INDIANA
DEPARTMENT OF TRANSPORTATION

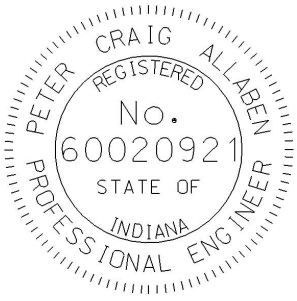
CONTRACT INFORMATION

CONSTRUCTION PLANS
SPECIAL PROVISIONS
ADDITIONAL CONTRACT REQUIREMENTS

FOR

CONTRACT NO. **SRS-30614-A**

LETTING DATE: **MARCH 25, 2009**



Certified By Peter Craig Allaben

Date **FEBRUARY 20, 2009**

CONTRACT INFORMATION
TABLE OF CONTENTS

CONTRACT NO. SRS-30614-A

This book shall be examined to determine that each page set out in the Contract Information Table of Contents, and the Special Provisions Table of Contents is attached, legible, and current.

CONTACT FOR CONTRACTORS

DISTRICT CONSTRUCTION ENGINEER: CURT SCHUM PHONE: 812-895-7343 *

*QUESTION FORM

Contractors shall submit contract specific questions by completing the Question Form accessed from the main INDOT letting information webpage at: (http://www.in.gov/dot/div/contracts/letting/index.html). Clicking on the hyperlink labeled "Contract Question Submittals" will load the form to be completed. A reasonable attempt will be made to have an answer on-line within two business days.

Retrieve the Question and Answer Form for a specific contract by going on-line in the same manner you retrieve Contract Information Books and Plans. The "Contract Letting Documents" hyperlink accessed from the main INDOT letting information webpage (http://www.in.gov/dot/div/contracts/letting/index.html) will display the interface used for selection of contract letting documents. For the document category, select "Q and A Form".

CONTACTS FOR DISTRICT PERSONEL ONLY

INDOT DESIGNER: RICHARD THOMAS PHONE: 812-895-7361

. PHONE:

PROJECT MANAGER: RICHARD THOMAS PHONE: 812-895-7361

PROPOSAL

TO THE
INDIANA DEPARTMENT OF TRANSPORTATION

DATE OF LETTING: March 25, 2009

TIME OF LETTING: 10:00 AM EASTERN DAYLIGHT SAVINGS TIME

LOCATION OF LETTING: N855 CONF RM, GOVERNMENT CENTER NORTH
100 N. SENATE AVENUE
INDIANAPOLIS, INDIANA 46204

LOCATION OF DEPOSIT: N855 GOVERNMENT CENTER NORTH
100 N. SENATE AVENUE
INDIANAPOLIS, INDIANA 46204

***** STATE CERTIFIED *****

CONTRACT NUMBER: SRS-30614-A PROJECT NUMBER: 0800006

STRUCTURE NUMBER:

ROUTE: 164

LOCATION: ON SR 164 FROM US 231 TO 0.47 MILE EAST OF US 231

DESCRIPTION: WEDGE AND LEVEL

VINCENNES DISTRICT COUNTY: DUBOIS

CONTRACT COMPLETION INFORMATION

CONTRACT COMPLETION DATE: September 18, 2009

DBE GOAL: A contract provision goal of **0** percent of the contract bid price has been established as the minimum amount for contracting to disadvantaged business enterprises.

THE FOLLOWING DOCUMENTS ARE INCLUDED IN THE CONTRACT:
2008 STANDARD SPECIFICATIONS EFFECTIVE
LIST OF APPROVED OR PREQUALIFIED MATERIALS
STANDARD DRAWINGS LISTED ON STANDARD DRAWING INDEX EFFECTIVE DATE 9-1-08

ADDITIONAL REFERENCE MATERIAL MAY BE AVAILABLE ON THE INDOT WEBSITE. THE REFERENCE MATERIAL MAY INCLUDE, BUT IS NOT LIMITED TO PERMITS, ASBESTOS REPORTS, GEOTECHNICAL REPORTS, AND PRE-BID QUESTIONS AND ANSWERS. THE CONTRACTOR SHALL CONSIDER THE AVAILABLE ADDITIONAL REFERENCE MATERIAL IN PREPARATION OF THE PROPOSAL BID.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE: March 25, 2009

CONTRACT ID: SRS-30614-A

CONTRACTOR:_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 WEDGE AND LEVEL					
0001	105-06845 CONSTRUCTION ENGINEERING	LUMP	LUMP			.
0002	109-08359 LIQUIDATED DAMAGES	1.000 DOL	1.00000		1.00	
0003	109-08360 CONTRACT LIENS	1.000 DOL	1.00000		1.00	
0004	109-08440 QUALITY ADJUSTMENTS, HMA	1.000 DOL	1.00000		1.00	
0005	109-08443 QUALITY ADJUSTMENTS, TEMPORARY TRAFFIC CONTROL DEVICES	1.000 DOL	1.00000		1.00	
0006	109-08444 QUALITY ADJUSTMENTS, FAILED MATERIALS	1.000 DOL	1.00000		1.00	
0007	109-09489 PAYMENT ADJUSTMENT, PG ASPHALT BINDER	1.000 DOL	1.00000		1.00	
0008	110-01001 MOBILIZATION AND DEMOBILIZATION	LUMP	LUMP			.
0009	202-02279 CURB AND GUTTER, REMOVE	377.000 LFT	.			.
0010	202-52710 SIDEWALK, CONCRETE, REMOVE	162.000 SYS	.			.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE: March 25, 2009

CONTRACT ID: SRS-30614-A

CONTRACTOR:_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0011	304-07490 HMA PATCHING, TYPE B	130.000	TON	.		.	
0012	306-08034 MILLING, ASPHALT, 1 1/2 IN.	9800.000	SYS	.		.	
0013	306-08432 MILLING, APPROACH	1200.000	SYS	.		.	
0014	401-07327 QC/QA-HMA, 2, 70, SURFACE, 9.5 mm	850.000	TON	.		.	
0015	406-05520 ASPHALT FOR TACK COAT	4.000	TON	.		.	
0016	604-06069 CURB RAMP, CONCRETE	114.400	SYS	.		.	
0017	604-07894 CURB RAMP, CONCRETE, A	28.000	SYS	.		.	
0018	604-07901 CURB RAMP, CONCRETE, G	4.900	SYS	.		.	
0019	604-07903 CURB RAMP, CONCRETE, K	17.800	SYS	.		.	
0020	605-06140 CURB AND GUTTER, CONCRETE	377.000	LFT	.		.	
0021	610-07487 HMA FOR APPROACHES, TYPE B	93.000	TON	.		.	

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE: March 25, 2009

CONTRACT ID: SRS-30614-A

CONTRACTOR:_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0022	621-06575 SODDING, NURSERY	20.000 SYS		.		.
0023	628-09402 FIELD OFFICE, B	6.000 MOS		.		.
0024	720-04499 INLET, RECONSTRUCT	3.000 EACH		.		.
0025	720-44000 CASTING, ADJUST TO GRADE , HANDHOLE	1.000 EACH		.		.
0026	720-44000 CASTING, ADJUST TO GRADE , TELEPHONE CASTING	1.000 EACH		.		.
0027	720-44036 CASTING GRATE, 8	2.000 EACH		.		.
0028	720-98712 CASTING GRATE, 10	1.000 EACH		.		.
0029	801-03290 CONSTRUCTION SIGN, C	3.000 EACH		.		.
0030	801-06203 TEMPORARY PAVEMENT MARKING, 4 IN.	430.000 LFT		.		.
0031	801-06207 TEMPORARY PAVEMENT MARKING, REMOVABLE, 4 IN.	430.000 LFT		.		.
0032	801-06640 CONSTRUCTION SIGN, A	29.000 EACH		.		.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE: March 25, 2009

CONTRACT ID: SRS-30614-A

CONTRACTOR:_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0033	801-06775 MAINTAINING TRAFFIC	LUMP	LUMP			.
0034	802-05701 SIGN POST, SQUARE, 1, REINFORCED ANCHOR BASE	11.000 LFT		.		.
0035	802-07060 SIGN, SHEET, RELOCATE	1.000 EACH		.		.
0036	802-97428 POST, TUBULAR , FOR STREET IDENTIFICATION SIGN	10.000 LFT		.		.
0037	802-97812 STREET NAME IDENTIFICATION SIGN , RELOCATE	1.000 EACH		.		.
0038	805-02441 SIGNAL CABLE, ROADWAY LOOP, 1C 14GA.	960.000 LFT		.		.
0039	805-78795 SAW CUT FOR ROADWAY LOOP AND SEALER	396.000 LFT		.		.
0040	808-04298 PAVEMENT MESSAGE MARKING, THERMOPLASTIC, WORD (RR)	1.000 EACH		.		.
0041	808-06701 LINE, THERMOPLASTIC, BROKEN, WHITE, 4 IN.	280.000 LFT		.		.
0042	808-06703 LINE, THERMOPLASTIC, SOLID, WHITE, 4 IN.	275.000 LFT		.		.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE: March 25, 2009

CONTRACT ID: SRS-30614-A

CONTRACTOR:_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0043	808-75240 LINE, THERMOPLASTIC, BROKEN, YELLOW, 4 IN.	300.000 LFT		.		.
0044	808-75245 LINE, THERMOPLASTIC, SOLID, YELLOW, 4 IN.	3225.000 LFT		.		.
0045	808-75274 TRANSVERSE MARKINGS, THERMOPLASTIC, SOLID, YELLOW, CROSSHATCH LINE, 8 IN.	85.000 LFT		.		.
0046	808-75297 TRANSVERSE MARKINGS, THERMOPLASTIC, STOP LINE, 24 IN.	315.000 LFT		.		.
0047	808-75300 TRANSVERSE MARKINGS, THERMOPLASTIC, CROSSWALK LINE, 6 IN.	400.000 LFT		.		.
0048	808-75320 PAVEMENT MESSAGE MARKINGS, THERMOPLASTIC, LANE INDICATION ARROW	9.000 EACH		.		.
0049	808-75325 PAVEMENT MESSAGE MARKINGS, THERMOPLASTIC, WORD (ONLY)	6.000 EACH		.		.
	SECTION 0001 TOTAL					.
	TOTAL BID					.

CONTRACT NO. RS-30614

INDIANA DEPARTMENT OF TRANSPORTATION

ROAD PLANS

PROJECT NO. 0800006

PROJECT DESCRIPTION

WEDGE AND LEVEL

ON S.R. 164, FROM U.S. 231 TO 0.47 MILES EAST
OF U.S. 231 (PATOKA RIVER), DUBOIS COUNTY (IN JASPER)

Gross Length 0.47 MI.

Net Length 0.47 MI.

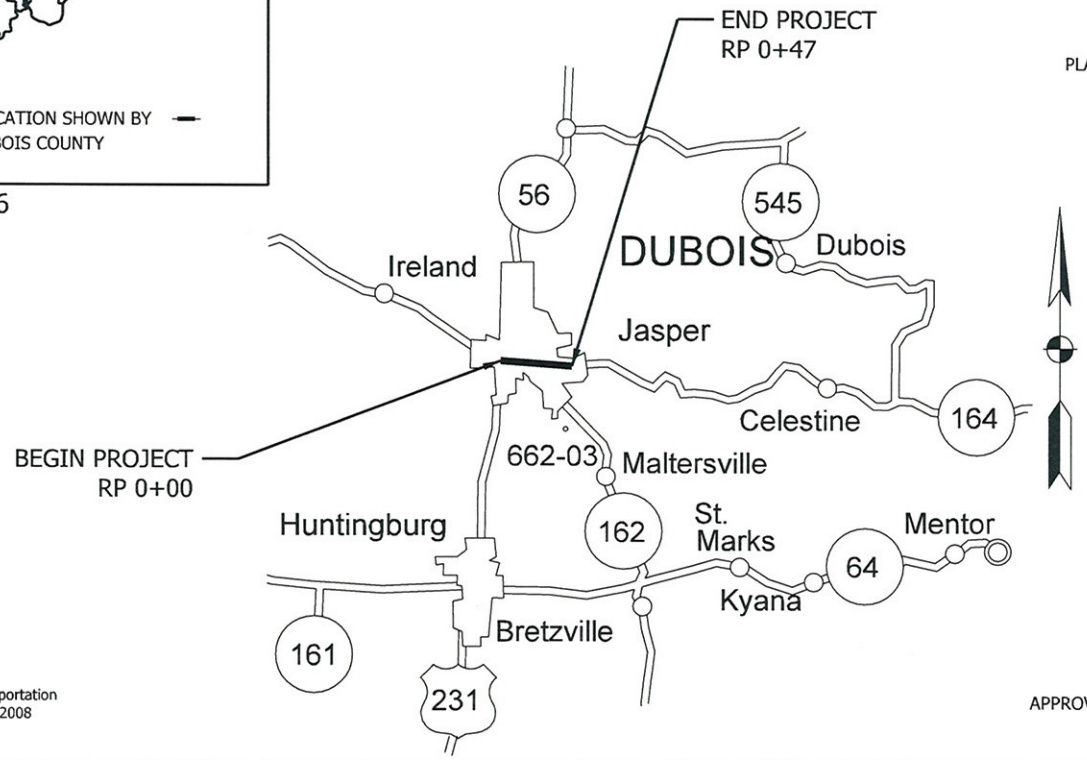
Federal Road Region 5	
TRAFFIC DATA	
A.D.T. (2008)	16640 V.P.D.
A.D.T. (2028) Proj.	19940 V.P.D.
D.H.V. ( )	V.P.H.
Directional Distribution	50/50
Trucks 9 % D.H.V.	1 % A.D.T.
DESIGN DATA	
Design Speed	30 M.P.H.
Project Design Criteria	GENERAL MAINTENANCE
Functional Class	MINOR ARTERIAL
Rural/Urban	RURAL
Terrain	LEVEL

Latitude: 38° 23' 21"

Longitued: 86° 55' 49"

PROJECT LOCATION SHOWN BY
DUBOIS COUNTY

DES. NO. 0800006



PLANS PREPARED BY: RICHARD S. THOMAS

RICHARD S. THOMAS
REGISTERED
No. 19400268
STATE OF INDIANA
PROFESSIONAL ENGINEER

Date: 02/02/09

CERTIFIED BY: Richard S Thomas

APPROVED FOR LETTING:

Indiana Department of Transportation
Standard Specification dated 2008
to be used with these plans.

Contract No. RS-30614

Contract SRS-30614

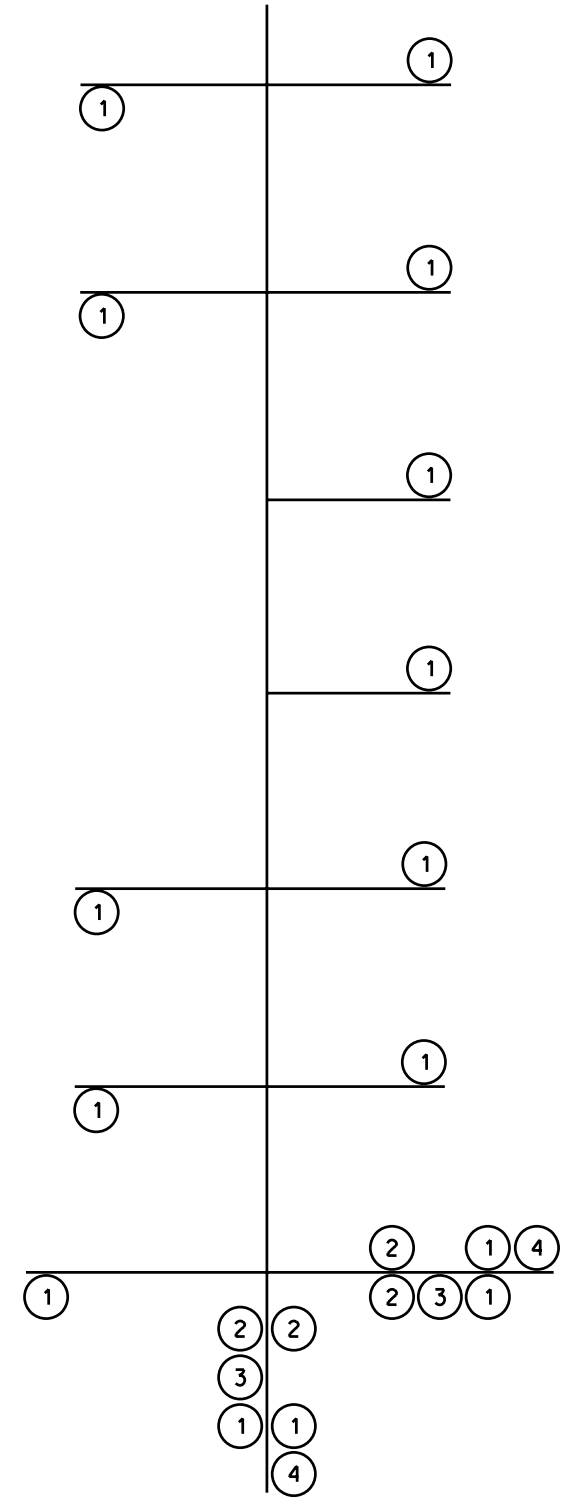
Contract No. RS-30614

CONSTRUCTION PLANS
INDEX

(NOT TO SCALE)

STRIP MAP

S.R. 164 FROM U.S. 231 (R.P. 0+00) TO
PATOKA RIVER BRIDGE (R.P. 0+47)



STA. 113+75
JACKSON STREET

STA. 110+90
MAIN STREET

STA. 108+15
NEWTON STREET

STA. 107+75
WEST 3RD STREET

STA. 105+00
WEST 4TH STREET

STA. 102+30
WEST 5TH STREET

DUBOIS COUNTY
BAINEBRIDGE TOWNSHIP

BEGIN PROJECT
STA. 100+00
US 231, RT
6TH STREET, LT

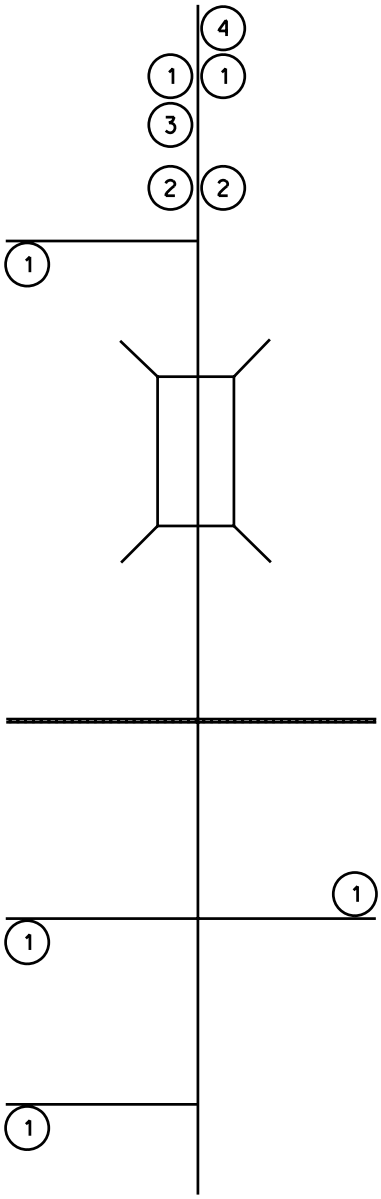
CONSTRUCTION SIGNS:

1. ROAD CONSTRUCTION AHEAD
2. ROAD CONSTRUCTION NEXT 0.5 MILES
3. END CONSTRUCTION
4. WORK ZONE PENALTY

(NOT TO SCALE)

STRIP MAP

S.R. 164 FROM U.S. 231 (R.P. 0+00) TO
PATOKA RIVER BRIDGE (R.P. 0+47)



STA. 123+89
RIVERSIDE

END PROJECT
STA. 121+29
PATOKA RIVER BRIDGE

END PAVING EXCEPTION
STA. 120+61

BEGIN PAVING EXCEPTION
STA. 119+81

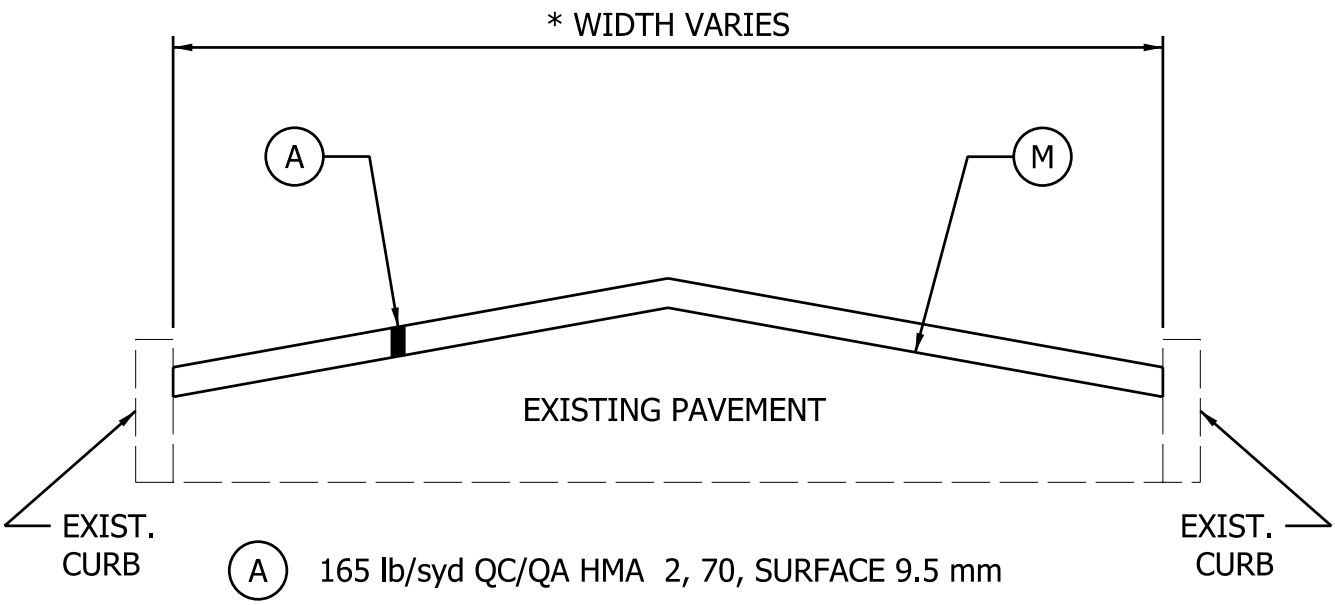
STA. 116+90
MILL STREET

DUBOIS COUNTY
BAINEBRIDGE TOWNSHIP

STA. 115+00
EAST 3RD STREET

CONSTRUCTION SIGNS:

1. ROAD CONSTRUCTION AHEAD
2. ROAD CONSTRUCTION NEXT 0.5 MILES
3. END CONSTRUCTION
4. WORK ZONE PENALTY



(A) 165 lb/syd QC/QA HMA 2, 70, SURFACE 9.5 mm

(M) ASPHALT MILLING, AVG. DEPTH 1½ INCH

* NOTE SEE TYPYICAL WIDTH TABLE FOR WIDTHS

TYPICAL SECTION

S.R. 164

			Contract No. RS-30614	
TYPICAL WIDTH TABLE (FOR INFORMATION ONLY)				
		Existing Width (Ft.)		Remarks
From (RP)	To (RP)	From	To	
100+00	107+40	48.0	48.0	
107+40	108+55	54.0	54.0	
108+55	119+81	39.0	39.0	
119+81	120+61			Paving Exception
120+61	121+00	34.0	34.0	
121+00	121+29	28.0	28.0	

						Contract No. RS-30614		
TYPICAL APPROACH TABLE (FOR INFORMATION ONLY)								
Location (Sta.)	Side (LT./RT)	Width (Ft)	Width 2 (Ft)	Length (Ft)	Area (SYS)	Tons	Milling (SYS)	Remarks
102+30	LT	64.0	47.0	12.0	74.0	6.1	74.0	West 5th Street
102+30	RT	54.0	40.0	12.0	62.7	5.2	62.7	West 5th Street
105+00	RT	64.0	48.0	16.0	99.6	8.2	99.6	West 4th Street
105+00	LT	64.0	48.0	12.0	74.7	6.2	74.7	West 4th Street
107+75	RT	65.0	40.0	23.0	134.2	11.1	134.2	West 3rd Street
107+75	RT	80.0	56.0	15.0	113.3	9.4	113.3	Newton Street
110+90	RT	75.0	52.0	10.0	70.6	5.8	70.6	Main Street
110+90	LT	80.0	52.0	30.0	220.0	18.2	220.0	Main Street
113+75	LT	62.0	40.0	15.0	85.0	7.0	85.0	Jackson Street
113+75	RT	55.0	40.0	15.0	79.2	6.5	79.2	Jackson Street
115+00	LT	110.0	110.0	3.0	36.7	3.0	36.7	East 3rd Street
116+90	LT	92.0	86.0	5.0	49.4	4.1	49.4	Mill Street
117+00	RT	72.0	56.0	4.0	28.4	2.3	28.4	Mill Street
					Total	**93.0**	**1127.7**	

Contract No. RS-30614

PATCHING LOCATIONS (for information only)

LOCATION	LANE (LT, RT)						
(STA OR RP)	MAINLINE	AUXILIARY	SHOULDER	WIDTH	LENGTH	TONS	REMARKS
105+25	RT			6'	75'	33.0	
106+10	RT			6'	40'	17.6	
108+40	RT			10'	20'	14.7	
114+30	RT			6'	6'	2.6	
114+45	RT			6'	6'	2.6	
116+00	RT			8'	10'	5.9	
				TOTAL		76.4	
			UNDISTRBUTED			23.6	
			GRAND TOTAL			100.0	

Contract No. RS-30614

Curb Ramp Location Table (For Information Only)

