract.

Track ALL embankment slopes left idle for more than 14 days, within or at the end of the 14-day idle period, to prevent erosion. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Retrack

slopes after rain event, as directed. Consider tracking of slopes to prevent erosion as subsidiary to the pertinent Items.

Correct subgrade (e.g. unstable areas, soft spots, etc.) prior to the dumping of HMA CP. Consider subsidiary to the pertinent Items.

**ITEM 134 – BACKFILLING (TY-A OR B) BACKFILLING PAVEMENT EDGES**

Supply RAP or Ty A, any grade for shoulder up. For RAP apply SS-1 at 0.10 gal/SY. For FLEX BASE apply SS-1 at 0.12 gal/SY.

**ITEM 162 – SODDING FOR EROSION CONTROL**

Furnish and place block sod.

**ITEM 168 – VEGETATIVE WATERING**

Water all areas of project to be seeded or sodded at a rate of 20 GAL/SY or as directed.

**ITEM 204 - SPRINKLING**

Apply water for dust control as directed. When dust control is not being maintained, cease operations until dust control is maintained. Consider subsidiary to the pertinent Items.

**ITEM 300 – ASPHALTS, OILS, AND EMULSIONS**

Asphalt season starts May 1 and ends September 15.

**ITEM 302 – AGGREGATES FOR SURFACE TREATMENTS**

Previously tested aggregates delivered to the project, which are found to contain excessive quantities of dust (more than 0.5 percent passing the no. 40 sieve) during pre-coating, stockpiling or hauling operations, will be rejected, unless otherwise directed. Use test method Tex-200-F, Part II, for testing.

**Article 302.2. Materials, Section A. Aggregate.** Table 3 Los Angeles abrasion, % max, is revised with the following requirement:

**Table 3  
Aggregate Quality Requirements**

Property	Test Method	Requirement	Requirement
Los Angeles abrasion, %, max	Tex-410-A	30	All aggregates

When TY E is provided, furnish coarse fractionated recycled asphalt pavement (CF-RAP). CF-RAP aggregate stockpiles must be approved on a stockpile-by-stockpile basis, unless approved by the Engineer. Do not exceed stockpiles greater than 2000 tons.

Furnish CF-RAP meeting the following aggregate quality requirements:

Property	Test Method	Requirement	Remarks
Deleterious Material,	Tex-217-F, Part 1	2.0	

% max.			
Decantation, % max.	Tex-406-A	1.5	

Furnish CF-RAP meeting the following gradation requirements, after ignition burn off of pre-existing asphalt, unless otherwise approved:

Sieve	Cumulative % Retained
5/8"	0
1/2"	10-25
3/8"	60-80
#4	85-100
#8	90-100

**ITEM 316 – SURFACE TREATMENTS**

Ensure the accuracy of the Distance Measuring Instrument (DMI) with the Engineer, prior to marking the Asphalt and Rock Land shots.

Ensure that all Surface Treatment/Seal Coat Operations are covered by HMA CP before the workers leave the project, for that particular day’s work, as directed.

No Seal Coat shall be exposed to traffic.

Surface all transitions, tapers, climbing lanes and intersections to the limits as directed.

Keep all traffic, including construction traffic, off freshly placed surface treatment, as directed.

Distribution to each control section will be proportioned to the volumetric quantity as shown on the “daily road report.”

Any oil or asphaltic material being paid for on the project shall use tank strap method as shown in TXDOT Seal Coat and Surface Treatment Manual 2004-1.

All transports will have a seal affixed at the point of origin. The Engineer will be present when the seal is broken on the Transport and will accept the shipping tickets and make distribution to the Contractor.

Be diligent about sweeping excess aggregate from seal coat projects one to two weeks after completing the work, and performing additional sweeping of shoulders if necessary to remove loose aggregate or debris after the job is completed.

Asphalt storage tanks may be used.

Use ionically compatible asphalt to precoat aggregate, which is compatible with the asphalt specified for each specific Surface Treatment.

**ITEM 354 - PLANING AND TEXTURING PAVEMENT**

No planed surface shall be exposed to traffic. The Contractor shall core all bridge deck hotmix to determine the approximate depth prior to beginning planning. This work will not be paid for directly but is considered subsidiary to this item.

Remove the loose material from the roadway before opening to traffic.

Plane a full lane width before opening to traffic at the end of a work period.

Accomplish a 2-inch depth of planing and texturing in two passes. A single cut will be permitted if at most a 1¼-inch vertical offset is created against adjacent lanes when opened to traffic at the end of a work period.

Accomplish the 2 inch Planed Butt Joint only when there is at least 4 inches of existing thickness of ACP. Consider the determination of existing thickness of ACP as subsidiary to the various items.

Taper planing at bridge ends as directed. Plane taper surfaces before placing HMAACP to allow a minimum of 1-inch surface course to abut the bridge ends.

Taper transverse faces at ends of passes as directed.

Make Transverse Tapers on each end of each pass using a minimum slope rate of 50 feet H to 1 inch V.

Remove all loose material and pavement from drainage slots on bridges, subsidiary to this item.

**ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES**

Cut pavements with the use of a saw as directed. Consider subsidiary to pertinent Items.

Use Class "B" sand bedding for pipe and box culvert installation unless otherwise directed.

**ITEM 416 - DRILLED SHAFT FOUNDATIONS**

Stake all Foundations, for approval, before beginning drilling operations, as directed. Examples of types of foundations are Bridge Supports, Traffic Signal Pole Foundation, Roadway Illumination Assembly Foundations, Sign Support Locations, etc.

Calculate the vertical signal head clearance before placing any Traffic Signal Pole Foundation.

Obtain approval before placing additional exposed Traffic Pole Foundation.

Field cut holes for anchor bolts only as directed.

Class “C” concrete will be required for drilled shaft foundations involving overhead sign structures.

As shown on Table 1 in Item 416, use Class C concrete for reinforced drill shafts for traffic signal poles, unless it is discovered during construction that the slurry or underwater concrete placement methods will be needed.

**ITEM 427 - SURFACE FINISHES FOR CONCRETE**

Provide rub finish to all concrete structures, except those with form liner surfaces.

**ITEM 432 - RIPRAP**

Make 4-inches thick unless otherwise noted or directed.

Where any proposed riprap joins existing riprap, saw cut the existing riprap and dowel/epoxy the joint as directed. Consider subsidiary to the pertinent Items.

Additional riprap may be required, as determined by the Engineer, near the end of project completion, due to unanticipated erosion locations. Any additional, approved riprap will be paid under this Item.

Consider saw cutting of riprap as subsidiary.

**ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING**

Daytime Lane Closures will not be allowed. Nighttime lane closures will be allowed from 8:00 PM to 5:00 AM. One lane may be closed at 8:00pm. Two lanes may be closed at 11:00pm. The AE is the authority to approve additional lane closures, prior to any work. The contractor may request additional lane closures or time extensions from the Area Engineer. Approval, if allowed will be in writing. Maintain a written record of documentation of “The Additional Approved Lane Closures.

No closures will be allowed on the weekends, which include the following holidays: January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, December 25, Easter weekend, and the working day prior to or immediately after any of the aforementioned holidays. Unless otherwise approved, no closures will be allowed on the weekends of special events that could be impacted by the construction. Ensure all equipment, vehicles, workers, etc., associated with these closures are off the roadways and all lanes re-opened, at least, by noon of the Friday before these holidays and special events.

Notify the Inspector so that they can notify Combined Transportation, Emergency, and Communications Center (CTECC) / Public Affairs Office, prior to implementing any “Approved Lane Closure” for a State Highway or Roadway. Provide notice no later than 11:00 AM (Central Time) and at least 24 hours prior to the closure. If the closure is scheduled on a Monday, then it will be called in by 11:00 AM on Friday. If the notification time falls on a State Holiday, which TxDOT observes, then make the notification to the Inspector by 11:00 AM on the day prior to the State Holiday. If you find you will need to report closure information after the 11:00 AM deadline, please contact Area Office for Construction Closures and/or Lowell Choate for

Also, provide “Advance Notice” of the Actual Lane Closure(s), on the Day (Night) of the Actual Lane Closure(s), to the TxDOT Inspector so that they can notify CTECC. Also, immediately upon removal of the Closure(s) provide notice to the TxDOT Inspector for them to notify CTECC.

Submit and secure concurrence, prior to the publication of any notices or placement of any traffic control devices for implementation of the traffic control plan, hereinafter called a Lane Closure Notice (LCN).

Present to TxDOT an LCN for traffic control, which is proposed for implementation, a minimum of four (4) full working days preceding any proposed implementation date. Indicate the estimated date, time, duration, and location for the proposed work. As a part of the LCN submit a written description of the lane closure(s) depicting the proposed traffic control devices used, based on the appropriate plan sheet, TxDOT or TMUTCD standards, and an operational description of the work to be performed.

Present to TxDOT, LCN’s proposed to detour traffic, a minimum of (7) full calendar days preceding any proposed implementation date.

Present to TxDOT, LCN’s proposed for night work, a minimum of (7) full calendar days preceding any proposed implementation date.

Receive concurrence prior to LCN implementation.

Maintain the existing number of through lane(s) in each direction, during the daylight hours, as directed.

Place four (4) “Electronic” Portable Changeable Message Signs (EPCMS) at locations requiring lane closures for one-week prior to the closures, or as directed. Obtain approval for the actual message that will appear on the boards. If more than two phases of a message are required per board, provide additional EPCMS’s to meet the two-phases-per-board requirement.

Use advance warning flashing arrow panels for the closing of traffic lanes. Furnish one stand-by unit, in good working condition at the jobsite, ready for immediate use.

Maintain access to all streets and driveways at all times, unless otherwise approved. Consider subsidiary to the pertinent Items.

Furnish advisory speed signs in enough numbers as directed.

Maintain enough workers to revise traffic control as directed.

For each Lane Closure Set-up, provide a “Buffer Space” and Shadow Vehicle with Truck Mounted Attenuator (TMA), as directed.

Provide a “Downstream” Buffer Space ( $\approx 100'$  per lane with devices spaced at  $\approx 20'$ ) for each lane closure setup, as directed.

Maintain construction-warning signs, which are needed for longer periods than what is shown on the traffic control plan or as directed. Consider subsidiary to the pertinent Items.

Cover or remove any existing sign(s), which conflict with temporary traffic control operations. Install all permanent signs, delineation, and object markers necessary for the operation of any roadway before opening that section of roadway to traffic, regardless of the phase during which the roadway construction occurs. Erect the signs on temporary mounts until the permanent mounts are installed. Consider any costs associated with the temporary mounts subsidiary. Repair or replace any signs, which are damaged by the Contractor’s operations during construction or which are deemed not sufficient. The Engineer will be the sole judge of the adequacy of the sign(s). Consider this work subsidiary to the pertinent Items.

Secure a 28-inch cone on top of any foundations that have protruding studs during construction. The cones will meet the specifications listed on BC (10)–14. In addition, they will be reflectorized, as described. All labor and materials will be considered subsidiary to the pertinent Items.

Provide 4 “Electronic” Portable Changeable Message Sign(s) (EPCMS) as part of the traffic control operations and provide another one that is available to utilize when a backup is needed. Consider the one designated for backup as subsidiary to the various Items of the project. All EPCMS will be exclusive to this project, unless otherwise approved. Placement location and message as directed.

Maintain Sandbags that are used for ballast, as directed. Consider subsidiary to the pertinent Items.

#### **ITEM 504 - FIELD OFFICE AND LABORATORY**

##### **Asphaltic Material Testing Facility**

Furnish a Type D structure for the asphalt-mix control laboratory for the Engineer’s exclusive use. Ensure the floor has enough strength to support the testing equipment and has an impervious covering.

Ensure the Type D structure has adequate air conditioning and is furnished with a minimum of one desk, three chairs, one file cabinet, a telephone, and one built-in equipment storage cabinet for the storage of nuclear equipment. Make the cabinet a minimum of 3-feet wide by 2-feet deep by 3-feet high and make provisions for locking securely. Provide the structure with a 240-volt electrical service entrance. Provide a minimum of four 120-volt circuits with 20-amp breakers and at most two grounded convenience outlets per circuit and provisions for a minimum of two 220-volt ovens with vents to the outside. Provide a minimum of two convenience outlets per wall and a utility sink with an adequate clean potable water supply for testing. Space heaters for heating the structure are unacceptable. Provide support blocks and tie down portable structures for stability.

Provide an ignition oven for the use of Department to determine asphalt content in accordance to Tex-236-F. Provide other laboratory equipment as directed.

Provide to the Department and their representative a computer meeting the minimum specification requirements in DMS 10101 "Computer Equipment." Provide a color printer no older than 2 years old. The operation system must be Microsoft Windows 7, unless directed otherwise. Provide DSL or better internet service. Computer must have at least two front USB ports. Consider subsidiary to pertinent Items.

Provide a permanent, fully equipped, indoor restroom, with toilet and running water as a part of the Type D structure, unless approved otherwise. Provide a monthly drinking water cooler with hot & cold taps and a monthly drinking water service, unless approved otherwise. Consider subsidiary to the pertinent Items.

Equivalent structures may be substituted for those specified under this Item, as agreed. The agreement must be in writing.

Maintain and repair any structure or equipment contained herein. Consider subsidiary to the pertinent Items.

#### **ITEM 528 - COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS**

Prepare base material as detailed on the plans. Shape to grade with an allowable tolerance of 1/4 inch.

#### **ITEM 585 - RIDE QUALITY FOR PAVEMENT SURFACES**

Use Surface Test Type B Pay Adjustment Schedule 2 to evaluate ride quality of the mainlanes in accordance with Item 585, "Ride Quality for Pavement Surfaces."

Use Surface Test Type A for pavement other than the mainlanes to evaluate ride quality of travel lanes in accordance with Item 585, "Ride Quality for Pavement Surfaces."

#### **ITEMS 610, 618, 620, & 624**

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) ----- Construction Division's (CST) materials producers list. See TxDOT website ([www.txdot.gov](http://www.txdot.gov)) – Business with TxDOT > Materials Information > Material Producer List - for list of pre-qualified manufacturers. Category is "Roadway Illumination and Electrical Supplies. "No substitutions" will be allowed for materials found on the list.

#### **ITEM 610 - ROADWAY ILLUMINATION ASSEMBLIES**

Utilize existing service drops for the illumination system.

Maintain all new and existing illumination for the duration of the contract.

All existing illumination, within the project limits, will remain operational until the last possible moment, as directed.

Place the illumination system in operation after satisfactory completion of the circuit tests. Final acceptance will not be made until the system has operated satisfactorily for a period of at least 14 consecutive days. Consider all repairs and adjustments subsidiary to pertinent Items. Pay for electrical energy during the trial period.

Inspection of all completed work provided in the Contract will be performed. The Contractor will be released from further maintenance on that project if the work is found to be satisfactory. Partial acceptance will be made and will be in no way void or alter any items of the contract.

### **ITEM 618 & 620 - CONDUIT & ELECTRICAL CONDUCTORS**

For electrical licensing and electrical certification requirements see Item 7 of the current Standard Specification book and any applicable Special Provisions to Item 7.

### **ITEM 618 - CONDUIT**

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies."

Conduit type is approved by the Engineer. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and 'elbow' it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown as directed by the Engineer in the event the existing conduit proves unusable due to location or damage.

Secure permission from the proper authority, as directed, before cutting into or removing any sidewalks or curbs for installation of this Item.

Saw cut and replace any riprap, which must be removed to install the conduit. Replace riprap with material and texture as directed.

The locations of conduit and ground boxes are diagrammatic and so shift, as directed, to accommodate field conditions.

Install conduit in an area not exceeding 2 feet in any direction from a straight line with the depth of the conduit at least 2 feet, unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least 1 foot below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2-inch sand cushion and backfill with at least 6 inches of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system including installed loop detectors and traffic signal cables which are in conformance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC) as directed.

Placement of conduit under the existing pavement using the open trench method will not be allowed without prior approval.

Seal all conduit ends with a permanently soft, non-toxic duct seal. The duct seal must not adversely affect plastic materials or corrode metals.

Use a coring device when drilling holes through concrete structures. Do not use masonry or concrete drills, unless otherwise approved.

Existing conduit may be proposed for reuse in this project. If the existing conduit cannot be used to place or add new electrical conductors, repair or replace this conduit, as directed. Repair of the conduit will be paid as "Extra Work" on a "Force Account" basis. Probe the existing conduit when locating drill shafts so that the existing conduit's location will be known before it is needed.

When using existing conduit, ensure that all conduits have bushings and are cleaned of dirt, mud, grease, and other debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. Consider this work subsidiary to this Item.

Consider all fittings, brackets, and junction boxes necessary to complete the installations subsidiary to the pertinent Items.

### **ITEM 620 - ELECTRICAL CONDUCTORS**

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division. Fuse holder is shown on the producer list under Items 610 & 620.

Provide 10 amp time delay fuses.

Provide breakaway disconnects in all breakaway poles. For Flashing Beacons (Item 685) and Ped poles (Item 687) within the project provide single-pole breakaway disconnects. Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Clearly and permanently, mark "Illumination" on the Illumination Conductors installed in a Signal Mast-Arm Pole or Strain Pole. Make the marks easily visible from the hand hole.

Identify the conductors as shown on the Electrical Details Standard Sheets when two or more conductors are present in one conduit or enclosure. Use identification tag with two plastic straps. Each tag will indicate circuit number, letter, or other identification as shown on the plans.

Bond grounding conductors, which share the same conduit, junction box or structures, together at every accessible point, in accordance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

All wiring will be in accordance with the National Electrical Code (NEC) and the appropriate Department standard sheets.

#### **ITEM 624 - GROUND BOXES**

All ground boxes for the traffic signal installation on this project will be precast polymer concrete of the size and type specified.

If an existing ground box with a metal cover is planned for use in a project, then that ground box will be replaced with a precast polymer concrete box and new cover (size to be determined by the Engineer). This work will be paid separately, as needed.

#### **ITEM 628 – ELECTRICAL SERVICES**

Notify Austin District Signal Shop of TxDOT, in a timely manner, at (512) 832-7012, to make arrangements for a Service Account.

The service enclosure provided in this contract will have provisions for pad locking the enclosure shut.

The traffic signal system will require 120/240-Volt Power Service provided by the Local Electric Utility Company. Make all arrangements for power.

Primary line extensions, connection charges, meter charges and other charges by the utility company, when required, will be paid for under Force Account Work. Ensure the costs associated with these charges are approved before engaging the utility company to do the work.

#### **ITEM 644 - SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES**

Fabricate all small signs not detailed on the plans in conformance with the latest edition of the “Standard Highway Sign Designs for Texas.”

<http://www.txdot.gov/business/resources/highway.html>

#### **ITEM 650 - OVERHEAD SIGN SUPPORTS**

Use lengths of trusses, tower heights, and posts shown in the summaries for bidding purposes only. Verify these dimensions upon substantial completion of the subgrade section at the location shown on the plans or as relocated. Notify the Engineer prior to shop drawing production concerning any discrepancies found that might reduce established ground clearance requirements.

Stake all sign support locations and obtain approval by the Engineer before the beginning of any construction of sign erection.

All signs removed within this project (both Large and Small) shall be salvaged and delivered in shipping crates for recycling to the TxDOT South Travis Area Engineer's Office located at 9275 S. IH 35, Austin, TX, 78744. Provide a 48-hour notice to TxDOT at (512) 282-2113, prior to delivery of salvaged material. Consider this subsidiary to various bid Items.

Ensure that neither the sign(s) nor portions of the sign face(s) will be reused at any time, either on or off the Right of Way, in such a way that the traveling public can see the reflective surface.

Remove and dispose of all sign structures removed within this project.

**ITEM 656 - FOUNDATIONS FOR TRAFFIC CONTROL DEVICES**

Field cut holes for anchor bolts only as directed.

Install traffic controller foundation (City TY E) only if called for on the plans or directed to do so.

Provide all the materials needed for the installation of foundations under this Item.

**ITEM 662, 666, & 672**

Notify the Engineer at least 24 hours in advance of removing existing striping and placing pavement markings & markers.

Apply markings during good weather unless otherwise directed. If markings are placed at Contractor's option, when inclement weather is impending, and the markings are damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the markings if required.

Unless the new striping design differs from the existing striping location (intersecting roadways and frontage roads), place the new striping to match existing striping.

**ITEM 662 - WORK ZONE PAVEMENT MARKINGS**

Place temporary pavement markings each night, as directed. Temporary flexible-reflective tabs will be allowed as temporary pavement markings on the mainlanes, but not on intersecting roadways or frontage roads.

Replace any missing tabs daily. Replaced tabs are at the Contractor's expense.

Remove work zone pavement markings within 48 hours after permanent striping has been completed.

Foil backed pavement markings will not be allowed.

**ITEM 666 - REFLECTORIZED PAVEMENT MARKINGS**

Apply Type I Reflectorized Pavement Markings weekly on all finished surfaces.

Reference the existing channel islands, gores, and lane striping before commencing work. Provide referencing that will include a sketch of the layout to the Engineer. Obtain approval for placement of guidemarks from the Engineer before installing any permanent pavement markings. Consider subsidiary to the pertinent Items.

Furnish a single drop of TY II glass beads for all TY I markings.

Refer to Article 2.C.1. Glass Traffic Beads, Type I Markings. Furnish a single drop of Type II glass beads (by weight).

**ITEM 672 - RAISED PAVEMENT MARKERS**

Place the bituminous adhesive at a temperature range of 380°F to 390°F. Place the pavement marker on the bituminous adhesive approximately 20 seconds after the adhesive is placed on the pavement. Ensure the pavement marker rests solely on the adhesive and not the pavement surface. Ensure that a minimum of 1/8 in. layer of bituminous adhesive remains between the pavement marker and the pavement surface.

**ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS**

Remove and dispose of, off the right of way, any existing raised pavement markings before beginning surfacing operations. Remove the existing traffic buttons and pavement markers, daily, as work progresses and as directed. Consider subsidiary to the pertinent Items.

**ITEM 686 – TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)**

Furnish black powder coated traffic signal pole bases, traffic signal poles, signal and luminaire arms, luminaire heads, and pedestrian pole assemblies with clear coat finish and UV inhibitors. The black color shall be #17038 from the Federal Standard 595B Color Chart. All attachments to the pole shall be painted black. Apply powder coated finish over the galvanized surface. Prepare galvanized surfaces for powder coating in accordance with the powder coating manufacturer's recommendations. Do not water-quench or chromate-quench galvanized surfaces to be powder coated. After preparing galvanized surfaces, powder coat with a minimum of 2.0 mils dry film thickness (DFT) of urethane powder or triglycidyl isocyanurate (TGIC) polyester powder. Provide powder coat adhesion meeting the 5A or 5B classifications of ASTM D3359. Ensure powder coating is uniform in appearance and free of scratches.

**ITEM 687 – PEDESTRIAN POLE ASSEMBLIES**

Utilize existing powder coated pedestrian poles as directed.

**ITEM 1122 - TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS**

Obtain the Engineer's approval for proposed methods used for erosion control before starting each phase of construction.

Consider the SW3P for this project to consist of the following Items, as directed:

Temporary Sediment Control Fence  
Rock Filter Dams

**ITEM SS 3239 – THIN OVERLAY MIXTURE (TOM)**

Provide mixture using PG 76-22.

Place mixture at the compacted lift thickness of one (1) inch.

Use aggregate meeting a Surface Aggregate Classification (SAC) requirement of A for surface course mixtures.

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC “A” requirement.

A Warm Mix Asphalt additive is required with a discharge temperature greater than 300° F when the haul distance from the plant to the project is greater than 40 miles or the ambient temperature is between 60-70° F, unless otherwise directed. WMA processes, such as water or foaming processes, are not allowed under these circumstances.

Tack coat or underseal is required for the use of this overlay mixture.

Use of pneumatic-tire rollers is prohibited

Water flow rate should exceed 30 seconds tested in accordance to Tex-246-F. The Engineer will require the Contractor to perform water flow rate testing at least once per lot.

**ITEMS 3267 - DENSE-GRADED HOT-MIX ASPHALT (SQ)**

Provide mixture Type B using PG binder 70-22 for the base course, and mixture Type A using PG binder 64-22 for sub-base the course.

All base or non-surface mixtures require SAC “B” aggregate, unless directed otherwise.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

Target laboratory molded density is 96.5% for mixtures without recycled asphalt and 97% for mixtures with recycled asphalt for TGC mixture designs.

When using Superpave Gyratory Compactor (SGC) to design mixtures, submit the SGC mix design to the Engineer for approval.

When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

All mixtures must meet the Hamburg requirement as stated in the table below.

<b>High-Temperature Binder Grade</b>	<b>Test Method</b>	<b>Hamburg Wheel Test <u>Requirements</u><sup>1</sup></b>		
		<b>Minimum # of Passes</b>	<b>Maximum Rut Depth (mm)<sup>2</sup></b>	<b>Minimum Rut Depth (mm)<sup>2,3</sup></b>
PG 64 or lower	Tex-242-F	7,000	12.5	3
PG 70	Tex-242-F	15,000	12.5	3
PG 76 or higher	Tex-242-F	20,000	12.5	3

1. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.
2. Rut depth tested @122°F
3. Unless approved otherwise.

When using RAP and/or RAS, include the management methods of processing, stockpiling, and testing of RAP and/or RAS in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted. Deleterious materials in RAP or RAS stockpiles should not exceed 1.5%, as determined by Tex-217-F, Part I and III.

RAP must be fractionated for all surface mix applications.

Complete all roadways before final surface course placement, unless directed otherwise.

Ensure placement sequence to avoid excess distance of longitudinal joint lapback not to exceed one day's production rates.

Use a device to create a maximum 3H: 1V notched wedge joint on all hot mix joints of 2 in. or greater. Consider subsidiary to the pertinent Items.

Submit any proposed adjustments or changes to a job mix formula to the Engineer before production of the new job mix formula.

Tack every intermediate layer, unless otherwise directed. Do not dilute tack coat. Apply it through a distributor spray bar in accordance with Article 316.3(A) Distributor.

Do not dilute tack coat. Apply it through a distributor spray bar in accordance with Article 316.3(A) Distributor.

When surface irregularities, as defined in Article 341.4.I.3.c(5), "Irregularities", are detected or measured, the Contractor must take immediate corrective action defined as the removal and replacement of a full lane width of the defective area using a paver to place new mix, unless otherwise directed. If there are multiple defective areas within a subplot, making up to 30% of the subplot by area, the Engineer will require the entire subplot be removed, unless directed otherwise.

Provide a minimum transition for all side streets of at least 12 feet and driveways of at least six (6) feet, unless otherwise shown on the plans or otherwise approved/directed.

**ITEM SS 3269**

Perform work during good weather, unless otherwise directed. If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

**ITEM SS3269 (HMACP Testing)**

The Contractor must sample asphalt binder, in accordance to the applicable item. Label the sample can with the corresponding CSJ, lot, and subplot numbers.

Samples must be stored in a common area where they are readily available to the TxDOT representative at the plant. The Contractor will be responsible for supplying storage for all samples. Retain all asphalt samples until hot mix production is complete or directed otherwise.

When directed, the Contractor is responsible for disposal of all asphalt binder samples, in accordance to Local, State, and Federal regulations.

**[Hot Mix Asphaltic Conc (HMAC) Core Holes]**

Refill and compact all HMAC core holes to the same elevation as the adjacent roadway. Use hot mix of the type being used in the project to fill core holes. As an alternative a high performance cold patching mix such as Rapid Cure Patching Mix meeting the requirements of DMS-9203 or Medium Cure Patching mix made with SCM meeting requirements of DMS-9202. Consider this work subsidiary to the pertinent Items.

**ITEM SS3269**

Transition from the new ACP to the existing surface tie-in by utilizing a required milled transition to a vertical butt joint. Make the transition a minimum of 50 feet H: 1 inch V slope ratio of newly placed ACP. Make the temporary joint, at the tie-in, a minimum of a "3-paper-taper" longitudinally and covering the entire width. Sawcut existing pavement as directed. Prior to milling, core the existing pavement to determine its thickness. Do not proceed with milling until directed. Consider this work subsidiary to the pertinent Items.

**ITEM 3269 - PERMEABLE FRICTION COURSE (PFC)**

Provide PG 76-22 binder.

Use aggregate meeting a Surface Aggregate Classification (SAC) requirement of "B". Blending SAC "B" aggregate is prohibited. The use of Recycled Asphalt Shingles (RAS) and Recycled Asphalt Pavement (RAP) are prohibited.

Water flow rate should not exceed 20 seconds tested in accordance to Tex-246-F. The Engineer will require the Contractor to perform water flow rate testing at least once per lot.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

**Project Number:** NH 2015(568)  
**County:** HAYS  
**Highway:** IH-35

**Sheet: 2**  
**Control: 0016-02-136, Etc.**

**ITEM SS 6834 – PORTABLE CHANGEABLE MESSAGE SIGNS**

Place three portable trailer mounted changeable message sign (PCMS) for seven days prior to beginning lane closures on surface streets, and one in the appropriate direction for mainlanes, and leave in place until paving operations are completed or as directed. Obtain approval for the actual message that will appear on the board.

CONTROL : 0016-02-136, ETC  
PROJECT : NH 2015(568)  
HIGHWAY : IH 35  
COUNTY : HAYS

TEXAS DEPARTMENT OF TRANSPORTATION

**GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS**

ALL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF  
----- TRANSPORTATION JUNE 1, 2004.  
STANDARD SPECIFICATIONS ARE INCORPORATED  
INTO THE CONTRACT BY REFERENCE.

ITEMS 1 TO 9 INCL., GENERAL REQUIREMENTS AND COVENANTS  
ITEM 100 PREPARING RIGHT OF WAY (103)  
ITEM 104 REMOVING CONCRETE  
ITEM 105 REMOVING STABILIZED BASE AND ASPHALT PAVEMENT  
ITEM 132 EMBANKMENT (100)(204)(210)(216)(400)  
ITEM 134 BACKFILLING PAVEMENT EDGES (162)(166)(168)(300)(314)  
ITEM 158 SPECIALIZED EXCAVATION WORK (132)  
ITEM 162 SODDING FOR EROSION CONTROL (166)(168)  
ITEM 168 VEGETATIVE WATERING  
ITEM 316 SURFACE TREATMENTS (210)(300)(302)  
ITEM 354 PLANING AND TEXTURING PAVEMENT  
ITEM 416 DRILLED SHAFT FOUNDATIONS (420)(421)(440)(448)  
ITEM 420 CONCRETE STRUCTURES (400)(421)(426)(427)(438)(440)(441)  
(448)  
ITEM 432 RIPRAP (247)(420)(421)(427)(431)(440)  
ITEM 438 CLEANING AND SEALING JOINTS AND CRACKS (RIGID PAVEMENT  
AND BRIDGE DECKS)  
ITEM 454 BRIDGE EXPANSION JOINTS (429)(442)  
ITEM 464 REINFORCED CONCRETE PIPE (400)  
ITEM 465 MANHOLES AND INLETS (400)(420)(421)(440)(471)  
ITEM 467 SAFETY END TREATMENT (400)(420)(421)(430)(432)(440)(445)  
(464)  
ITEM 496 REMOVING STRUCTURES (430)  
ITEM 500 MOBILIZATION  
ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING  
ITEM 504 FIELD OFFICE AND LABORATORY  
ITEM 528 COLOR TEXTURED CONCRETE AND LANDSCAPE PAVERS (132)(247)  
(420)(421)(440)  
ITEM 529 CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER (360)  
(420)(421)(440)

ITEM 531 SIDEWALKS (104)(360)(420)(421)(440)(530)  
 ITEM 533 SHOULDER TEXTURING  
 ITEM 536 CONCRETE MEDIANS AND DIRECTIONAL ISLANDS (420)(421)(427)  
 (440)(529)  
 ITEM 540 METAL BEAM GUARD FENCE (421)(441)(445)(529)(542)(544)  
 ITEM 542 REMOVING METAL BEAM GUARD FENCE  
 ITEM 544 GUARDRAIL END TREATMENTS  
 ITEM 545 CRASH CUSHION ATTENUATORS (421)  
 ITEM 610 ROADWAY ILLUMINATION ASSEMBLIES (421)(441)(442)(445)(446)  
 (449)(616)(620)  
 ITEM 618 CONDUIT (400)(445)(476)(622)  
 ITEM 620 ELECTRICAL CONDUCTORS  
 ITEM 624 GROUND BOXES (420)(421)(432)(440)(618)(620)  
 ITEM 636 ALUMINUM SIGNS (643)  
 ITEM 644 SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES (421)(440)  
 (441)(442)(445)(636)(643)(656)  
 ITEM 647 LARGE ROADSIDE SIGN SUPPORTS AND ASSEMBLIES (421)(440)  
 (441)(442)(445)(643)  
 ITEM 658 DELINEATOR AND OBJECT MARKER ASSEMBLIES (445)  
 ITEM 662 WORK ZONE PAVEMENT MARKINGS (666)(668)(672)(677)  
 ITEM 666 REFLECTORIZED PAVEMENT MARKINGS (316)(318)(662)(677)(678)  
 ITEM 668 PREFABRICATED PAVEMENT MARKINGS  
 ITEM 672 RAISED PAVEMENT MARKERS  
 ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS  
 ITEM 686 TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416)(421)(441)  
 (442)(445)(449)  
 ITEM 687 PEDESTAL POLE ASSEMBLIES (445)(449)(656)

SPECIAL PROVISIONS: SPECIAL PROVISIONS WILL GOVERN AND TAKE  
 ----- PRECEDENCE OVER THE SPECIFICATIONS ENUMERATED  
 HEREON WHEREVER IN CONFLICT THEREWITH.

REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS  
 (FORM FHWA 1273, MAY, 2012)

WAGE RATES

SPECIAL PROVISION "NOTICE TO ALL BIDDERS" (000---003)  
 SPECIAL PROVISION "NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO  
 ENSURE EQUAL EMPLOYMENT OPPORTUNITY" (000---004)  
 SPECIAL PROVISION "STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY  
 CONSTRUCTION CONTRACT SPECIFICATIONS" (000---006)  
 SPECIAL PROVISION "CERTIFICATION OF NONDISCRIMINATION IN EMPLOYMENT"  
 (000---009)  
 SPECIAL PROVISION "DEPARTMENT DIVISION MAILING AND PHYSICAL ADDRESS"  
 (000---011)  
 SPECIAL PROVISION "NOTICE OF CHANGES TO U.S. DEPARTMENT OF LABOR  
 REQUIRED PAYROLL INFORMATION" (000--1483)  
 SPECIAL PROVISION "ON-THE-JOB TRAINING PROGRAM" (000--2638)  
 SPECIAL PROVISION "DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL AID  
 CONTRACTS" (000--1966)  
 SPECIAL PROVISION "PARTNERING" (000--2329)  
 SPECIAL PROVISION "SCHEDULE OF LIQUIDATED DAMAGES" (000--2332)  
 SPECIAL PROVISION "NONDISCRIMINATION" (000--2607)

SPECIAL PROVISION "IMPORTANT NOTICE TO CONTRACTORS" (000--2839)  
 SPECIAL PROVISION TO ITEM 1 (001---015)  
 SPECIAL PROVISION TO ITEM 2 (002---017)  
 SPECIAL PROVISION TO ITEM 3 (003---033)  
 SPECIAL PROVISION TO ITEM 4 (004---017)  
 SPECIAL PROVISION TO ITEM 5 (005---004)  
 SPECIAL PROVISIONS TO ITEM 6 (006---030)(006---047)  
 SPECIAL PROVISION TO ITEM 7 (007---918)  
 SPECIAL PROVISIONS TO ITEM 8 (008---070)(008---119)  
 SPECIAL PROVISIONS TO ITEM 9 (009---009)(009---015)  
 SPECIAL PROVISION TO ITEM 100 (100---002)  
 SPECIAL PROVISION TO ITEM 134 (134---006)  
 SPECIAL PROVISION TO ITEM 161 (161---006)  
 SPECIAL PROVISION TO ITEM 166 (166---001)  
 SPECIAL PROVISION TO ITEM 247 (247---033)  
 SPECIAL PROVISION TO ITEM 300 (300---039)  
 SPECIAL PROVISION TO ITEM 302 (302---010)  
 SPECIAL PROVISION TO ITEM 316 (316---016)  
 SPECIAL PROVISION TO ITEM 318 (318---010)  
 SPECIAL PROVISION TO ITEM 360 (360---013)  
 SPECIAL PROVISION TO ITEM 416 (416---001)  
 SPECIAL PROVISION TO ITEM 420 (420---002)  
 SPECIAL PROVISION TO ITEM 421 (421---035)  
 SPECIAL PROVISION TO ITEM 429 (429---008)  
 SPECIAL PROVISION TO ITEM 431 (431---001)  
 SPECIAL PROVISION TO ITEM 440 (440---006)  
 SPECIAL PROVISION TO ITEM 441 (441---008)  
 SPECIAL PROVISION TO ITEM 442 (442---016)  
 SPECIAL PROVISION TO ITEM 448 (448---002)  
 SPECIAL PROVISION TO ITEM 454 (454---003)  
 SPECIAL PROVISION TO ITEM 464 (464---006)  
 SPECIAL PROVISION TO ITEM 465 (465---002)  
 SPECIAL PROVISION TO ITEM 476 (476---003)  
 SPECIAL PROVISION TO ITEM 500 (500---011)  
 SPECIAL PROVISION TO ITEM 502 (502---033)  
 SPECIAL PROVISION TO ITEM 530 (530---006)  
 SPECIAL PROVISION TO ITEM 533 (533---014)  
 SPECIAL PROVISION TO ITEM 540 (540---031)  
 SPECIAL PROVISION TO ITEM 544 (544---001)  
 SPECIAL PROVISION TO ITEM 545 (545---001)  
 SPECIAL PROVISION TO ITEM 610 (610---015)  
 SPECIAL PROVISION TO ITEM 620 (620---001)  
 SPECIAL PROVISION TO ITEM 624 (624---014)  
 SPECIAL PROVISION TO ITEM 636 (636---014)  
 SPECIAL PROVISION TO ITEM 643 (643---001)  
 SPECIAL PROVISION TO ITEM 658 (658---006)  
 SPECIAL PROVISION TO ITEM 672 (672---034)  
 SPECIAL PROVISION TO ITEM 687 (687---005)  
 SPECIAL PROVISION TO SPECIAL SPECIFICATION ITEM 1122 (1122--002)  
 SPECIAL PROVISION TO SPECIAL SPECIFICATION ITEM 6834 (6834--002)

SPECIAL SPECIFICATIONS:

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ITEM 1122 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL  
CONTROLS (161)(432)(556)  
ITEM 3239 THIN OVERLAY MIXTURE (TOM)  
ITEM 3267 DENSE-GRADED HOT-MIX ASPHALT (SMALL QUANTITY)  
ITEM 3269 PERMEABLE FRICTION COURSE (PFC) (210)(300)(301)(320)(520)  
(585)  
ITEM 6834 PORTABLE CHANGEABLE MESSAGE SIGN

GENERAL: THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH  
----- PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER  
PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-  
LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL  
PROVISIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFI-  
CATIONS FOR THIS PROJECT.