LOCATION		REMOVAL		INSTALL									
ADJACENT STREET	QUADRANT	SIDEWALK, CONCRETE, REMOVE (SYS)	CURB AND GUTTER, CONCRETE, REMOVE (LFT)	CURB RAMP TYPE	CURB RAMP, CONCRETE (SYS)	NURSERY SODDING (SYS)	HMA PATCHING, TYPE B (TON)	CURB AND GUTTER, CONCRETE (LFT)	CASTING ADJUST TO GRADE (EACH)	SIGN POST, SQUARE, 1, REINFORCED ANCHOR BASE (LFT)	SIGN, SHEET, RELOCATE (EACH)	STREET NAME IDENTIFICATION SIGN, RELOCATE (EACH)	REMARKS
5th	NW	15.3	29.0	*	15.3		2.1	29.0					
5th	NE	8.6	20.0	*	8.6		1.5	20.0					
5th	SW	12.5	22.0	*	12.5		1.6	22.0	1.0	11.0	1.0		Reset stop sign and adjust telephone casting to grade
5th	SE	8.1	20.0	*	8.1	1.5	1.5	20.0					
4th	NW	7.5	21.0	*	7.5	2.0	1.6	21.0					
4th	NE	7.5	20.0	*	7.5	1.5	1.5	20.0					
4th	SW	8.1	23.0	*	8.1	1.5	1.7	23.0					
4th	SE	8.1	25.0	*	8.1		1.8	25.0					
3rd	NW	5.8	15.0	*	5.8		1.1	15.0					
3rd	NE	10..3	19.0	*	10.3		1.4	19.0					
3rd	SW	7.2	16.0	*	7.2		1.2	16.0					
3rd	SE	14.8	21.0	*	7.6	5.5	1.6	21.0	1.0				Adjust hand hole
Main	NW	7.0	16.0	A	7.0		1.2	16.0					
Main	NE	7.0	16.0	A	7.0		1.2	16.0					
Main	SW	7.0	16.0	A	7.0		1.2	16.0			1.0		Reset street identification sign. Tubular post to match existing post
Main	SE	7.0	16.0	A	7.0		1.2	16.0					
Jackson	NW	8.9	14.0	K	8.9		1.0	14.0					

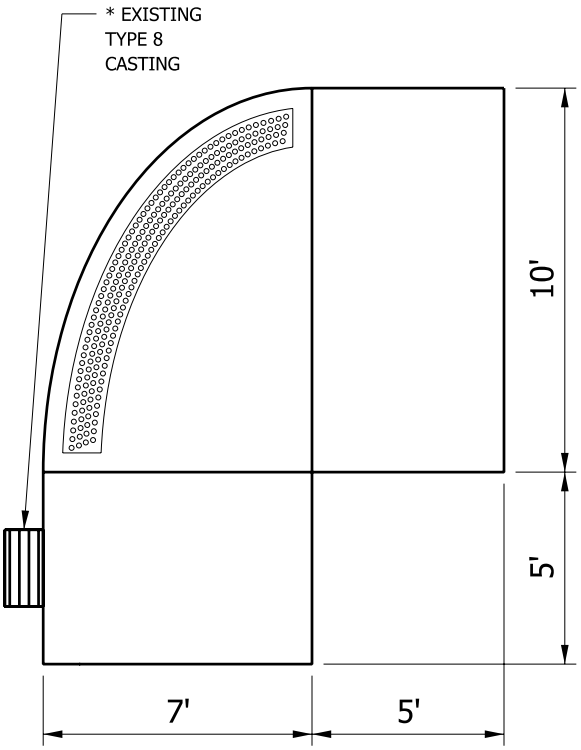
Contract No. RS-30614

Curb Ramp Location Table (For Information Only)

LOCATION		REMOVAL		INSTALL									REMARKS
ADJACENT STREET	QUADRANT	SIDEWALK, CONCRETE, REMOVE (SYS)	CURB AND GUTTER, CONCRETE, REMOVE (LFT)	CURB RAMP TYPE	CURB RAMP, CONCRETE (SYS)	NURSERY SODDING (SYS)	HMA PATCHING, TYPE B (TON)	CURB AND GUTTER, CONCRETE (LFT)	CASTING ADJUST TO GRADE (EACH)	SIGN POST, SQUARE, 1, REINFORCED ANCHOR BASE (LFT)	SIGN, SHEET, RELOCATE (EACH)	STREET NAME IDENTIFICATION SIGN, RELOCATE (EACH)	
Jackson	NE	8.9	14.0	K	8.9		1.0	14.0					
Jackson	SW	4.9	12.0	G	4.9	5.0	0.9	12.0					
Jackson	SE	7.8	22.0	*	7.8	1.0	1.6	22.0					
	TOTAL	**162.0**	**377.0**		**165.1**	**18.0**	**27.9**	**377.0**	**2.0**	**11.0**	**1.0**	**1.0**	

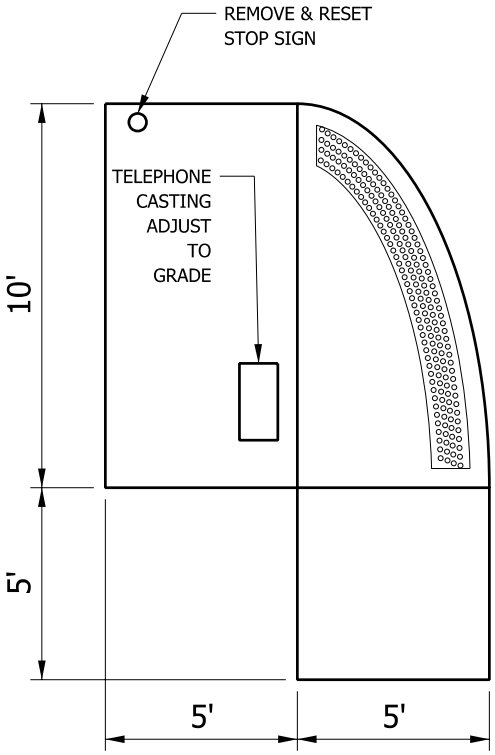
* Modified Curb Ramp see Details

NW 5TH STREET

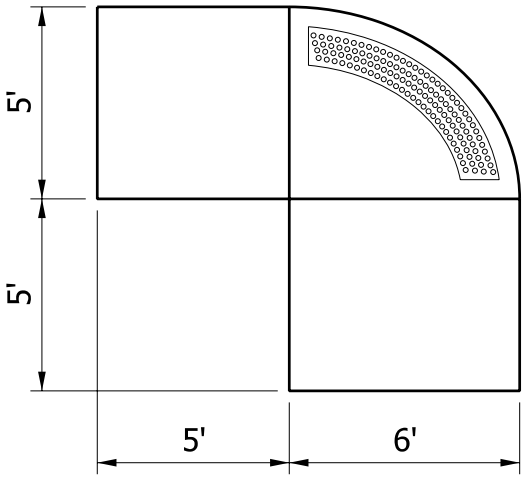


* SEE CASTING DETAIL SHEET FOR DETAILS

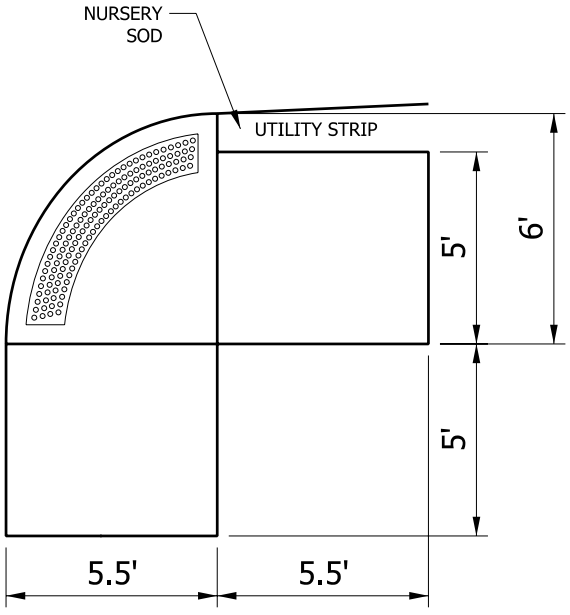
SW 5TH STREET



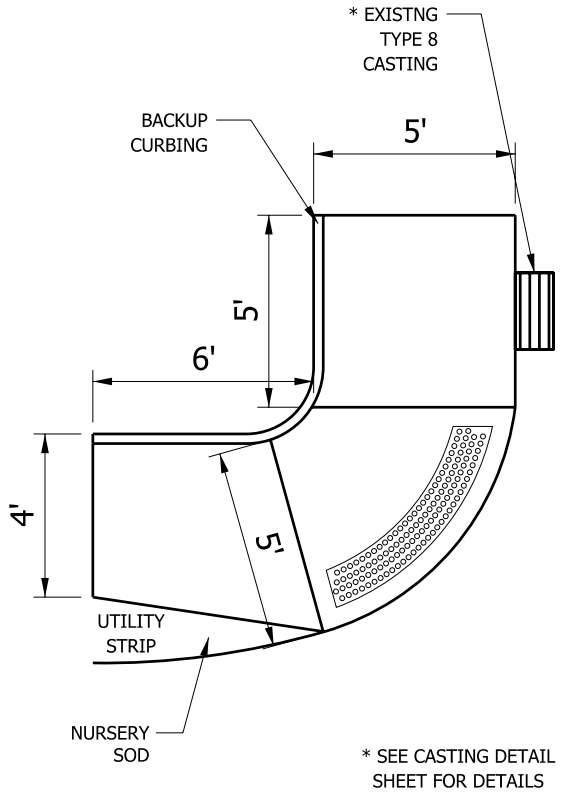
NE 5TH STREET



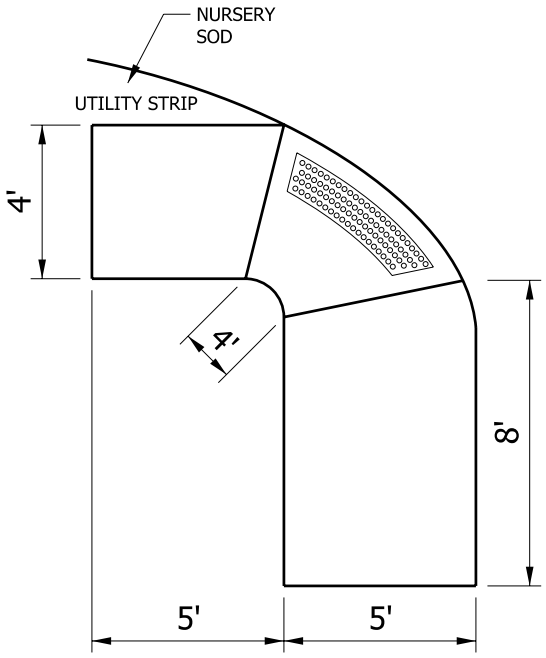
SE 5TH STREET



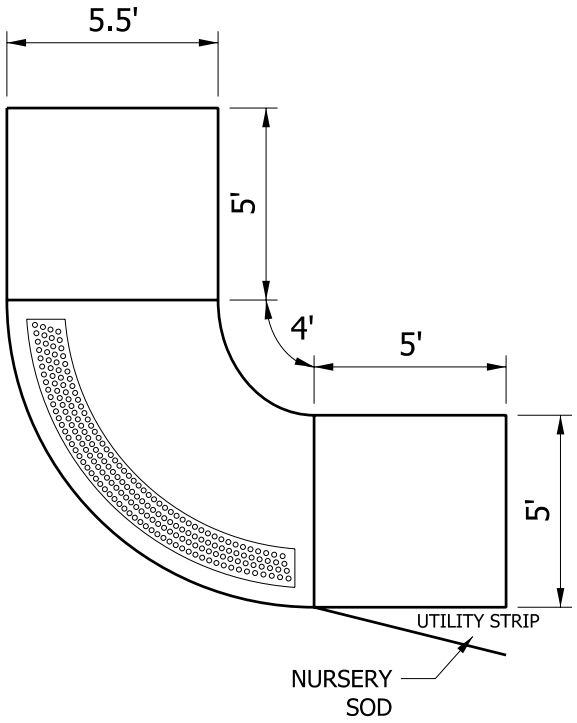
NW 4TH STREET



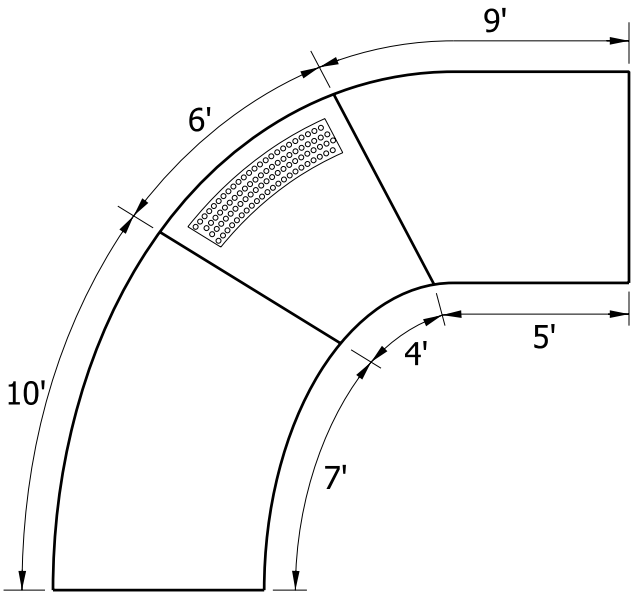
SW 4TH STREET



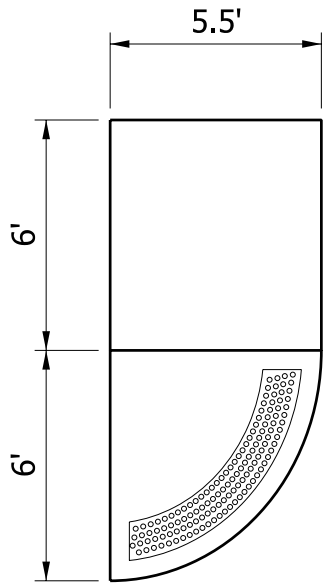
NE 4TH STREET



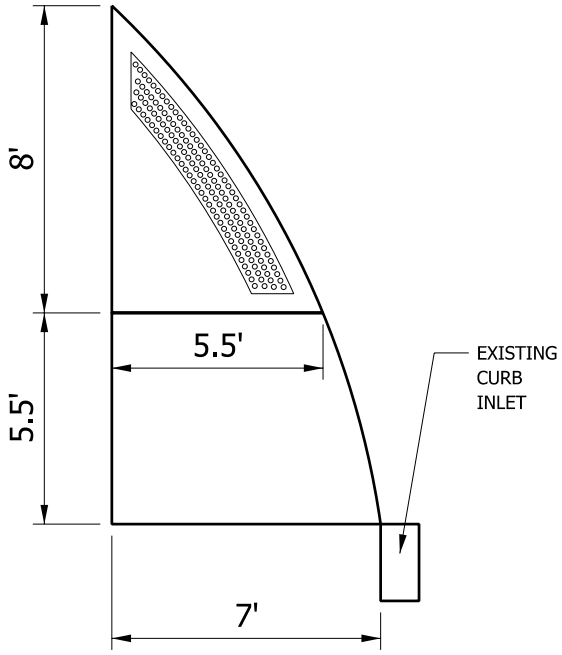
SE 4TH STREET



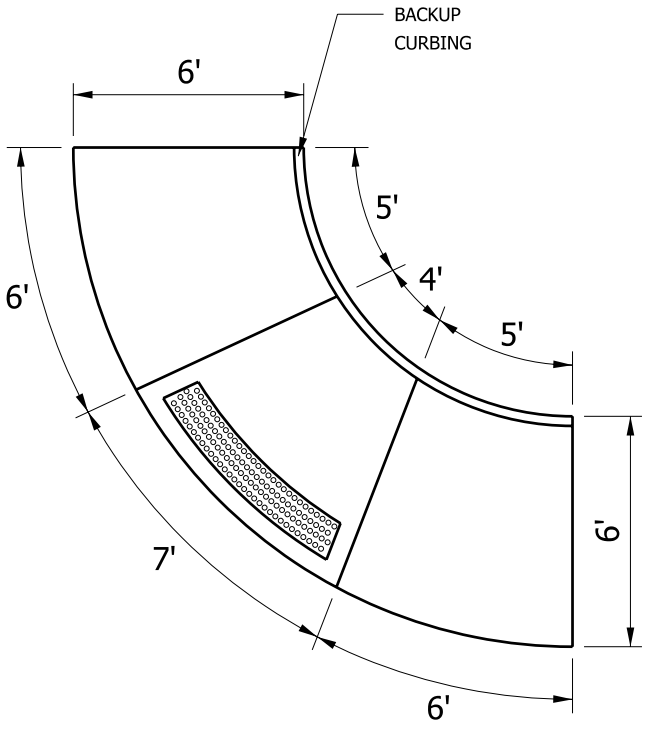
NW 3RD STREET



SW 3RD STREET

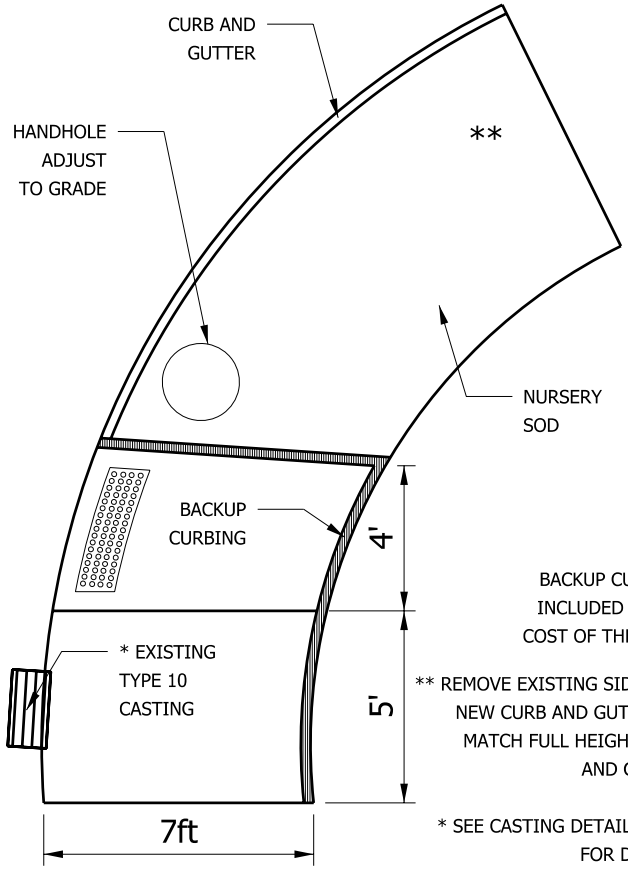


NE 3RD STREET



BACKUP CURBING
INCLUDED IN THE
COST OF CURB RAMP

SE 3RD STREET

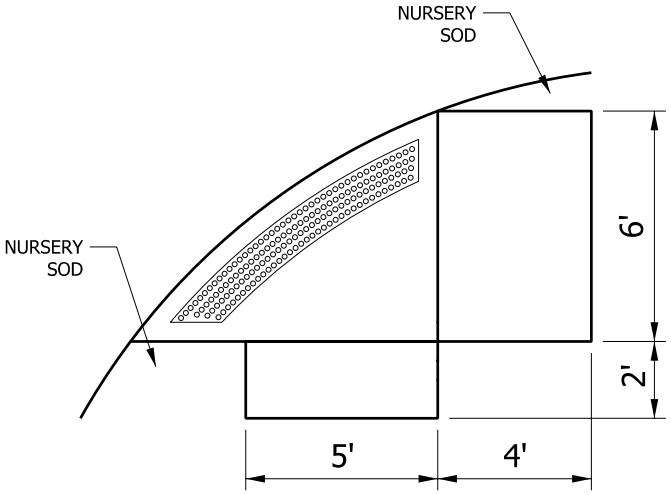


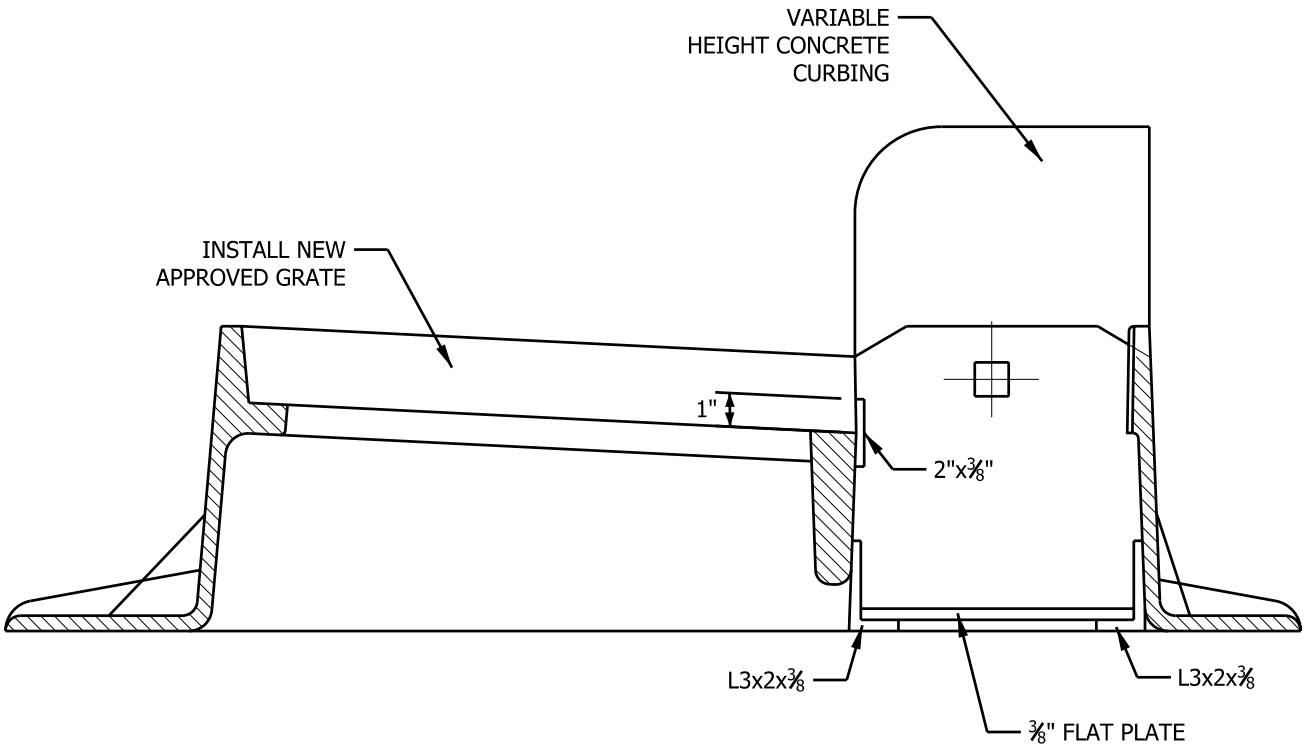
BACKUP CURBING
INCLUDED IN THE
COST OF THE RAMP

** REMOVE EXISTING SIDEWALK
NEW CURB AND GUTTER TO
MATCH FULL HEIGHT CURB
AND GUTTER

* SEE CASTING DETAIL SHEET
FOR DETAILS

SE JACKSON





ANGLE AND FLAT PLATE TO BE
CONTINUOUSLY WELDED

LOCATIONS:
NW 5TH ST.
NW 4TH ST.
SE 3RD ST.