## **SPECIAL PROVISION**

**008---070**

### **Prosecution and Progress**

For this project, Item 008, "Prosecution and Progress," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

This Item is supplemented by the following:

**8.11. Incentive Using Road-User Cost or Contract Administration Liquidated Damage Values and Disincentive Using Road-User Cost.** This special provision is for the application of incentives and disincentives as follows:

- incentives for early Contract completion using contract administration liquidated damage or substantial completion of work ahead of time using daily road-user cost values as basis and
- disincentives for late substantial completion of work using daily road-user costs.

Incentive provisions, based on contract administration liquidated damages, will apply when shown on the plans. Incentive provisions, based on road-user cost, will apply when shown on the plans. Disincentive provisions, based on road-user cost, will apply when road-user cost incentive provisions are shown on the plans. The disincentive provisions, based on road-user cost, will also apply when shown separately on the plans (without an associated road-user cost incentive). Definitions are as follows:

- **Contract Completion** - The final acceptance date (day) unless performance, establishment and maintenance periods occur. In the case of performance, establishment and maintenance periods, completion shall be considered when all work is complete and accepted except for performance, establishment and maintenance periods, with time computed to the suspension of time charges for the acceptance process.
- **Substantial Completion of Work** - The date (day) when all project work (or the work for a specified milestone or phase) requiring lane or shoulder closures or obstructions is completed, and traffic is following the lane arrangement as shown on the plans for the finished roadway (or the specified milestone or phase of work); all pavement construction and resurfacing are complete; and traffic control devices and pavement markings are in their final position (or as called for on the plans for the specified milestone of work). The Engineer may make an exception for permanent pavement markings provided the lack of markings does not cause a disruption to traffic flow or an unsafe condition for the traveling public, and work zone pavement markings are in place.

When A + B Bidding provisions are included in the Contract, the B working days bid will be considered as the time allowed for completion, contract or substantial as applicable. In addition, the plans will show either the number of working days or a specific date for the purposes of computing substantial completion incentives or disincentives.

Time charge adjustments will be made in accordance with the schedule required to meet Article 8.1, "Prosecution of Work" and Article 8.2, "Progress Schedules," the proposal, and the plans. For Contracts with milestone dates, time charges for the completion incentives and disincentives will not be adjusted for weather, weekends, holidays, or other unforeseeable events not under the control or responsibility of the Department. However, time charges for completion incentives or disincentives may be adjusted by the Engineer when;

- work, under the control of the Department, such as extension of limits or changes in scope, change the actual duration of completion,
- delays occur due to unadjusted utilities or unclear right-of-way when clearance is not the responsibility of the Contractor, or
- catastrophic events occur, such as a declared state of emergency or natural disaster, if the event directly affects the Contractor's prosecution.

**A. Incentives.** When shown on the plans and in accordance with the Contract, the Department will pay an incentive for the early Contract completion or substantial completion of work under the number of working days stipulated in the Contract. The maximum number of working days used in computing the credit will be 30 days for each milestone and Contract completion incentive unless otherwise shown in the Contract. The amount of the credit will be added to money due or to become due to the Contractor.

- 1. Early Contract Completion Incentive.** The incentive will be based on the difference between the actual early Contract completion days and the Contract completion days in the Contract. The difference will then be multiplied by the daily contract administration liquidated damage value shown in the proposal.
- 2. Early Substantial Completion of Work Incentive.** The incentive will be based on the differences between the actual early substantial completion of work and the Contract days allowed to substantially complete the work (or the specified milestone or phase of work). The difference will then be multiplied by the daily road-user cost values specified for substantial Contract completion (or road-user cost specified for the corresponding milestone or phase of work).

**B. Disincentives for Failure to Substantially Complete Work on Time.** When shown on the plans and in accordance with the Contract, failure to substantially complete the work (or specified milestone or phase of work) within the established number of working days will result in the assessment of disincentives using the daily road-user cost shown on the plans for each working day in excess of those allowed. The road-user cost disincentive

deductions will be in addition to any Contract administration liquidated damages, in accordance with Article 8.5, "Failure to Complete Work on Time." The amount of the disincentive will be deducted from money due or to become due to the Contractor. The road-user cost disincentives will be assessed not as a penalty, but for added expense incurred by the traveling public.

## **SPECIAL PROVISION**

### **360---013**

#### **Concrete Pavement**

For this project, Item 360, “Concrete Pavement,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 360.2. Materials, Section D. Epoxy** is voided and replaced by the following:

Provide Type III, Class C epoxy in accordance with DMS-6100, “Epoxies and Adhesives,” for installing all drilled-in reinforcing steel. Request approval for the use of epoxy types other than Type III, Class C.

**Article 360.3. Equipment, Section E. Curing Equipment.** The third sentence is voided and replaced by the following:

Provide curing equipment that is independent of all other equipment when required to meet the requirements of Article 360.4.I, “Curing.”

**Article 360.4. Construction, Section H. Spreading and Finishing, Section 2. Maintenance of Surface Moisture.** The first and second sentences are voided and replaced by the following:

Prevent surface drying of the pavement before application of the curing system by means that may include water fogging, the use of wind screens, and the use of evaporation retardants.

**Article 360.4. Construction, Section H. Spreading and Finishing, Section 3. Surface Texturing** is voided and replaced by the following:

Complete final texturing before the concrete has attained its initial set. Drag the carpet longitudinally along the pavement surface with the carpet contact surface area adjusted to provide a satisfactory coarsely textured surface. Prevent the carpet from getting plugged with grout. Do not perform carpet dragging operations while there is excessive bleed water.

A metal-tine texture finish is required for all areas with a posted speed limit in excess of 45 mph. A metal-tine texture finish is required unless otherwise shown on the plans for areas with a posted speed limit less than 45 mph. Immediately following the carpet drag, apply a single coat of evaporation retardant at a rate recommended by the manufacturer. Provide the metal-tine finish immediately after the concrete surface has set enough for consistent tining. Operate the metal-tine device to obtain grooves spaced at 1 in., approximately 3/16 in. deep, with a minimum depth of 1/8 in., and approximately 1/12 in. wide. Do not overlap a previously tined area. Use manual methods to achieve similar results on ramps and other irregular sections of pavements. Repair damage to the edge of the slab and joints immediately after texturing. Do not tine pavement that will be overlaid or that is scheduled for blanket diamond grinding or shot blasting.

When carpet drag is the only surface texture required by the plans, ensure that adequate and consistent micro-texture is achieved by applying sufficient weight to the carpet and keeping the carpet from getting plugged with grout, as directed by the Engineer. Target a carpet drag texture of 0.04 in., as measured by Tex 436-A. Correct any location with a texture less than 0.03 in. by diamond grinding or shot blasting. The Engineer will determine the test locations at points located transversely to the direction of traffic in the outside wheel path.

**Article 360. 4. Construction, Section I. Curing.** The first sentence is voided and replaced by the following:

Keep the concrete pavement surface from drying as described in Section 360.4.H.2, “Maintenance of Surface Moisture,” until the curing material has been applied.

**Article 360. 4. Construction, Section I. Curing, Section 1. Membrane Curing.** The first paragraph is voided and replaced by the following:

Spray the concrete surface uniformly with 2 coats of membrane curing compound at an individual application rate of not more than 180 sq. ft. per gal. Do not allow the concrete surface to dry before applying the curing compound. Use a towel or absorptive fabric to remove any standing pools of bleed water that may be present on the surface before applying the curing compound. Apply the first coat within 10 min. after completing texturing operations. Apply the second coat within 30 min. after completing texturing operations.

## **SPECIAL PROVISION**

### **416---001**

#### **Drilled Shaft Foundations**

For this project, Item 416, “Drilled Shaft Foundations,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 416.5. Payment, Section A. Drilled Shaft** is voided and replaced by the following.

**A. Drilled Shaft.** The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Drilled Shaft” or “Drilled Shaft (Non-reinforced)” or “Drilled Shaft (Sign Mounts)” or “Drilled Shaft (High Mast Pole)” or “Drilled Shaft (Roadway Illumination Pole)” or “Drilled Shaft (Traffic Signal Pole)” of the specified diameter, subject to the limitations for overruns authorized by the Engineer given in Section 416.5.A.1, “Overrun.”

**Article 416.5. Payment, Section A. Drilled Shaft, Section 2. Maximum Plan Length Shaft** is supplemented by the following.

- For roadway illumination poles, the maximum plan length shaft is the maximum length shaft, regardless of diameter, for any roadway illumination pole included in the contract.
- For traffic signal poles, the maximum plan length shaft is the maximum length shaft, regardless of diameter, for any traffic signal pole included in the contract.

## **SPECIAL PROVISION**

**448---002**

### **Structural Field Welding**

For this project, Item 448, "Structural Field Welding," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 448.3 Equipment** is voided and replaced by the following:

Provide electrode drying and storing ovens that can maintain the required temperatures specified in Section 448.4.C.1, "Electrode Condition." Each oven must have a door that is sealed and can be latched. Each oven must have a small port that may be opened briefly to insert a thermometer or the oven must be equipped with a thermometer that allows for direct reading of temperature inside the oven without opening the oven. Provide equipment able to preheat and maintain the temperature of the base metal as required and as shown on the plans. Provide approved equipment, temperature indicator sticks, infrared thermometer, etc., for checking preheat and interpass temperatures at all times while welding is in progress. Provide welding equipment meeting the requirements of the approved welding procedure specifications (WPS), if required, and capable of making consistent high-quality welds.

**Article 448.4.B.2.Certified Steel Structures Welder.** The second bulleted item is voided and replaced by the following:

- Use metal for test plates that meets Item 442, "Metal for Structures," with a minimum yield point of 36 ksi. The minimum width of test plate must be sufficient to accommodate the radiograph inspection of 6 continuous inches of the weld, not counting the ends of the weld.

**Article 448.4.C.5. Welding Practice.** The second paragraph is voided and replaced by the following:

Use the stringer-bead technique where possible for groove welds. In vertical welding passes, progress upward using a back-step sequence keeping the end of the low-hydrogen electrode contained within the molten metal and shield of flux, unless the electrode manufacturer's specifications indicate otherwise

**Article 448.4.C.7. Radiographic Inspection** is supplemented by the following:

Meet the requirements specified in Section 441.3.B.5.a, "Radiographic Testing" for radiograph film quality.

**SPECIAL PROVISION**

**464---006**

**Reinforced Concrete Pipe**

For this project, Item 464, “Reinforced Concrete Pipe,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 464.2. Materials, Section A. Fabrication** is voided and replaced by the following:

Fabrication plants must be approved by the Construction Division in accordance with DMS-7310, “Reinforced Concrete Pipe and Machine-Made Precast Concrete Box Culvert Fabrication and Plant Qualification,” before furnishing precast reinforced concrete pipe for Department projects. The Construction Division maintains a list of approved reinforced concrete pipe plants.

Furnish material and fabricate reinforced concrete pipe in accordance with DMS-7310, “Reinforced Concrete Pipe and Machine-Made Precast Concrete Box Culvert Fabrication and Plant Qualification.”

**Article 464.2. Materials, Section B. Design, 1. General.** Table 2 is voided and replaced by the following:

**Table 2  
Arch Pipe**

<b>Design Size</b>	<b>Equivalent Diameter (in.)</b>	<b>Rise (in.)</b>	<b>Span (in.)</b>
1	18	13-1/2	22
2	21	15-1/2	26
3	24	18	28-1/2
4	30	22-1/2	36-1/4
5	36	26-5/8	43-3/4
6	42	31-5/16	51-1/8
7	48	36	58-1/2
8	54	40	65
9	60	45	73
10	72	54	88

**Article 464.2 Materials, Section C. Physical Test Requirements** is voided and not replaced.

**Article 464.2. Materials, Section D. Markings.** The first paragraph is voided and replaced by the following:

Furnish each section of reinforced concrete pipe marked with the following information specified in DMS-7310, “Reinforced Concrete Pipe and Machine-Made Precast Concrete Box Culvert Fabrication and Plant Qualification”:

- class or D-Load of pipe,
- ASTM designation,
- date of manufacture,
- pipe size,
- name or trademark of fabricator and plant location,
- designated fabricator’s approval stamp,
- pipe to be used for jacking and boring (when applicable), and
- designation “SR” for pipe meeting sulfate-resistant concrete plan requirements (when applicable).

**Article 464.2. Materials, Section E. Inspection** is voided and replaced by the following:

Provide access for inspection of the finished pipe at the project site before and during installation.

**Article 464.2. Materials, Section F. Causes for Rejection** is voided and replaced by the following:

Individual section of pipe may be rejected for any of the conditions stated in the Annex of DMS-7310, “Reinforced Concrete Pipe and Machine-Made Precast Concrete Box Culvert Fabrication and Plant Qualification.”

**Article 464.2. Materials, Section G. Repairs** is voided and replaced by the following:

Make repairs if necessary as stated in the Annex of DMS-7310, “Reinforced Concrete Pipe and Machine-Made Precast Concrete Box Culvert Fabrication and Plant Qualification.”

**Article 464.2. Materials, Section H. Rejections** is voided and not replaced.

## SPECIAL PROVISION

### 465---002

#### Manholes and Inlets

For this project, Item 465, "Manholes and Inlets," of the Standard Specifications, is hereby voided and replaced with the articles below.

**465.1 Description.** Construct manholes and inlets, complete in place or to the stage detailed, including furnishing and installing frames, grates, rings and covers. Drainage junction boxes are classified as manholes.

**465.2 Materials.** Furnish materials in accordance with the followings:

- Item 420, "Concrete Structures"
- Item 421, "Hydraulic Cement Concrete"
- Item 440, "Reinforcing Steel"
- Item 471, "Frames, Grates, Rings, and Covers"

Cast-in-place manholes, inlets, risers, and appurtenances are acceptable unless otherwise shown. Alternate designs for cast-in-place items must be acceptable to the Engineer and must conform to functional dimensions and design loading. Alternate designs must be designed and sealed by a licensed professional engineer.

- A. Concrete.** Furnish Class H concrete for formed precast manholes and inlets. Furnish concrete per DMS-7310 for machine-made precast manholes and inlets. Air-entrained concrete will not be required in precast concrete members. Furnish Class C concrete for cast-in-place manholes and inlets unless otherwise shown on the plans.
- B. Mortar.** Furnish Type S mortar in accordance with ASTM C270.
- C. Timber.** Provide sound timber for temporary covers when used with Stage I construction (see Section 465.3, "Construction") that is a minimum of 3 in. nominal thickness and reasonably free of knots and warps.
- D. Other Materials.** Commercial-type hardware of other materials may be used with prior approval.

**465.3 Construction.** All types of manholes and inlets may be built either complete or in 2 stages, described as Stage I and Stage II. Build manholes and inlets designed to match the final roadway surface.

Construct the Stage I portion of manholes and inlets as shown on the plans or as specified in this Item. Furnish and install a temporary cover as approved by the Engineer.

For Stage I construction of cast iron or steel inlet units, furnish and install the storm drain pipe and a temporary plug for the exposed end of the storm drain pipe from the storm drain to a point below the top of curb indicated on the plans.

Construct Stage II after the pavement structure is substantially complete unless otherwise approved by the Engineer.

For Stage II, construct the remaining wall height and top of manhole or inlet and furnish and install any frames, grates, rings and covers, manhole steps, curb beams, or collecting basins required.

Construct cast-in-place manholes and inlets in accordance with Item 420, "Concrete Structures." Forms will be required for all concrete walls. Outside wall forms for cast-in-place concrete may be omitted with the approval of the Engineer if the surrounding material can be trimmed to a smooth vertical face.

**A. Precast Manholes and Inlets.** Construct formed precast manholes and inlets in accordance with Item 420, except as otherwise noted in this Item. Construct machine-made precast manholes and inlets in accordance with ASTM C 478, except as otherwise noted in this Item. Mix and place concrete for machine-made manholes and inlets per the requirements of DMS-7310. Conform to the product permissible variations and rejection criteria stated in ASTM C 478 for machine-made precast manholes and inlets. Cure all precast units in accordance with Item 424, "Precast Concrete Structures (Fabrication)."

Multi-project fabrication plants (as defined in Item 424, "Precast Concrete Structures (Fabrication)") that produce manholes and inlets will be approved by the Construction Division in accordance with DMS-7340, "Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Manholes and Inlets." The Construction Division maintains a list of approved multi-project plants.

1. **Lifting Holes.** For precast units, provide no more than 4 lifting holes in each section. Lifting holes may be cast, cut into fresh concrete after form removal, or drilled. Provide lifting holes large enough for adequate lifting devices based on the size and weight of the section. The maximum hole diameter is 3 in. at the inside surface of the wall and 4 in. at the outside surface. Do not cut more than 5 in. in any direction of reinforcement per layer for lifting holes. Repair spalled areas around lifting holes.
2. **Marking.** Clearly mark each precast manhole and inlet unit with the following information:
  - name or trademark of fabricator and plant location;
  - product designation;
  - ASTM designation (if applicable);
  - date of manufacture;
  - designated fabricator's approval stamp; and
  - designation "SR" for product meeting sulfate-resistant concrete plan requirements (when applicable).

3. **Storage and Shipment.** Store precast units on a level surface. Do not ship units until design strength requirements have been met.
- B. Excavation, Shaping, Bedding, and Backfill.** Excavate, shape, bed, and backfill in accordance with Item 400, "Excavation and Backfill for Structures." For all manhole and inlet structures where joints consist of rubber boots, rubber gaskets, bulk or preformed joint sealant, immediate backfilling is permitted. Take precautions in placing and compacting the backfill to avoid any movement of manholes and inlets. Remove and replace manholes and inlets damaged by the Contractor at no expense to the Department.
- C. Manholes and Inlets for Precast Concrete Pipe Storm Drains.** Construct manholes and inlets for precast concrete pipe storm drains as soon as is practicable after storm drain lines into or through the manhole or inlet locations are completed. Neatly cut all storm drains at the inside face of the walls of the manhole or inlet and point up with mortar.
- D. Manholes and Inlets for Monolithic Pipe Storm Drains.** Construct bases for manholes and inlets on monolithic pipe storm drains either monolithically with the storm drain or after the storm drain is constructed.
- E. Manholes for Box Storm Drains.** Cast bases for manholes for box storm drains as an integral part of the storm drain. Construct manholes before backfilling, or cover the manhole opening temporarily and backfill the storm drain as a whole.
- F. Inverts.** Shape and route floor inverts passing out or through the manhole or inlet as shown on the plans. Shape by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.
- G. Finishing Complete Manholes and Inlets.** Complete manholes and inlets in accordance with the plans. Backfill to original ground elevation in accordance with Item 400, "Excavation and Backfill for Structures."
- H. Finishing Stage I Construction.** Complete Stage I construction by constructing the walls to the elevations shown on the plans and backfilling to required elevations in accordance with Item 400, "Excavation and Backfill for Structures."
- I. Stage II Construction.** Construct subgrade and base course or concrete pavement construction over Stage I manhole or inlet construction, unless otherwise approved by the Engineer. Excavate to expose the top of Stage I construction and complete the manhole or inlet in accordance with the plans and these Specifications, including backfill and cleaning of all debris from the bottom of the manhole or inlet.
- J. Inlet Units.** Install cast iron or steel inlet units in conjunction with the construction of concrete curb and gutter. Set the inlet units securely in position before placing concrete for curb and gutter. Form openings for the inlets and recesses in curb and gutter as shown on the plans. Place and thoroughly consolidate concrete for curb and gutter adjacent to inlets and around the inlet castings and formed openings and recesses without displacing the inlet units.

**465.4 Measurement.** All manholes and inlets satisfactorily completed in accordance with the plans and specifications will be measured by each manhole or inlet, complete, or by each manhole or inlet completed to the stage of construction required by the plans.

**465.5 Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for as follows:

- A. Complete Manholes.** Payment for complete manholes will be made at the unit price bid for “Manhole (Complete)” of the type specified.
- B. Complete Inlets.** Payment for inlets will be made at the unit price bid for “Inlet (Complete),” of the type specified.
- C. Manholes Stage I.** Payment for Manholes, Stage I, will be made at the unit price bid for each “Manhole (Stage I)” of the type specified.
- D. Manholes Stage II.** Payment for Manholes, Stage II, will be made at the unit price bid for each “Manhole (Stage II)” of the type specified.
- E. Inlets Stage I.** Payment for Inlets, Stage I, will be made at the unit price bid for each “Inlet (Stage I)” of the type specified.
- F. Inlets Stage II.** Payment for Inlets, Stage II, will be made at the unit price bid for each “Inlet (Stage II)” of the type specified.

These price are full compensation for concrete, reinforcing steel, mortar, frames, grates, rings and covers, excavation, and backfill and for all other materials, tools, equipment, labor, and incidentals

## SPECIAL PROVISION

### 476---003

#### **Jacking, Boring, or Tunneling Pipe or Box**

For this project, Item 476, "Jacking, Boring, or Tunneling Pipe or Box," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 476.3. Construction, Section A. Jacking.** The third paragraph is voided and replaced by the following:

Ensure that excavation for the underside of the pipe for at least 1/3 of the circumference of the pipe conforms to the contour and grade of the pipe. Ensure that the excavation for the bottom slab of the box conforms to the grade of the box. If desired, over excavate to provide not more than 2 in. of clearance for the upper portion of the pipe or box. Taper this clearance to zero at the point where the excavation conforms to the contour of the pipe or box. When jacking of pipe has begun, the operation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment. Pressure-grout any over excavation of more than 1 in. When shown on the plans, pressure-grout between the carrier pipe and casing.

**Article 476.3. Construction, Section B. Boring.** The fifth paragraph is voided and replaced by the following:

1. **Larger Diameter Boring Methods.** For drainage and large utility borings, use the pilot hole or auger method. Pressure-grout any over excavation of more than 1 in. When shown on the plans, pressure-grout between the carrier pipe and casing.
  - a. **Pilot Hole Method.** Bore a 2 in. pilot hole the entire length of the crossing, and check it for line and grade on the opposite end of the bore from the work shaft. This pilot hole will serve as centerline for the larger diameter hole to be bored.
  - b. **Auger Method.** Use a steel encasement pipe of the appropriate diameter equipped with a cutter head to mechanically perform the excavation. Use augers of sufficient diameter to convey the excavated material to the work shaft.
2. **Electrical and Communication Conduit Boring.** For electrical and communication conduit borings, limit over excavation to the dimensions shown in Table 1. Increased boring diameters will be allowed for outer diameters of casing and couplings. Pressure grouting will not be required for electrical and communication conduit borings.

**Table 1**

**Allowable Bore Diameter for Electrical or Communication Conduit or Casing**

<b>Single Conduit Bores</b>		<b>Multiple Conduit Bores</b>	
<b>Conduit Size (in.)</b>	<b>Maximum Allowable Bore (in.)</b>	<b>Conduit Size (in.)<sup>1</sup></b>	<b>Maximum Allowable Bore (in.)</b>
2	4	4	6
3	6	5	8
4	6	6	10
6	10	7	12
		8	12

1. The diameter of multiple conduits is the sum of the outside diameter of the two largest conduits for placement of up to 4 conduits in one bore. Submit boring diameters for the Engineer's approval when more than 4 conduits are to be placed in a bore.

**Article 476.3. Construction, Section C. Tunneling** is supplemented by the following:

When shown on the plans, pressure-grout between the carrier pipe and liner plate.

**SPECIAL PROVISION  
545---001**

**Crash Cushion Attenuators**

For this project, Item 545, “Crash Cushion Attenuators,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Article 545.2 Materials. The first paragraph is voided and replaced by the following:

- A. Crash Cushion Attenuators. Furnish new crash cushion attenuators of the designated category listed in Table 1 and in accordance with the details shown on the plans and on the manufacturer’s shop drawings, or equal as approved. When the plans designate that the Department will furnish crash cushion attenuators, pick them up at the location shown on the plans.

**Table 1.  
Category**

<b>Sacrificial (S)</b>	<b>Reusable (R)</b>	<b>Low Maintenance (L)</b>
ABSORB 350	QUAD II	HEART
ACZ 350	TAU-II	QGELITE
Sand-filled Plastic Module Arrays	TRACC	REACT/REACT II
QUEST		SMART CUSHION
BEAT-SSCC		TAU-II-R

**Article 545.5 Payment.** The first paragraph is voided and replaced by the following:

The work performed and materials furnished in accordance with this Item and measured as provided for under “Measurement” will be paid for at the unit price for “Crash Cushion Attenuator (Install),” of the category, width (N or W), and test level, “Crash Cushion Attenuator (Move and Reset),” and “Crash Cushion Attenuator (Remove).” This price is full compensation for foundations, materials, stockpiling, moving and removing, hauling, installing and resetting, disposal of unsalvageable materials, equipment, labor, tools, and incidentals.

## **SPECIAL PROVISION**

### **610---015**

#### **Roadway Illumination Assemblies**

For this project, Item 610, “Roadway Illumination Assemblies,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 610.2. Materials.** The fourth paragraph is voided and replaced by the following:

Do not provide shop drawings for complete assemblies that are fabricated in accordance with this Item and standard details shown on the plans. Electronically submit shop drawings for optional multi-sided steel pole designs, optional aluminum pole designs, and non-standard designs required when basic wind speeds and/or pole base mounting heights at the installation locations are in excess of that shown on the Roadway Illumination Pole (RIP) standard. Manufacturers may request that the Department add the shop drawings and design calculations they submit for this Item to a pre-approved list of optional and non-standard pole designs. The submittal requirements and procedures for these optional and non-standard illumination pole shop drawings and calculations are linked to the “Shop Drawings” page located online at:

[http://www.dot.state.tx.us/business/contractors\\_consultants/bridge/shop\\_drawings/default.htm](http://www.dot.state.tx.us/business/contractors_consultants/bridge/shop_drawings/default.htm)

## **SPECIAL PROVISION**

### **620---001**

#### **Electrical Conductors**

For this project, Item 620, "Electrical Conductors," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 620.2 Materials.** The fourth and fifth paragraphs are void and replaced by the following:

Use white insulation for grounded (neutral) conductors, except that grounded conductors AWG No. 4 and larger may be black with white tape marking at every accessible location. Do not use white insulation or marking for any other conductor except control wiring specifically shown on the plans.

Ensure that insulated grounding conductors are green except that insulated grounding conductors AWG No. 4 and larger may be black with green tape marking at every accessible location. Do not use green insulation or marking for any other conductor except control wiring specifically shown on the plans.

## SPECIAL PROVISION

### 624---014

#### Ground Boxes

For this project, Item 624, "Ground Boxes," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 624.1. Description** is voided and replaced by the following:

Construct, furnish, and install ground boxes complete with lids. Remove existing ground boxes.

**Article 624.2 Construction and Materials.** The first paragraph is voided and replaced by the following:

Provide new materials that comply with the details shown on the plans and meet the following requirements:

- Construct cast-in-place concrete ground boxes and aprons in accordance with Item 420, "Concrete Structures," and Item 440, "Reinforcing Steel."
- Provide fabricated precast polymer concrete ground boxes, and precast concrete ground boxes that comply with DMS-11070, "Ground Boxes."
- Construct a concrete apron, when shown on the plans, in accordance with Item 432, "Riprap," and Item 440, "Reinforcing Steel."

**Article 624.2. Construction and Materials** is supplemented by the following:

Remove existing ground boxes to at least 6 in. below the conduit level. Uncover conduit to a sufficient distance so that 90 degree bends can be removed and conduit reconnected. Clean the conduit in accordance with Item 618, "Conduit" and pull, splice, or terminate new conductors as indicated in the plans. Cleaning of conduit is subsidiary to this Item. Pulling, splicing, or terminating conductors will be paid under Item 620, "Electrical Conductors." Backfill area to ground level with acceptable material upon completing adjacent work related to conduit and conductors.

**Article 624.3. Measurement** is voided and replaced by the following:

This Item will be measured by each ground box complete in place or by each ground box removed.

**Article 624.4. Payment** is voided and replaced by the following:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Ground Boxes" of the types and sizes specified and for "Remove Existing Ground Boxes." This price is full compensation for excavating and backfilling; constructing, furnishing, installing, and removing the ground boxes and concrete aprons when required; and equipment, labor, materials, tools, and incidentals.

## SPECIAL PROVISION

### 636---014

#### Aluminum Signs

For this project, Item 636, "Aluminum Signs," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 636.1. Description** is voided and replaced by the following:

- **Installation.** Furnish, fabricate, and erect signs. Sign supports are provided for under other Items.
- **Replacement.** Replace existing signs on existing sign supports.
- **Refurbishing.** Refurbish existing signs on existing sign supports.

**Article 636.2. Materials, Section A. Sign Blanks** is voided and replaced by the following:

**A. Sign Blanks.** Furnish sign blank substrates in accordance with DMS-7110, "Aluminum Sign Blanks" or DMS-8305, "Fiberglass Sign Substrate," and in accordance with the types shown on the plans. Use single-piece sheet-aluminum substrates for Type A (small) signs. Use either extruded aluminum or fiberglass substrates for Type G (ground-mounted) or Type O (overhead-mounted) signs as shown on the plans.

**Article 636.2. Materials, Section B. Sign Face Reflectorization** is supplemented by the following:

Ensure that sign legend, symbols, borders, and background exhibit uniform color, appearance, and retroreflectivity when viewed both day and night.

**Article 636.2. Materials, Section C. Sign Messages.** The last two bullets are voided and replaced by the following:

- Fabricate non-reflective black film legend from materials meeting DMS-8300.
- Furnish direct-applied route markers and other attachments within the parent sign face, unless otherwise specified in the plans.

**Article 636.2. Materials, Section D. Hardware** is supplemented by the following:

Furnish sign hardware for fiberglass signs in accordance with the fiberglass substrate manufacturer's recommendations.

**Article 636.3. Construction, Section A. Fabrication, Part 1. Sign Blanks.** The first paragraph is voided and replaced by the following:

Furnish sign blanks to the sizes and shapes shown on the plans and that are free of buckles, warps, burrs, dents, cockles, or other defects. Do not splice individual extruded aluminum or fiberglass panels.

**Article 636.3. Construction, Section A. Fabrication, Part 2. Sheeting Application** is voided and replaced by the following:

**2. Sheeting Application.** Apply sheeting to sign blanks in conformance with the sheeting manufacturer's recommended procedures. Meet the fabrication requirements of DMS-8300, Section 8300.7.F, "Sign Fabrication" for white, orientation non-compliant sheeting listed on the Department's Material Producer List entitled "Sign Face Materials." Clean and prepare the outside surface of extruded aluminum or fiberglass flanges in the same manner as the sign panel face.

Minimize the number of splices in the sheeting. Overlap the lap-splices by at least 1/4 in. Use butt splices for Type C microprismatic, Type D, and Type E reflective sheeting. Provide a 1-ft. minimum dimension for any piece of sheeting. Do not splice sheeting for signs fabricated with transparent screen inks or colored transparent films.

**Article 636.3. Construction, Section A. Fabrication, Part 3. Sign Assembly.** The first paragraph is voided and replaced by the following:

**3. Sign Assembly.** Assemble extruded aluminum signs in accordance with the details shown on the plans. Assemble fiberglass signs in accordance with the fiberglass manufacturer's recommendations located on the Department's Material Producer List entitled "Fiberglass Sign Substrates." Sign face surface variation must not exceed 1/8 in. per foot. Surface misalignment between panels in multi-panel signs must not exceed 1/16 in. at any point.

**Article 636.3. Construction, Section B. Storage and Handling.** The last paragraph is voided and replaced by the following:

Store all finished signs off the ground and in a vertical position until erected. Store finished sheet-aluminum substrate signs in a weatherproof building. Extruded aluminum and fiberglass substrate signs may be stored outside.

**Article 636.3. Construction, Section E. Replacement** is supplemented by the following:

Mounting hardware for fiberglass signs will be per the fiberglass substrate manufacturer's recommendations.

**Article 636.3. Construction, Section H. Documentation** is added.

**H. Documentation.** Provide a notarized original of the Signing Material Statement (Form 2273) with the proper attachments for verification of compliance.

**Article 636.5. Payment.** The first paragraph is voided and replaced by the following:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Aluminum Signs," "Fiberglass Signs," "Signs," "Replacing Existing Aluminum Signs," "Replacing Existing Fiberglass Signs," "Refurbishing Aluminum Signs," or "Refurbishing Fiberglass Signs," of the type specified.

**Article 636.5. Payment, Section B. Replacement** is voided and replaced by the following:

**B. Replacement.** This price is full compensation for: furnishing and installing new aluminum or fiberglass signs and hardware; removal of existing signs; fabrication of sign panels; treatment of sign panels required before application of the background materials; application of the background materials and messages to the sign panels; furnishing and fabricating frames, wind beams, stiffeners, or required joint backing strips; furnishing bolts, rivets, screws, fasteners, clamps, brackets, and sign support connections; assembling and erecting the signs; preparing and cleaning the signs; salvaging and disposing of unsalvageable material; and equipment, materials, labor, tools, and incidentals.

**SPECIAL PROVISION**

**643---001**

**Sign Identification Decals**

For this project, Item 643, “Sign Identification Decals,” of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 643.2. Materials.** Figure 1 and Table 1 are replaced by the following:

<b>TxDOT</b>												
<b>C</b>	<b>Fabrication Date</b>										<b>T</b>	<b>1</b>
J	F	M	A	M	J	J	A	S	O	N	D	<b>2</b>
	200		201		202		203		204			<b>3</b>
	0	1	2	3	4	5	6	7	8	9		<b>4</b>
<b>Sheeting MFR - Substrate</b>												
A	B	C	D	E	F	G	H	J	K	L	M	<b>5</b>
<b>Film/Ink MFR</b>												
A	B	C	D	E	F	G	H	J	K	L	M	<b>6</b>
<b>Sheeting MFR - Legend</b>												
A	B	C	D	E	F	G	H	J	K	L	M	<b>7</b>
<b>Installation Date</b>												
				0	1	2	3					<b>8</b>
	0	1	2	3	4	5	6	7	8	9		<b>9</b>
J	F	M	A	M	J	J	A	S	O	N	D	<b>10</b>
	200		201		202		203		204			<b>11</b>
	0	1	2	3	4	5	6	7	8	9		<b>12</b>

**Figure 1**  
**Decal Design (row numbers explained in Table 1).**

**Table 1**  
**Decal Description**  
**Row Explanation**

<b>1</b> – Sign Fabricator
<b>2</b> – Month Fabricated
<b>3</b> – First 3 Digits of Year Fabricated
<b>4</b> – Last Digit of Year Fabricated
<b>5</b> – Manufacturer of the Sheeting Applied to the Substrate
<b>6</b> – Film (colored transparent or non-reflective black) or Screen Ink Manufacturer
<b>7</b> – Manufacturer of the Sheeting for the Legend
<b>8</b> – Tens digit of Date Installed
<b>9</b> – Ones Digit of Date Installed
<b>10</b> – Month Installed
<b>11</b> – First 3 Digits of Year Installed
<b>12</b> – Last Digit of Year Installed

**Article 643.3. Construction, Section A. Sign Fabricator.** Replace the first bullet with the following:

- “C” if fabricated by a commercial sign fabricator or “T” if fabricated by the Department or the Texas Department of Criminal Justice,

**Article 643.3. Construction, Section A. Sign Fabricator.** Replace the last bullet with the following:

- sheeting, film, and ink manufacturers (codes for these manufacturers are located in the Department’s approved Material Producer List, “Sign Face Materials”)

**Article 643.3. Construction, Section B. Contractor.** This section is voided and not replaced.

## **SPECIAL PROVISION**

**687---005**

### **Pedestal Pole Assemblies**

For this project, Item 687, "Pedestal Pole Assemblies," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 687.2. Materials** is supplemented by the following:

- C. Pedestrian Push Button Pole Assembly.** Provide diameter as shown in the plans, schedule 40 steel pipe or tubing, aluminum pipe (alloy 6061-T6), or rigid metal conduit. Do not use aluminum conduit. Galvanize pedestrian push button post in accordance with Item 445, "Galvanizing," unless otherwise shown on the plans.