CASTING DETAIL

S.R. 164

Contract No. RS-30614

TRAFFIC ITEMS (FOR INFORMATION ONLY)

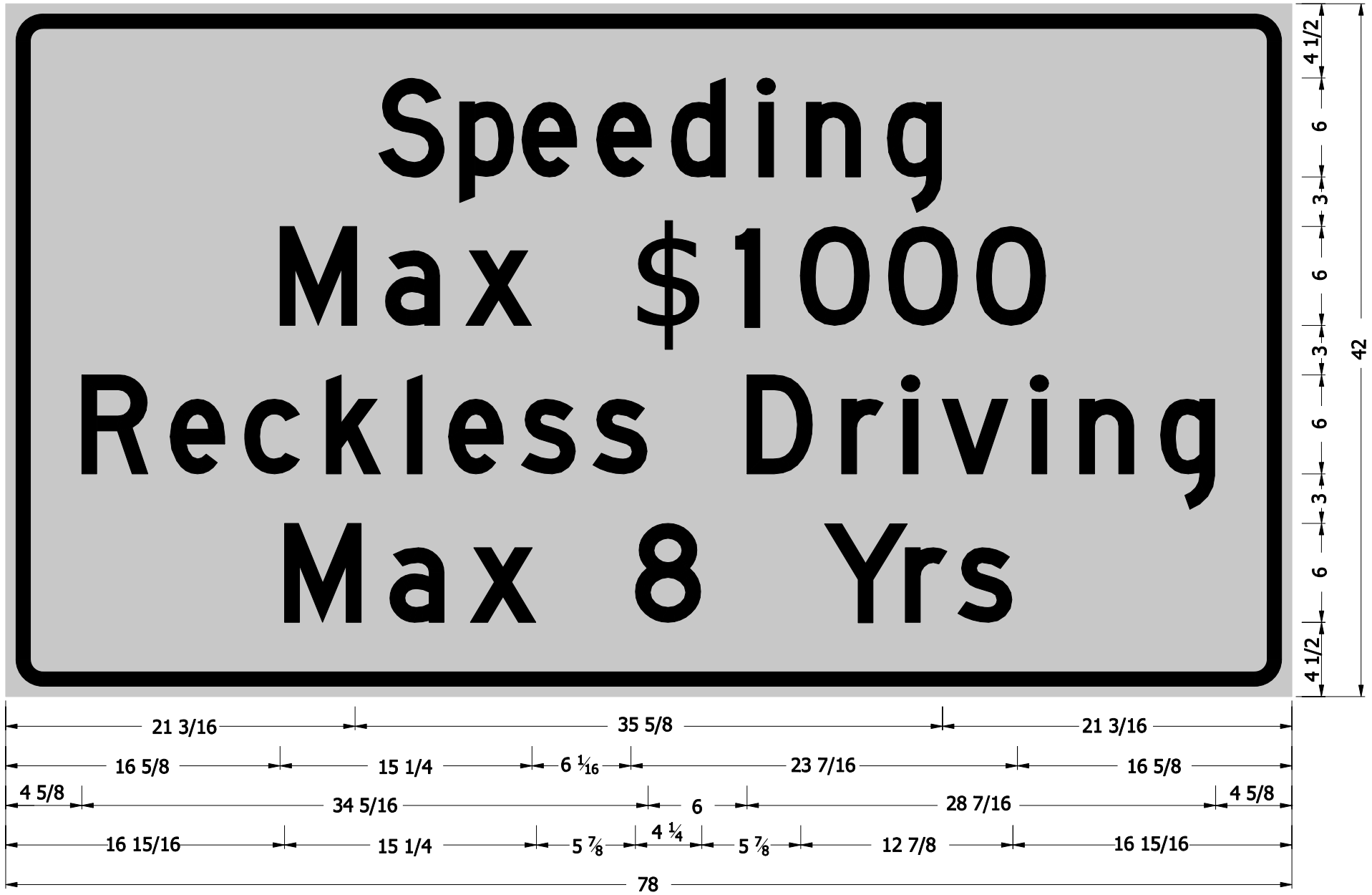
LOCATION (STA OR RP)								
FROM	TO	DESCRIPTION	ITEM	LENGTH	PAINT/THERMO	COLOR	WIDTH	REMARKS
100+00		STOP BAR	808-75297	12	THERMO	WHITE	24"	Left
100+50		STOP BAR	808-75297	12	THERMO	WHITE	24"	Left
100+00	101+00		808-06703	100	THERMO	WHITE	4"	Lane Line
100+00	102+10		808-75245	420	THERMO	YELLOW	4"	Double Center Line
100+00	102+10		808-06701	53	THERMO	WHITE	4"	Broken White Right
101+00	102+10		808-06701	28	THERMO	WHITE	4"	Broken White Left
102+30		STOP BAR	808-75297	18	THERMO	WHITE	24"	West 5th Street, Right
102+70	104+80		808-75245	420	THERMO	YELLOW	4"	Double Center Line
102+70	104+80		808-06701	53	THERMO	WHITE	4"	Broken White Right
102+70	104+80		808-06701	53	THERMO	WHITE	4"	Broken White Left
105+00		STOP BAR	808-75297	15	THERMO	WHITE	24"	West 4th Street, Left
105+00		STOP BAR	808-75297	18	THERMO	WHITE	24"	West 4th Street, Right
105+25	107+10		808-75245	370	THERMO	YELLOW	4"	Double Center Line
105+25	107+10		808-06701	46	THERMO	WHITE	4"	Broken White Right
105+25	107+10		808-06701	46	THERMO	WHITE	4"	Broken White Left
106+20		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
106+80		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
107+00		STOP BAR	808-75297	12	THERMO	WHITE	24"	Right
107+10		STOP BAR	808-75297	12	THERMO	WHITE	24"	Right
107+75		STOP BAR	808-75297	22	THERMO	WHITE	24"	West 3rd Street
108+50		STOP BAR	808-75297	13	THERMO	WHITE	24"	Left
108+50	109+00		808-75245	100	THERMO	YELLOW	4"	Double Center Line
108+75	110+70		808-75245	195	THERMO	YELLOW	4"	Lane Line Right
108+75		STOP BAR	808-75297	13	THERMO	WHITE	24"	Center
108+75	110+70		808-75240	48	THERMO	YELLOW	4"	Broken Yellow Right
108+75	110+70		808-75240	48	THERMO	YELLOW	4"	Broken Yellow Left
109+00	110+70		808-75245	170	THERMO	YELLOW	4"	Lane Line Left

					Contract No. RS-30614			
TRAFFIC ITEMS (FOR INFORMATION ONLY)								
LOCATION (STA OR RP)								
FROM	TO	DESCRIPTION	ITEM	LENGTH	PAINT/THERMO	COLOR	WIDTH	REMARKS
109+15		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
109+25		ONLY	808-75325		THERMO	WHITE		
109+90		ONLY	808-75325		THERMO	WHITE		
110+10		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
110+90		STOP BAR	808-75297	24	THERMO	WHITE	24"	Main Street, Left
110+90		STOP BAR	808-75297	24	THERMO	WHITE	24"	Main Street, Right
111+30	113+25		808-75245	195	THERMO	YELLOW	4"	Lane Line Right
111+30	113+25		808-75245	195	THERMO	YELLOW	4"	Lane Line Left
111+30	112+40		808-75240	28	THERMO	YELLOW	4"	Broken yellow Left
111+30	112+40		808-75240	28	THERMO	YELLOW	4"	Broken Yellow Right
111+40		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
111+55		ONLY	808-75325		THERMO	WHITE		
112+40		CROSSHATCH	808-75274	85	THERMO	YELLOW	8"	End of Turn Lane
113+25		STOP BAR	808-75297	13	THERMO	WHITE	24"	Right
113+40	113+46	CROSS WALK	808-75300	78	THERMO	WHITE	6"	Jackson Street Intersection
113+75		CROSS WALK	808-75300	120	THERMO	WHITE	6"	Jackson Street Intersection
113+75		CROSS WALK	808-75300	120	THERMO	WHITE	6"	Jackson Street Intersection
113+75		STOP BAR	808-75297	38	THERMO	WHITE	24"	Jackson Street, Left
113+75		STOP BAR	808-75297	12	THERMO	WHITE	24"	Jackson Street, Right
113+95	114+01	CROSS WALK	808-75300	78	THERMO	WHITE	6"	Jackson Street Intersection
114+05		STOP BAR	808-75297	14	THERMO	WHITE	24"	Left
114+05	114+90		808-06703	85	THERMO	WHITE	4"	Lane Line
114+20		STOP BAR	808-75297	13	THERMO	WHITE	24"	Center
114+20	116+50		808-75245	460	THERMO	YELLOW	4"	Double Center Line
114+35		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
114+55		ONLY	808-75325		THERMO	WHITE		
114+75		ARROW	808-75320		THERMO	WHITE		Left Turn Lane

Contract No. RS-30614

TRAFFIC ITEMS (FOR INFORMATION ONLY)

LOCATION (STA OR RP)		DESCRIPTION	ITEM	LENGTH	PAINT/THERMO	COLOR	WIDTH	REMARKS
FROM	TO							
115+00		STOP BAR	808-75297	10	THERMO	WHITE	24"	East 3rd Street
115+60	116+50		808-06703	90	THERMO	WHITE	4"	Lane Line
115+70		ONLY	808-75325		THERMO	WHITE		
116+15		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
116+90		STOP BAR	808-75297	10	THERMO	WHITE	24"	Mill Street
117+00		STOP BAR	808-75297	10	THERMO	WHITE	24"	Mill Street
117+00	119+81		808-75245	281	THERMO	YELLOW	4"	Lane Line Right
117+00	119+81		808-75245	281	THERMO	YELLOW	4"	Lane Line Left
117+00	119+81		808-75240	70	THERMO	YELLOW	4"	Broken Yellow Right
117+00	119+81		808-75240	70	THERMO	YELLOW	4"	Broken Yellow Left
117+25		ARROW	808-75320		THERMO	WHITE		Left Turn Lane
117+60		ONLY	808-75325		THERMO	WHITE		Right
118+25		RAILROAD			THERMO	WHITE		
120+61	121+29		808-75245	136	THERMO	YELLOW	4"	Double Center Line
120+65		STOP BAR	808-75297	12	THERMO	WHITE	24"	Left
112+90, RT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
113+05, RT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
113+20, RT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+10, LT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+25, LT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+25, LT		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+40, CENTER		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+40, CENTER		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop
114+55, CENTER		RDWAY LOOP						122' - 1C 14GA, 144' Saw and Seal Loop



6 D UPPER AND LOWER; 2.250" Radius, 0.875" Border, 0.625" Indent, Black on Orange;
[Speeding] D; [Max $1000] D; [Reckless Driving] D; [Max 8 Yrs] D;

XG 20-7

INDIANA DEPARTMENT OF TRANSPORTATION

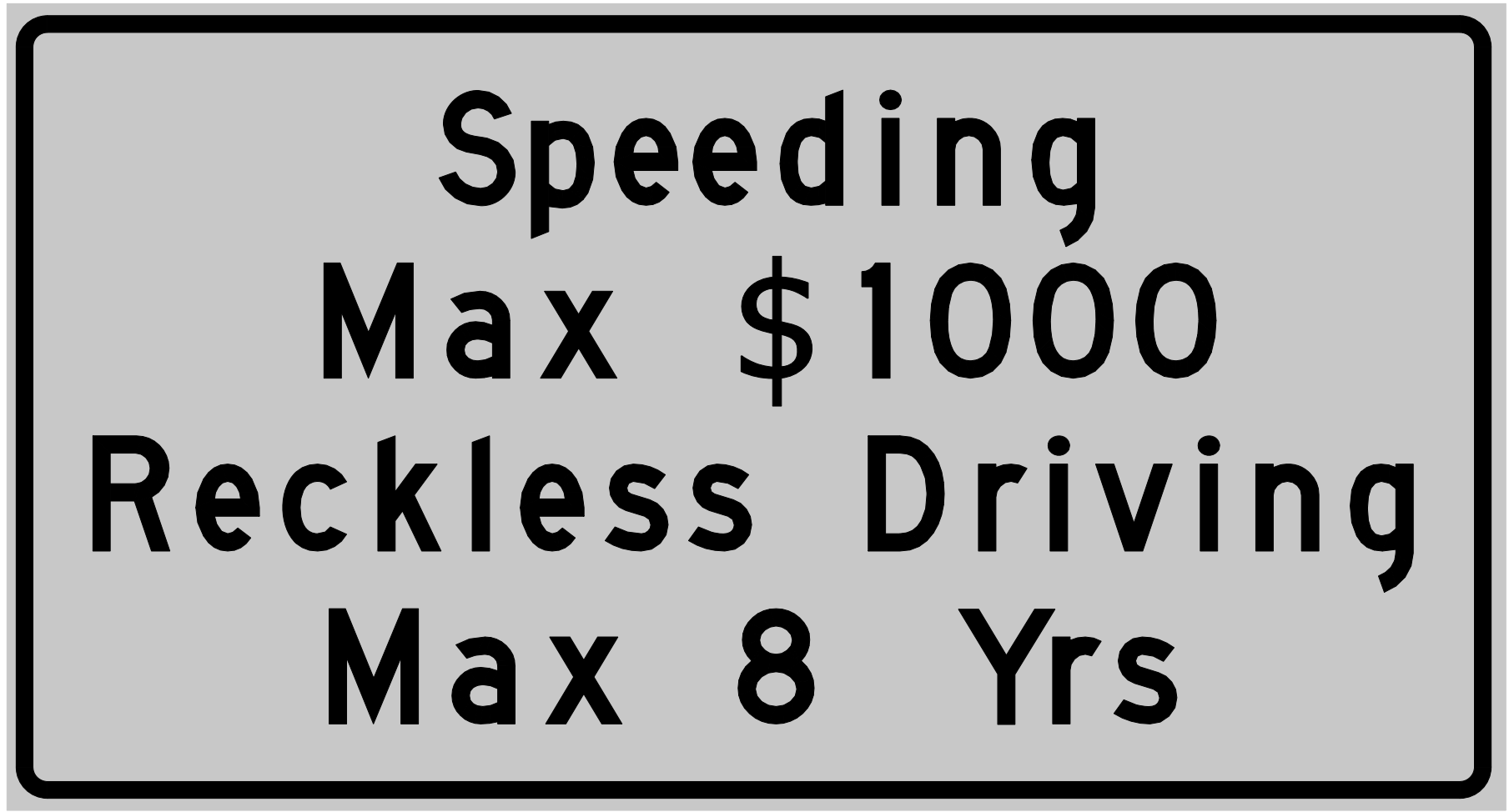
WORKSITE ADDED
PENALTY SIGN 78 x 42

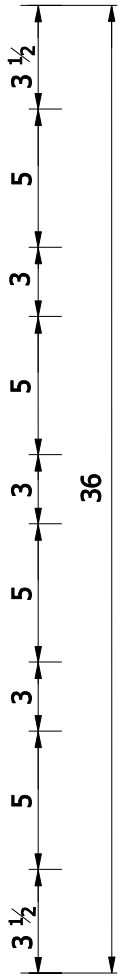
9-03-07

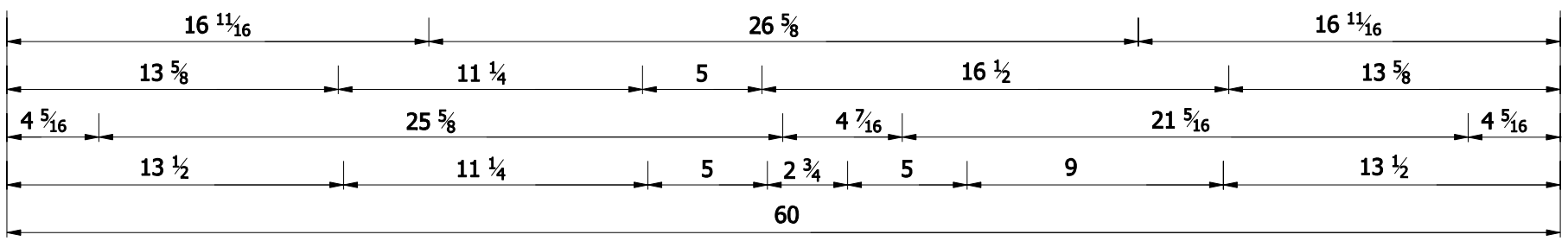
E 801-R-542d

19

Contract SRS-30614







5 C UPPER AND LOWER; 2.250" Radius, 0.875" Border, 0.625" Indent, Black on Orange;
[Speeding] C; [Max $1000] C; [Reckless Driving] C; [Max 8 Yrs] C;

XG 20-7a

INDIANA DEPARTMENT OF TRANSPORTATION

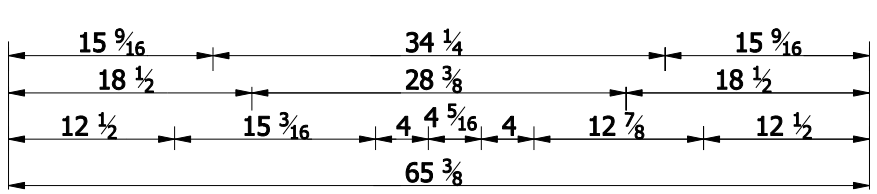
WORKSITE ADDED
PENALTY SIGN 60 x 36

9-03-07

E 801-R-543d

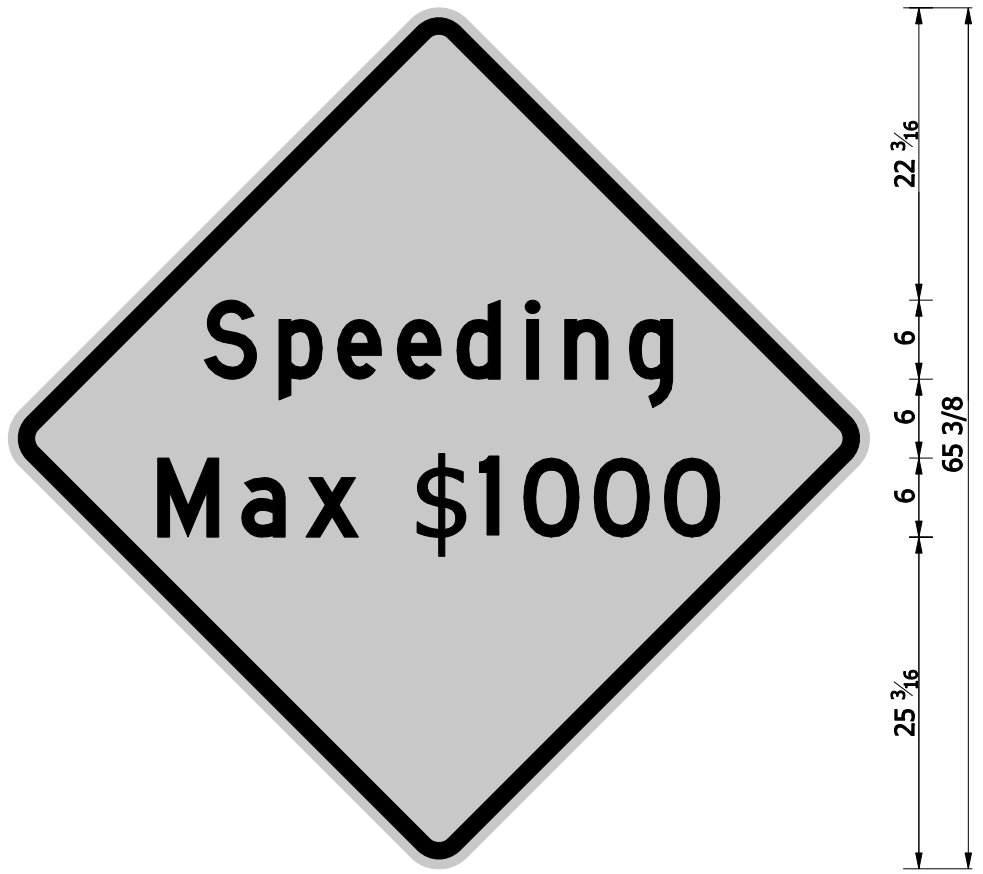
20

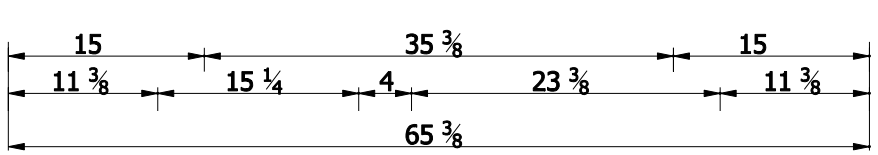
Contract SRS-30614



48x48 ; 6 D UPPER AND LOWER
48.000" across sides 3.000" Radius, 1.250" Border, 0.750" Indent, Black on Orange;
[Reckless] D; [Driving] D; [Max 8 Yrs] D;

XG20-7b





48x48 ; 6 D UPPER AND LOWER
48.000" across sides 3.000" Radius, 1.250" Border, 0.750" Indent, Black on Orange;
[Speeding] D; [Max $1000] D;

XG20-7c

INDIANA DEPARTMENT OF TRANSPORTATION

WORKSITE ADDED
PENALTY SIGNS 48 x 48

E 801-R-544d

21

9-03-07

Contract SRS-30614

TRAFFIC CONTROL DEVICE REPORT

CONTRACT: _____ PROJECT: _____ DATES: _____ thru _____

LOCATION	DESCRIPTION	DATE PLACED	* Use "✓" if O.K.							DATE REMOVED	*REMARKS
			S	M	T	W	T	F	S		

* If device is not O.K., describe deficiency under Remarks.

Date Corrective Action Taken: _____ Report Prepared By: _____ , Title: _____

SPECIAL PROVISIONS
TABLE OF CONTENTS

VINCENNES DISTRICT

100-C-147 PAYMENT OF PREDETERMINED MINIMUM WAGE DETERMINATION
(DAVIS-BACON ACT)
General Decision Number IN080006

(Revised 02-08-08)

General Decision Number IN080006 shall apply to this contract.

The above referenced wage determination is available at the Department's Contract Administration Division website location: http://www.in.gov/dot/div/contracts/letting/index.html

The modification number and publication date for the General Decision effective for the bid opening is posted on the Contract Administration website ten days prior to the bid opening. The bidder shall enter the appropriate modification number, General Decision Number, and publication date in the proposal form.

100-C-151a FHWA-1273

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

(Revised 03-10-94)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 26, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. **Instructions for Certification - Primary Covered Transactions:**
(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

*****

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

*****

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT PREFERENCE FOR APPALACHIAN CONTRACTS

(Applicable to Appalachian contracts only.)

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph 1c shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph 4 below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which he estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, he shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within 1 week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph 1c above.

5. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

100-C-151c DBE RECORD KEEPING AND TIMELY PAY

(Revised 09-01-05)

SECTION 103, AFTER LINE 341, INSERT AS FOLLOWS:

103.02.1 Record Keeping

All firms performing work on Department contracts bidding on Department contracts, or offering quotes for subcontract or trucking services shall register with the Department, annually, by submitting the following information to the Department's Economic Opportunity Division, Room N904, 100 N. Senate Avenue, Indianapolis, IN 46204 or fax it to (317) 233-0891.

(a) firm's name;
(b) firm's address;
(c) firm's status as a DBE or non-DBE;
(d) the age of the firm; and
(e) the annual gross receipts of the firm
(f) approximately how many Department projects has the firm bid or quoted in the past 12 months. (If none, please indicate 0)
(g) in which of the following markets has the firm participated?
1. prime Contractor
2. subcontractor
3. trucking firm
4. consultant

SECTION 109, AFTER LINE 618, INSERT AS FOLLOWS:

Within 10 business days of receipt of payment for any such estimate, the Contractor shall make payment to all subcontractors for the value of their work performed and materials complete in place in accordance with this contract. Failure to comply with this clause shall constitute a material breach of the contract and may result in sanctions under the contract.

Any delay or postponement of payment among the parties may take place only for good cause, with the Department's written approval. The explanation from the Contractor shall be made in writing to the Department.

100-C-151d EXECUTIVE ORDER 11246

(Revised 03-09-06)

The Standard Specifications are revised as follows:

SECTION 103, LINE 342, DELETE AND INSERT AS FOLLOWS:

103.03 ~~Blank.~~ *Executive Order 11246: Notice of Requirements for Affirmative Action to Ensure Equal Employment Opportunity*

This requirement will apply only to a federal aid contract. The Code of Federal Regulations 41 CFR 60-4.2(d) is amended by revising Paragraph 2 of the Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), to read as follows:

2. *The Contractor's or Bidder's attention is called to the Equal Opportunity Clause and the Standard Federal Equal Employment Opportunity Construction Contract Specifications set forth herein.*

(a) Timetables

The timetables for minority and female participation for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

1. Minorities

Immediately.

2. Women

April 1, 1980 to indefinite.

The goals are shown in 103.03(j) and 103.03(k).

Contractors who are signatory to an area (Hometown) plan are covered by 103.03(b). All Contractors, signatory or not to an area (Hometown) plan, will be covered by the minority goals as shown in 103.03(j).

These goals are applicable to all the Contractor's construction work, whether or not it is Federal or federally-assisted, performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed, in accordance with 41 CFR 60-4 as set out in Volume 45, No. 194 of the Federal Register dated October 3, 1980. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

(b) Area (Hometown) Plans

Until further notice, the following goals and timetables for minority utilization shall be included in all Federal or federally-assisted construction contracts and subcontracts in excess of $10,000.00 to be performed in the respective covered areas. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

1. Cincinnati, Ohio Area

Area Covered: Ohio counties of Clermont, Hamilton, and Warren; Kentucky counties of Boone, Campbell, and Kenton; and Indiana county of Dearborn. The minority hiring goal in Dearborn County, Indiana is 11 percent.

2. Indianapolis, Indiana Area

Area Covered: Marion County. The minority hiring goal in Marion County is 12.5 percent.

(c) Written Notification

The Contractor shall provide written notification to the Department within ten work days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor, employer identification number, estimated dollar amount of the contract, estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

(d) 41 CFR 60-4.3 Equal Opportunity Clauses

The equal opportunity clause published as 41 CFR 60-1.4(a) of this chapter is required to be included in, and is part of, all non-exempt Federal contracts and subcontracts, including construction contracts and subcontracts. The equal opportunity clause published at 41 CFR 60-1.4(b) is required to be included in, and is a part of, all non-exempt federally-assisted construction contracts and subcontracts. In addition to the clause described above, all Federal contracting officers, all applicants and all non-construction Contractors, as applicable, shall include the specification set forth in this section in all Federal and federally-assisted construction contracts in excess of $10,000.00 to be performed in geographical areas designated by the Department pursuant to 41 CFR-60-4.6 of this part and in construction subcontracts in excess of $10,000.00 necessary in whole or in part to the performance of non-construction Federal contracts and subcontracts covered under the Executive Order.

1. *As used in these specifications:*

   a. *"Covered area" means the geographical area described in the solicitation from which this contract resulted.*

   b. *"Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.*

   c. *"Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.*

   d. *"Minority" includes:*

      (1) *Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);*

      (2) *Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);*

      (3) *Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and*

      (4) *American Indian or Alaskan Native original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.*

2. *Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000.00 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.*

3. *If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.*

4. *The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7.a through 7.p of this specification. The goals set forth in the solicitation form which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization, the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.*

5. *Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.*

6. *In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.*

7. *The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:*

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organization when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Department when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the source compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all

management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. *Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.*

h. *Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.*

i. *Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.*

j. *Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.*

k. *Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.*

l. *Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to see or to prepare for, through appropriate training, etc., such opportunities.*

m. *Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.*

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations under 7.a. through 7.p. of this specification. The efforts of a contractors' association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7.a. through 7.p. of this specification provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in Paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, of these specifications, the Department will proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records.

Records shall at least include for each employee the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, trainee, helper, or laborer), date of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

The notice set forth in 41 CFR 60-4.2 and the specifications set forth in 41 CFR 60-4.3 replace the New Form for Federal Equal Employment Opportunity Bid Conditions for Federal and Federally-Assisted Construction published as 41 CFR 32482 and commonly known as the Model Federal EEO Bid Conditions. The New Form shall not be used after the regulations in 41 CFR part 60-4 become effective.