**Article 687.3 Construction, Sections B. Installation and C. Painted Finish.** are voided and replaced by the following:

- B. Installation.** Install pedestal pole assemblies and pedestrian push button pole assemblies as shown on the plans or as directed. Pedestal pole assemblies include foundation, pole shaft, base, anchor bolts, anchor bolt nuts, anchor bolt template, shims, and miscellaneous components. Watertight breakaway electrical disconnects are required for pedestal pole assemblies used in conjunction with vehicle and pedestrian heads and components. Pedestrian push button post assemblies include foundation, post, and post cap.

Use established industry and utility safety practices to erect assemblies near overhead or underground utilities. Consult with the appropriate utility company prior to beginning such work.

Repair damaged galvanizing in accordance with Section 445.3.D, "Repairs."

- C. Painted Finish.** When required, paint pedestal pole and pedestrian push button post assemblies in accordance with details shown on the plans.

**Article 687.4 Measurement** is voided and replaced by the following:

**687.4 Measurement.** This Item will be measured by each pedestal pole assembly or each pedestrian pushbutton post assembly."

**Article 687.5 Payment** is voided and replaced by the following:

**687.5. Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Pedestal Pole Assembly" or by the unit bid price for "Pedestrian Push Button Post Assembly."

This price is full compensation for furnishing and installing the shaft; base, shims, anchor bolts, and foundation; and materials, equipment, labor, tools, and incidentals.

New signal heads will be paid for under Item 682, "Vehicle and Pedestrian Signal Heads."

**SPECIAL SPECIFICATION****3239****Thin Overlay Mixture (TOM)**

1. **Description.** Construct a thin friction course overlay surface mix composed of a compacted mixture of aggregate and asphalt binder mixed hot in a mixing plant and placed at a lift thickness of 3/4 to 1-1/4 inch.
2. **Materials.** Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the specification requirements are met and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify specification compliance.

**A. Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1, and as specified in this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definition in this Section for either a coarse aggregate or fine aggregate. Do not use reclaimed asphalt pavement (RAP). Supply mechanically crushed gravel or stone aggregates that meet the definitions in Tex-100-E. The Engineer will designate the plant or the quarry as the sampling location. Samples must be from materials produced for the project. The Engineer will establish the surface aggregate classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II. Do not add material to an approved stockpile from sources that do not meet the aggregate quality requirements of the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) unless otherwise approved.

1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Provide aggregates from sources listed in the BRSQC. Use only the rated values for hot mix listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in hot mix asphalt. Provide aggregate from non-listed sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources.

Provide coarse aggregate with at least the minimum SAC as shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes. When shown on the plans, SAC requirements apply to aggregates used on surfaces other than travel lanes. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the BRSQC.

Unless otherwise shown on the plans, Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of material retained on the No. 8 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. When blending, do not use Class C or D aggregates.

**Table 1**  
**Aggregate Quality Requirements**

Property	Test Method	Requirement
<b>Coarse Aggregate</b>		
SAC	AQMP	Note 1
Deleterious material, %, max	Tex-217-F, Part I	1.0
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 2
Los Angeles abrasion, %, max	Tex-410-A	35
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	20
Coarse aggregate angularity, 2 crushed faces, %, min	Tex 460-A, Part I	100 <sup>3</sup>
Flat and elongated particles @ 3:1, %, max	Tex-280-F	10
<b>Fine Aggregate</b>		
Linear shrinkage, %, max	Tex-107-E	3
<b>Combined Aggregate<sup>4</sup></b>		
Sand equivalent, %, min	Tex-203-F	45

1. Surface aggregate classification of "A" is required unless otherwise shown on plans.

2. Not used for acceptance purposes. Used by the Engineer as an indicator of the need for further investigation.

3. Only applies to crushed gravel.

4. Aggregates, without mineral filler, or additives, combined as used in the job-mix formula (JMF).

- 2. Fine Aggregate.** Fine aggregates consist of manufactured sands and screenings. Natural sands are not allowed in any mixture. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify that the material is free from organic impurities. Use fine aggregate from coarse aggregate sources that meet the requirements in Table 1, unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

**Table 2  
Gradation Requirements for Fine Aggregate**

Sieve Size	% Passing by Weight or Volume
3/8"	98 - 100
#8	70 - 100
#200	0 - 30

3. **Recycled Asphalt.** Do not use recycled asphalt from RAP or RAS.
4. **Mineral Filler.** Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Do not use more than 2% mineral hydrated lime, unless otherwise shown on the plans. Do not add lime or cement directly into the mixing drum of any plant where they are removed through the exhaust stream, unless the plant has a baghouse or dust collection system that reintroduces them back into the drum.

When used, provide mineral filler that:

- is sufficiently dry, free-flowing and free from clumping and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E (not applicable for hydrated lime or fly ash); and
- meets the gradation requirements in Table 3

**Table 3  
Gradation Requirements for Mineral Filler**

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55-100

- B. **Baghouse Fines.** Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.
- C. **Asphalt Binder.** Furnish performance-graded (PG) asphalt binder PG 76-22 or PG 70-22, as specified in the notes and in accordance with Section 300.2.J, "Performance-Graded Binders".
- D. **Tack Coat.** Unless otherwise shown on the plans or approved, furnish CSS-1P, SS-1P, or a PG binder with a minimum high-temperature grade of PG 58 for the tack coat binders, in accordance with Item 300, "Asphalts, Oils, and Emulsions." Do not dilute emulsion asphalts at the terminal, in the field, or at any other location before use.

The Engineer will obtain at least one sample of the tack coat binder per project and test it to verify compliance with Item 300. The Engineer will obtain the sample from the asphalt distributor immediately before use.

- E. **Additives.** When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing or improve the quality of the mixture may be allowed, when approved.

1. **Antistripping Agent.** If lime or liquid antistripping agent is used, add in accordance with Item 301, “Asphalt Antistripping Agents.” When the plans require lime to be added as an antistripping agent, hydrated lime added as mineral filler will count towards the total quantity of hydrated lime specified. No more than 1% hydrated lime will be added to any mixture.
2. **Warm Mix Asphalt (WMA).** Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using Department approved WMA additives or processes. The Department’s approved list of WMA additives and processes is located at <http://ftp.dot.state.tx.us/pub/txdot-info/cmd/mpl/wma.pdf>.

WMA is allowed for use on all projects and is required when shown on plans. The maximum placement or target discharge temperature for WMA may be set at a value less than 275°F when shown on the plans.

Department approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures greater than 275°F; however, such mixtures will not be defined as WMA.

5. **Equipment.** Provide required or necessary equipment in accordance with Item 320, “Equipment for Hot-Mix Asphalt Materials.”
6. **Construction.** Produce, haul, place, and compact the specified paving mixture. Schedule and participate in a prepaving meeting with the Engineer as required in the Quality Control Plan (QCP).
  - A. **Certification.** Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 4. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level II certified specialist. Provide a Level IA certified specialist at the plant during production operations. Provide a Level IB certified specialist to conduct placement tests.

**Table 4  
Test Methods, Test Responsibility, and Minimum Certification Levels**

<b>1. Aggregate Testing</b>	<b>Test Method</b>	<b>Contractor</b>	<b>Engineer</b>	<b>Level</b>
Sampling	Tex-400-A	✓	✓	IA
Dry sieve	Tex-200-F, Part I	✓	✓	IA
Washed sieve	Tex-200-F, Part II	✓	✓	IA
Deleterious material	Tex-217-F, Part I	✓	✓	II
Decantation	Tex-217-F, Part II	✓	✓	II
Los Angeles abrasion	Tex-410-A		✓	
Magnesium sulfate soundness	Tex-411-A		✓	
Micro-Deval abrasion	Tex-461-A		✓	
Coarse aggregate angularity	Tex-460-A	✓	✓	II
Flat and elongated particles	Tex-280-F	✓	✓	II
Linear shrinkage	Tex-107-E	✓	✓	II
Sand equivalent	Tex-203-F	✓	✓	II
Organic impurities	Tex-408-A	✓	✓	II
<b>2. Mix Design &amp; Verification</b>	<b>Test Method</b>	<b>Contractor</b>	<b>Engineer</b>	<b>Level</b>
Design and JMF changes	Tex-204-F	✓	✓	II
Mixing	Tex-205-F	✓	✓	II
Molding (TGC)	Tex-206-F	✓	✓	IA
Laboratory-molded density	Tex-207-F	✓	✓	IA
VMA	Tex-207-F	✓	✓	II
Rice gravity	Tex-227-F	✓	✓	IA
Ignition oven calibration <sup>1</sup>	Tex-236-F	✓	✓	II
Indirect tensile strength	Tex-226-F	✓	✓	II
Overlay Test	Tex-248-F		✓	
Hamburg Wheel test	Tex-242-F	✓	✓	II
Boil test	Tex-530-C	✓	✓	IA
<b>3. Production Testing</b>	<b>Test Method</b>	<b>Contractor</b>	<b>Engineer</b>	<b>Level</b>
Random sampling	Tex-225-F		✓	IA
Mixture sampling	Tex-222-F	✓	✓	IA
Molding (TGC)	Tex-206-F	✓	✓	IA
Laboratory-molded density	Tex-207-F	✓	✓	IA
VMA (calculation only)	Tex-207-F	✓	✓	IA
Rice gravity	Tex-227-F	✓	✓	IA
Gradation & asphalt content <sup>1</sup>	Tex-236-F	✓	✓	IA
Control charts	Tex-233-F	✓	✓	IA
Moisture content	Tex-212-F	✓	✓	IA
Hamburg Wheel Test	Tex-242-F	✓	✓	II
Micro-Deval abrasion	Tex-461-A		✓	
Boil Test	Tex-530-C	✓	✓	IA
Aging Ratio	Tex-211-F		✓	
<b>4. Placement Testing</b>	<b>Test Method</b>	<b>Contractor</b>	<b>Engineer</b>	<b>Level</b>
Random sampling	Tex-225-F		✓	IA
Establish rolling pattern	Tex-207-F	✓		IB
Control charts	Tex-233-F	✓	✓	IA
Ride quality measurement	Tex-1001-S	✓	✓	N/A
Thermal profile	Tex-244-F	✓	✓	IB
Tack coat adhesion	Tex-243-F		✓	IB

1. Refer to Section 4.I.2.c for exceptions to using an ignition oven.

- B. Reporting.** Use Department-provided software to record and calculate all test data. Obtain the latest version of the software from the Engineer or from [http://www.dot.state.tx.us/txdot\\_library/consultants\\_contractors/forms/site\\_manager.htm](http://www.dot.state.tx.us/txdot_library/consultants_contractors/forms/site_manager.htm).

The Engineer and the Contractor must provide any available test results to the other party when requested. The maximum allowable time for the Contractor and Engineer to exchange test data is as given in Table 4a unless otherwise approved. The Engineer and the Contractor shall immediately report to the other party any test result that requires production to be suspended, requires a payment penalty, or fails to meet the specification requirements. Record and submit all test results and pertinent information on Department-provided software to the Engineer electronically by means of a portable USB flash drive or diskette, or via email.

**Table 4a  
Reporting Schedule**

Description	Reported By	Reported To	To Be Reported Within
<b>Production Quality Control</b>			
Gradation <sup>1</sup> Asphalt content <sup>1</sup> Laboratory-molded density <sup>2</sup> Moisture content <sup>3</sup>	Contractor	Engineer	1 working day of completion of the subplot
<b>Production Quality Assurance</b>			
Gradation <sup>3</sup> Asphalt content <sup>3</sup> Laboratory-molded density <sup>1</sup> Hamburg wheel test <sup>3</sup> Overlay test <sup>3</sup> Binder tests <sup>2</sup>	Engineer	Contractor	1 working day of completion of the subplot
<b>Placement Quality Control</b>			
Thermal profile <sup>1</sup>	Contractor	Engineer	1 hr. of performing the test for segregation, longitudinal joint density, and thermal profile
<b>Placement Quality Assurance</b>			
Thermal profile <sup>2</sup> Aging ratio <sup>2</sup>	Engineer	Contractor	1 working day of receipt of the trimmed cores for in-place air voids <sup>4</sup>
Pay Adjustment Summary	Engineer	Contractor	2 working days of performing all required tests and receiving Contractor test data

1. These tests are required on every subplot.

2. Optional test. To be reported as soon as results become available.

3. To be performed at the frequency specified on the plans.

4. Additional time is allowed if cores can not be dried to constant weight within 1 day.

The Engineer will use the Department-provided software to calculate all pay adjustment factors for the lot. Sublot samples may be discarded after the Engineer and Contractor sign off on the pay adjustment summary documentation for the lot.

Use the procedures described in Tex-233-F to plot the results of all quality control (QC) and quality assurance (QA) testing. Update the control charts as soon as test results for each subplot become available. Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

- C. **QCP.** Develop and follow the QCP in detail. Obtain approval from the Engineer for changes to the QCP made during the project. The Engineer may suspend operations if the Contractor fails to comply with the QCP.

Submit a written QCP to the Engineer before the mandatory prepping meeting. Receive the Engineer's approval of the QCP before beginning production. Include the following items in the QCP:

1. **Project Personnel.** For project personnel, include:
  - a list of individuals responsible for QC with authority to take corrective action; and
  - contact information for each individual listed.
2. **Material Delivery and Storage.** For material delivery and storage, include:
  - the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
  - aggregate stockpiling procedures to avoid contamination and segregation;
  - frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and
  - procedure for monitoring the quality and variability of asphalt binder.
3. **Production.** For production, include:
  - loader operation procedures to avoid contamination in cold bins;
  - procedures for calibrating and controlling cold feeds;
  - procedures to eliminate debris or oversized material;
  - procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, lime, liquid antistripping);
  - procedures for reporting job control test results; and
  - procedures to avoid segregation and drain-down in the silo.
4. **Loading and Transporting.** For loading and transporting, include:
  - type and application method for release agents; and
  - truck loading procedures to avoid segregation.
5. **Placement and Compaction.** For placement and compaction, include:
  - proposed agenda for mandatory prepaving meeting, including date and location;
  - type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
  - procedures for the transfer of mixture into the paver, while avoiding segregation and preventing material spillage;
  - process to balance production, delivery, paving, and compaction to achieve continuous placement operations;
  - paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
  - procedures to construct quality longitudinal and transverse joints.

#### **D. Mixture Design.**

1. **Design Requirements.** Use the mix design for dense-graded hot-mix asphalt mixtures using the Texas Gyrotray Compactor (TGC) given in Tex-204-F,

Part I. Design a mixture meeting the requirements listed in Tables 1, 2, 3, 5, and 6, unless approved otherwise by the Engineer.

Use an approved laboratory to perform the Hamburg Wheel test and Overlay test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test and Overlay test. Evaluate the mixture using the Hamburg Wheel Test and Overlay test at the optimum asphalt content (OAC). The Construction Division maintains a list of approved laboratories. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test and Overlay test results on the laboratory mixture design.

The Contractor may submit a new mixture design at any time during the project. The Engineer will approve all mixture designs before the Contractor can begin production. When shown on the plans, the Engineer will provide the mixture design.

Provide the Engineer with a mixture design report using Department-provided software. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level II person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

**Table 5**  
**Master Gradation Bands (% Passing by Weight or Volume) and Volumetric Properties**

Sieve Size	Fine Mixture (% Passing by Weight or Volume)
3/4"	–
1/2"	100.0
3/8"	85.0 – 100.0
#4	40.0 – 60.0
#8	17.0 – 27.0
#16	5.0 – 27.0
#30	5.0 – 27.0
#50	5.0 – 27.0
#200	5.0 – 9.0
Property	Requirement
Binder Content, % Minimum <sup>2</sup>	6.0
Design VMA <sup>1</sup> , % Minimum	16.0
Plant-Produced VMA, % Minimum	15.5

1. Voids in mineral aggregates.

2. Unless approved otherwise.

**Table 6  
Laboratory Mixture Design Properties**

<b>Property</b>	<b>Test Method</b>	<b>Requirement</b>
Target Laboratory-Molded Density, %	Tex 207 F	97.5
Hamburg Wheel Tracking Test, PG 76-22, Min. passes <sup>1</sup>	Tex 242-F	20,000
Hamburg Wheel Tracking Test, PG 70-22, Min. passes <sup>1</sup>	Tex 242-F	15,000
Tensile Strength (dry), psi.	Tex-226-F	85-180
Overlay Test, Min cycles		500
Lime Content, Max %		1.0
Drain Down Test, Max %	Tex 235 - F	0.20

1. Mold test specimens to 93%+/- 1% as per Tex 242-F.

**2. Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation and target asphalt percentage used to establish target values for hot mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommend rate on the JMF1 submittal. The Engineer and the Contractor will verify JMF1 based on a plant-produced mixture from the trial batch, unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1.

**a. Contractor's Responsibilities.**

- (1) Providing Gyratory Compactor.** Furnish a Texas Gyratory Compactor (TGC), calibrated in accordance with Tex-914-F, for molding production samples. Locate the TGC at the Engineer's field laboratory and make the TGC available to the Engineer for use in molding production samples.
- (2) Gyratory Compactor Correlation Factors.** Use Tex-206-F, Part II, to perform a gyratory compactor correlation when the Engineer uses a different TGC. Apply the correlation factor to all subsequent production test results.
- (3) Submitting JMF1.** Furnish the Engineer a mix design report (JMF1), and request approval to produce the trial batch. If opting to have the Department perform the Hamburg Wheel test and Overlay test on the laboratory mixture, provide the Engineer with approximately 20,000 g of the design mixture and request that the Department perform the Hamburg Wheel test.
- (4) Supplying Aggregate.** Provide the Engineer with approximately 40 lb. of each aggregate stockpile, unless otherwise directed.
- (5) Supplying Asphalt.** Provide the Engineer at least 1 gal. of the asphalt material and sufficient quantities of any additives proposed for use.