(e) 41 CFR 60-4.5 Hometown Plans

If the Contractor is participating, either individually or through an association, in an approved Hometown Plan (including heavy highway affirmative action plans) it shall comply with its affirmative action obligations under Executive Order 11246 by complying with its obligations under the Plan: Provided, that each Contractor or subcontractor participating in an approved Plan is individually required to comply with the equal opportunity clause set forth in 41 CFR 60-1.4; to make a good faith effort to achieve the goals for each trade participating in the Plan in which it has employees; and that the overall good performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan's goals and timetables. If the Contractor is not participating in an approved Hometown Plan it shall comply with the specifications set forth in 41 CFR 60-4.3 and with the goals and timetables for the appropriate area as listed in the Notice required by 41 CFR 60-4.2 with regard to that trade. For the purposes of 41 CFR 60-4, the Contractor is not participating in a Hometown Plan for a particular trade if it:

1. *Ceases to be signatory to a Hometown Plan covering that trade.*

2. *Is signatory to a Hometown Plan for that trade but is not party to a collective bargaining agreement for that trade.*
3. *Is signatory to a Hometown Plan for that trade but is party to a collective bargaining agreement with labor organizations which are not or cease to be signatories to the same Hometown Plan for that trade.*

4. *Is signatory to a Hometown Plan for that trade and is party to a collective bargaining agreement with a labor organization for that trade but the two have not jointly executed a specific commitment in the Hometown Plan for that trade.*

5. *In participating in a Hometown Plan for that trade which is no longer acceptable to the Office of Federal Contract Compliance Programs.*

6. *Is signatory to a Hometown Plan for that trade but is party to a collective bargaining agreement with a labor organization for that trade and the labor organization and the Contractor have failed to make a good faith effort to comply with their obligations under the Hometown Plan for that trade.*

7. *If the Contractor participates in Hometown Plans, it must be able to demonstrate its participation and document its compliance with the provisions of the Hometown Plan.*

(f) 41 CFR 60-4.6 Goals and Timetables

The Department, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects, or construction contracts performed in specific geographical areas. The goals shall be applicable to each construction trade in a covered Contractor's or subcontractor's entire workforce which is working in the

area covered by the goals and timetables, shall be published as notices in the Federal Register, and shall be inserted by the contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2.

(g) 41 CFR 60-4.7 Effect on Other Regulations

The regulations in this part are in addition to the regulations contained in this chapter which apply to construction Contractors and subcontractors generally. So particularly, 41 CFR 60-1.4(a), (b), (c), (d), and (e); 60-1.5; 60-1.7; 60-1.8; 60-1.26; 60-1.29; 60-1.30; 60-1.32; 60-1.42; 60-1.43; and 41 CFR part 60-3; part 60-20; part 60-30; part 60-40; and part 60-50.

(h) 41 CFR 60-4.8 Show Cause Notice

If an investigation or compliance review reveals that a construction Contractor or subcontract has violated the Executive Order, any contract clause, specifications or the regulations in this chapter and if administrative enforcement is contemplated, the Department will issue to the Contractor or subcontractor a notice to show cause which shall contain the items specified in IiI0-(iv) of 41 CFR 60-2.2(c)(1). If the Contractor does not show good cause within 30 days, or in the alternative, fails to enter an acceptable conciliation agreement which includes where appropriate, make up goals and timetables, back pay, and seniority relief for affected class members, the compliance agency shall follow the procedure described in 41 CFR 60-1.26(b), provided that where a conciliation agreement has been violated, no show cause notice is required prior to the initiation of enforcement proceedings.

(i) 41 CFR 60-4.9 Incorporation by Operation of the Order

By operation of the Order, the equal opportunity clause contained in 41 CFR 60-1.4, 41 CFR 60-4.2 and 41 CFR 60-4.3 shall be deemed to be a part of every solicitation or of every contract and subcontract, as appropriate, required by the Order and regulations in this chapter to include such clauses whether or not they are physically incorporated in such solicitation or contract and whether or not the contract is written.

(j) Minority Hiring Goals by County

COUNTY	*PCT.*	*COUNTY*	*PCT.*	*COUNTY*	*PCT*
Adams	*4.4*	*Hendricks*	*12.5*	*Pike*	*3.5*
Allen	*4.4*	*Henry*	*3.9*	*Porter*	*20.9*
Bartholomew	*9.7*	*Howard*	*4.4*	*Posey*	*4.8*
Benton	*1.5*	*Huntington*	*4.4*	*Pulaski*	*18.4*
Blackford	*3.9*	*Jackson*	*9.7*	*Putnam*	*9.7*
Boone	*12.5*	*Jasper*	*18.4*	*Randolph*	*3.9*
Brown	*9.7*	*Jay*	*3.9*	*Ripley*	*9.2*
Carroll	*1.5*	*Jefferson*	*9.6*	*Rush*	*9.7*
Cass	*3.7*	*Jennings*	*9.7*	*St. Joseph*	*7.1*
Clark	*11.2*	*Johnson*	*12.5*	*Scott*	*9.6*
Clay	*3.1*	*Knox*	*3.5*	*Shelby*	*12.5*
Clinton	*1.5*	*Kosciusko*	*6.2*	*Spencer*	*3.5*
Crawford	*9.6*	*LaGrange*	*6.2*	*Starke*	*18.4*
Daviess	*9.7*	*Lake*	*20.9*	*Steuben*	*4.4*
Dearborn	*11.0*	*LaPorte*	*18.4*	*Sullivan*	*3.1*
Decatur	*9.7*	*Lawrence*	*9.7*	*Switzerland*	*9.2*
Dekalb	*4.4*	*Madison*	*4.9*	*Tippecanoe*	*2.7*
Delaware	*5.3*	*Marion*	*12.5*	*Tipton*	*4.4*
Dubois	*3.5*	*Marshall*	*7.1*	*Union*	*3.9*
Elkhart	*4.0*	*Martin*	*9.7*	*Vanderburgh*	*4.8*
Fayette	*3.9*	*Miami*	*3.7*	*Vermillion*	*3.1*
Floyd	*11.2*	*Monroe*	*3.1*	*Vigo*	*3.1*
Fountain	*1.5*	*Montgomery*	*1.5*	*Wabash*	*3.7*
Franklin	*9.2*	*Morgan*	*12.5*	*Warren*	*1.5*
Fulton	*6.2*	*Newton*	*18.4*	*Warrick*	*4.8*
Gibson	*4.8*	*Noble*	*4.4*	*Washington*	*9.6*
Grant	*3.7*	*Ohio*	*9.2*	*Wayne*	*3.9*
Greene	*9.7*	*Orange*	*9.6*	*Wells*	*4.4*
Hamilton	*12.5*	*Owen*	*9.7*	*White*	*1.5*
Hancock	*12.5*	*Parke*	*2.5*	*Whitley*	*4.4*
Harrison	*9.6*	*Perry*	*3.5*		

(k) Female Hiring Goal

The female hiring goal is 6.9 percent throughout the State. Minority females may be counted both as a minority and as a female. Double counting will be permitted for reporting on Form CC-257.

100-C-151e TITLE VI ASSURANCES

(Adopted 05-01-08)

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations**: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the Department of Transportation Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination**: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds or race, color, sex, age, disability, religion or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment**: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, sex, or national origin.

4. **Information and Reports**: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Indiana Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Indiana Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance**: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Indiana Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to: (a) withholding of payments to the contractor under the contract until the contractor complies, and/or (b) cancellation, termination or suspension of the contract, in whole or in part.

6. **Incorporation of Provisions**: The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontract or procurement as the Indiana Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for non-compliance, provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Indiana Department of Transportation to enter into such litigation to protect the interests of the Indiana Department of Transportation, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

100-C-188 2008 STANDARD SPECIFICATIONS

(Revised 04-18-07)

Wherever in the contract documents the 1999 or 2006 Standard Specifications are referenced, it shall be interpreted to mean the 2008 Standard Specifications.

100-C-214 CONSTRUCTION LETTING E-MAIL BOX

(Revised 04-23-08)

The Contractor has the option to submit certain contract bid documents, as defined in the proposal, either as original paper copies filed with the proposal or as electronic documents.

To submit electronic documents, the Contractor shall attach the documents to an e-mail sent to the following address:

constructionletting@indot.in.gov

To ensure that the electronic documents are placed in the correct contract folder with a date and time stamp and that they cannot be altered, the subject line of the e-mail shall contain the following information in the exact format shown:

CompanyNameDocumentTitleLettingDate-ContractNumber

The subject line shall contain no spaces, periods, commas, apostrophes or other punctuation marks other than the one hyphen indicated between CompanyNameDocumentTitleLettingDate and ContractNumber.

LettingDate shall be in the format MMDDYY.

ContractNumber shall be in the format AA#####Z, where AA is the 1 or 2 letter prefix, ##### is the 5 digit number and Z is the 1 letter suffix.

The following is an example of the subject line for the Jones Construction Co., Inc., submitting a drug testing plan for contract IR-30999-A for a March 15, 2008 letting:

JonesConstructionCoIncDrugPlan031508-IR30999A

Documents must be time stamped by the INDOT e-mail box prior to the time stated in the advertisement.

101-C-221 CONTRACT IDENTIFICATION FOR 2009 FEDERAL RECOVERY ACT CONTRACTS

(Adopted 02-01-09)

This contract has been identified as 2009 Federal Recovery Act contract. Anywhere that the contract number is referred to in the contract documents, it shall be read to include the letter "S" as the first letter of the prefix of the contract number.

103-C-222 CONTRACTOR REPORTING REQUIRMENTS FOR 2009 FEDERAL RECOVERY ACT CONTRACTS

(Adopted 02-01-09)

This contract has been identified as a 2009 Federal Recovery Act contract.

In addition to all other reporting required by the contract, the Contractor and all subcontractors utilized on the contract shall also separately maintain and report the following Recovery Act contract information in a format approved by the Department:

1. The number of salaried or non-salaried persons who were employed by the Contractor prior to award of the contract and who are assigned directly to field duties as part of the contract.
2. The number of additional salaried or non-salaried persons employed by the Contractor as a direct result of award of the contract and who are assigned directly to field duties as part of the contract.
3. The number of additional salaried or non-salaried persons employed by the Contractor as a direct result of award of the contract and who are assigned either to the home office or to field duties on another project.

The report shall include the name, job classification and hourly pay rate for each employee reported.

Reports shall be submitted every 30 days beginning no later than 15 days after award of the contract and shall include the number of employees, as defined above, at the time of the report.

The Engineer reserves the right to change the reporting requirements for Recovery Act contracts at any time without any additional compensation to the Contractor.

107-C-029 EQUAL EMPLOYMENT OPPORTUNITY TRAINEE PROGRAM

(Revised 03-20-08)

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 138, INSERT AS FOLLOWS:

When the project is funded in total or in part by the United States Government and no Equal Employment Opportunity hours are shown in the Proposal book, the Contractor shall participate in the Department's Equal Employment Opportunity Trainee Program. Requirements for participation in the program are available on the Department's website or from the Department's Equal Opportunity Division. Failure by the Contractor to comply with this requirement may result in reduction or loss of prequalification to bid for future work.

107-C-208 USE OF CONES IN LIEU OF DRUMS

(*Adopted 03-30-07)*

SECTION 107, BEGIN LINE 416, DELETE AND INSERT AS FOLLOWS:

Pavements and shoulders having an edge drop of more than 3 in. (75 mm) shall be delineated with drums in accordance with 801.09. Delineation shall be at a maximum spacing of 200 ft (60 m). The use of cones in accordance with 801.08 will be permitted ~~during daylight hours in lieu of drums~~ *as shown on the plans except cones shall not be used for interstate lane restrictions*.

SECTION 801, BEGIN LINE 259, DELETE AND INSERT AS FOLLOWS:

Cones shall be made of a material to withstand impact without damage to striking vehicles. They shall have a substantial base to restrict overturning. Cones and tubular markers shall be as shown on the plans.

Cones shall be used only during temporary activities where portability is advantageous and they remain in place and do not create a hazard to traffic. The use of cones in lieu of drums will be permitted ~~during daylight hours unless otherwise directed~~ *as shown on the plans except cones shall not be used for interstate lane restrictions*.

Tubular markers shall be used for separating two-lane two-way traffic as shown on the plans or as directed.

Cones and tubular markers shall be secured in place either by weighting or adhesives. The use of metal bases will not be permitted.

107-C-220 WORKER SAFETY

(Adopted 11-20-08)

The Standard Specifications are revised as follows:

SECTION 107, BEGIN LINE 240, DELETE ANDINSERT AS FOLLOWS:

(a) ~~Employee~~ *Worker* Safety

All workers within the right-of-way who are exposed either to traffic or construction equipment within the work area shall wear high visibility safety apparel in accordance with 23 CFR 634.

If a trench, 5 ft (1.5 m) or more in depth, is constructed on a project, the requirements for trench safety systems as specified in OSHA regulations 29 CFR 1926, Subpart P, shall be performed. Unless otherwise specified, trench safety systems work will not be paid for separately, but the cost thereof shall be included in the cost of the pay item covering the trench excavation work.

SECTION 107, BEGIN LINE 430, DELETE AS FOLLOWS:

Sufficient barricades, supplemented by watchers or flaggers when necessary, shall be provided continuously to protect any and all parts of the work and to promote safe and orderly movement of traffic. When a road is closed or posted for official detour but is still usable by local traffic, barricades and road closure sign assemblies, in addition to the closure barricades, required at the beginning and end of the portion of such road being detoured, shall be erected at the site of bridge removals, pipe removals, or other high hazard locations. Such barricades shall be located within 150 ft (50 m) of the removal location. These barricades shall be of the type shown on the plans, and in accordance with 801.07. Such barricades shall extend from shoulder to shoulder, or to the limit of area that is readily traversable by a motor vehicle, as directed. During non-working hours, no opening shall exist in the barricades. The road closure sign assembly shall be placed at or near the center of the roadway. If these requirements are violated, operations shall be suspended until adequate measures are taken for full compliance. ~~Flaggers or watchers shall wear a flagger's vest while directing traffic. Official law enforcement officers in uniform will not be required to wear a vest. The vest shall be furnished and be made of a durable fluorescent material, flame orange color, with two vertical reflective stripes on both the front and back. It shall be kept clean and provide maximum visibility at all times.~~ The use of hand signaling flags will not be permitted except for emergency ~~and single flagger~~ situations. The "Stop"/"Slow" paddle shall be required as a primary hand signaling device to control traffic through work areas. The "Stop"/"Slow" paddle shall be in accordance with section 6E.03 of the MUTCD, except it shall be at least 24 in. (610 mm) wide.

107-R-169 STATEMENTS ABOUT EXISTING CONDITIONS OF UTILITIES, ADDITIONAL RIGHT-OF-WAY, AND ENCROACHMENTS

(Revised 02-18-08)

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 733, INSERT AS FOLLOWS:

107.26 Existing Conditions of Utilities, Additional Right-of-Way, and Encroachments

Such existing conditions are as described below.

(a) Utilities

The status of all utility companies and organizations potentially involved with the work to be performed are described below as know at the time this contract was prepared.

The facilities of Verizon exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Mark Weichman of the utility may be contacted at 812-522-0313.

The facilities of Ohio Valley Gas exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Mark Mayfield of the utility may be contacted at 765-584-6842 Ext. 110.

The facilities of Ireland Utilities exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Morris Weidbrenner of the utility may be contacted at 812-482-8826.

The facilities of Avenue Broadband Utilities exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Bart Kotter of the utility may be contacted at 812-895-7666.

The facilities of Dubois County REC Inc. exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Greg Dilger of the utility may be contacted at 812-482-1188.

The facilities of Insight Communications exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Chris Dowdy of the utility may be contacted at 812-428-2460 Ext. 32718.

The facilities of Jasper Municipal Utilities exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, William Nordhoff of the utility may be contacted at 812-482-5252.

(b) Right-of-Way

There is no involvement of additional right-of-way for the contract.

(c) Encroachments

There is no involvement of encroachments for the contract.

(d) Other Noteworthy Conditions

There are no other noteworthy conditions which may affect the prosecution and progress of the contract.

(e) Preconstruction Conference Notification

The Contractor shall provide notification during the preconstruction conference about known corrections to or omissions of the information presented in 107.26(a) through 107.26(d) above. Otherwise, notification shall be provided as required in 105.06. Notifications regarding such corrections or omissions shall not alleviate the Contractor's inquiry or interpretation obligations as contained in 120 IAC 3-6-6.

108-C-192 TEMPORARY EROSION CONTROL MEASURES

(Revised 03-20-08)

The Standard Specifications are revised as follows:

SECTION 108, BEGIN LINE 107, DELETE AND INSERT AS FOLLOWS:

An amended Erosion Control Plan shall be submitted in accordance with 327 IAC 15-5 for those areas not included in the Department submittal ~~or~~ as necessary for changes initiated by the Contractor. Items to include consist of sequencing of operations, *stockpile sites, equipment storage sites, plant sites,* ~~borrow and disposal areas,~~ and haul roads as well as any revision to the Department's submittal. All appropriate erosion control items shall be in place prior to disturbing the project site. A copy of the amended plan shall be provided to the Engineer.

Borrow and disposal sites shall be in accordance with 203.08.

The Contractor shall submit the planned sequencing of erosion and sediment control measures to be used on the project to:

IDEM
Rule 5 Coordinator
100 N. Senate Avenue
Mail Code 65-42 Room 1255
Indianapolis, IN 46204

Indiana Dept. of Transportation
Senior Environmental Manager
Room N642
100 N. Senate Avenue
Indianapolis, IN 46204

When required by 327 IAC 15-5, stockpile and storage sites shall be permitted by an IDEM Notice of Intent (NOI). The Contractor shall submit either a new IDEM NOI or revise the original NOI for the project. A copy of the new or revised NOI shall be submitted to the Engineer prior to any operations at a stockpile or storage site.

All information shall be submitted and approved prior to land disturbing activities. All appropriate erosion control items shall be in place prior to disturbing the project site. A copy of the amended plan shall be provided to the Engineer.

The Contractor shall designate one or more of its employees *as an Erosion Control Supervisor. The Erosion Control Supervisor shall* ~~to~~ be responsible for the preparation, submittal, and ensuring receipt of the approval of the amended erosion

control plan. Such individual(s) shall also be responsible for obtaining all other necessary permits including the wetland inspection and archaeological record check and field survey in accordance with 203.08, and for all environmental inspections. Such individual(s) shall oversee the installation of all erosion control measures and shall conduct ~~regular~~ *weekly and post-event* inspections *and perform all other tasks related to the installation, maintenance, and removal of erosion control measures. The Erosion Control Supervisor shall accompany personnel from IDEM or other governmental agencies, as required, during site visits by those agencies.* ~~and~~ *The Erosion Control Supervisor shall be responsible for* completion of all reports in accordance with 205.

A minimum of 14 days prior to commencing work, the Contractor shall prepare and submit to the Engineer, for approval, an erosion control plan that includes, at a minimum, the following items:

(a) Locations of all proposed soil stockpiles.

(b) Locations of all proposed equipment storage areas, fueling locations, construction trailers, batch plants, and designated concrete truck washout areas.

(c) Proposed construction sequence and phasing of erosion control measures.

(d) Location of all construction entrances where vehicles and equipment will enter and exit the site.

(e) Material handling and spill prevention plan, which shall include a list of expected materials that may be present on the site during construction operations, as well as a written description of how these materials will be handled to minimize the potential that the materials may enter the storm water runoff from the site.

(f) Statements that the erosion control measures for the project shall, at a minimum, be inspected on a weekly basis and within 24 h of every 1/2 in. (13 mm) rain event.

(g) Monitoring and maintenance plan for erosion control measures.

The erosion control plan shall be signed by the Erosion Control Supervisor. The Engineer will submit the erosion control plan to the Department's Office of Environmental Services Permit Coordinator.

The name~~(s)~~ of the ~~designated individual(s)~~ *Erosion Control Supervisor* shall be furnished the Engineer at, or prior to, the preconstruction meeting. Should the designated individual(s) need to be replaced during the contract, replacements shall be designated within seven calendar days and notification shall be furnished the Engineer.

Permanent erosion control measures shall be incorporated into the work at the earliest practicable time as the construction progresses to stabilize the site.

In order to minimize pollution to bodies of water, the practices and controls set out below shall be followed.

(a) When work areas are located in or adjacent to bodies of water, such areas shall be separated by a dike or other barrier to keep contained. Sediment disturbance of these bodies of waters shall be minimized during the construction and removal of such barriers.

(b) All waterways shall be cleared as soon as practicable of false-work, temporary piling, debris, or other obstructions placed during construction operations.

(c) Water from aggregate washing or other operations containing sediment shall be treated by filtration, a settling basin, or other means sufficient to reduce the sediment content.

(d) Pollutants such a fuels, lubricants, asphalt, sewage, wash water, or waste from concrete mixing operations, and other harmful materials shall not be discharged into existing bodies of water.

(e) All applicable regulations and statutes relating to the prevention and abatement of pollution shall be complied with in the performance of the contract.

SECTION 108, AFTER LINE 177, INSERT AS FOLLOWS:

The cost of preparation of the erosion control plan shall be included in the cost of the various erosion and sediment control items.

SECTION 205, AFTER LINE 33, INSERT AS FOLLOWS:

Temporary erosion control measures shall be placed as soon as possible. Silt fence and sediment traps shall be installed prior to beginning earth disturbing activities.

Temporary seeding shall be placed on disturbed areas that are expected to be undisturbed for over 7 days or as directed by the Engineer.

Check dams shall be installed as soon as possible in areas of construction. Once ditches are to grade, permanent erosion control measures shall be placed as soon as possible and no later than 5 workdays after ditch grading is completed. During construction, if ditch flow patterns change, erosion control measures may need to be moved or adjusted so that no areas are left unprotected.

Pipe end sections and anchors shall be placed when the structure is installed. If the pipe end sections or anchors cannot be placed at the same time, temporary riprap splashpads shall be placed at the outlets of the pipes until the pipe end sections or anchors can be placed.

SECTION 205, AFTER LINE 108, INSERT AS FOLLOWS:

(o) Stable Construction Entrance

The Contractor shall provide a stable construction entrance at the points where construction traffic will enter onto an existing road. This entrance shall be a minimum of 12 ft wide, 50 ft long, and constructed of 12 in. of No. 2 stone. The radii shall be large enough to accommodate the vehicles utilizing the entrance. Additional stone may be required, as directed, to maintain the usefulness of the stable construction entrance. Where there in insufficient room for a stable construction entrance, other measures shall be taken to prevent the tracking of sediment onto the pavement.

SECTION 205, AFTER LINE 118, DELETE AND INSERT AS FOLLOWS:

205.04 Maintenance

Temporary erosion and sediment control measures shall be inspected by the Contractor*'s Erosion Control Supervisor* once every seven days and after *each* rain ~~activities~~ *activity*. Inspections shall be documented and records shall be maintained by the Contractor, to be made available for review upon request. Records shall include, at a minimum, the date, the inspector's name, the maintenance and corrections needed based on this inspection, and the status of previously identified deficiencies. The temporary protection measures shall be returned to good working conditions within 48 hours after inspection or as directed. Sediment shall be removed as approved and disposed of in accordance with 201.03 and 203.08. *Inspection records shall be kept until the entire contract is complete and has been permanently stabilized.*

SECTION 205, AFTER LINE 148, INSERT AS FOLLOWS:

No. 2 stone for stable construction entrances will be measured by the ton (megagram) in accordance with 109.01(b).

SECTION 205, LINE 166, INSERT AS FOLLOWS:

for at the contract unit price per each unit installed. *No. 2 stone for stable construction entrances will be paid for at the contract unit price per ton.*

SECTION 205, AFTER LINE 176, INSERT AS FOLLOWS:

No. 2 Stone .....TON (Mg)

SECTION 205, AFTER LINE 213, INSERT AS FOLLOWS:

The cost of constructing, maintaining, and removal of the stable construction entrance shall be included in the cost of No. 2 stone.

108-C-209 REPORTING SUBCONTRACT PAYMENTS

(Adopted 07-11-07)

The Standard Specifications are revised as follows:

SECTION 108, AFTER LINE 28, INSERT AS FOLLOWS:

The Contractor shall submit monthly reports, in a format approved by the Department, of all payments made to subcontractors. Reports shall be submitted no later than 10 days after the end of each month in which a subcontractor is paid for work on the contract. Reports shall include any release of retainage payments made to subcontractors.

108-C-210 DETERMINATION AND EXTENSION OF CONTRACT TIME

(Adopted 07-19-07)

The Standard Specifications are revised as follows:

SECTION 108, BEGIN LINE 335, DELETE AND INSERT AS FOLLOWS:

The Department may order suspension of work either wholly or in part, for a period of time for certain holidays. For such orders, *if the contract suspension is not stated in the contract documents,* the contract completion time will be adjusted as follows:

(a) If the contract completion time is on a work day basis, no work days will be charged on those days that work on the controlling operation is suspended.

(b) If the contract completion time is on a calendar day basis, all calendar days on which work on the controlling operation is suspended will be excluded.

(c) If the contract completion time is a fixed calendar date, the contract will ~~not~~ be extended *by the number of days that work on the controlling operation is suspended*.

(d) If the contract contains an intermediate completion time, said time will be adjusted in accordance with the requirements of (a) or (b), above as appropriate, provided that the suspension occurs within the time period while the intermediate completion time is in effect.

109-C-211 COST REDUCTION INCENTIVE

(Adopted 07-19-07)

The Standard Specifications are revised as follows:

SECTION 109, DELETE LINES 330 THROUGH 499.

SECTION 109, AFTER LINE 500, INSERT AS FOLLOWS:

109.04 Cost Reduction Incentive, CRI

The Contractor may submit a written proposal for modifying the Contract Documents for the purpose of reducing construction costs or contract time. The proposal shall produce a savings without impairing essential functions, characteristics, and timing of the project including, but not limited to, safety, service life, economy of operations, the traveling public, ease of maintenance, desired appearance, design standards and construction schedules.

(a) CRI Initial Requirements

The Contractor shall initially submit five copies of a brief proposal to the Department to illustrate the concept or idea. At a minimum, the Contractor shall submit the following.