- (6) **Ignition Oven Correction Factors.** Determine the aggregate and asphalt correction factors from the ignition oven in accordance with Tex-236-F. Provide the Engineer with split samples of the mixtures, including all additives (except water), and blank samples used to determine the correction factors. Correction factors established from a previously approved mixture design may be used for the current mixture design, if the mixture design and ignition oven are the same as previously used, unless otherwise directed.
- (7) **Boil Test.** Perform the test and retain the tested sample from Tex-530-C. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.
- (8) **Trial Batch Production.** Upon receiving conditional approval of JMF1 and authorization from the Engineer to produce a trial batch, provide a plant-produced trial batch, including the WMA additive or process, if applicable, for verification testing of JMF1 and development of JMF2. Produce the trial batch mixture with an asphalt content within 0.5% of the optimum asphalt content established for JMF1, unless otherwise approved.
- Obtain and provide the Engineer with approximately 20,000 g of trial batch mixture in a sealed container, box, or bags labeled with the CSJ number, mixture type, and date for Hamburg testing.
- (9) **Trial Batch Production Equipment.** To produce the trial batch, use only equipment and materials proposed for use on the project.
- (10) **Trial Batch Quantity.** Produce enough quantity of the trial batch to ensure that the mixture is representative of JMF1.
- (11) **Number of Trial Batches.** Produce trial batches as necessary to obtain a mixture that meets the requirements in Table 7.
- (12) **Trial Batch Sampling.** Obtain a representative sample of the trial batch and split it into three equal portions, in accordance with Tex-222-F. Label these portions as “Contractor,” “Engineer,” and “Referee.” Deliver samples to the appropriate laboratory as directed.
- (13) **Trial Batch Testing.** Test the trial batch to ensure that the mixture produced using the proposed JMF1 meets the verification testing requirements for gradation; asphalt content, laboratory-molded density, and VMA listed in Table 8 and is in compliance with the Hamburg Wheel and Overlay test requirements in Tables 6 and 7. Use an approved laboratory to perform the Hamburg Wheel test and Overlay test on the trial batch mixture or request that the Department perform the Hamburg Wheel test and Overlay test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test and Overlay test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.

**(14) Development of JMF2.** After the Engineer grants full approval of JMF1 based on results from the trial batch, evaluate the trial batch test results, determine the optimum mixture proportions, and submit as JMF2. Adjust the asphalt content to achieve the specified target laboratory-molded density. The asphalt content established for JMF2 is not required to be within any tolerance of the optimum asphalt content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 5.

**(15) Mixture Production.** After receiving approval for JMF2 and receiving a passing result from the Department's or a Department-approved laboratory's Hamburg Wheel test and the Department's Overlay test on the trial batch, use JMF2 to produce Lot 1. As an option, once JMF2 is approved, proceed to Lot 1 production at the Contractor's risk without receiving the results from either the Department's Hamburg Wheel test or Overlay test on the trial batch. If electing to proceed without the Hamburg Wheel test and Overlay test results from the trial batch, notify the Engineer. Note that the Engineer may require that up to the entire subplot of any mixture failing the Hamburg Wheel test or Overlay test be removed and replaced at the Contractor's expense.

**(16) Development of JMF3.** Evaluate the test results from Lot 1, determine the optimum mixture proportions, and submit as JMF3 for use in Lot 2.

**(17) JMF Adjustments.** If necessary, adjust the JMF before beginning a new lot. The adjusted JMF must:

- be provided to the Engineer in writing before the start on a new lot;
- be numbered in sequence to the previous JMF;
- meet the master gradation limits shown in Table 5; and
- be within the operational tolerances of JMF2 listed in Table 7.

**(18) Requesting Referee Testing.** If needed, use referee testing in accordance with Section 4.I.1, "Referee Testing," to resolve testing differences with the Engineer.

**Table 7  
Operational Tolerances**

Description	Test Method	Allowable Difference from Current JMF Target	Allowable Difference between Contractor and Engineer <sup>1</sup>
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±3.0 <sup>2</sup>	±3.0
Individual % retained for sieves smaller than #8 and larger than #200		±3.0 <sup>2</sup>	±3.0
% passing the #200 sieve		±2.0 <sup>2</sup>	±1.6
Asphalt content, % <sup>5</sup>	Tex-236-F	±0.3 <sup>3</sup>	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±0.5
Laboratory-molded bulk specific gravity		N/A	±0.020
VMA, % min		Note 4	N/A
Drain-down, %	Tex-235-F	±0.10	±0.10
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	± 0.020

1. Contractor may request referee testing only when values exceed these tolerances.

2. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 sieve will be considered out of tolerance when outside the master grading limits.

3. Tolerance between trial batch test results and JMF1 (lab produced mix) is not allowed to exceed 0.5%, unless otherwise directed. Tolerance between JMF1 (lab produced mix) and JMF2 is allowed to exceed ±0.3%.

4. Test and verify that Table 5 requirements are met.

5. May be obtained from asphalt meter readouts for Type I

**b. Engineer’s Responsibilities.**

- (1) **Gyratory Compactor.** The Engineer will use a Department TGC, calibrated in accordance with Tex-914-F, to mold samples for laboratory mixture design verification. For molding trial batch and production specimens, the Engineer will use the Contractor-provided TGC at the field laboratory or will provide and use a Department TGC at an alternate location. The Engineer will make the Contractor-provided TGC in the Department field laboratory available to the Contractor for molding verification samples.
- (2) **Conditional Approval of JMF1.** When the Contractor is required to perform the mixture design as shown on plans, within 10 working days of receiving the mixture design report (JMF1) and all required materials and Contractor-provided Hamburg Wheel test and Overlay test results, the Engineer will review the Contractor’s mix design report and verify conformance with all aggregates, asphalt, additives, and mixture specifications. The Engineer may perform tests to verify that the aggregates meet the requirements listed in Table 1. The Engineer will grant the Contractor conditional approval of JMF1, if the information provided on the paper copy of JMF1 indicates that the Contractor’s mixture design meets the specifications. When the Contractor does not provide Hamburg Wheel test and Overlay test results with laboratory mixture design, allow the Engineer 10 working days for conditional approval of JMF 1. The Engineer will base full approval of JMF1 on test results on mixture from the trial batch.

- (3) **Hamburg Wheel Testing of JMF1.** If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the laboratory mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 6.
- (4) **Authorizing Trial Batch.** After conditionally approving JMF1, including either Contractor- or Department-supplied Hamburg Wheel test and Overlay test results, the Engineer will authorize the Contractor to produce a trial batch.
- (5) **Ignition Oven Correction Factors.** The Engineer will use the split samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven in accordance with Tex-236-F.
- (6) **Testing the Trial Batch.** Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the gradation, asphalt content, laboratory-molded density, and VMA meet the requirements listed in Table 7. If the Contractor requests the option to have the Department perform the Hamburg Wheel test and Overlay test on the trial batch mixture, the Engineer will mold samples in accordance with Tex-242-F and Tex-248-F to verify compliance with the Hamburg Wheel test and Overlay test requirement in Table 6.

The Engineer will have the option to perform the following tests on the trial batch:

- Tex-226-F, to verify that the indirect tensile strength meets the requirement shown in Table 6.
  - Tex-235-F, to verify that drain-down meets the requirements shown in Table 6;
  - Tex-461-A, to determine the need for additional magnesium sulfate soundness testing; and
  - Tex-530-C, to retain and use for comparison purposes during production.
- (7) **Full Approval of JMF1.** The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for gradation, asphalt content, laboratory-molded density, and VMA confirm that the trial batch meets the requirements in Table 7.

The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet the requirements in Table 5.

- (8) **Approval of JMF2.** The Engineer will approve JMF2 within 1 working day if the gradation meets the master grading limits shown in Table 5 and is within the operational tolerances of JMF1 listed in

Table 7. The asphalt content established for JMF2 is not required to be within any tolerance of the optimum asphalt content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 5.

- (9) **Approval of Lot 1 Production.** The Engineer will authorize the Contractor to proceed with Lot 1 production as soon as a passing result is achieved from the Department's or an approved laboratory's Hamburg Wheel test and Overlay test. As an option, the Contractor may, at their own risk, proceed with Lot 1 production without results from the Hamburg Wheel test and Overlay test on the trial batch.

If the Department's or approved laboratory's sample from the trial batch fails the Hamburg Wheel test or Overlay test, the Engineer will suspend production until further Hamburg Wheel tests or Overlay tests meet the specified values. The Engineer may require up to the entire subplot of any mixture failing the Hamburg Wheel test or Overlay test to be removed and replaced at the Contractor's expense.

- (10) **Approval of JMF3.** The Engineer will approve JMF3 within 1 working day if it meets the master grading limits shown in Table 5 and is within the operational tolerances of JMF2 listed in Table 7.

**E. Production Operations.** Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification.

1. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures in legible increments in accordance with Item 320, "Equipment for Hot-Mix Asphalt Materials." Unless otherwise approved, do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.
2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F (or 275°F for WMA) and is not lower than 215°F. The Department will not pay for or allow placement of any mixture produced at more than 350°F.

When WMA is required, produce the WMA within the target temperature discharge range of 215°F and 275°F. Take corrective action any time the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor's corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. If requested, determine the moisture content by oven-drying in accordance with Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

- F. Hauling Operations.** Before use, clean all truck beds to ensure that mixture is not contaminated. When a release agent is necessary, use a release agent on the approved list maintained by the Construction Division to coat the inside bed of the truck.
- G. Placement Operations.** Collect haul tickets from each load of mixture delivered to the project and provide the Department’s copy to the Engineer approximately every hour, or as directed by the Engineer, unless otherwise shown on the plans. When the Pave-IR system is not used for specification compliance, measure and record the internal temperature of the mixture as discharged from the truck or material transfer device prior to entering the paver and an approximate station number on each ticket, unless otherwise shown on plans. Unless otherwise directed, calculate and report the yield and cumulative yield following the production of every 125 tons or following every 2 hours of production, whichever occurs first for the specified lift and provide to the Engineer. The Engineer may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations.

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly. Place mixture within the compacted lift thickness shown in Table 8, unless otherwise shown on the plans or allowed.

**Table 8  
Compacted Lift Thickness and Required Core Height**

<b>Compacted Lift Thickness</b>		<b>Minimum Untrimmed Core Height (in.) Eligible for Testing</b>
<b>Minimum (in.)</b>	<b>Maximum (in.)</b>	
0.75	1.25	N/A

- 1. Weather Conditions.** Place when the roadway surface temperature is equal to or higher than 70°F, unless otherwise approved or shown on the plans. Measure the roadway surface temperature with a handheld infrared thermometer or infrared camera. The Engineer may allow mixture placement to begin prior to the roadway surface reaching the required temperature requirements, if conditions are such that the roadway surface will reach the required temperature within 2 hrs. of beginning placement operations. Unless otherwise shown on the plans, place mixture only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.

2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.13 and 0.16 gal. of residual asphalt per square yard of surface area. Apply a uniform tack coat to all contact surfaces of curbs, structures, and all joints. Allow adequate time for emulsion to break completely prior to placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller when directed. The Engineer may use Tex-243-F to verify that the tack coat has adequate adhesive properties. The Engineer may suspend paving operations until there is adequate adhesion.
3. **Lay-Down Operations.** When WMA is not used, measure the temperature of the mixture delivered to the paver and take corrective action if needed to ensure the temperature does not drop below 275 °F.
  - a. **Thermal Profile.** Use an infrared thermometer or thermal camera to obtain a thermal profile on each subplot in accordance with Tex-244-F. The Engineer may allow the Contractor to reduce the testing frequency based on a satisfactory test history. The Engineer may also obtain as many thermal profiles as deemed necessary. Thermal profiles are not applicable in miscellaneous paving areas subject to hand work such as driveways, crossovers, turnouts, gores, tapers, and other similar areas.
    - (1) **Moderate Thermal Segregation.** Any areas that have a maximum temperature differential greater than 25°F but not exceeding 50°F are deemed as having moderate thermal segregation. Take immediate corrective action to eliminate the moderate thermal segregation. Evaluate areas with moderate thermal segregation by performing a density profile in accordance with Section 4.I.3.c(2), “Segregation Density Profile).”
    - (2) **Severe Thermal Segregation.** Any areas that have a maximum temperature differential greater than 50°F are deemed as having severe thermal segregation. When the Pave-IR system is not used, no production or placement bonus will be paid for any subplot that contains severe thermal segregation. Unless otherwise directed, suspend operations and take immediate corrective action to eliminate severe thermal segregation. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Item. Evaluate areas with severe thermal segregation by performing a density profile in accordance with Section 4.I.3.c(2), “Segregation (Density Profile).” Unless otherwise directed, remove and replace the material in any areas that have both severe thermal segregation and a failing result for Segregation (Density Profile). The subplot in question may receive a production and placement bonus if applicable when the defective material is successfully removed and replaced.
    - (3) **Use of the Pave-IR System.** In lieu of obtaining thermal profiles on each subplot using an infrared thermometer or thermal camera, the

Contractor may use the Pave IR system (paver mounted infrared bar) to obtain a continuous thermal profile in accordance with Tex-244-F. When electing to use the Pave-IR system, notify the Engineer more than 24 hours from the start of production and specify if using the Pave-IR system for specification compliance or for information only. When electing to use the Pave-IR system for information only, use an infrared thermometer or thermal camera to obtain thermal profiles in accordance with Tex-244-F.

When using the Pave-IR system, review the output results on a daily basis and, unless otherwise directed, provide the output results to the Engineer for review. Modify the paving process as necessary to eliminate any (moderate or severe) thermal segregation identified by the Pave-IR system. The Engineer may suspend paving operations if the Contractor cannot successfully modify the paving process to eliminate thermal segregation. Upon completion of use of the Pave-IR system for specification compliance or as requested by the Engineer, provide the Engineer with electronic copies of all daily data files which can be used with the Pave-IR system software to generate temperature profile plots.

**b. Windrow Operations.** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

**H. Compaction.** Roll with a steel-wheel roller without excessive breakage of the aggregate and to provide a smooth surface and uniform texture. If a steel-wheel roller is used in vibratory mode, operate at low amplitude and high frequency. Do not use pneumatic-tire rollers. Use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern. Thoroughly moisten the roller drums with soap and water solution to prevent adhesion. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

The Engineer may require the Contractor to use Tex-246-F to test and verify that the compacted mixture is not permeable, especially if the placed mix is allowed to cool below 275°F before compaction occurs and WMA is not used. The water flow rate should be greater than 30 seconds. If the water flow rate is lower than 30 seconds, the mix design or construction methods may need to be adjusted. Permeability test should be conducted at least on the first subplot of a day's or night's production.

The Engineer may require cores be taken to verify thickness and bond strength. Maintain thickness within  $\pm 1/4$  inch of the target thickness. If the thickness exceeds this tolerance, it may be subject to removal, as directed by the Engineer. Adjust

application rates of the tack coat or underseal if the thin overlay mixture is not bonded to the underlying pavement.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic, unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

- I. Acceptance Plan.** Sample and test the hot mix on a lot and subplot basis at the frequency shown in Table 9. A production lot consists of four equal sublots. The Engineer will select subsequent lot sizes based on the anticipated daily production. The lot size will be between 500 tons and 2,000 tons. The Engineer may change the lot size before the Contractor begins any lot. If production or placement test results are not within the acceptable tolerances listed in Table 7, suspend production until test results or other information indicate to the satisfaction of the Engineer that the next material produced or placed will meet the specified values.

**Table 9  
Production and Placement Testing Frequency**

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	1 per subplot	1 per 12 sublots
Individual % retained for sieves smaller than #8 and larger than #200			
% passing the #200 sieve			
Laboratory-molded density	Tex-207-F	N/A	1 per subplot
VMA			
Laboratory-molded bulk specific gravity			
Moisture content	Tex-212-F, Part II	When directed	
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	1 per subplot
Asphalt content	Tex-236-F	1 per subplot	1 per lot
Hamburg Wheel test	Tex-242-F	N/A	1 per project
Thermal profile	Tex-244-F	1 per subplot	
Asphalt binder sampling and testing <sup>1</sup>	Tex-500-C	1 per subplot (sample only)	
Boil test <sup>1</sup>	Tex-530-C	1 per lot	

1. The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.

- 1. Referee Testing.** The Construction Division is the referee laboratory. The Contractor may request referee testing if the differences between Contractor and Engineer test results exceed the operational tolerance shown in Table 7 and the differences cannot be resolved. Make the request within 5 working days after receiving test results and cores from the Engineer. Referee tests will be performed only on the subplot in question and only for the particular test in question. Allow 10 working days from the time the referee laboratory receives the samples for reporting of test results. The Department may require the Contractor to reimburse the Department for referee tests, if more than three referee tests per project are required, and the Engineer's test results are closer than the Contractor's test results to the referee test results.

The Construction Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample.

## 2. **Production Acceptance.**

a. **Production Lot.** A production lot consists of four equal sublots. The Engineer will select subsequent lot sizes based on the anticipated daily production. The lot size will be between 500 tons and 2,000 tons. The Engineer may change the lot size before the Contractor begins any lot.

(1) **Incomplete Production Lots.** If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot.

### b. **Production Sampling.**

(1) **Mixture Sampling.** At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with Tex-225-F.

Obtain hot mix samples from trucks at the plant in accordance with Tex-222-F. For each subplot, take one sample at the location randomly selected. The Engineer will witness the sampling. For each lot, the Engineer will randomly select, obtain and test a “blind” sample from at least one subplot. The location of the Engineer’s “blind” sample will not be disclosed to the Contractor. The Engineer will use the Contractor’s split sample for sublots not sampled by the Engineer.

The sampler will split each sample into three equal portions in accordance with Tex-200-F and label these portions as “Contractor,” “Engineer,” and “Referee.” The Engineer will witness the sample splitting and take immediate possession of the samples labeled “Engineer” and “Referee.” The Engineer will maintain the custody of the samples labeled “Engineer” and “Referee” until testing by the Department is completed. Discard unused samples after the Engineer has accepted the material for payment.

(2) **Tack Coat Binder Sampling.** Obtain a 1-qt. sample of the asphalt binder for each lot of mixture produced. Obtain the sample at approximately the same time the mixture random sample is obtained. Take the sample in accordance with Tex-500-C, Part III. Label the can with the corresponding lot and subplot numbers, and deliver the sample to the Engineer.

(3) **Asphalt Binder Sampling.** Obtain a 1 qt. sample of the asphalt binder for each lot of mixture produced. Obtain the sample at approximately the same time the mixture random is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill. Take the sample in accordance with Tex-500-C, Part II. Label the can with the corresponding lot and subplot numbers, and deliver the sample to the Engineer.

The Engineer may also obtain independent samples. If the Engineer chooses to obtain an independent asphalt binder sample, the Engineer will split a sample of the asphalt binder with the Contractor. The Engineer will test at least one asphalt binder sample per project to verify compliance with Item 300, "Asphalts, Oils, and Emulsions."

- c. **Production Testing.** The Contractor and Engineer must perform production tests in accordance with Table 10. The Contractor has the option to verify the Engineer's test results on split samples provided by the Engineer. Determine compliance with operational tolerances listed in Table 7 for all sublots.

Control mixture production to yield a laboratory-molded density as indicated in Table 6 for the mixture type being produced to  $\pm 1.0\%$  as tested by the Engineer. Suspend production if two consecutive sublots fail to meet this requirement, unless otherwise approved. Resume production after the Engineer approves changes to production methods.

Referee testing is required for any subplot with a laboratory-molded density greater than 98.5% or less than 96.5%. If the new laboratory-molded density is within the range of 96.5% to 98.5%, the material will receive full payment in accordance with Sections 5.A and 5.B. If the new laboratory-molded density is not within the range of 96.5% to 98.5%, the Engineer may require removal and replacement or may allow the subplot to be left in place without payment or at a reduced payment. Replacement material meeting the requirements of this Item will be paid for in accordance with this Article.

If the aggregate mineralogy is such that Tex-236-F does not yield reliable results, the Engineer may allow alternate methods for determining the asphalt content and aggregate gradation. Unless otherwise allowed, the Engineer will require the Contractor to provide evidence that results from Tex-236-F are not reliable before permitting an alternate method. If an alternate test method is allowed, use the applicable test procedure as directed.

- d. **Operational Tolerances.** Control the production process within the operational tolerances listed in Table 7. When production is suspended, the Engineer will allow production to resume when test results or other information indicates that the next mixture produced will be within the operational tolerances.
- (1) **Gradation.** Unless otherwise directed, suspend production when either the Contractor's or the Engineer's test results for gradation exceed the operational tolerances for three consecutive sublots on the same sieve or four consecutive sublots on any sieve. The consecutive sublots may be from more than one lot.
- (2) **Asphalt Content.** Unless otherwise directed, suspend production when two or more sublots within a lot are out of operational tolerance for asphalt content based on either the Contractor's or the Engineer's

test results. Suspend production and shipment of mixture if the asphalt content deviates from the current JMF by more than 0.5% for any subplot.

- (3) **Hamburg Wheel Test.** The Engineer may perform a Hamburg Wheel test at any time during production. In addition to testing production samples, the Engineer may obtain cores and perform the Hamburg Wheel test on any area of the roadway where rutting is observed. The Engineer may require up to the entire subplot of any mixture failing the test to be removed and replaced at the Contractor's expense.

If the Department's or Department-approved laboratory's Hamburg Wheel test results do not meet the minimum number of passes specified in Table 6, the Contractor may request that the Department confirm the results by retesting the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

- e. **Individual Loads of Mix.** The Engineer can reject individual truckloads of mix. When a load of mix is rejected for reasons other than temperature, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 7, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load, and the Engineer may require removal.

### 3. Placement Acceptance.

- a. **Placement Lot.** A placement lot consists of four placement sublots. A placement subplot consists of the area placed during a production subplot.
  - (1) **Incomplete Placement Lots.** An incomplete placement lot consists of the area placed as described in Section 4.I.2.a.(2), "Incomplete Production Lots," excluding miscellaneous areas as defined in Section 4.I.3.a(3), "Miscellaneous Areas." Placement sampling is required if the random sample plan for production resulted in a sample being obtained from an incomplete production subplot.
- b. **Irregularities.** Identify and correct irregularities including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities and areas where the mixture does not bond to the existing pavement. If

irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than 1 day while the Contractor is taking appropriate corrective action.

- c. **Recovered Asphalt Dynamic Shear Rheometer (DSR).** The Engineer may take production samples or cores from suspect areas of the project to determine recovered asphalt properties. Asphalt binders with an aging ratio greater than 3.5 do not meet the requirements for recovered asphalt properties and may be deemed defective when tested and evaluated by the Construction Division. The aging ratio is the dynamic shear rheometer (DSR) value of the extracted binder divided by the DSR value of the original unaged binder. DSR values are obtained according to AASHTO T 315 at the specified high temperature performance grade of the asphalt. The Engineer may require removal and replacement of the defective material at the Contractor's expense. The asphalt binder will be recovered for testing from production samples or cores in accordance with Tex-211-F.

4. **Ride Quality.** Unless otherwise shown on the plans, measure ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces."

7. **Measurement.** TOM will be measured by the ton of composite TOM. The composite TOM is defined as the asphalt, aggregate, and additives. The weights of asphalt and aggregate will be calculated based on the measured weight of TOM and the target percentage of asphalt and aggregate. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

- A. **Asphalt.** The asphalt weight in tons will be determined from the total weight of TOM. Measured asphalt percentage will be obtained using Tex-236-F or asphalt flow meter readings, as determined by the Engineer.

1. **Target Percentage.** The JMF target asphalt percentage will be used to calculate the weight of asphalt binder unless the measured asphalt binder percentage is more than 0.3 percentage points below the JMF target asphalt percentage. Volumetric meter readings will be adjusted to 140°F and converted to weight.
2. **Measured Percentage.** The measured asphalt percentage will be used for payment for that lot's production when the measured percentage is more than 0.3 percentage points below the JMF target asphalt percentage.

- B. **Aggregate.** The aggregate weight in tons will be determined from the total weight of TOM less the weight of the asphalt.

8. **Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "TOM (Asphalt)" of the binder specified and for "TOM (Aggregate)" of the grade and surface aggregate classification specified. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals.

Trial batches will not be paid for unless they are included in pavement work approved by the Department.

Pay adjustment for ride quality will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

## SPECIAL SPECIFICATION

3267

### Dense-Graded Hot-Mix Asphalt (Small Quantity)

- 1. Description.** Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant. This specification is intended for small quantity (SQ) HMA projects, typically under 5,000 tons total production.
- 2. Materials.** Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the specification requirements are met and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

**A. Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1 and as specified in this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply aggregates that meet the definitions in Tex-100-E for crushed gravel or crushed stone. The Engineer will designate the plant or the quarry as the sampling location. Samples must be from materials produced for the project. The Engineer will establish the surface aggregate classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II.

- 1. Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregate from sources listed in the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) located at <http://www.txdot.gov/business/resources/producer-list.html> are preapproved for use.

For sources not listed on the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance; and
- once approved, do not add material to the stockpile unless otherwise approved.

Use only the rated values for hot mix listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in hot mix. Provide aggregate from non-listed sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources.

Provide coarse aggregate with at least the minimum SAC as shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes. SAC requirements apply to aggregates used on surfaces other than travel lanes when shown on the plans. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the BRSQC.

- a. Blending Class A and Class B Aggregates.** Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. For blending purposes, coarse aggregate from RAP and Recycled Asphalt Shingles (RAS) will be considered as Class B aggregate.

When the Contractor blends Class A and B aggregates to meet a Class A requirement, the Engineer may perform tests at any time during production to ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. In such cases where the Engineer elects to verify conformance, the Engineer will use the Department's mix design Excel template to calculate the percent of Class A aggregate retained on the No. 4 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks using the gradations supplied by the Contractor on the mixture design report as an input for the Excel template; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

- 2. Intermediate Aggregate.** Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. When used, supply intermediate aggregates that are free from organic impurities.

The Engineer may test the intermediate aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. When used, supply intermediate aggregate from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

- 3. Fine Aggregate.** Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. At most 15% of the total aggregate may be field sand or other uncrushed fine aggregate. With the exception of field sand, use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

**Table 1**  
**Aggregate Quality Requirements**

Property	Test Method	Requirement
<b>Coarse Aggregate</b>		
SAC	AQMP	As shown on plans
Deleterious material, %, max	Tex-217-F, Part I	1.5
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 1
Los Angeles abrasion, %, max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	30
Coarse aggregate angularity, 2 crushed faces, %, min	Tex-460-A, Part I	85 <sup>2</sup>
Flat and elongated particles @ 5:1, %, max	Tex-280-F	10
<b>Fine Aggregate</b>		
Linear shrinkage, %, max	Tex-107-E	3
<b>Combined Aggregate<sup>3</sup></b>		
Sand equivalent, %, min	Tex-203-F	45

1. Not used for acceptance purposes. Optional test used by the Engineer as an indicator of the need for further investigation

2. Only applies to crushed gravel.

3. Aggregates, without mineral filler, RAP, RAS, or additives, combined as used in the job-mix formula (JMF).

**Table 2**  
**Gradation Requirements for Fine Aggregate**

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70-100
#200	0-30

- B. Mineral Filler.** Mineral filler consists of finely divided mineral matter, such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the plans.

Do not use more than 2% mineral hydrated lime unless otherwise shown on the plans. If a substitute binder is used, do not use more than 1% hydrated lime unless otherwise shown on the plans or allowed by the Engineer. Test all mineral fillers except hydrated lime and fly ash in accordance with Tex-107-E to ensure specification compliance. The plans may require or disallow specific mineral fillers. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

**Table 3  
Gradation Requirements for Mineral Filler**

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55–100

- C. Baghouse Fines.** Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.
- D. Asphalt Binder.** Furnish the type and grade of performance-graded (PG) asphalt specified on the plans.
- E. Tack Coat.** Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, “Asphalts, Oils, and Emulsions.” Specialized or preferred tack coat materials may be allowed by the Engineer or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

The Engineer will obtain at least one sample of the tack coat binder per project in accordance with Tex-500-C, Part III, and test it to verify compliance with Item 300. The Engineer will obtain the sample from the asphalt distributor immediately before use.

- F. Additives.** Use the type and rate of additive specified when shown on the plans. Other additives that facilitate mixing, compaction, or improve the quality of the mixture may be allowed when approved. Provide the Engineer with documentation such as the bill of lading showing the quantity of additives used in the project unless otherwise directed.
- 1. Lime and Liquid Antistripping Agent.** When lime or a liquid antistripping agent is used, add in accordance with Item 301, “Asphalt Antistripping Agents.” Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.
  - 2. Warm Mix Asphalt (WMA).** Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using Department-approved WMA additives or processes. The Department’s Material Producer List of WMA additives and processes is located at <http://www.txdot.gov/business/resources/producer-list.html>.

WMA is allowed for use on all projects and is required when shown on plans. The maximum placement or target discharge temperature for WMA may be set at a value less than 275°F when shown on the plans.

Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures greater than 275°F; however, such mixtures will not be defined as WMA.

- G. Recycled Materials.** Use of RAP and RAS is permitted unless otherwise shown on the plans. Do not exceed the maximum allowable percentages of RAP and RAS shown in Table 4. The allowable percentages shown in Table 4 may be decreased or increased when shown on the plans. Determine asphalt content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with Tex-236-F. The Engineer may verify the asphalt content of the stockpiles at any time during production. Perform other tests on RAP and RAS when shown on the plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. When RAP or RAS is used, calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5 during mixture design and HMA production. During HMA production, use a separate cold feed bin for each stockpile of RAP and RAS.

Surface, intermediate, and base mixes referenced in Tables 4 and 5 are defined as follows:

- "Surface" mixes are the final lift or riding surface of the pavement structure;
  - Intermediate" mixes are non-surface mixtures placed less than or equal to 8 inches from the riding surface; and
  - "Base" mixes are non-surface mixtures placed greater than 8 inches from the riding surface.
- 1. RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2 in. sieve.

Use of Contractor-owned RAP including HMA plant waste is permitted unless otherwise shown on the plans. Department-owned RAP stockpiles are available for the Contractor's use when the stockpile locations are shown on the plans. If Department-owned RAP is available for the Contractor's use, the Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP. This allowance does not apply to a Contractor using unfractionated RAP. Department-owned RAP generated through required work on the Contract is available for the Contractor's use when shown on the plans. Perform any necessary tests to ensure Contractor- or Department-owned RAP is appropriate for use. The Department will not perform any tests or assume any liability for the quality of the Department-owned RAP unless otherwise shown on the plans. The Contractor will retain ownership of RAP generated on the project when shown on the plans.

Fractionated RAP is defined as having two or more RAP stockpiles, divided into coarse and fine fractions.

The coarse RAP stockpile will contain only material retained by processing over a 3/8 in. screen or 1/2 in. screen unless otherwise approved. The fine RAP stockpile will contain only material passing the 3/8 in. screen or 1/2 in. screen unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8 in. screen or 1/2 in. screen to fractionate the RAP. The maximum percentages of fractionated RAP may be comprised of coarse or fine fractionated RAP or the combination of both coarse and fine fractionated RAP.

Do not use Department- or Contractor-owned RAP contaminated with dirt or other objectionable materials. Do not use Department- or Contractor-owned RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with Tex-406-A, Part I. Determine the plasticity index in accordance with Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

**Table 4  
Maximum Allowable Amounts of RAP<sup>1</sup>**

Maximum Allowable Fractionated RAP <sup>2</sup> (%)			Maximum Allowable Unfractionated RAP <sup>3</sup> (%)		
Surface	Intermediate	Base	Surface	Intermediate	Base
20.0	30.0	40.0	10.0	10.0	10.0

1. Must also meet the recycled binder to total binder ratio shown in Table 5.

2. Up to 5% RAS may be used separately or as a replacement for fractionated RAP.

3. Unfractionated RAP may not be combined with fractionated RAP or RAS.

2. **RAS.** Use of post-manufactured RAS or post-consumer RAS (tear-offs) is permitted unless otherwise shown on the plans. Up to 5% RAS may be used separately or as a replacement for fractionated RAP in accordance with Table 4 and Table 5. RAS is defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS is processed manufacturer’s shingle scrap by-product. Post-consumer RAS is processed shingle scrap removed from residential structures. Comply with all regulatory requirements stipulated for RAS by the Texas Commission on Environmental Quality (TCEQ). RAS may be used separately or in conjunction with RAP.

Process the RAS by ambient grinding or granulating such that 100% of the particles pass the 3/8 in. sieve when tested in accordance with Tex-200-F, Part I. Perform a sieve analysis on processed RAS material prior to extraction (or ignition) of the asphalt.

Add sand meeting the requirements of Table 1 and Table 2 or fine RAP to RAS stockpiles if needed to keep the processed material workable. For any stockpile that contains RAS, the entire stockpile will be considered a RAS stockpile and be limited to no more than 5.0% of the HMA mixture in accordance with Table 4.

Certify compliance of the RAS with DMS-11000, “Evaluating and Using Nonhazardous Recyclable Materials (NRM) Guidelines.” If the RAS has not come into contact with any hazardous materials, treat it as an established NRM. Use RAS from shingle sources on the Department’s Material Producer List located at <http://www.txdot.gov/business/resources/producer-list.html>. Prior to use, remove substantially all materials that are not part of the shingle, such as wood, paper, metal, plastic, and felt paper. Determine the deleterious content of RAS material for mixture design purposes in accordance with Tex-217-F, Part III. Do not use RAS if deleterious materials are more than 0.5% of the stockpiled RAS unless otherwise approved. Submit a sample for approval to the Engineer prior to submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.

- H. Substitute Binders.** Unless otherwise shown on the plans, the Contractor may use a substitute PG binder listed in Table 5 in lieu of the PG binder originally specified, if the substitute PG binder and mixture made with the substitute PG binder meet the following:
- the substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.J, “Performance-Graded Binders”;
  - the substitute binder has an un-aged dynamic shear value less than or equal to 2.00 kPa and an RTFO aged dynamic shear value less than or equal to 5.00 kPa at the PG test temperature; and
  - the mixture has less than 10.0 mm of rutting on the Hamburg Wheel test (Tex-242-F) after the number of passes required for the originally specified binder. Use of substitute PG binders may only be allowed at the discretion of the Engineer if the Hamburg Wheel test results are between 10.0 mm and 12.5 mm.

**Table 5**  
**Allowable Substitute PG Binders and Maximum Recycled Binder Ratios**

Originally Specified PG Binder	Allowable Substitute PG Binder	Maximum Ratio of Recycled Binder <sup>1</sup> to Total Binder (%)		
		Surface	Intermediate	Base
<b>HMA</b>				
76-22 <sup>2</sup>	70-22 or 64-22	20.0	20.0	20.0
	70-28 or 64-28	30.0	35.0	40.0
70-22 <sup>2</sup>	64-22	20.0	20.0	20.0
	64-28 or 58-28	30.0	35.0	40.0
64-22 <sup>2</sup>	58-28	30.0	35.0	40.0
76-28 <sup>2</sup>	70-28 or 64-28	20.0	20.0	20.0
	64-34	30.0	35.0	40.0
70-28 <sup>2</sup>	64-28 or 58-28	20.0	20.0	20.0
	64-34 or 58-34	30.0	35.0	40.0
64-28 <sup>2</sup>	58-28	20.0	20.0	20.0
	58-34	30.0	35.0	40.0
<b>WMA<sup>3</sup></b>				
76-22 <sup>2</sup>	70-22 or 64-22	30.0	35.0	40.0
70-22 <sup>2</sup>	64-22 or 58-28	30.0	35.0	40.0
64-22 <sup>4</sup>	58-28	30.0	35.0	40.0
76-28 <sup>2</sup>	70-28 or 64-28	30.0	35.0	40.0
70-28 <sup>2</sup>	64-28 or 58-28	30.0	35.0	40.0
64-28 <sup>4</sup>	58-28	30.0	35.0	40.0

1. Combined recycled binder from RAP and RAS.

2. Use no more than 20.0% recycled binder when using this originally specified PG binder.

3. WMA as defined in Section 3267.2.F.2, "Warm Mix Asphalt (WMA)."

4. When used with WMA, this originally specified PG binder is allowed for use at the maximum recycled binder ratios shown in this table.

3. **Equipment.** Provide required or necessary equipment in accordance with Item 320, “Equipment for Asphalt Concrete Pavement.”
4. **Construction.** Produce, haul, place, and compact the specified paving mixture. In addition to tests required by the specification, Contractors may perform other QC tests as deemed necessary. At any time during the project, the Engineer may perform production and placement tests as deemed necessary in accordance with Item 5, “Control of the Work.” On or before the first day of paving, schedule and participate in a pre-paving meeting with the Engineer unless otherwise directed.
  - A. **Certification.** Personnel certified by the Hot Mix Asphalt Center Certification Program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design that is developed and signed by a Level 2 certified specialist.