1. *A statement that the proposal is submitted as a conceptual CRI.*

2. *A brief proposal with graphics, if appropriate, to illustrate and describe the concept.*

3. *A brief description of the existing work and the proposed changes for performing the work including a discussion of the comparative advantages and disadvantages for each and how the proposal meets the original intent of the design.*

4. *An approximate cost estimate for performing the work under the existing contract and under the proposed change.*

5. *An approximate cost estimate of design and engineering fees associated with the proposed change.*

6. *A description of any effects the proposed change would have on Department costs other than those in the contract such as future construction, design, right-of-way, utilities, maintenance, and operations costs.*

7. *The amount of time that will be needed to develop a formal CRI proposal.*

8. *A statement of the date by which the Department must execute an agreement adopting the proposal to obtain the maximum cost reduction during the remainder of the contract time, the date the work must begin in order to not delay the contract, and the reasoning for this time schedule.*

9. *An approximate estimate of the effect the proposal will have on the time for completion of the contract, including development of the formal proposal, review by the Department and implementation.*

10. *The name of the redesign professional engineer, if any.*

11. *Reference to the applicable INDOT Design Manual provisions.*

12. *A statement regarding impacted permit requirements.*

13. *Identify any material not in current contract that the contractor proposes to use and corresponding applicable specifications.*

The Department will notify the Contractor in writing within five business days after receipt of the proposal that the proposal has been rejected, accepted, or that a meeting needs to be arranged to discuss the proposed conceptual CRI. If the Department fails to respond within five business days, the proposal will be deemed rejected. If a meeting is requested, the Contractor shall arrange a meeting involving any professional

engineer that will be used in development of the proposal; the engineer who designed the original plans or review engineer designated by the Department; contractor personnel; and INDOT personnel as determined by the Engineer. This meeting shall be held within 10 business days of receipt of the written notification, unless the Engineer approves additional time. At least two business days prior to the meeting, the Contractor shall provide a copy of its conceptual CRI to all persons invited to the meeting. Within 10 business days or a mutually agreed upon time after this meeting, INDOT will notify the Contractor in writing as to whether a complete CRI may be developed.

(b) CRI Formal Proposal Requirements

If a concept is accepted by the Department, a formal proposal shall be submitted with a statement identifying the proposal as a CRI and shall contain, at a minimum, information as follows:

1. *A description of the difference between the planned work and the proposed change with a comparison of effects on safety, service life, economy of operations, the traveling public, ease of maintenance, desired appearance, design standards, and construction schedules.*

2. *Proposed changes in the contract documents. Documents showing design changes shall be signed and bear the seal of a licensed professional engineer. Design changes shall be supported by design computations as necessary for a thorough and expeditious evaluation.*

3. *The pay items, unit prices, and quantities affected by the change.*

4. *Complete, detailed cost estimates for performance of the work both as planned and as proposed.*

5. *The calendar date required for approval of the proposal in order to produce the savings indicated.*

6. *Locations and situations, including test results, in which similar measures have been successfully used.*

7. *A statement regarding the effect the proposal will have on the contract completion time.*

8. *A signed contract between the Contractor and the Contractor's redesign engineer, who prepared and sealed the plans for the CRI proposal, shall be submitted to the Department. The contract shall provide for the following:*

    a. *The Contractor's redesign engineer shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications and other services furnished by the redesign engineer under this contract. The redesign engineer shall correct or revise any errors or omissions in its designs, drawings, specifications, and other services. The Contractor's redesign engineer shall indemnify, defend, and hold harmless the*

State and its agents, officials, and employees, from all claims and suits including court costs, attorney's fees, and other expenses caused by any acts, errors, or omissions of the Contractor's redesign engineer, its agents, or employees, in connection with the CRI proposal.

b. Neither the Department's review, approval, nor acceptance of the plans for the CRI shall be construed to operate as a waiver of rights under the contract or cause of action arising out of the contract. The Contractor's redesign engineer shall be and shall remain liable to the Department for all damages caused by the Contractor's redesign engineer.

c. The rights and remedies of the Department provided in the contract are in addition to all other rights and remedies provided by law.

d. No terms between the Contractor and the redesign engineer shall adversely affect the Department's liability protection.

9. Contractor's engineering costs to develop the proposal shall be submitted with full documentation.

Additional information shall be provided as required to properly evaluate the proposed change. Failure to do so may result in rejection of the cost reduction incentive proposal.

(c) Approval of Formal CRI Proposal

The Engineer will be the sole judge as to whether a formal CRI proposal qualifies for consideration, evaluation, and approval. A proposal which requires excessive time or cost for review, evaluation, or investigation, or which is not consistent with Department design policies, may be rejected. A proposal may also be rejected if not submitted within the time frame specified in the Contractor's conceptual proposal, unless the Engineer approves additional time. Proposed changes in pavement design including materials or pavement type, changes in materials required to be installed by a certified installer, or changes in right-of-way will not be approved. A proposal which uses empirical design (AASHTO LRFD Bridge Design Specifications, Section 9.7.2) of the concrete bridge deck will not be considered or approved. Only proposals which result in the Department's portion of the estimated net savings being $10,000 or more will be considered. Except as provided in 109.04(d), the Department will not be liable for failure to accept or act upon a proposal submitted in accordance with the requirements herein or for delays to the work attributable to such proposal, unless an extension of time is provided as part of the agreed CRI proposal.

Original contract bid prices shall not be based on the anticipated approval of a CRI proposal. If the proposal is rejected, the contract shall be completed at the original contract prices. If a CRI proposal is not approved on or before the calendar date submitted by the Contractor in the CRI shown on the proposal, such proposal will be deemed rejected. In determining the estimated net savings, the contract prices bid may be disregarded if it is determined that such prices do not represent a fair measure of the value of the work to be performed or deleted.

The CRI proposal will not be approved if equivalent options are already available within the contract, or if the Department is already considering a change order to the contract which includes the proposal revisions.

If the CRI proposal is approved, it will be executed by means of a change order. The change order will show the changes in the plans and specifications necessary to permit the proposal to be put into effect and the net estimated savings will be set forth on the change order.

Upon approval, the Department will have the right to use, duplicate, and disclose in whole or in part, all data necessary for the subsequent adoption of the proposal for future projects.

The provisions of this specification will apply only to a contracts awarded to the lowest bidder in accordance with the Department's competitive bidding requirements.

(d) Payment for Design of Formal Proposal, if Rejected

Except as provided elsewhere herein, if the Department rejects the formal CRI proposal, the Contractor will be reimbursed for 50% of the Contractor's reasonable design costs incurred after the Department's acceptance of the CRI conceptual proposal.

The Contractor will also be reimbursed for 50% of the Contractor's reasonable design costs of an approved CRI proposal if the Department determines that the proposal is no longer feasible because of changes in field conditions or other conditions beyond the control of the Contractor. If written approval was given to proceed with the work, procure materials, begin fabrication, and rejection occurs, the work and fabrication costs will be reimbursed in accordance with 109.05. The Contractor will be compensated for materials ordered which are unique to the project based on the Contractor's cost minus salvage value if the Contractor is unable to return these items to the vendor. All such material may, at the option of the Department, be purchased at its actual cost. There will be no reimbursement for costs incurred prior to the acceptance of the conceptual CRI proposal. The Contractor will not be reimbursed for design costs if a formal CRI proposal is rejected because it was not submitted within the time frame specified in the Contractor's conceptual proposal or additional time approved by the Engineer, if the Contractor fails to submit additional information requested by the Department, or if the design criteria used in the proposal does not comply with the Department's design standards.

(e) Other Conditions

The Contractor shall continue to perform the work in accordance with the contract requirements until a change order incorporating the CRI proposal has been approved. However, no contract work that will be affected by a CRI proposal shall be performed until the CRI proposal has been approved or rejected.

Prior to approval, the Engineer may modify a proposal with the concurrence of the Contractor, to enhance it or make it acceptable. If any modification increases or decreases the net savings resulting from the proposal, the Contractor's 50% share will be determined upon the basis of the proposal as modified.

The Department reserves the right to include in the change order the conditions it deems appropriate for consideration, approval and implementation of the CRI proposal. Acceptance of the change order by the Contractor shall constitute acceptance of such conditions. As a condition for considering a Contractor's CRI proposal, the Department also reserves the right to require the Contractor to share in the Department's costs of investigating the proposal. If this condition is imposed, the Contractor shall indicate acceptance in writing. Such acceptance shall constitute full authority for the Department to deduct amounts for the investigation from moneys due the Contractor under the contract.

The Engineer may reject, in accordance with 105.03 and 105.11, all or any portion of work performed under an approved CRI proposal.

(f) Time Savings Proposals

The Department will consider as a CRI proposal, any proposals that reduce contract time by changing phasing of the work, the traffic control plan, or design elements.

The Department will consider proposals that result in time savings and at the same time may increase the cost of the project. The Department will be the sole judge as to whether the benefits of completing the project or a project phase before the scheduled completion date or milestone, offsets an increase to the cost of the project.

The submittals for time savings will be reviewed using the CRI proposal process. The Contractor shall provide the Department sufficient information to enable the Department to evaluate the cost benefit of the savings.

(g) Adjustments to Contract Time

For approved formal CRI proposals the Department will adjust the applicable contract time as set out in the proposal. Any adjustment will be set forth in the change order for the CRI proposal. Depending on the Contractor's proposal, the adjustment will be an increase or decrease in the appropriate completion date.

(h) Method of Measurement

The work, as revised by the formal CRI proposal, will be measured as complete and in place and in accordance with the change order.

(i) Basis of Payment

The work, as revised by the formal CRI proposal, will be paid for as complete and in place and in accordance with the change order. In addition, 50% of the total net savings of the CRI proposal will be paid for separately as follows:

1. *An initial amount of 25% of the total estimated savings will be paid to the Contractor upon approval of the change order.*

2. *Upon completion of all items of work included in the change order, the total net savings will be calculated and the Contractor will be paid the difference between 50% of the total net savings and the initial payment of 25% of the total estimated savings.*

3. *A cost savings of not less than $5,000.00 shall be guaranteed to the Department.*

The actual formal CRI proposal net savings will be checked upon completion of the contract and determination of final quantities to determine if any payment adjustment is required.

Except for the time savings component of a formal CRI proposal, the total net savings will be determined by the difference between the cost of the revised work and the cost of the related work required by the original plans and specifications. The cost of the revised work includes the administrative costs incurred by the Department to review the proposal. These costs will be agreed to in the change order. Only those work items directly affected by the plan change will be considered in making the determination of net cost savings. Subsequent plan changes affecting the modified work items but not related to the CRI proposal will be excluded from such determination. Upon completion of all work included in the CRI proposal, the final total net savings will be determined by comparing the cost of the work based on the original contract quantities with the cost of the actual CRI proposal work performed. In determining the savings, the Department reserves the right to consider other factors in addition to the contract bid prices and proposed unit prices if, in the judgment of the Department, such prices do not represent a fair measure of the value of the work to be deleted from or added to the contract.

The net savings of a CRI proposal to reduce contract time will be determined by multiplying the number of days saved by the daily liquidated damages as set forth in Section 108.08 or as otherwise provided in the contract.

Redesign engineering, in accordance with this section, is defined as 50% of the contractor's reasonable design costs incurred after the Department's acceptance of the CRI proposal. Redesign engineering will be paid when a conceptual CRI has been accepted by INDOT but the final proposal is rejected.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Cost Reduction Incentive Proposal No. ____	*LS*
Redesign Engineering, CRI Proposal No. ____	*LS*

109-C-213 CONTRACT LIENS

(Adopted 07/27/07)

Upon receipt of a claim under Indiana Code 8-23-9-26, the Department will retain out of the amount due the Contractor the amount of the claim. The amount to be retained will be withheld from partial payment estimates until the total amount of the claim has been retained.

In order to retain an amount when required by the code, the Engineer will apply a negative quantity to the contract liens pay item for the actual dollar amount of the claim. Upon resolution of the claim, the Engineer will post a positive quantity to the contract liens pay item equal to the amount originally retained. The final quantity of the contract liens pay item will be zero prior to final payment.

The contract unit price for contract liens will be one dollar.

Payment will be made under:

Pay Item	**Unit Symbol**
Contract Liens	DOL

109-C-218 PAYMENT FOR EXTRA WORK

(Adopted 03-20-08)

The Standard Specifications are revised as follows:

SECTION 109, BEGIN LINE 501, DELETE AND INSERT AS FOLLOWS:

109.05 *Payment for* Extra Work ~~and Force Account Work~~

Extra work performed in accordance with 104.03 will be paid for by one of the following methods:

(a) Agreed Price

Extra work ~~performed in accordance with 104.03~~ will be paid for at the *agreed upon* unit prices or lump sum prices as ~~approved on the change order~~ *documented on approved change order. The Contractor shall, when directed, furnish a cost breakdown to substantiate a unit price or lump sum price.*

(b) Force Account

~~However, the~~ *The* Department may require the Contractor to ~~do such~~ *perform extra* work on a force account basis *when a price cannot be agreed upon in accordance with 109.05(a). The Contractor shall, when directed, submit a written proposal for the extra work prior to the start of the work. When directed, the proposal shall include the planned labor, materials, equipment, and schedule for the work. Extra work performed by force account will be documented on an approved change order and will* ~~to~~ be compensated in the following manner:

~~(a)~~ *1.* Labor Costs

For all labor and foremen in direct charge of the specific operations, the Contractor will receive the rate of wage, or scale, agreed upon in writing before beginning work for each hour that said labor and foremen are actually engaged in such work.

The Contractor will receive the actual costs paid to, or in behalf of, workmen by reasons of subsistence and travel allowances, worker's compensation insurance premiums, unemployment insurance contributions, social security taxes, health and

welfare benefits, pension fund benefits, or other benefits when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. The Contractor shall furnish satisfactory evidence of the rate or rates paid for insurance premiums and tax.

An amount equal to 20% of the sum of the above items will also be paid the Contractor.

~~(b)~~ *2.* Bond and Insurance

For bond premium and property damage and liability insurance premiums, the Contractor will receive the actual cost, to which cost 10% will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond premium and insurance premiums.

~~(c)~~ *3.* Materials

For materials accepted and used, the Contractor will receive the actual cost of such materials delivered on the work, including transportation charges paid by the Contractor, exclusive of machinery rentals as hereinafter set forth, to which cost 12% will be added.

~~(d)~~ *4.* Equipment

For Contractor owned machinery or special equipment other than small tools as defined herein, the rates shall be not more than those listed in the current Rental Rate Blue Book as published by ~~Dataquest, Inc.~~ *EquipmentWatch®. The rate used shall be the FHWA hourly rate which is the ownership cost rate plus the operating cost rate.* Regardless of the time used, ~~this~~ *the ownership cost* rate shall be the hourly rate obtained by dividing the monthly Blue Book rate by 176 with appropriate adjustments made for region and age. Actual ~~fuel, lubricant and~~ transportation costs may be added to the ~~rental cost~~ *FHWA rate*. Small tools will be defined as tools costing less than $500 each, or an aggregate total of $1,000 or less.

For machinery or special equipment not owned by the Contractor, the rate shall be as shown on invoices. Actual fuel, lubricant and transportation costs may be added to the rental cost. *The Engineer may designate the use of the fuel percentage of the Rental Rate Blue Book operating cost rate in lieu of actual fuel and lubricant costs. No payment will be made for repairs to rented equipment.*

For equipment that is operational, on-site, and necessary for force account work, but is idle due to conditions beyond the control of the Contractor, a standby rate will apply. The standby rate will also apply during the period of transportation and on-site assembly and disassembly of the equipment for transportation purposes. The standby rate will be the published ownership cost rate reduced by 50 percent. Standby time will not be paid for in excess of 8 hours per day minus the number of hours paid for at the FHWA rate per day; or 40 hours per week minus the number of hours paid for at the FHWA rate per week. If rented equipment necessary for force account work is idle, the Department will pay the Contractor for the actual invoice rates for the duration of the idle period.

The Contractor shall provide a list of all information needed to verify the Blue Book rental rate for each piece of equipment. The information shall include the

equipment type, manufacturer name, model number, year, any attachments used, and any other information necessary to determine the proper rate.

The Contractor will receive payment for the total costs agreed upon to which sum 12% will be added.

~~(e)~~ *5.* Miscellaneous

No additional allowance will be made for general superintendence or other costs for which no specific allowance is herein provided.

~~(f)~~ *6.* Subcontracting

For administration costs in connection with approved subcontract work, the Contractor shall receive an amount equal to 10% of the first $3,000 and 7% thereafter, or the total cost of such work computed as set forth above.

~~(g)~~ *7.* Compensation

The Contractor and the Engineer shall compare records of the cost of work done as ordered on a force account basis at the end of each day. These records shall be made in duplicate and signed by both. Each shall retain one copy.

~~(h)~~ *8.* Statements

No payment will be made for work performed on a force account basis until the Contractor has furnished triplicate itemized statements of the cost of such force account work detailed as follows:

~~1.~~ *a.* name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman;

~~2.~~ *b.* designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment;

~~3.~~ *c.* quantities of materials, prices, and extensions;

~~4.~~ *d.* transportation of materials;

~~5.~~ *e.* cost of property damage, liability and worker's compensation insurance premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by receipted invoices for all materials used and for transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials where taken from its stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

If the Contractor fails or refuses to prosecute extra *work* or force account work as directed, the Department may withhold payment of all current estimates until the Contractor's failure or refusal is eliminated.

~~**(i) Cost Breakdown**~~

~~In case the work is performed as extra work, the Contractor shall, when directed, furnish a cost breakdown to substantiate a lump sum price or unit price.~~

109-C-219 PG ASPHALT BINDER MATERIAL COST ADJUSTMENTS

(Revised 12-11-08)

The Standard Specifications are revised as follows:

SECTION 109, AFTER LINE 643, INSERT AS FOLLOWS:

109.05.3 PG Asphalt Binder Material Cost Adjustments

The Contractor shall elect at the time the bid proposal is submitted, in a manner determined by the Department, whether or not to enact PG asphalt binder material cost adjustments. If the Contractor elects not to enact such adjustments, there will be no adjusted payment made to the Contractor for changes in the cost of PG asphalt binder materials used on the project and the provisions of this specification will not be applied to the contract. PG asphalt binder material cost adjustments will not be added to the contract at any time after the Contractor has elected not to enact such adjustments with submittal of the bid proposal.

When the Contractor elects to enact PG asphalt binder material cost adjustments at the time the bid proposal is submitted, the Department will adjust payment to the Contractor due to an increase or decrease in the cost of PG asphalt binder material used on the project to produce HMA mixtures that are paid in accordance with 304, 401, 402, 410, 610 or 718. Payment will be adjusted when an increase or decrease in the PG asphalt binder index for the contract exceeds 10 percent. Payment will only be adjusted when the total original or revised quantity of at least one HMA pay item exceeds 2,000 tons (2,000 Mg).

For contracts without any original HMA pay item quantity equal to or greater than 2,000 tons (2,000 Mg), adjusted payment will not be made until the revised quantity of at least one HMA pay item meets the quantity criteria. No adjusted payment will be made on any quantity of HMA items placed prior to when the 2,000 ton (2,000 Mg) criteria has been met.

The Department will determine a PG asphalt binder index from one or more commercial services that provide regional indices. The PG asphalt binder index will be maintained by the Office of Materials Management and posted on the Department's website. The posting will include an explanation of how the index is determined. A monthly payment adjustment will be calculated for each HMA pay item placed on the contract during that month. The total PG asphalt binder adjustment applied to the contract each month will be the sum of the calculations for each HMA pay item. The payment adjustment for each HMA pay item will be calculated as follows:

For a price increase:

$$MPA = (Q \times Pb)/100 \times LI \times [(BI-LI)/LI - 0.10]$$

For a price decrease:

MPA = (Q x Pb)/100 x LI x [(BI-LI)/LI + 0.10]
Where:

MPA = Mixture Payment Adjustment, in dollars, calculated to the nearest 0.01 dollar for each HMA pay item.
Q = Quantity of a HMA pay item placed, in tons (megagrams), entered to the actual 0.01 unit placed. The quantity will be calculated prior to calculation of any other quantity adjustment.
Pb = Percent of virgin asphalt binder from the DMF, in the adjustment period, or JMF for the HMA mixture, entered to the nearest 0.1.
BI = PG asphalt binder index for the month the HMA pay item is placed, reported to the nearest whole dollar.
LI = PG asphalt binder index for the contract. The LI for all original contract HMA pay items equals the BI for the month immediately prior to the month of letting for the contract. The LI for any HMA extra work pay item will be the BI for the month the unit price for the pay item is submitted by the Contractor.

The calculation of (BI-LI)/LI will be rounded to the nearest 0.001. Payment will only be adjusted when the absolute value of (BI-LI)/LI is equal to or greater than 0.101.

If HMA pay items are placed beyond the specified contract completion date for the contract, the Department will calculate pay adjustments on the BI for the month of the specified completion date or the month of placement, whichever result is less.

The unit price of PG asphalt binder payment adjustment will be one dollar and the pay quantities will be in units of dollars.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Payment Adjustment, PG Asphalt Binder	*DOL*

111-C-178 STOCKPILED MATERIALS

(Adopted 09-01-05)

The Standard Specifications are revised as follows:

SECTION 111, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:
be incorporated into the work and delivered in the vicinity of the project, or stored in approved storage facilities. Such materials shall be limited to structural steel, concrete structural members, ~~pavement~~ reinforcing steel, pavement contraction joints, granular base and subbase materials, aggregates for HMA and concrete pavements, and structural supports for signals, signs, and luminaires.

In addition to the aforementioned, the Department will consider the stockpiling of other steel products, such as guardrail, culvert pipe, etc if it has been determined that a critical shortage of material would cause delay to the project.

SECTION 111, BEGIN LINE 115, DELETE AS FOLLOWS:

Approval of partial payment for stockpiled materials will not constitute final acceptance of such materials for use in completing the work. Structural steel members and ~~pavement~~ reinforcing steel may be subjected to additional inspection and testing prior to final acceptance and incorporation into the work. All other stockpiled pay items will be subjected to additional inspection and testing prior to final acceptance and incorporation into the work.

203-R-550 APPROVAL OF BORROW AND DISPOSAL SITES

(Adopted 03-20-08)

The Standard Specifications are revised as follows:

SECTION 201, BEGIN LINE 3, INSERT AS FOLLOWS:

201.01 Description

This work shall consist of clearing, grubbing, removing, and disposing of all vegetation and debris, except such objects as are designated to remain or are to be removed in accordance with other sections of these specifications, within the construction limits shown on the plans. If no construction limits are shown, the right-of-way and easement areas will be the construction limits. This work shall include the preservation from injury or defacement of all vegetation and objects designated to remain. *Disposal of material shall be in accordance with 203.08.*

SECTION 201, BEGIN LINE 43, DELETE AND INSERT AS FOLLOWS:

Unless burned in accordance with the requirements herein, perishable materials and debris shall be removed from the right-of-way and disposed of ~~at locations off the construction site and outside the limits of view from the traveled roadway~~ *in accordance with 203.08. If permitted, sod*. ~~Sod~~ may be disposed of within the right-of-way, but outside the construction limits~~, if permitted. Written permission shall be obtained from the property owner on whose property the materials and debris are to be placed. All necessary arrangements shall be made with the owner for obtaining suitable disposal locations. The cost involved shall be included in the contract price of pay items.~~

SECTION 202, BEGIN LINE 13, DELETE AND INSERT AS FOLLOWS:

202.02 General Requirements

All buildings and foundations in accordance with 202.06, structures, fences, tanks, and other obstructions, any portions of which are on the right-of-way shall be razed, removed, and disposed of, except utilities and those features for which other provisions have been made for removal. Designated salvageable material shall be removed without unnecessary damage in sections or pieces which may be transported readily and shall be stored at specified places within the project limits or as otherwise designated. ~~Unless otherwise permitted and except~~ *Except* for regulated materials, which ~~are defined in~~ *shall be disposed of in accordance with* 104.06, and bridge painting debris which is subject to 619, non-salvageable material shall be disposed of in accordance with

*203.*08 ~~State, Federal, and local regulations. Unregulated material that may be disposed of on private property, other than approved landfill sites, shall only be done with written approval of the Engineer and the property owner with appropriate permits and shall be outside the limits of view from the traveled roadway. Copies of all agreements with property owners shall be furnished~~. Unsuitable material shall be removed from cisterns, septic tanks, other tanks, basements, and cavities. The disposition of this material shall be in accordance with all applicable and current State, Federal, and Local Regulations.

SECTION 203, BEGIN LINE 49, DELETE AND INSERT AS FOLLOWS:

203.08 Borrow or Disposal

Borrow shall consist of approved material required for the construction of embankments or for other portions of the work and shall be obtained from approved locations and sources outside the right-of-way. Borrow material shall be free of substances that will form deleterious deposits, or produce toxic concentrations or combinations that may be harmful to human, animal, plant or aquatic life, or otherwise impair the designated uses of ~~the~~ *a* stream or area. Unless otherwise designated in the contract, arrangements shall be made for obtaining borrow. Borrow, as designated herein, shall not include material excavated beyond the right-of-way limits at intersecting public roads, private and commercial drive ~~approaches, nor~~ *approaches and* material furnished as B borrow.

Disposal of waste material, other than regulated material, from within the right-of-way shall only be allowed at approved locations either within or outside the right-of-way. Disposal of regulated material shall be in accordance with 104.06.

~~Proposed borrow sites and proposed disposal sites for excavated material shall be identified before such material is excavated or disposed of within or outside the right-of-way.~~

Except where ~~a permitted or~~ *a* licensed commercial site *or a permitted site* is utilized *for borrow or disposal, the Contractor shall obtain all permits required by local, state and federal laws prior to the start of any operations at the site.*

Licensed commercial sites and permitted sites are defined as follows:

(a) A licensed commercial site is a solid waste facility with a current IDEM operation number.

(b) A permitted site is a location that is operated under permits required by local, state and federal laws for the activities proposed by the Contractor. A permitted site shall also have documentation that a wetlands delineation and an archaeological survey have been performed by qualified professionals.

For proposed borrow or disposal sites other than licensed commercial or permitted sites, an inspection of areas outside the construction limits shall be conducted by a qualified wetland professional *approved by the Department* to determine if wetlands are present on the site. *An approved wetland professional shall be prequalified with the Department to perform environmental services work type 5.4 Ecological Surveys or shall be certified by the Society of Wetland Scientists as a wetland professional-in-training or*

professional wetland scientist. A list of approved wetland professionals is maintained on the Department's website. ~~This~~ *The wetlands* inspection shall be in accordance with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands. The inspection shall also determine if isolated wetlands as defined by ~~the~~ IDEM are present. ~~The Contractor shall submit a document, signed by the wetland professional, verifying that the site has been inspected for the presence of wetlands in accordance with the federal manual and for isolated wetlands and, if any are present, specifying the area to be demarcated as jurisdictional waters and/or wetland.~~ *The Contractor shall demarcate in a method approved by the Engineer the boundary of all wetlands identified within the proposed borrow or disposal site.* ~~Once the area to be used for borrow or for disposal of excavated material has been shown not to contain jurisdictional or isolated wetlands, the boundary of the area cleared shall be demarcated. The methods of demarcation shall be as approved by the Engineer.~~

For proposed borrow or disposal sites other than licensed commercial or permitted sites, a qualified archaeologist shall perform a record check and field survey to determine if any significant archaeological sites exist within the proposed site. The Indiana Department of Natural Resources Division of Historic Preservation and Archeology maintains a roster of qualified archeological consultants. If any archaeological sites are identified, the archaeologist shall establish the limits of the site along with a reasonable border. The Contractor shall demarcate in a method approved by the Engineer the border of all archeological sites identified within the proposed borrow or disposal site.

Identified archeological sites shall not be disturbed unless the site is cleared by established procedures and written authorization to enter the site has been obtained by the Contractor. Under no circumstances shall an employee of the Contractor or the State of Indiana share in the ownership or profit from the sale of any archaeological artifacts that may be salvaged.

~~The Department maintains a list of professional consultants who are prequalified to perform various types of work. A qualified wetland professional shall be a professional consultant who is prequalified with the Department to perform Environmental Services work type 5.4 Ecological Surveys, or is certified by the Society of Wetland Scientists, SWS, as a wetland professional in training or professional wetland scientist. The Department's list of prequalified professional consultants is located at http://www.in.gov/dot/div/legal/rfp/eligiblefirms.xls.~~

~~Previously approved sites may be utilized for borrow or disposal operations if the Contractor furnishes a valid permit or document signed by a wetland professional prior to utilizing the site.~~

Borrow and disposal sites shall be approved by the Engineer prior to the start of any earth disturbing operations at the site. A request for approval of a borrow or disposal site shall be submitted to the Engineer a minimum of 14 days prior to the Contractor's planned start of operations at the site. All requests for approval of a borrow or disposal site shall include a description of the Contractor's planned operations at the site. In the case of disposal sites, the description shall include a listing of the types of material to be disposed of at the site.

A request for approval of a licensed commercial site shall include the following:

(a) The name and address of the facility.
(b) The IDEM operating number.
(c) The expiration date of the IDEM operating permit.

A request for approval of a permitted site shall include the following:

(a) Name of the site owner.
(b) Address of the site.
(c) A list of the permits, permit numbers and permit expiration dates for all permits under which the site operates.
(d) Documentation that a wetlands delineation and an archaeological survey have been performed by qualified professionals.

A request for approval of a site, other than a licensed commercial or permitted site, shall include the following:

(a) Name of the property owner.
(b) Address or location of the site.
(c) A copy of a right-of-entry obtained from the property owner. Rights-of-entry shall include rights for access by Department personnel to the site for the purposes of monitoring, measurement and sampling.
(d) A site plan showing the site location, site dimensions, adjacent property and right-of-way lines, all demarcated jurisdictional wetlands or isolated wetlands, all demarcated archeological sites, existing and proposed finished contours and proposed finished slope grades.
(e) A site operations plan detailing the operations proposed for the site, what equipment will be utilized, how the site will be accessed and any other information relevant to the operation of the site.
(f) A copy of the Rule 5 Notice of Intent, if required under 327 IAC 15-5.
(g) An erosion control plan for the site including the types of erosion control measures to be incorporated and the sequencing of the measures in respect to the operations plan for the site.
(h) Documentation signed by a wetlands professional verifying that the site has been inspected for the presence of both wetlands and isolated wetlands and, if any are present, specifying the area to be demarcated as jurisdictional or isolated wetlands.
(i) Documentation of the archeological record check and field survey signed by a qualified archeologist including the limits and border of any archeological site discovered.
(j) Copies of all other permits obtained by the Contractor to perform operations at the site.

The Contractor shall provide the Engineer a minimum of 14 days notice prior to opening borrow areas for the purpose of obtaining original cross section elevations and measurements and to sample the borrow material prior to use.

The Contractor shall install temporary erosion and sediment control measures at borrow or disposal sites other than licensed commercial and permitted sites prior to the start of any earth disturbing activity. ~~If the Contractor elects to use the site, all required permits shall be obtained.~~ The Contractor shall develop and construct all mitigation measures *necessary to* ~~and~~ fulfill ~~all~~ *the* requirements ~~detailed by such~~ *of all* permits *obtained by the Contractor for operation of a borrow or disposal site*. ~~The Contractor shall also obtain written permission from the land owner for Department personnel to access the site for monitoring.~~

No excavation shall occur or no material shall be disposed of ~~beyond~~ *within* the boundaries of the demarcated *wetlands and archeological* area*s unless the operations are in compliance with all required permits and these specifications.*

No extension of completion time will be granted due to any delays by the Contractor in securing approval of borrow or disposal sites.

~~Before borrow or disposal operations are begun, the Contractor shall submit operation plans for approval. Such plans shall include the following:~~

~~(a) a detailed sketch showing the limits relative to property and right-of-way lines;~~

~~(b) the grade of all slopes;~~

~~(c) an erosion control plan in accordance with the requirements of 327 IAC 15-5;~~

~~(d) the encasement, finished grading, and seeding procedures; and~~

~~(e) archaeological clearance.~~

~~Notice shall be given in advance of opening borrow areas so that cross section elevations and measurements of the ground surface after stripping may be taken and the borrow material may be tested before being used.~~

~~Except when a commercial source is utilized, a qualified archaeologist shall perform a record check and field survey of borrow or disposal limits to determine if any significant archaeological sites are within the limits. Results of the record check and survey shall be furnished in writing prior to the excavation of any material. If any archaeological sites are identified, the archaeologist shall establish the limits of the site along with a reasonable border. The site shall not be disturbed unless the archaeological site is cleared by established procedures and written authorization to enter the site has been issued. Under no circumstances shall an employee of the Contractor or the State of Indiana share in the ownership or profit from the sale of any archaeological artifacts that may be salvaged. No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site.~~

Approval of a proposed borrow or disposal site by the Engineer, whether the proposed site is commercial, permitted, or otherwise, shall not relieve the Contractor of its responsibility to utilize an appropriate site and to comply with all Local, State and Federal laws and regulations.

SECTION 203, BEGIN LINE 286, DELETE AND INSERT AS FOLLOWS:

203.10 Disposal of Excavated Material Except Waterway and Peat Excavation

Excavation material shall be used for the construction of embankments, shoulders, special fill, or other places as may be specified or directed, depending on the nature of the material. Excavated material that is suitable for embankment construction that is not required for maintenance of traffic shall be placed in the embankment before placing any borrow material, unless otherwise authorized in writing.

If more material is excavated from within required cut slopelines than is needed to construct embankments or special fills, the excess may be used to widen embankments, flatten fill slopes, or be used otherwise as directed. All excess excavated material that cannot be used constructively within the project limits shall be disposed of off the right-of-way in accordance with ~~201.03 and~~ 203.08.

Excavation obtained from the right-of-way and planned to be used in fills may be wasted and replaced with borrow with no additional payment only after written permission is obtained. All required samples of the borrow or the excavation materials involved shall be furnished with no additional payment.

203.11 Disposal of Waterway Excavation

Unless otherwise provided, material resulting from waterway excavation shall be used ~~to fill old channels and~~, if suitable, in embankment, special fill, and approach embankments, or any combination of these, as specified or directed.

~~A~~ *Any* portion of waterway excavation *material* which is unsuitable for the above uses, ~~a~~ *any* portion which is suitable but is in excess of that required for such uses, or ~~if~~ *when* locations for such ~~disposal~~ *uses* are not available, the ~~disposal~~ *material* shall be *disposed* of in accordance with ~~201.03~~ *203.08*.

203.12 Disposal of Peat

All material removed as peat excavation, removed or displaced by machine operation, or displaced by the advancing backfilling material shall be ~~uniformly spread between the toes of fill slopes and the swamp ditches or beyond, or otherwise~~ disposed of in accordance with 203.08.

400-R-553 HMA PROVISIONS

(Revised 11-20-08)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 401 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT

401.01 Description

This work shall consist of one or more courses of QC/QA HMA base, intermediate, or surface mixtures constructed on prepared foundations in accordance with 105.03.

401.02 Quality Control

The HMA shall be supplied from a certified HMA plant in accordance with ITM 583; Certified ~~Volumetric~~ Hot Mix Asphalt Producer Program. The HMA shall be transported and placed according to a Quality Control Plan, QCP, prepared and submitted by the Contractor in accordance with ITM 803; Contractor Quality Control Plans for Hot Mix Asphalt Pavements. The QCP shall be submitted to the Engineer at least 15 days prior to commencing HMA paving operations.

MATERIALS

401.03 Materials

Materials shall be in accordance with the following:

Asphalt Materials
PG Binder.....902.01(a)
Coarse Aggregates 904
Base Mixtures – Class D or Higher
Intermediate Mixtures – Class C or Higher
*Surface Mixtures – Class B or Higher
Fibers.....AASHTO ~~MP 8~~ *M 325*
Fine Aggregates 904
*Surface aggregate requirements are listed in 904.03(d).

401.04 Design Mix Formula

A design mix formula, DMF, shall be prepared in accordance with 401.05 and submitted in a format acceptable to the Engineer one week prior to use. The DMF shall state the maximum particle size in the mixture. The DMF shall state the calibration factor, test temperature, and absorption factors to be used for the determination of binder content using the ignition oven in accordance with ITM 586, the binder content by extraction in accordance with ITM 571, and a Mixture Adjustment Factor (MAF). The DMF shall state the source, type, and dosage rate of any stabilizing additives. Approval of the DMF will be based on the ESAL and mixture designation. A mixture number will be assigned by the Engineer. No mixture will be accepted until the DMF has been approved.

The ESAL category identified in the pay item correlates to the following ESAL ranges.

ESAL CATEGORY	ESAL
1	< 300,000
2	300,000 to < 3,000,000
3	3,000,000 to < 10,000,000
4	10,000,000 to < 30,000,000
5	≥ 30,000,000

401.05 Volumetric Mix Design

The DMF shall be determined for each mixture from a volumetric mix design by a design laboratory selected from the Department's list of approved Mix Design Laboratories. A volumetric mixture shall be designed in accordance with ~~the respective~~ AASHTO *R 35* and ~~ASTM~~ *the respective AASHTO* reference~~s~~ as listed below.

~~Standard Specification for Superpave Volumetric Mix Design ..... AASHTO M 323~~

~~Standard Specification for Designing Stone Matrix Asphalt (SMA) ..... AASHTO MP 8~~

~~Standard Practice for Mixture Conditioning of Hot Mix Asphalt (HMA) ..... AASHTO R 30~~

~~Standard Practice for Superpave Volumetric Design for Hot Mix Asphalt (HMA) ..... AASHTO R 35~~

~~Maximum Specific Gravity and Density of Bituminous Paving Mixtures ..... AASHTO T 209~~

~~Resistance of Compacted Asphalt Mixture to Moisture Induced Damage ..... AASHTO T 283~~

~~Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor ..... AASHTO T 312~~

~~Bulk Specific Gravity of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing ..... ASTM D 6752~~

Bulk Specific Gravity and Density of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing ..... AASHTO T 331

The single percentage of aggregate passing each required sieve shall be within the limits of the following gradation tables.

	Dense Graded, Mixture Designation – Control Point (Percent Passing)				
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
Sieve Size					
50.0 mm					
37.5 mm	100.0				
25.0 mm	90.0 - 100.0	100.0			
19.0 mm	< 90.0	90.0 - 100.0	100.0		
12.5 mm		< 90.0	90.0 - 100.0	100.0	100.0
9.5 mm			< 90.0	90.0 - 100.0	95.0 -100.0
4.75 mm				< 90.0	90.0 - 100.0
2.36 mm	19.0 - 45.0	23.0 - 49.0	28.0 - 58.0	32.0 - 67.0	
1.18 mm					30.0 - 60.0
600 µm					
300 µm					
75 µm	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0	6.0 - 12.0

PCS Control Point for Mixture Designation (Percent Passing)					
Mixture Designation	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	NA
PCS Control Point	40	47	39	47	NA

Open Graded, Mixture Designation – Control Point (Percent Passing)		
	OG19.0	OG25.0
Sieve Size		
37.5 mm		100.0
25.0 mm	100.0	70.0 – 98.0
19.0 mm	70.0 – 98.0	50.0 – 85.0
12.5 mm	40.0 – 68.0	28.0 – 62.0
9.5 mm	20.0 – 52.0	15.0 – 50.0
4.75 mm	10.0 – 30.0	6.0 – 30.0
2.36 mm	15.0 ± 8.0	15.0 ± 8.0
1.18 mm	2.0 – 18.0	2.0 – 18.0
600 µm	1.0 – 13.0	1.0 – 13.0
300 µm	0.0 – 10.0	0.0 – 10.0
150 µm	0.0 – 9.0	0.0 – 9.0
75 µm	0.0 – 8.0	0.0 – 8.0
Percent of Binder	> 3.0	> 3.0

Dust/Calculated Effective Binder Ratio shall be taken from 0.6 to 1.2, when the aggregate gradation passes above the primary control sieve (PCS) control point and 0.8 to 1.6 when the aggregate gradation is less than or equal to the PCS. The Dust/Calculated Effective Binder Ratio for 4.75 mm mixtures shall be 0.9 to 2.0.

The optimum binder content for dense graded mixtures shall produce 4.0% air voids at N_{des} and for open graded mixtures shall produce 15.0% – 20.0% air voids at N_{des}. The design for dense graded mixtures shall have at least four points, including a minimum of two points above and one point below the optimum. A one point design may be used for open graded mixtures. The maximum specific gravity of the ~~uncompressed~~

uncompacted mixture shall be determined in accordance with AASHTO T 209, *Section 9.5.1. The bulk specific gravity of the gyratory specimens shall be determined in accordance with AASHTO T 166, Method A for dense graded mixtures and AASHTO T 331 for open graded mixtures.*

The percent draindown of open graded mixtures shall not exceed 0.30% in accordance with AASHTO T 305. Open graded mixtures may incorporate fibers. *The binder for open graded mixtures containing fibers may be reduced by one temperature classification, 6°C, for the upper temperature classification. The fiber type and minimum dosage rate shall be in accordance with AASHTO M 325.*

Dense graded mixture shall be tested for moisture susceptibility in accordance with AASHTO T 283 except that the loose mixture curing shall be replaced by mixture conditioning for 2 h in accordance with AASHTO R 30. The minimum tensile strength ratio, TSR, shall be 80%. The 6 in. (150 mm) mixture specimens shall be compacted in accordance with AASHTO T 312. If anti-stripping additives are added to the mixture to be in accordance with the minimum TSR requirements, the dosage rate shall be submitted with the DMF.

A PG binder grade or source change will not require a new mix design. If the upper temperature classification of the PG binder is lower than the original PG grade, a new TSR value is required. A new DMF shall be submitted for a binder grade change and shall reference the originating DMF/JMF number.

The MAF equals the Gmm from the mixture design divided by the following: 2.465 for 9.5 mm mixtures and 2.500 for 12.5 mm, 19.0 mm, and 25.0 mm mixtures. If the MAF calculation results in a value where $0.980 \leq MAF \leq 1.020$, then the MAF shall be considered to be 1.000. ~~If the calculated MAF is outside of the above range, then the actual calculated value shall be used.~~ *If the MAF is greater than 1.020, the calculated MAF value shall have 0.020 subtracted from the value. If the MAF is less than 0.980, the calculated MAF value shall have 0.020 added to the value.* The MAF does not apply to OG mixtures.

Changes in the source or types of aggregates shall require a new DMF. A new DMF shall be submitted to the District ~~Materials and Tests~~ *Testing* Engineer for approval one week prior to use.

~~Changes in the source of specified binders, except for PG 58-28 or PG 64-22, shall require a new DMF. Changes in the grade of a specified binder shall require a new DMF.~~

The mixture design compaction temperature for the specimens shall be 300 ± 9°F (150 ± 5°C) for dense graded mixtures and 260°F (125°C) for open graded mixtures.

Design criteria for each mixture shall be based on the ESAL shown in the contract documents and shall be as follows:

GYRATORY COMPACTION EFFORT					
ESAL	N_{ini}*	N_{des} *	N_{max}*	Max. % Gmm @ N_{ini}	Max. % Gmm @ N_{max}
DENSE GRADED					
< 300,000	6	50	75	91.5	98.0
300,000 to < 3,000,000	7	75	115	90.5	98.0
3,000,000 to < 10,000,000	8	100	160	89.0	98.0
10,000,000 to < 30,000,000	8	100	160	89.0	98.0
≥ 30,000,000	9	125	205	89.0	98.0
OPEN GRADED					
ALL ESAL	NA	20	NA	NA	NA
* N_{ini} , N_{des} , N_{max} , - definitions are included in AASHTO PP 28					

VOIDS IN MINERAL AGGREGATE (VMA) CRITERIA @ N_{des}	
Mixture Designation	Minimum VMA, Percent
4.75 mm	16.0
9.5 mm	15.0
12.5 mm	14.0
19.0 mm	13.0
25.0 mm	12.0
OG19.0 mm	NA
OG25.0 mm	NA

VOIDS FILLED WITH ASPHALT (VFA) CRITERIA @ N_{des}	
ESAL	VFA, Percent
< 300,000	70 – 80
300,000 to < 3,000,000	65 – 78
3,000,000 to < 10,000,000	65 – 75
10,000,000 to < 30,000,000	65 – 75
≥ 30,000,000	65 – 75
Note 1: For 9.5 mm mixtures, the specified VFA range shall be 73% to 76% for design traffic levels ≥ 3 million ESALs.	
Note 2: For 25.0 mm mixtures, the specified lower limit of the VFA shall be 67% for design traffic levels < 0.3 million ESALs.	
Note 3: For 4.75 mm mixtures, the specified VFA range shall be 75% to 78% for design traffic levels ≥ 3 million ESALs.	
Note 4: For OG19.0 mm and OG25.0 mm mixtures, VFA is not applicable.	

401.06 Recycled Materials

Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse

aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25.0% by weight (mass) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 5.0% by weight (mass) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the DMF.

~~Recycled materials shall not be used in ESAL Category 3, 4, or 5 surface mixtures or open graded mixtures.~~ *A maximum of 15.0% RAP or 3.0% ARS by weight (mass) of the total mixture may be used in ESAL category 3, 4, or 5 surface mixtures and open graded mixtures. The recycled material for the ESAL category 3, 4, or 5 surface mixtures shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.*

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 401.05.

Mixtures containing 15.0% or less RAP shall use the same grade of binder as specified. The binder for mixtures containing greater than 15.0% and up to 25.0% RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.

401.07 Lots and Sublots

Lots will be defined as ~~4000~~ *5000* t (~~4000~~ *5000* Mg) of base or intermediate mixtures or ~~2400~~ *3000* t (~~2400~~ *3000* Mg) of surface mixture. Lots will be further sub-divided into sublots not to exceed 1000 t (1000 Mg) of base or intermediate mixtures or 600 t (600 Mg) of surface mixture. Partial sublots ~~or~~ *of* 100 t (100 Mg) or less will be added to the previous sublot. Partial sublots greater than 100 t (100 Mg) constitute a full sublot. *Partial lots of four sublots or less will be added to the previous lot, if available.*

401.08 Job Mix Formula

A job mix formula, JMF, shall be developed by a certified HMA producer. A JMF used in the current or previous calendar year that was developed to N_{des} will be allowed. The mixture compaction temperature shall be 300 ± 9°F (150 ± 5°C) for dense graded mixtures and 260 ± 9°F (125 ± 5°C) for open graded mixtures. The JMF for each mixture shall be submitted to the Engineer and shall use the same MAF as the DMF.

401.09 Acceptance of Mixtures

Acceptance of mixtures for binder content, VMA at N_{des}, and air voids at N_{des} for each lot will be based on tests performed by the Engineer. ~~Acceptance testing for surface mixtures will include tests for moisture content.~~ The Engineer will randomly select the location(s) within each sublot for sampling in accordance with ITM 802. *The first 300 t (300 Mg) of the first sublot of the first lot for each DMF/JMF will not be sampled.* An acceptance sample will consist of two plate samples with the first being at the random location and the second 2 ft (0.6 m) ahead station. A backup sample consisting of two plate samples shall be located 2 ft (0.6 m) towards the center of the mat from the

acceptance sample. ~~For surface mixtures, an additional sample shall be located 2 ft (0.6 m) back station from the random sample location.~~

Samples from each location shall be obtained from each sublot from the pavement in accordance with ITM 580. *The Engineer will take immediate possession of the samples.*

The binder content will be determined in accordance with ITM 586 or ITM 571 as directed by the Engineer. The maximum specific gravity will be determined in accordance with AASHTO T 209, *Section 9.5.1*. The air voids will be determined in accordance with AASHTO PP 28 based on the average bulk specific gravity from two gyratory specimens and the MSG for the sublot. The VMA will be determined in accordance with AASHTO PP 28 based on the average bulk specific gravity from two gyratory specimens, the percent aggregate in the mixture from the sublot and the BSG of the aggregate blend from the DMF/JMF as applicable. The gyratory pills will be prepared in accordance with AASHTO T 312.

The bulk specific gravity of gyratory specimens for dense graded mixtures will be determined in accordance with AASHTO T 166*, Method A* except samples are not required to be dried overnight. The bulk specific gravity of gyratory specimens for open graded mixtures, OG19.0, OG25.0 will be determined in accordance with ~~ASTM D 6752, except as follows. The duration of the test from initiating the vacuum extraction to weighing the specimen after the water bath will not exceed five minutes. The mass of water absorbed by the specimen while in the water bath will be subtracted from the mass of the specimen obtained in the water bath. Any test in which the mass of water absorbed by the specimen exceeds 5 g is invalid~~ *AASHTO T 331*.

~~The mixture properties for each sublot shall meet the requirements for the tolerances from the JMF as shown in the table as follows.~~

~~ACCEPTANCE TOLERANCES~~	
~~MIXTURE PROPERTIES~~	~~TOLERANCES FROM THE JMF~~
~~DENSE GRADED~~	
~~Air Voids~~	~~JMF ± 1.0%~~
~~Binder Content~~	~~JMF ± 0.5%~~
~~VMA~~	~~JMF ± 1.0%~~
~~OPEN GRADED~~	
~~Air Voids*~~	~~JMF ± 3.0%~~
~~Binder Content~~	~~JMF ± 0.5%~~
~~* Gmb will be determined in accordance with ASTM D 6752~~	

~~The maximum percent of moisture in the mixture shall not exceed 0.10 from plate samples.~~

A binder draindown test in accordance with AASHTO T 305 for open graded mixtures shall be completed once per lot in accordance with 401.07 and shall not exceed 0.50%.

The Engineer's acceptance test results for each sublot will be available after the sublot and testing are complete.

Air voids, binder content and VMA values will be reported to the nearest ~~0.1~~ *0.01*%. ~~Moisture and d~~*D*raindown test results will be rounded to the nearest 0.01%. Rounding will be in accordance with 109.01(a).

~~Pay factors will be determined in accordance with 401.19(a).~~ *Pay factors for dense graded mixtures with original contract pay item quantities greater than or equal to one lot will be determined in accordance with 401.19(a). Partial lots of four sublots or less will have pay factors determined in accordance with 401.19(b) if the previous lot is not available.*

Pay factors for dense graded mixtures with original contract pay item quantities less than one lot and open graded mixtures will be determined in accordance with 401.19(b).

The Contractor may request an appeal of the Engineer's test results in accordance with 401.20.

Fibers incorporated into the mixture will be accepted on the basis of a type A certification for the specified material properties for each shipment of fibers. Fibers from different manufacturers and different types of fibers shall not be intermixed.

In the event that an acceptance sample is not available to represent a sublot~~(s)~~, all test results of the previous sublot will be used for acceptance. If the previous sublot is not available, the subsequent sublot will be used for acceptance.

CONSTRUCTION REQUIRMENTS

401.10 General

Equipment for HMA operations shall be in accordance with 409. The Contractor shall submit to the Engineer ~~a~~ written ~~Certificate of Compliance~~ *documentation* that includes the manufacturer's make, model, serial number, manufactured year, and the manufacturer's literature with pictures. The ~~Certificate of Compliance~~ *documentation* shall be submitted prior to use and shall certify that the paving equipment proposed for the project is new and includes the modifications or have been modified in accordance with the following.

The paver shall be equipped with means of preventing the segregation of the coarse aggregate particles when moving the mixture from the paver hopper to the paver augers. The means and methods used shall be in accordance with the paver manufacturer's instructions and may consist of chain curtains, deflector plates, or other such devices, or any combination of these.