**Table 6  
Test Methods, Test Responsibility, and Minimum Certification Levels**

Test Description	Test Method	Contractor	Engineer	Level
<b>1. Aggregate and Recycled Material Testing</b>				
Sampling	Tex-400-A	✓	✓	1A
Dry sieve	Tex-200-F, Part I	✓	✓	1A
Washed sieve	Tex-200-F, Part II	✓	✓	1A
Deleterious material	Tex-217-F, Parts I & III	✓	✓	1A
Decantation	Tex-217-F, Part II	✓	✓	1A
Los Angeles abrasion	Tex-410-A		✓	
Magnesium sulfate soundness	Tex-411-A		✓	
Micro-Deval abrasion	Tex-461-A		✓	
Coarse aggregate angularity	Tex-460-A	✓	✓	2
Flat and elongated particles	Tex-280-F	✓	✓	2
Linear shrinkage	Tex-107-E	✓	✓	2
Sand equivalent	Tex-203-F	✓	✓	2
Organic impurities	Tex-408-A	✓	✓	2
<b>2. Asphalt Binder &amp; Tack Coat Sampling</b>				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
<b>3. Mix Design &amp; Verification</b>				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F	✓	✓	1A
VMA <sup>1</sup> (calculation only)	Tex-204-F	✓	✓	2
Rice gravity	Tex-227-F	✓	✓	1A
Ignition oven correction factors <sup>2</sup>	Tex-236-F	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	2
Hamburg wheel test	Tex-242-F	✓	✓	2
Boil test	Tex-530-C	✓	✓	1A
<b>4. Production Testing</b>				
Mixture sampling	Tex-222-F	✓	✓	1A
Molding (TGC)	Tex-206-F		✓	1A
Molding (SGC)	Tex-241-F		✓	1A
Laboratory-molded density	Tex-207-F		✓	1A
VMA <sup>1</sup> (calculation only)	Tex-204-F		✓	1A
Rice gravity	Tex-227-F		✓	1A
Gradation & asphalt content <sup>2</sup>	Tex-236-F		✓	1A
Moisture content	Tex-212-F		✓	1A
Hamburg Wheel test	Tex-242-F		✓	2
Boil test	Tex-530-C		✓	1A
<b>5. Placement Testing</b>				
Trimming roadway cores	Tex-207-F	✓	✓	1A/1B
In-place air voids	Tex-207-F		✓	1A/1B
Establish rolling pattern	Tex-207-F	✓		1B
Ride quality measurement	Tex-1001-S	✓	✓	Note 3

1. Voids in mineral aggregates.

2. Refer to Section 3267.4.I.3 for exceptions to using an ignition oven.

3. Profiler and operator are required to be certified at the Texas Transportation Institute facility when Surface Test Type B is specified.

**B. Reporting, Testing, and Responsibilities.** Use Department-provided Excel templates to record and calculate all test data pertaining to the mixture design. The Engineer will use Department Excel templates for any production and placement testing. Obtain the latest version of the Excel templates at <http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html> or from the Engineer.

The maximum allowable time for the Engineer to exchange test data with the Contractor is as given in Table 7 unless otherwise determined. The Engineer will immediately report to the Contractor any test result that requires suspension of production or placement or that fails to meet the specification requirements.

Subsequent mix placed after test results are available to the Contractor, which require suspension of operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Section 5.3, “Conformity with Plans, Specifications, and Special Provisions.”

**Table 7  
Reporting Schedule**

<b>Description</b>	<b>Reported By</b>	<b>Reported To</b>	<b>To Be Reported Within</b>
<i><b>Production Testing</b></i>			
Gradation Asphalt content Laboratory-molded density VMA (calculation) Hamburg wheel test Moisture content Boil test Binder tests	Engineer	Contractor	1 working day of completion of the test
<i><b>Placement Testing</b></i>			
In-place air voids	Engineer	Contractor	1 working day of completion of the test <sup>1</sup>

1. 2 days are allowed if cores cannot be dried to constant weight within 1 day.

### **C. Mixture Design.**

**1. Design Requirements.** The Contractor may elect to design the mixture using a Texas Gyrotory Compactor (TGC) or a Superpave Gyrotory Compactor (SGC) unless otherwise shown on the plans. Use the typical weight design example given in Tex-204-F, Part I, when using a TGC. Use the Superpave mixture design procedure given in Tex-204-F, Part IV, when using a SGC. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, and 10.

- a. Target Laboratory Molded Density When The TGC Is Used.** Design the mixture at a 96.5% target laboratory-molded density or as noted in Table 9. The target laboratory-molded density may be increased in 0.5% increments, not to exceed 97.0%, at the Contractor’s discretion.
- b. Design Number of Gyration (Ndesign) When The SGC Is Used.** Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 9. The Ndesign level may be reduced to no less than 35 gyrations at the Contractor’s discretion.

Use an approved laboratory to perform the Hamburg Wheel test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test.

The Department maintains the Material Producer List of approved laboratories located at <http://www.txdot.gov/business/resources/producer-list.html>. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Engineer will provide the mixture design when shown on the plans. The Contractor may submit a new mixture design at any time during the project. The Engineer will verify and approve all mixture designs (JMF1) before the Contractor can begin production.

Provide the Engineer with a mixture design report using the Department-provided Excel template. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- asphalt content and aggregate gradation of RAP and RAS stockpiles;
- the target laboratory-molded density (or Ndesign level when using the SGC);
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level 2 person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

**Table 8  
Master Gradation Limits (% Passing by Weight or Volume)  
and VMA Requirements**

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
2"	100.0 <sup>1</sup>	–	–	–	–
1-1/2"	98.0–100.0	100.0 <sup>1</sup>	–	–	–
1"	78.0–94.0	98.0–100.0	100.0 <sup>1</sup>	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	100.0 <sup>1</sup>	–
1/2"	50.0–70.0	–	–	98.0–100.0	100.0 <sup>1</sup>
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
<b>Design VMA, % Minimum</b>					
–	12.0	13.0	14.0	15.0	16.0
<b>Production (Plant-Produced) VMA, % Minimum</b>					
–	11.0	12.0	13.0	14.0	15.0

1. Defined as maximum sieve size. No tolerance allowed.

**Table 9  
Laboratory Mixture Design Properties**

Mixture Property	Test Method	Requirement
Target laboratory-molded density, %(TGC)	Tex-207-F	96.5 <sup>1</sup>
Design gyrations (N <sub>design</sub> for SGC)	Tex-241-F	50 <sup>2</sup>
Indirect tensile strength (dry), psi	Tex-226-F	85–200 <sup>3</sup>
Boil test <sup>4</sup>	Tex-530-C	–

1 May be adjusted in 0.5% increments within a range of 96.0% to 97.5% when shown on the plans or specification or when mutually agreed between the Engineer and Contractor.

2. May be adjusted within a range of 35–100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor.

3. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.

4. Used to establish baseline for comparison to production results. May be waived when approved.

**Table 10  
Hamburg Wheel Test Requirements**

High-Temperature Binder Grade	Test Method	Minimum # of Passes <sup>1</sup> @ 12.5 mm <sup>2</sup> Rut Depth, Tested @ 50°C
PG 64 or lower	Tex-242-F	10,000
PG 70		15,000
PG 76 or higher		20,000

1. May be decreased or waived when shown on the plans.

2. When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to increase the target laboratory-molded density (TGC) by 0.5% to no more than 97.5% or lower the N<sub>design</sub> level (SGC) to no less than 35 gyrations.

- 2. Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation, target laboratory molded density (or N<sub>design</sub> level), and target asphalt percentage used to establish target values for hot mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommend rate on the JMF1 submittal. Furnish the Engineer a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. If opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, provide the Engineer with approximately 10,000 g of the design mixture and request that the Department perform the Hamburg Wheel test. The Engineer will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise determined. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. Provide the Engineer with split samples of the mixtures and blank samples used to determine the ignition oven correction factors. The Engineer will determine the aggregate and asphalt correction factors from the ignition oven used for production testing in accordance with Tex-236-F.

The Engineer will use a TGC calibrated in accordance with Tex-914-F in molding production samples. If the SGC is used to design the mix, provide an SGC at the Engineer’s field laboratory for use in molding production samples.

The Engineer may perform Tex-530-C and retain the tested sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

**3. JMF Field Adjustments.** If JMF adjustments are necessary to achieve the specified requirements, the adjusted JMF must:

- be provided to the Engineer in writing before the start on a new lot;
- be numbered in sequence to the previous JMF;
- meet the mixture requirements in Table 4 and Table 5;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of the current JMF listed in Table 11.

The Engineer may adjust the asphalt content to maintain desirable laboratory density near the optimum value while achieving other mix requirements.

**Table 11  
Operational Tolerances**

Description	Test Method	Allowable Difference Between Trial Batch and JMF1 Target	Allowable Difference from Current JMF Target
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	Must be Within Master Grading Limits in Table 8	±5.0 <sup>1,2</sup>
Individual % retained for sieves smaller than #8 and larger than #200			±3.0 <sup>1,2</sup>
% passing the #200 sieve			±2.0 <sup>1,2</sup>
Asphalt content, %	Tex-236-F	±0.5	±0.3 <sup>2</sup>
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0
VMA, %, min	Tex-204-F	Note 3	Note 3

1. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
2. Only applies to mixture produced for Lot 1 and higher.
3. Mixture is required to meet Table 8 requirements.

**D. Production Operations.** Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification. Submit a new mix design and perform a new trial batch when the asphalt content of:

- either RAP stockpile used in the mix is more than 0.5% higher than the value shown on the mixture design report; or
- RAS stockpile used in the mix is more than 2.0% higher than the value shown on the mixture design report.

**1. Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, “Asphalts, Oils, and Emulsions,” or outside the manufacturer’s recommended values. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with Item 320, “Equipment for Asphalt

Concrete Pavement.” Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F (or 275°F for WMA) and is not lower than 215°F. The Department will not pay for or allow placement of any mixture produced at more than 350°F.

When WMA is required, produce the WMA within the target temperature discharge range of 215°F and 275°F. Take corrective action any time the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor’s corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. The Engineer may determine the moisture content by oven-drying in accordance with Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. The Engineer will obtain the sample immediately after discharging the mixture into the truck, and will perform the test promptly.

- E. **Hauling Operations.** Before use, clean all truck beds to ensure that mixture is not contaminated. When a release agent is necessary, use a release agent on the Department’s Material Producer List to coat the inside bed of the truck.

Use only equipment for hauling as defined in Section 3267.4.G.3.c, “Hauling Equipment.” Other hauling equipment may be used when allowed by the Engineer.

- F. **Placement Operations.** Collect haul tickets from each load of mixture delivered to the project and provide the Department’s copy to the Engineer approximately every hour, or as directed by the Engineer. Unless otherwise directed, use a non-contact infrared thermometer to measure and record the internal temperature of the mixture as discharged from the truck or material transfer device prior to or as the mix enters the paver and an approximate station number or GPS coordinates on each ticket. Calculate the daily yield and cumulative yield for the specified lift and provide to the Engineer at the end of paving operations for each day unless otherwise directed. The Engineer may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations by the end of paving operations for each day.

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly.

Place the mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines in Table 12 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

**Table 12  
Compacted Lift Thickness and Required Core Height**

Mixture Type	Compacted Lift Thickness Guidelines		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

1. **Weather Conditions.** Place mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Measure the roadway surface temperature with a handheld infrared thermometer. The Engineer may allow mixture placement to begin prior to the roadway surface reaching the required temperature requirements, if conditions are such that the roadway surface will reach the required temperature within 2 hours of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hours of paving.
  
2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply the tack coat in a uniform manner to avoid streaks and other irregular patterns. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Allow adequate time for emulsion to break completely prior to placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller to remove streaks and other irregular patterns when directed.
  
3. **Lay-Down Operations.**
  - a. **Windrow Operations.** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.
  
  - b. **Hauling Equipment.** The Contractor may elect to use belly dumps, live bottom, or end dump trucks to haul and transfer mixture; however, with exception of paving miscellaneous areas, end dump trucks are only allowed when used in conjunction with an MTD with remixing capability unless otherwise allowed by the Engineer.
  
  - c. **Screed Heaters.** If the paver stops for more than 5 minutes, turn off screed heaters to prevent overheating of the mat.

- G. Compaction.** Uniformly compact the pavement to contain between 3.8% and 8.5% in-place air voids. When the in-place air voids exceed the range of 3.8% and 8.5%, take immediate corrective action to bring the operation within these tolerances. Areas defined in Section 3267.I.2 “Miscellaneous Areas,” are not subject to in-place air void determination. In all other areas, the Engineer may obtain and test cores and may suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or greater than 9.9%. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids.

Furnish the type, size, and number of rollers required for compaction as approved. Use a pneumatic-tire roller to seal the surface unless excessive pickup of fines occurs. Use additional rollers as required to remove any roller marks. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.

On the first day of production, use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern that will produce the desired in-place air voids unless otherwise directed.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Complete all compaction operations before the pavement temperature drops below 160°F unless otherwise allowed. The Engineer may allow compaction with a light finish roller operated in static mode for pavement temperatures below 160°F.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

## **H. Production Acceptance.**

- 1. Production Lot.** Each day of production is defined as a production lot. Lots will be sequentially numbered and will correspond to each new day of production. Note that lots are not subdivided into sublots for this specification.
- 2. Production Sampling.**
  - a. Mixture Sampling.** The Engineer may obtain mixture samples in accordance with Tex-222-F at any time during production.
  - b. Asphalt Binder Sampling.** The Engineer may obtain or require the Contractor to obtain 1 qt. samples of the asphalt binder at any time during production from a port located immediately upstream from the mixing drum or pug mill in accordance with Tex-500-C, Part II. The Engineer may test any of the asphalt binder samples to verify compliance with Item 300, “Asphalts, Oils, and Emulsions.”

3. **Production Testing.** The Engineer will test at the frequency listed in the Department's Guide Schedule of Sampling and Testing and this specification. The Engineer may suspend production if production tests do not meet specifications or are not within operational tolerances listed in Table 11. If the Engineer's laboratory-molded density on any sample is less than 95.0% or greater than 98.0%, take immediate corrective action to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

If the aggregate mineralogy is such that Tex-236-F does not yield reliable results, the Engineer may use alternate methods for determining the asphalt content and aggregate gradation. Use the applicable test procedure if an alternate test method is selected.

**Table 13  
Production and Placement Testing**

Description	Test Method
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F
Individual % retained for sieves smaller than #8 and larger than #200	
% passing the #200 sieve	
Laboratory-molded density	Tex-207-F
Laboratory-molded bulk specific gravity	
In-Place air voids	
VMA	Tex-204-F
Moisture content	Tex-212-F, Part II
Theoretical maximum specific (Rice) gravity	Tex-227-F
Asphalt content	Tex-236-F
Hamburg Wheel test	Tex-242-F
Recycled Asphalt Shingles (RAS) <sup>1</sup>	Tex-217-F, Part III
Asphalt binder sampling and testing	Tex-500-C
Tack coat sampling and testing	Tex-500-C, Part III
Boil test	Tex-530-C

1. Testing performed by the Construction Division or designated laboratory.

- a. **Void in Mineral Aggregates (VMA).** The Engineer may determine the VMA for any production lot. Take immediate corrective action if the VMA value for any lot is less than the minimum VMA requirement for production listed in Table 8. Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the minimum VMA requirement for production listed in Table 8. In addition to suspending production, the Engineer may require removal and replacement or may allow the lot to be left in place without payment.
- b. **Hamburg Wheel Test.** The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. When the production or core samples fail the Hamburg Wheel test criteria in Table 10,

suspend production until further Hamburg Wheel tests meet the specified values. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire lot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

If the Department's or approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by retesting the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

4. **Individual Loads of Hot Mix.** The Engineer can reject individual truckloads of hot mix. When a load of hot mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load and the Engineer may require removal.

#### **I. Placement Acceptance.**

1. **Placement Lot.** A placement lot is defined as the area placed during a production lot (one day's production). Placement lot numbers will correspond with production lot numbers.
2. **Miscellaneous Areas.** Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Temporary detours are subject to in-place air void determination when shown on the plans. Miscellaneous areas also include level-ups and thin overlays when the layer thickness specified on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 12. The specified layer thickness is based on the rate of 110 lb./sq. yd. for each inch of pavement unless another rate is shown on the plans. Compact miscellaneous areas in accordance with Section 3267.4.G, "Compaction." Miscellaneous areas are not subject to in-place air void determination.
3. **Placement Sampling.** Provide the equipment and means to obtain and trim roadway cores on site. On site is defined as in close proximity to where the cores are taken. Obtain the cores within 1 working day of the time the placement lot is completed unless otherwise approved. Unless otherwise shown on the plans, obtain two 6-in. diameter cores side-by-side at each location selected by the Engineer for in-place air void determination. For Type D and Type F mixtures, 4-in. diameter cores are allowed. Mark the cores for identification, measure and record the untrimmed core height, and provide the information to the Engineer. The Engineer will witness the coring operation and measurement of the core thickness.

Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. If an adequate bond does not exist between the current and underlying layer, take corrective action to ensure that an adequate bond will be achieved during subsequent placement operations.

Immediately after obtaining the cores from the roadway, trim the cores in accordance with Tex-207-F if the core heights meet the minimum untrimmed values listed in Table 12. Trim the cores on site in the presence of the Engineer. Use a permanent marker or paint pen to record the date and lot number on each core as well as the designation as Core A or B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after they are trimmed and will retain custody of the cores until the Department's testing is completed. Prior to turning the trimmed cores over to the Engineer, the Contractor may elect to wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

The Engineer may elect to have the cores transported back to the Department's laboratory at the HMA plant via the Contractor's haul truck or other designated vehicle. In such cases where the cores will be out of the Engineer's possession during transport, the Engineer will use the Construction Division's protocol to provide a secure means and process that protects the integrity of the cores during transport.

In lieu of the Contractor trimming the cores on site immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

Immediately after obtaining the cores, dry the core holes and tack the sides and bottom. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

- 4. Placement Testing.** The Engineer may measure in-place air voids at any time during the project to verify specification compliance.
  - a. In-Place Air Voids.** The Engineer will measure in-place air voids in accordance with Tex-207-F and Tex-227-F. Cores not meeting the height requirements in Table 12 will not be tested. Before drying to a constant weight, cores may be pre-dried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will use the corresponding theoretical maximum specific gravity to determine the air void content of each core. The Engineer will use the average air void content of the two cores to determine the in-place air voids at the selected location.

The Engineer will use the vacuum method to seal the core if required by Tex-207-F. The Engineer will use the test results from the unsealed core to if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

- 5. Irregularities.** Identify and correct irregularities including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities and areas where the mixture does not bond to the existing pavement. If irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than 1 day while the Contractor is taking appropriate corrective action.
- 6. Ride Quality.** Use Surface Test Type A to evaluate ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.
- 5. Measurement.** Hot mix will be measured by the ton of composite hot mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."
- 6. Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under Article 3267.5, "Measurement," will be paid for at the unit price bid for "Dense Graded Hot-Mix Asphalt (SQ)" of the type, surface aggregate classification, and binder specified. These prices are full compensation for surface preparation; materials including tack coat; placement; equipment; labor; tools; and incidentals.

Trial batches will not be paid for unless they are included in pavement work approved by the Department.

Pay adjustment for ride quality if applicable will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

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