The following specific requirements shall also apply to identified HMA pavers:

1. Blaw-Knox HMA pavers shall be equipped with the Blaw-Knox Materials Management Kit, MMK.

2. Cedarrapids HMA pavers shall be those that were manufactured in 1989 or later.

3. Barber-Green/Caterpillar HMA pavers shall be equipped with deflector plates as identified in the December, 2000 Service Magazine entitled "New Asphalt Deflector Kit {6630-DFL, 6631-DFL, or 6640-DFL}".

The Contractor is also required to demonstrate to the Engineer prior to use, that the modifications to the paving equipment have been implemented on all pavers to be used on the project.

Fuel oil, kerosene, or solvents shall not be transported in open containers on equipment. Cleaning of equipment and small tools shall not be accomplished on the pavement or shoulder areas.

Segregation or flushing or bleeding of HMA mixtures will not be permitted. Corrective action shall be taken to prevent continuation of these conditions. Segregated or flushed or bleeding HMA mixtures shall be removed if directed. All areas showing an excess or deficiency of binder shall be removed and replaced.

All mixtures that become loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced.

401.11 Preparation of Surfaces to be Overlaid

The subgrade shall be shaped to the required grade and sections, free from all ruts, corrugations, or other irregularities, and uniformly compacted and approved in accordance with 207. Milling of an existing pavement surface shall be in accordance with 306. Surfaces on which a mixture is placed shall be free from objectionable or foreign materials at the time of placement.

~~Compacted aggregate bases and rubblized~~ *Rubblized concrete* pavements shall be primed in accordance with 405. PCCP, milled asphalt surfaces, and asphalt surfaces shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

401.12 Process Control

The Engineer and Contractor will jointly review the operations to ensure compliance with the QCP. Continuous violations of compliance with the QCP will result in suspension of paving operations.

401.13 Weather Limitations

HMA courses of less than 138 lb/syd (75 kg/m^2) shall be placed when the ambient temperature and the temperature of the surface on which it is to be placed is 45°F (7°C) or above. No mixture shall be placed on a frozen subgrade.

401.14 Spreading and Finishing

The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 409.03(c). Prior to paving, both the planned quantity and

lay rate shall be adjusted by multiplying by the MAF. When mixture is produced from more than one DMF or JMF for a given pay item, the MAF will be applied to the applicable portion of the mixture for each. The temperature of each mixture at the time of spreading shall not be more than 18°F (10°C) below the minimum mixing temperature as shown on the JMF for mixtures compacted in accordance with 402.15.

Planned HMA courses greater than ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* placed under traffic, shall be brought up even with each adjacent lane at the end of each work day. Planned HMA courses less than or equal to ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on open graded mixtures.

Hydraulic extensions on the paver will not be permitted for continuous paving operations. Fixed extensions or extendable screeds shall be used on courses greater than the nominal width of the paver except in areas where the paving width ~~vary~~ *varies*. Hydraulic extensions may be used in tapers and added lanes less than 250 ft (75 m) in length.

Automatic slope and grade controls shall be used as outlined in the QCP.

HMA mainline and HMA shoulders which are 8.0 ft (2.4 m) or more in width shall be placed with paving equipment in accordance with 409.03(c)1.

When laying mixtures with density not controlled by cores, the speed of the paver shall not exceed 50 ft (15 m) per min. Rollers shall be operated to avoid shoving of the HMA and at speeds not to exceed 3 mph (4.5 km/h). However, vibratory rollers will be limited to 2.5 mph (4 km/h).

The finished thickness of any course shall be at least two times but not more than four times the maximum particle size as shown on the DMF.

401.15 Joints

Longitudinal joints in the surface shall be at the lanelines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 6 in. (150 mm), and be located within 12 in. (300 mm) of the lane line.

Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course. For areas inaccessible to rollers, other mechanical devices shall be used to achieve the required density.

If constructed under traffic, temporary transverse joints shall be feathered to provide a smooth transition to the driving surface.

401.16 Density

Acceptance will be based on lots and sublots in accordance with 401.07.

Density of the compacted dense graded mixture will be determined from cores except where:

(a) the total planned lay rate to be placed over a shoulder existing prior to the contract award is less than 385 lb/syd (210 kg/m^2); or

(b) the first lift of material placed at less than 385 lb/syd (210 kg/m^2) over a shoulder existing prior to the contract award.

Density of any random core location(s) in these areas will be assigned a value of 92.0 %MSG and compaction shall be in accordance with 402.15.

Open graded mixtures shall be compacted with six passes of a static tandem roller and will be assigned a value of 84.0% of MSG. Vibratory rollers shall not be used on open graded mixtures.

Density acceptance by cores will be based on samples obtained from two random locations selected by the Engineer within each sublot in accordance with ITM 802. One core shall be cut at each random location in accordance with ITM 580. The transverse core location will be located so that the edge of the core will be no closer than 3 in. (75 mm) from a confined edge or 6 in. (150 mm) from a non-confined edge of the course being placed. The maximum specific gravity will be determined from the samples obtained in 401.09.

The Contractor shall obtain cores in the presence of the Engineer with a device that shall produce a uniform 6 in. (150 mm) diameter pavement sample. Coring shall be completed prior to the random location being covered by the next course. Surface courses shall be cored within two work days of placement. Damaged core(s) shall be discarded and replaced with a core from a location selected by adding 1.0 ft (0.3 m) to the longitudinal location of the damaged core using the same transverse offset.

The Contractor and the Engineer shall mark the core to define the course to be tested. If the core indicates a course thickness of less than two times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing.

The Engineer will take immediate possession of the cores. If the Engineer's cores are subsequently damaged, additional coring will be the responsibility of the Department. Subsequent core locations will be determined by subtracting 1.0 ft (0.3 m) from the random location using the same transverse offset.

The density for the mixture will be expressed as the percentage of maximum specific gravity (%MSG) obtained by dividing the average bulk specific gravity by the maximum specific gravity for the sublot, times 100. *Samples for the bulk specific gravity and maximum specific gravity will be dried in accordance with ITM 572.* The Engineer will determine the ~~BSG~~ *bulk specific gravity* of the cores in accordance with AASHTO T 166, *Method A*. The maximum specific gravity will be determined in accordance with AASHTO T 209, *Section 9.5.1* ~~from samples prepared in accordance with ITM 572. The target value for density of dense graded mixtures of each sublot shall be 92.0%~~.

Within one work day of coring operations the Contractor shall clean, dry, and refill the core holes with HMA of similar or smaller size particles.

~~The test results for each sublot shall meet the requirements for the tolerances as shown in the table below.~~

~~DENSE GRADED ACCEPTANCE TOLERANCE~~	
~~Core Density~~	~~94.0 ± 2.0 %MSG~~

~~Pay factors will be determined in accordance with 401.19(b).~~

The Engineer's acceptance test results for each sublot will be available when the sublot testing is complete. Acceptance of the pavement for density (%MSG) will be reported to the nearest ~~0.1~~ *0.01*%. Rounding will be in accordance with 109.01(a).

401.17 Shoulder Corrugations

Shoulder corrugations shall be in accordance with 606.

401.18 Pavement Smoothness

The pavement smoothness will be accepted by means of a profilograph, a 16 ft (4.9 m) long straightedge, or a 10 ft (3 m) long straightedge.

The profilograph shall be used where all of the following conditions are met:

(a) the design speed is greater than 45 mph (70 km/h),

(b) the pavement lanes are full width and 0.1 mi (0.16 km) or longer, and

(c) the HMA is placed on a milled surface or the total combined planned lay rate of surface, intermediate, and base is 385 lb/syd (210 kg/m2) or greater.

If a pay item, Profilograph, HMA, is included in the contract and the above conditions are met, the Contractor shall furnish, calibrate, and operate an approved profilograph in accordance with ITM 912. The profilogram produced shall become the property of the Department. The profilograph shall remain the property of the Contractor. When a profilograph, HMA, is not included as a pay item, and the above conditions are met, the Department will furnish, calibrate, and operate the profilograph or the Department will develop a change order in accordance with 109.05 to include profilograph, HMA as a pay item.

Within the limits of a smoothness section where the posted speed is ~~40~~ *45* mph (65 km/h) or less, smoothness of that section may be measured by a profilograph or a 16 ft (4.9 m) long straightedge. The Contractor shall notify the Engineer of the selected process prior to placement of the HMA. Smoothness pay adjustments are only applicable when measured by a profilograph.

The 16 ft (4.9 m) long straightedge *is used to check longitudinal profile and* shall be used on *all* overlays where the profilograph is not specified. *For contracts that include a profilograph pay item,* ~~T~~*t*he 16 ft (4.9 m) long straightedge shall be used on all

shoulders, on all full width pavement lanes shorter than 0.1 mi (0.16 km) *in length*, on tapers, within 50 ft (15 m) of a reinforced concrete bridge approach, and within 50 ft (15 m) of an existing pavement, which is being joined.

The 10 ft (3 m) long straightedge shall be used *to check* ~~for~~ transverse slopes *across travel lanes and shoulders*, approaches, and crossovers.

All wavelike irregularities and abrupt changes in profile caused by paving operations shall be corrected.

Each finished course of base and intermediate shall be subject to approval. The pavement smoothness shall be checked on any new intermediate course located immediately below a surface course and the surface course at the locations as designated in ITM 912.

If grinding of the intermediate course is used for pavement smoothness corrections, the grinding shall not precede the surface placement by more than 30 calendar days if open to traffic.

When the 16 ft (4.9 m) straightedge is used on a surface course, the pavement variations shall be corrected to 1/4 in. (6 mm) or less. When the 10 ft (3 m) straightedge is used, the pavement variations shall be corrected to 1/8 in. (3 mm) or less.

When the profilograph is being used on a surface course, in addition to the requirements for the profile index, all areas having a high or low point deviation in excess of 0.3 in. (8 mm) shall be corrected. Courses underlying the surface courses that are exposed by corrective actions shall be milled to 1 1/2 in. (38 mm) and replaced with the same type surface materials. The initial profile index shall be determined prior to any corrective action. The final profile index *for each section requiring corrective action* will be determined after all corrective action *within that section* has been completed.

When the profilograph is being used on an intermediate course, all areas having a high or low point deviation in excess of 0.3 in. (8 mm) shall be corrected. *After corrective action is taken on an intermediate course, a 16 ft (4.9 m) straightedge may be used to verify the adequacy of the corrective action.* When the 16 ft (4.9 mm) or 10 ft (3 m) straightedge is being used on an intermediate course, all areas having a high or low point deviation in excess of 1/4 in. (6 mm) shall be corrected.

401.19 Pay Factors

(a) Dense Graded Mixture ≥ One Lot

Pay factors (PF) are calculated for binder content, air voids at N_{des}, VMA at N_{des} and in-place density (%Gmm). The Percent Within Limits (PWL) for each lot will be determined in accordance with ITM 588. The appropriate pay factor for each property is calculated as follows:

Estimated Percent Within Limits (PWL) greater than 90:

$$PF = (105.00-0.50 \times (100.00-PWL))/100$$

Estimated PWL greater than or equal to 50 and equal to or less than 90:

$$PF = (100.00 – 0.000020072 \times (100.00 - PWL)^{3.5877})/100$$

If the Lot PWL for any one of the properties is less than 50 or a sublot has an air void content less than 1.0%, the lot will be referred to the Office of Materials Management for adjudication as a failed material in accordance with normal Department practice as listed in 105.03.

Binder content, air voids, VMA, and in-place density (%Gmm) PF values will be reported to the nearest 0.01. Rounding will be in accordance with 109.01(a).

A composite pay factor for each lot based on test results for mixture properties and density is determined by a weighted formula as follows:

$$Lot\ PF = 0.20(PF_{BINDER}) + 0.35(PF_{VOIDS}) + 0.10(PF_{VMA}) + 0.35\ (PF_{DENSITY})$$

where:

$Lot\ PF$	=	*Lot Composite Pay Factor for Mixture and Density*
PF_{BINDER}	=	*Lot Pay Factor for Binder Content*
PF_{VOIDS}	=	*Lot Pay Factor for Air Voids at* N_{des}
PF_{VMA}	=	*Lot Pay Factor for VMA at* N_{des}
$PF_{DENSITY}$	=	*Lot Pay Factor for In-Place Density (%Gmm)*

The lot quality assurance adjustment for mixture properties and density is calculated as follows.

$$q = L \times U \times (Lot\ PF – 1.00)/MAF$$

where:

q	=	*quality assurance adjustment for mixture properties and density of the lot*
L	=	*Lot quantity*
U	=	*Unit price for the material, $/TON ($/Mg)*
$Lot\ PF$	=	*Lot Pay Factor*

Lot test results for binder content, air voids, VMA, and density will be used to determine the Lot Pay Factors.

The specification limits for binder content, air voids at N_{des}*, VMA at* N_{des}*, and density will be as follows:*

SPECIFICATION LIMITS				
Mixture				
	*LSL**		*USL***	
Binder Content, %	*- 0.40 from JMF*		*+ 0.40 from JMF*	
Air Voids (Va) at Ndes, %	*2.60*		*5.40*	
Voids In Mineral Aggregate at Ndes, %	*Greater Of*		*Lesser Of*	
	Spec-0.50	*JMF-1.20*	*Spec +2.00*	*JMF+ 1.20*
Density				
	LSL		*USL*	
Roadway Core Density (% Gmm), %	*91.00*		*Not Applicable*	
* *LSL, Lower Specification Limit* ** *USL, Upper Specification Limit*				

(b) Dense Graded Mixture < One Lot and Open Graded Mixture

A composite pay factor for each sublot based on test results for mixture properties and density is determined in a weighted formula as follows:

$$SCPF = 0.20(PF_{BINDER}) + 0.35(PF_{VOIDS}) + 0.10(PF_{VMA}) + 0.35(PF_{DENSITY})$$

where:

SCPF = Sublot Composite Pay Factor for Mixture and Density
PF_{BINDER} = Sublot Pay Factor for Binder Content
PF_{VOIDS} = Sublot Pay Factor for Air Voids at N_{des}
PF_{VMA} = Sublot Pay Factor for VMA at N_{des}
$PF_{DENSITY}$ = Sublot Pay Factor for Density

If the SCPF for a sublot is less than 0.85, the ~~Materials and Tests Division~~ *Office of Materials Management* will evaluate the pavement. If the Contractor is not required to remove the mixture, quality assurance adjustments of the lot will be assessed or other corrective actions taken as determined by the ~~Materials and Tests Division~~ *Office of Materials Management*.

The sublot quality assurance adjustment for mixture properties and density is calculated as follows.

$$q = L \times U \times (SCPF - 1.00)/MAF$$

where:

q = quality assurance adjustment for the sublot
L = sublot quantity
U = unit price for the material $/TON ($/Mg)
SCPF =sublot composite pay factor

~~(a) Mixture~~

Sublot test results for mixture properties will be assigned pay factors in accordance with the following.

BINDER CONTENT		
DENSE GRADED	OPEN GRADED	PAY FACTOR
Deviation from JMF (± %)	Deviation from JMF (± %)	Pay Factor
≤ 0.2	≤ 0.2	1.05
0.3	0.3	1.04
0.4	0.4	1.02
0.5	0.5	1.00
0.6	0.6	0.90
0.7	0.7	0.80
0.8	0.8	0.60
0.9	0.9	0.30
1.0	1.0	0.00
> 1.0	> 1.0	Submitted to the ~~Materials and Tests Division~~ *Office of Materials Management**
* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.		

VMA		
DENSE GRADED	OPEN GRADED	PAY FACTOR
Deviation from JMF (± %)	Deviation from JMF (± %)	Pay Factor
≤ 0.5		1.05
> 0.5 and ≤ 1.0	All	1.00
> 1.0 and ≤ 1.5		0.90
>1.5 and ≤ 2.0		0.70
> 2.0 and ≤ 2.5		0.30
> 2.5		Submitted to the ~~Materials and Tests Division~~ *Office of Materials Management**
* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.		

AIR VOIDS		
DENSE GRADED	OPEN GRADED	PAY FACTOR
Deviation from JMF (± %)	Deviation from JMF (± %)	Pay Factor
≤ 0.5	≤ 1.0	1.05
> 0.5 and ≤ 1.0	> 1.0 and ≤ 3.0	1.00
1.1	3.1	0.98
1.2	3.2	0.96
1.3	3.3	0.94
1.4	3.4	0.92
1.5	3.5	0.90
1.6	3.6	0.84
1.7	3.7	0.78

1.8	3.8	0.72
1.9	3.9	0.66
2.0	4.0	0.60
> 2.0	> 4.0	Submitted to the ~~Materials and Tests Division~~ *Office of Materials Management**
* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.		

For mixtures produced during a plant's adjustment period, pay factors based on the JMF with the above tolerances will be used to compute quality assurance adjustments.

~~(b) Density~~

Sublot test results for density will be assigned pay factors in accordance with the following.

DENSITY		
Percentages are based on %MSG	Pay Factors – Percent	
Dense Graded	Open Graded	
≥ 97.0		Submitted to the ~~Materials and Tests Division~~ *Office of Materials Management**
95.6 - 96.9		1.05 - 0.01 for each 0.1% above 95.5
94.0 - 95.5		1.05
93.1 - 93.9		1.00 + 0.005 for each 0.1% above 93.0
92.0 - 93.0	84.0	1.00
91.0 - 91.9		1.00 - 0.005 for each 0.1% below 92.0
90.0 - 90.9		0.95 - 0.010 for each 0.1% below 91.0
89.0 - 89.9		0.85 - 0.030 for each 0.1% below 90.0
≤ 88.9		Submitted to the ~~Materials and Tests Division~~ *Office of Materials Management**
* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.		

The pay factors ~~shall~~ *will* be rounded to the nearest 0.01.

(c) Smoothness

When the pavement smoothness is tested with a profilograph, payment will be based on a zero blanking band on the final profile index in accordance with the following table. A Quality Assurance Pay Factor, PFs, for smoothness will apply to the planned typical section including the aggregate base, and the HMA base, intermediate, and

surface courses. The quality assurance adjustment for each section will include the total area of each pavement lane excluding shoulders for 0.1 mi (0.16 km) long section represented by the profile index calculated by the following formula.

~~$q_s = (PF_s - 1.00) \sum_{i-1}^{n} \left(A \times \frac{S}{T} \times U \right)$~~

$$q_s = (PF_s - 1.00) \sum_{i=1}^{n} \left(A \times \frac{S}{T} \times U \right)$$

where:

q_s = quality assurance adjustment for smoothness for one section
PF_s = pay factor for smoothness
n = number of layers
A = area of the section, syd (m^2)
S = planned spread rate for material, lb/syd (kg/m^2)
T = conversion factor: 2000 lb/ton (1000 kg/Mg)
U = unit price for the material, $/ton ($/Mg)

The quality assurance adjustment for smoothness, Qs, for the contract will be the total of the quality assurance adjustments for smoothness, qs, on each section by the following formula.

$$Q_s = \sum q_s$$

ADJUSTMENT FOR SMOOTHNESS ($PI_{0.0}$) ZERO BLANKING BAND	
Design Speed Greater Than 45 mph (70 km/hr)	
Profile Index in./0.1 mi. (mm per 0.16 km)	Pay Factor
Over 0.00 to 1.20 in. (Over 0 to 30 mm)	1.06
Over 1.20 to 1.40 in. (Over 30 to 35 mm)	1.05
Over 1.40 to 1.60 in. (Over 35 to 40 mm)	1.04
Over 1.60 to 1.80 in. (Over 40 to 45 mm)	1.03
Over 1.80 to 2.00 in. (Over 45 to 50 mm)	1.02
Over 2.00 to 2.40 in. (Over 50 to 60 mm)	1.01
Over 2.40 to 3.20 in. (Over 60 to 80 mm)	1.00
Over 3.20 to 3.40 in. (Over 80 to 85 mm)	0.96

All pavement with a profile index ($PI_{0.0}$) greater than 3.40 in. (85 mm) shall be corrected to 3.40 in. (85 mm).

Quality assurance pay factors greater than 1.00 will be applicable only to the initial measured profile index, prior to any corrective work. *Regardless of the pay factor tabulated above, quality assurance pay factors for individual sections that require corrective action for high or low points in excess of 0.3 in. (8 mm) will not be greater than 1.00.* Quality assurance pay factors of 1.00 or less will be applied to pavement sections where corrective work has been completed.

The total quality assurance adjustment~~s~~ is ~~to be~~ calculated as follows:

$$Q = Q_s + (\sum q)$$

where

Q = total quality assurance adjustment
Q_s = quality assurance adjustment for smoothness
q = *lot or* sublot quality assurance adjustment

401.20 Appeals

If the QC test results do not agree with the acceptance test results, a request, along with the QC test results, may be made in writing for additional testing. The appeal sample will be analyzed in a lab different than the lab that analyzed the original sample when requested by the Contractor. Additional testing may be requested for one or more of the following tests: MSG, BSG of the gyratory specimens, binder content, or BSG of the density cores. The request for the appeal for MSG, BSG of gyratory specimens, binder content or BSG of the density cores shall be submitted within seven calendar days of receipt of the Department's written results for that sublot. The sublot and specific test(s) shall be specified at the time of the appeal request. Only one appeal request per sublot is permitted. Upon approval of the appeal, the Engineer will perform additional testing as follows.

The backup or new sample(s) will be tested in accordance with the applicable test method for the test requested.

(a) MSG

The backup MSG sample will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 209, Section 9.5.1.

(b) BSG of the Gyratory Specimen

New gyratory specimens will be prepared and tested in accordance with AASHTO T 312 from the backup sample.

(c) Binder Content

The backup binder content sample will be prepared and tested in accordance with the test method that was used for acceptance *or as directed by the Engineer*.

(d) BSG of the Density Core

Additional cores shall be taken within seven calendar days unless otherwise directed. Additional core locations will be determined by adding 1.0 ft (0.3 m) longitudinally of the cores tested using the same transverse offset. The appeal density cores will be *dried in accordance with ITM 572 and* tested in accordance with AASHTO T 166, *Method A*.

The appeal results will replace all previous test result(s) for acceptance of mixture in accordance with 401.09 and density in accordance with 401.16. The results will be furnished to the Contractor.

401.21 Method of Measurement

HMA mixtures will be measured by the ton (megagram) of the type specified, in accordance with 109.01(b). The measured quantity will be divided by the MAF to determine the pay quantity.

Milled shoulder corrugations will be measured in accordance with 606.02.

401.22 Basis of Payment

The accepted quantities for this work will be paid for at the contract unit price per ton (megagram) for QC/QA-HMA, of the type specified, complete in place.

Payment for furnishing, calibrating, and operating the profilograph, and furnishing profile information will be made at the contract lump sum price for profilograph, HMA.

Adjustments to the contract payment with respect to mixture, density, and smoothness for mixture produced will be included in a quality assurance adjustment pay item in accordance with 109.05.1.

Milled shoulder corrugations will be paid for in accordance with 606.03.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Profilograph, HMA	LS
QC/QA-HMA, _____, _____, _____, _____mm (ESAL[1])(PG[2])(Course[3])(Mix[4])	TON (Mg)

(1) ESAL Category as defined in 401.04
(2) Number represents the high temperature binder grade. Low temperature grades are -22.
(3) Surface, Intermediate, or Base
(4) Mixture Designation

Preparation of surfaces to be overlaid shall be included in the cost of other pay items.

Coring and refilling of the core holes shall be included in the cost of other pay items within this section.

No payment will be made for additional anti-stripping additives, appeal coring or traffic control expenditures related to coring operations.

Corrections for pavement smoothness shall be included in the cost of other pay items within this section.

The price for Profilograph, HMA will be full compensation regardless of how often the profilograph is used or how many profilograms are produced.

If QC/QA-HMA intermediate over QC/QA-HMA base mixtures are specified, QC/QA-HMA intermediate mixture may be permitted as a substitute for the QC/QA-HMA intermediate and QC/QA-HMA base mixtures upon a written request by the Contractor. The request for the substitution shall be prepared in advance of the work. A computation will be made in order to obtain a unit price for the QC/QA-HMA intermediate mixture. The quantity and amount for QC/QA-HMA intermediate mixture shall equal the sum of the contract quantities and amounts shown for QC/QA-HMA intermediate and QC/QA-HMA base mixtures. The unit price for QC/QA-HMA intermediate mixture shall be equal to the sum of contract amounts divided by the sum of contract quantities. Payment for the QC/QA-HMA intermediate mixture will be made at the unit price per ton (megagram) for QC/QA-HMA intermediate mixture. No payment will be made for additional work or costs which may result due to this change.

SECTION 402, AFTER LINE 39a, INSERT AS FOLLOWS:

Mixture Type	Type A	Type B	Type C	Type D
Design ESAL	200,000	2,000,000	9,000,000	11,000,000
Surface	9.5 mm	9.5 mm	9.5 mm	9.5 mm
	12.5 mm	*12.5 mm*	*12.5 mm*	*12.5 mm*
Surface – PG Binder	64-22	64-22	70-22	70-22
Intermediate	*12.5 mm*	*12.5 mm*	*12.5 mm*	*12.5 mm*
	19.0 mm	19.0 mm	19.0 mm	19.0 mm
Intermediate – PG Binder	64-22	64-22	64-22	70-22
Base	*19.0 mm*	*19.0 mm*	*19.0 mm*	*19.0 mm*
	25.0 mm	25.0 mm	25.0 mm	25.0 mm
Base – PG Binder	64-22	64-22	64-22	64-22

SECTION 402, LINE 52, DELETE AND INSERT AS FOLLOWS:

The MAF equals the Gmm from the mixture design divided by the following: 2.465 for 9.5 mm mixtures and 2.500 for 12.5 mm, 19.0 mm, and 25.0 mm mixtures. If the MAF calculation results in a value where $0.980 \leq MAF \leq 1.020$, then the MAF shall be considered to be 1.000. ~~If the calculated MAF is outside of the above range, then the actual calculated value shall be used.~~ *If the MAF is greater than 1.020, the calculated MAF value shall have 0.020 subtracted from the value. If the MAF is less than 0.980, the calculated MAF value shall have 0.020 added to the value.*

SECTION 402, BEGIN LINE 118, DELETE AND INSERT AS FOLLOWS:

~~Recycled materials may be used in all mixtures except type C and type D surface mixtures.~~ *A maximum of 15.0% RAP or 3.0% ARS by weight (mass) of the total mixture may be used in type C and D surface mixtures provided the recycled material is 100% passing the 3/8 in. (9.5 mm) sieve and 95% to 100% passing the No. 4 (4.75 mm) sieve.*

SECTION 402, BEGIN LINE 125, DELETE AND INSERT AS FOLLOWS:

~~The binder low temperature classification for mixtures containing greater than 15.0% and up to 25.0% RAP shall be -28°C, and the binder high temperature classification may be reduced by 6°C.~~ *Mixtures containing 15.0% or less RAP shall use the same grade of binder as specified. The binder for mixtures containing greater than 15.0% and up to 25.0% RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.*

SECTION 402, BEGIN LINE 204, DELETE AND INSERT AS FOLLOWS:

Planned HMA courses greater than ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* placed under traffic shall be brought up even with each adjacent lane at the end of each work day. Planned HMA courses less than or equal to ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on open graded mixtures.

SECTION 402, LINE 346, INSERT AS FOLLOWS:

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166*, Method A*. The maximum specific gravity will be determined in accordance with AASHTO T 209*, Section 9.5.1*. Density shall not be less than 92.0%.

SECTION 406, BEGIN LINE 9, INSERT AS FOLLOWS:

406.02 Materials

The type and grade of asphalt material shall be in accordance with the following:

Asphalt Emulsion, AE-T, AE-PMT*, SS-1h*.....902.01(b)
PG Asphalt Binder, PG 64-22.....902.01(a)

SECTION 410, BEGIN LINE 19, DELETE AND INSERT AS FOLLOWS:

410.03 Materials

Materials shall be in accordance with the following:

Asphalt Materials
PG Binder, PG 76-22, PG 70-22.....902.01(a)
Coarse Aggregates, Class AS.....904
~~Stabilizing Additive .....AASHTO MP 8~~
Fibers ..... AASHTO M 325
Fine Aggregates (sand, mineral filler) 904

SECTION 410, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

410.05 SMA Mix Design

The DMF shall be determined for each mixture from a SMA mix design by a design laboratory selected from the Department's list of approved Mix Design

Laboratories. A SMA mixture shall be designed in accordance with ~~the respective AASHTO references as listed below~~ *AASHTO M 325 and R 35*.

~~Standard Practice for Designing Stone Matrix Asphalt (SMA).....AASHTO MP 8~~

~~Standard Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA).....AASHTO R 30~~

~~Standard Specification for Designing Stone Matrix Asphalt (SMA).....AASHTO MP 8~~

~~Determining the Plastic Limit and Plasticity Index of Soils.....AASHTO T 90~~

~~Maximum Specific Gravity and Density of Bituminous Paving Mixtures.....AASHTO T 209~~

~~Resistance of Compacted Asphalt Mixture to Moisture Induced Damage.....AASHTO T 283~~

~~Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures.....AASHTO T 305~~

~~Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor.....AASHTO T 312~~

~~Method for Viscosity Determination of Asphalt Binder Using Rotational Viscometer.....AASHTO T 316~~

SECTION 410, LINE 84, INSERT AS FOLLOWS:

The optimum binder and aggregate gradation content shall produce 4.0% air voids. The maximum specific gravity of the uncompacted mixture shall be determined in accordance with AASHTO T 209*, Section 9.5.1*. The percent draindown for SMA surface mixture shall not exceed 0.30% in accordance with AASHTO T 305.

SECTION 410, LINE 89, DELETE AND INSERT AS FOLLOWS

The MAF equals the Gmm from the mixture design divided by the following: 2.465 for 9.5 mm mixtures and 2.500 for 12.5 mm, 19.0 mm, and 25.0 mm mixtures. If the MAF calculation results in a value where $0.980 \leq MAF \leq 1.020$, then the MAF shall be considered to be 1.000. ~~If the calculated MAF is outside of the above range, then the actual calculated value shall be used.~~ *If the MAF is greater than 1.020, the calculated MAF value shall have 0.020 subtracted from the value. If the MAF is less than 0.980, the calculated MAF value shall have 0.020 added to the value. The MAF does not apply to OG mixtures.*

SECTION 410, BEGIN LINE 121, DELETE AND INSERT AS FOLLOWS:

410.06 Recycled Materials

~~Mainline surface shall not contain recycled materials.~~ *Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The recycled material shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95% to 100% passing the No. 4 (4.75 mm) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials.*

Recycled materials may be used as a substitute for a portion of the new materials required to produce mainline surface. When only RAP is used in the mixture, the RAP shall not exceed 15.0% by weight (mass) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed 3.0% by weight (mass) of the total mixture. For substitution or use, 1.0% of ARS is considered equal to 5.0% RAP. The percentages of recycled materials shall be as specified on the DMF.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904. Gradations of the combined aggregates shall be in accordance with 410.05.

Mixtures containing RAP shall use the same grade of binder as specified.

SECTION 410, BEGIN LINE 136, DELETE AS FOLLOWS:

410.09 Acceptance of Mixtures

Acceptance of mixtures for binder content, ~~moisture,~~ and gradation for each lot will be based on tests performed by the Engineer. The Engineer will randomly select the location(s) within each sublot for sampling in accordance with ITM 802. *An acceptance sample will consist of one plate sample at the random location. A backup sample will consist of one plate sample located 2 ft (0.6 m) towards the center of the mat from the acceptance sample.*

Samples from each location shall be obtained from each sublot from the pavement in accordance with ITM 580. *The Engineer will take immediate possession of the samples.*

A maximum specific gravity sample and a binder content and gradation sample will be obtained from the plate sample in accordance with ITM 587. The binder content will be determined in accordance with ITM 586 or ITM 571 as directed by the Engineer and the gradation will be determined in accordance with AASHTO T 30. The maximum specific gravity will be determined in accordance with AASHTO T 209, Section 9.5.1. ~~The second sample shall be located from the random sample by offsetting 1 ft (0.3 m) transversely towards the center of the mat and will be used for the moisture sample~~. The test results of the sublots will be averaged and shall meet the requirements for tolerances from the JMF for each sieve and binder content.

~~The maximum percent of moisture in the mixture shall not exceed 0.10 from plate samples.~~

SECTION 410, LINE 170, DELETE AS FOLLOWS:

Single test values and averages will be reported to the nearest 0.1% ~~except moisture will be reported to the nearest 0.01%~~. Rounding will be in accordance with 109.01(a).

SECTION 410, BEGIN LINE 240, DELETE AND INSERT AS FOLLOWS:

Planned SMA courses greater than ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* placed under traffic, shall be brought up even with each adjacent lane at the end of each work day. Planned SMA courses less than or equal to ~~165 lb/syd (90 kg/m^2)~~ *220 lb/syd (120 kg/m^2)* shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane.

SECTION 410, LINE 313, INSERT AS FOLLOWS:

The density of the mixture will be expressed as the percentage of maximum specific gravity (%MSG) obtained by dividing the average bulk specific gravity by the maximum specific gravity for the sublot, times 100. *Samples for the bulk specific gravity and maximum specific gravity will be dried in accordance with ITM 572.* The Engineer will determine the BSG of the cores in accordance with AASHTO T 166*, Method A*. The maximum specific gravity will be determined in accordance with AASHTO T 209, *Section 9.5.1*. ~~from plant produced materials prepared in accordance with ITM 572.~~ The target value for density of SMA mixtures of each sublot shall be 93.0%.

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166, Method A. The maximum specific gravity will be determined in accordance with AASHTO T 209, Section 9.5.1. Density shall not be less than 92.0%.

SECTION 410, BEGIN LINE 404, DELETE AND INSERT AS FOLLOWS:

410.20 Appeals

If the QC test results do not agree with the acceptance test results, a request, along with the QC test results, may be made in writing for additional testing. ~~The basis of the appeal shall include applicable QC test results showing acceptable quality results and shall be submitted within seven calendar days of receipt of the Department's written results for that sublot. Acceptable QC test results are defined as QC test results resulting in less pay adjustment to the contract than that determined by the Department. If an appeal is granted, appeal cores shall be taken within seven calendar days after written notification unless otherwise directed. Within one work day of appeal coring operations the Contractor shall clean, dry, and refill the core holes with SMA or HMA surface materials.~~ A*dditional testing may be requested for one or more of the following tests: binder content, gradation, or MSG of the mixture samples and bulk specific gravity of the density cores. The appeal request shall be submitted within seven calendar days of receipt of the Department's written results for that sublot. The sublot and specific tests shall be specified at the time of the appeal request. Only one appeal request per sublot is permitted. Upon approval of the appeal, the Engineer will perform additional testing.*

~~The results of the appeal cores will replace the initial test results for a sublot(s) or lot and be used as the basis for acceptance.~~ *The appeal results will replace all previous test results for acceptance of mixture in accordance with 410.09 and density in*

accordance with 410.16. The results will be furnished to the Contractor. The backup mixture samples or density cores will be tested in accordance with the following:

(a) ~~Mixture~~ *MSG*

~~Upon approval for the additional testing, the Contractor shall take cores in accordance with ITM 580. The core location will be within 1.0 ft (0.3 m) longitudinally of the sample tested using the same transverse offset.~~ *The backup maximum specific gravity sample will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 209, section 9.5.1.*

(b) Binder Content and Gradation

The backup binder content and gradation sample will be prepared and tested in accordance with the test methods that were used for acceptance.

~~(b)~~ *(c) BSG of the* Density *Core*

Cores shall be taken within seven calendar days unless otherwise directed. Additional core locations will be determined by adding 1.0 ft (0.3 m) longitudinally of the cores tested using the same transverse offset. ~~Each sublot density will be calculated using the average bulk specific gravity of the cores obtained for that sublot and the average MSG of the lot.~~ *The cores will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 166, Method A. The Contractor shall clean, dry, and refill the core holes with SMA or HMA surface materials within one work day of the coring operations.*

SECTION 902, LINE 16, DELETE AND INSERT AS FOLLOWS:

1. Lots and Sublots

A binder lot for each grade of PG binder will be one week of HMA production. Lots will be further subdivided into sublots for each *calendar day* ~~twelve hour period when~~ *that* HMA is produced ~~within a calendar day. A lot will contain one to fourteen sublots~~.

2. Sampling

~~Each sample~~ *An acceptance sample and backup sample* shall be taken from the asphalt delivery system at the HMA plant. ~~Each sample~~ *The two samples* will represent a sublot. *A copy of a load ticket identifying the binder source shall be submitted with the sublot samples. The Engineer will take immediate possession of the samples.* ~~The Department will randomly select one sublot from each lot in accordance with ITM 802 for either complete or partial testing. If the sublot selected is in compliance, the lot will be accepted. If the sublot is not in compliance, the material will be adjudicated as a failed material in accordance with 105.03.~~

3. PG Binder Testing

The Department will randomly select one sublot from each lot in accordance with ITM 802 for either complete or partial testing in accordance with AASHTO M 320. Complete PG binder testing will consist of RTFO DSR and PAV BBR testing. Partial PG binder testing will consist of RTFO DSR testing. Rotational viscosity and flashpoint tests are not required. If the sublot selected is in accordance with the specifications, the lot will be accepted. If the selected sublot is not in accordance with the specifications, the material will be adjudicated as a failed material in accordance with 105.03.

~~PG binder testing will be performed on completed PG binder lots and will consist of either complete or partial testing. Complete PG binder testing consists of RTFO-DSR and PAV-BBR testing. Complete PG binder testing will be performed on the first sublot of the first lot of production for each grade of material for each supplier, per plant, and then randomly once every ten lots. Partial PG binder testing consists of RTFO-DSR testing on a random sublot of each lot. Lots and/or sublots to be tested will be selected in accordance with Section 3.0 of ITM 802. Random lots designated for complete testing will be selected upon the delivery of the first lot. Rotational viscosity and flashpoint tests are not required for complete or partial testing.~~

~~If the test results from the complete or the partial testing are in accordance with the specifications, the entire lot of PG material is considered to be acceptable.~~

~~If the test results from a complete test are not in accordance with the specifications, the results will be reported to the DMTE and the Department's Asphalt Engineer. The DMTE will prepare a failed materials report in accordance with 105.03, and the next PG binder lot will be selected for complete testing.~~

~~If the test results from the partial test are not in accordance with the specifications, the Department's laboratory will initiate a PAV-BBR test on the same sublot. The test results will be reported to the DMTE and the Department's Asphalt Engineer. The DMTE will prepare a failed material report in accordance with 105.03, and the next PG binder lot will be selected for complete testing.~~

~~For any PG binder lot having test results not complying with the specifications, the remaining samples for that lot and all the backup samples will be held for 60 days from the date written notification is provided for possible appeal testing. After 60 days, all samples will be discarded. PG binder samples and backups for lots meeting specifications will be discarded promptly.~~

~~The Department's Asphalt Engineer will review the supplier's ASC program and the appropriate DMTE will review the Certified HMA Producer's QCP for compliance for all failing complete test results.~~

4. Appeals

If the Contractor does not agree with the acceptance test results for the lot, a request may be made in writing for additional testing. The appeal shall be submitted within ~~30~~ *15* calendar days of receipt of the Department's written results. The basis of the appeal shall include complete AASHTO M 320 test results for the specific sublot in question ~~plus test values from all other sublots for the parameters being disputed~~. *The appeal results will replace all previous test results for acceptance of the lot.*

~~If an appeal is accepted, the Department will randomly select two additional sublot samples if available from the lot in question. The additional sublot samples if available and the backup sample will be tested in an AASHTO accredited laboratory for the failing test parameters. The backup and additional test results for each test will be averaged. The average value for each test will be considered the final lot value. The Contractor will be notified in writing of the additional test results, the final lot values, and the appeal conclusions.~~

~~If the appeal is not accepted, the Department will respond to the Contractor stating the grounds for the denial.~~

SECTION 902, AFTER LINE 122, INSERT AS FOLLOWS:

SS-1h is a slow setting, hard penetration type, intended for tack coats.

The requirements for asphalt emulsions shall be in accordance with the following:

Characteristic [1] [2]	AASHTO Test Method	RS-2	HFRS-2	AE-90	AE-90S	AE-T	*SS-1h*	AE-150	AE-150L	AE-PL	AE-PMT [6]	AE-PMP [6]
Test on Emulsion												
Viscosity, Saybolt Furol at 25°C, min.	T 72			50			*20*	50				20+
Viscosity, Saybolt Furol at 25°C, max.	T 72					100	*100*		100	115	100	
Viscosity, Saybolt Furol at 50°C, min.	T 72	75	75		50			75				
Viscosity, Saybolt Furol at 50°C, max.	T 72	400	400					300				
Demulsibility w/35 mL, 0.02N CaC12, %, min.	T 59	50	50		30							
Demulsibility w/50 mL, 0.10N CaC12, %, min.	T 59			75		75					25+	25+
Oil Distillate by Distillation, mL/100 g Emul [3]	T 59	4.0	4.0	4.0	3.0	4.0	*4.0*	7.0	7.0	3.0	3.0	3.0
Residue by Distillation, %, min.	T 59	68	68	68	65 [5]	54	*57*	68	60	30		
Residue by Distillation, % max.	T 59					62			65			
Sieve Test, %, max.	T 59	0.10	0.10	0.10	0.10	0.10	*0.10*	0.10	0.10	0.10	0.10	0.10
Penetrating Ability, mm, min.	902.02(w)									6		
Stone Coating Test, %	902.02(t)3a			90				90	90			
Settlement, %, max.	T 59	5	5	5								
Storage Stability, %, max.	T 59				1							
Asphalt Content by Distillation at 204°C, %, min.											54	45
Asphalt Content by Distillation at 204°C, %, max.											62	
Tests on Residue												
Penetration (0.1 mm) at 25°C, 100g, 5 s, min. [4]	T 49	100	100	100	90	50	*40*				50	300+
Penetration (0.1 mm) at 25°C, 100g, 5 s, max. [4]	T 49	200	200	200	150	200	*90*				200	
Penetration (0.1 mm) at 25°C,	T 49							100	100			

50g, 5 s, min. (4)												
Penetration (0.1 mm) at 25°C, 50g, 5 s, max. (4)	T 49							300	300			
Ductility at 25°C, mm, min.	T 51	400	400	400		400	*400*					
Solubility in Org. Sol., %, min.	T 44	97.5	97.5	97.5	97.5	97.5	*97.5*	97.5	97.5	97.5	97.5	97.5
Float Test at 50°C, s, max. (4)	T 50											
Float Test at 60°C, s, min. (4)	T 50		1200	1200	1200	1200		1200	1200			
Force Ratio	T 300				0.3							
Elastic Recovery, at 4°C	T 301				58							
Polymer Content by Infrared											1.5+	1.5+

Notes: (1) Broken samples or samples more than 10 days old will not be tested.
(2) Combined percentage of the residue and oil distillate by distillation shall be at least 70% (note the different units – ml for oil and % for residue).
(3) Oil distillate shall be in accordance with ASTM D 396, table 1, grade no. 1
(4) The Engineer may waive the test.
(5) Maximum temperature to be held for 15 minutes 200 ± 5°C.
(6) Asphalt shall be polymerized prior to emulsification.

SECTION 904, AFTER LINE 128, INSERT AS FOLLOWS:

The fine aggregate angularity value shall not apply to OG mixtures.

604-R-542 DETECTABLE WARNING ELEMENTS

(Revised 11-20-08)

The Standard Specifications are revised as follows:

SECTION 604, BEGIN LINE 25, DELETE AND INSERT AS FOLLOWS:

~~The detectable warning elements shall be set in thin set latex modified mortar in accordance with ANSI A108.1 or as recommended by the element manufacturer for outdoor use for adhering brick to concrete.~~

The detectable warning surface in concrete curb ramps shall be selected from the Department's list of approved Detectable Warning Elements in accordance with 905.05.

The mortar bed material shall be a high-strength mortar in accordance with ASTM C 387. Part of the mix water shall be replaced with a Type II polymer modifier meeting the requirements of ASTM C 1438. The proportioning of water and polymer modifier shall be as recommended by the manufacturer of the polymer modifier.

A type ~~A~~ *C* certification in accordance with 916 ~~for detectable warning elements and thin set latex modified mortar shall be furnished~~ *shall be furnished for the masonry mortar and polymer modifier* prior to use of the materials~~.~~

SECTION 604, BEGIN LINE 98, DELETE AND INSERT AS FOLLOWS:

(g) Detectable Warning Elements

~~Detectable warning elements shall be as shown on the plans. They shall be set in a thin set mortar on top of the concrete base. The concrete base shall be cleaned of all materials which might prevent the mortar from adhering to the base. The mortar shall be applied to the concrete in accordance with the manufacturer's recommendations. Where elements smaller than full sized are needed, whole elements shall be cut full depth with an appropriate power saw.~~

~~Brick joints shall be hand tight with a maximum of 1/16 in. (1.5 mm) width.~~

~~The joints between bricks shall be filled with a fine aggregate No. 15 or an equivalent sand. This filling shall be accomplished by repeated brooming of the aggregate across the face of the bricks. Excess aggregate shall then be removed from the surface.~~

Detectable warning elements shall be manufactured or field cut to completely fill the area of the curb ramp as shown on the plans. Elements shall be installed to be level across joints or seams and shall be flush with the edges of adjoining concrete.

Brick elements shall be placed in a mortar setting bed within the hardened concrete block out. The concrete base of the block out shall have a rough textured finish, such as would be produced by a screed or wood float. The depth of the block out shall be such that a mortar bed thickness of 3/8 in. minimum to 3/4 in. maximum is achieved for the nominal depth of the element. The hardened concrete base shall be free of all material which might prevent the mortar setting bed from adhering. The concrete base shall be dampened with water, but be surface dry immediately prior to the placing the mortar setting bed. The mortar setting bed shall be laid out the desired thickness, no more than 2 ft ahead of laying the elements. The elements shall be buttered with mortar on the bottom before placement into the setting bed. Elements from various manufacturers shall not be mixed at any individual concrete ramp location.

Brick elements shall be laid out in a running or stacked bond pattern with a 1/16 average joint width. The joint width shall not exceed 1/8 in. Whole elements should be laid first, followed by elements cut to size, keeping the number of joints to a minimum. A masonry saw shall be used to produce a clean, accurate, straight cut. The joint between elements shall be completely filled with a dry fine aggregate. The fine aggregate may be obtained from a non-Certified Aggregate Producer, but it shall be natural sand having a gradation where at least 95% of the material passes the No. 4 sieve. Excess fine aggregate shall be removed from the surface of the elements.

Cast iron elements shall be installed in accordance with the manufacturer's recommendations. When required, cutting of the elements shall be in accordance with the manufacturer's recommendations. Cut edges shall be ground to a smooth shape consistent with the manufactured edges.

Approved elements other than brick or cast iron shall be installed in accordance with the manufacturer's recommendations.

SECTION 905, BEGIN LINE 36, DELETE AND INSERT AS FOLLOWS:

905.05 Detectable Warning Elements

~~Detectable warning bricks used in sidewalk curb ramps shall be in accordance with ASTM C 902, Class SX, type II. The color shall approximate 30109 or 30166 in accordance with Federal Standard No. 595a. The color shall be consistent throughout the brick. The truncated domes shall be as shown on the plans. The minimum dimensions of the brick shall be 2 1/4 in. (60 mm) thick by 3 5/8 in. (90 mm) wide by 7 5/8 in. (195 mm) long. The minimum thickness shall not be measured within the area of the domes.~~

The detectable warning surface in concrete curb ramps shall be constructed using materials from the Departments approved list of Detectable Warning Elements, which is maintained by the Office of Materials Management. An element manufacturer wishing to add a product to the approved list shall comply with Procedure L of ITM 806.

(a) Brick detectable warning elements shall consist of clay, shale, or similarly naturally occurring earthy substance, subjected to heat treatment at elevated temperatures to form bricks or pavers. The dimensions of the element shall be 8 in. in length, 4 in. in width including any spacing lugs. The thickness of the element shall be 2 in., excluding dome height and edge chamfers. The truncated domes on the surface shall be formed integral with the main body of the detectable warning element and be present on the element prior to heat treatment. The size and physical requirements of the elements shall be in accordance with ASTM C 902 for weather and traffic environment classifications Class SX, Type II, respectively. The truncated domes may be ground off to meet the cap thickness requirement for compressive strength testing.

*(b) Brick detectable warning elements shall be predominantly red-brown in color and shall be uniform throughout the element. The color will be determined from the average of five color readings for detectable warning elements when measured at the top surface between the raised truncated domes and determined in accordance with ASTM E 1349, CIE Illuminant D65, 10° Standard Observer, using instrument geometry of 45°/0°, and the CIE L*a*b* color system. The tested elements shall be within the limits as follows:*

	Minimum	*Maximum*
*L**	*35.0*	*50.0*
*a**	*6.0*	*36.0*
*b**	*0.0*	*30.0*

The value of a shall not be less than 90% of the value of b*. The color difference of any installed element after one year of exposure or of an individual detectable warning element from the average color for any product or model from a manufacturer shall not be greater than 5.0 ΔE* units. The color shall be uniform throughout the detectable warning elements.*

(c) Cast iron detectable warning elements shall be manufactured from gray iron in accordance with AASHTO M 105, Class 30A as a minimum. The truncated domes shall be as shown on the plans. The tops of the domes and the space between domes shall have a non-slip textured surface. The minimum thickness of the casting shall be 0.300 in. The minimum thickness shall not be measured within the area of integral reinforcing ribs or bracing, domes or the textured surface.

(d) The height tolerance of the truncated domes shall be within 0.18 to 0.26 (3.50 to 6.50 mm). The base diameter, dome top diameter and dome spacing shall be within ± 1/16 in. (± 1.5 mm) of the design value. The design values shall be within the ranges identified in the Standard Drawings. No more than 2 truncated domes per element may be out of tolerance for dimensions.

(e) Detectable warning elements that are not classified as brick in accordance with 905.05(a) or cast iron in accordance with 905.05(c) will be considered. The detectable warning elements shall meet the color requirements of 905.05(b) and the truncated dome requirements of 905.05(d).

628-R-552 FIELD OFFICE, FIELD LABORATORY, COMPUTER SYSTEMS AND OFFICE MACHINES

(Revised 04-25-08)

The Standard Specifications are revised as follows:

SECTION 105, LINE 593, DELETE AND INSERT AS FOLLOWS:

105.17 ~~Field Office~~ *Blank*

SECTION 105, DELETE LINES 594 THRU 954.

SECTION 106, LINE 168, DELETE AND INSERT AS FOLLOWS:

106.04 ~~Field Laboratory~~ *Blank*

SECTION 106, DELETE LINES 169 THRU 173.

SECTION 628, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 628 – FIELD OFFICE, FIELD LABORATORY, COMPUTER SYSTEMS AND OFFICE MACHINES

628.01 Description

This work shall consist of providing the specified facilities, equipment, supplies and services in accordance with 105.03.

628.02 Field Office and Laboratory Requirements

When specified, the Contractor shall provide a field office, computer systems, office machines, field laboratory, services, equipment and supplies for the Department's exclusive use in accordance with the minimum requirements listed below.

(a) Field Office

The field office shall be located as mutually agreed by the Engineer and the Contractor. If a building exists within the limits of the right-of-way that is acceptable as a field office and the building is scheduled to be removed under the terms of the contract, the building may be equipped and furnished as the field office. A building within the right-of-way that is furnished under this specification shall be removed prior to the date of the last work and other acceptable facilities for the field office shall then be provided.

The field office may be a permanent building or a trailer and shall be of the type shown on the Schedule of Pay Items. The building or trailer furnished for the field office shall be in accordance with all applicable state and local codes and applicable IOSHA/OSHA requirements.

The field office shall be complete and ready for use by the Department, including all utility connections and specified computer systems, office machines, internet service, equipment and supplies, prior to the start of work. If the Contractor is unable to provide the permanent field office prior to the start of the work, the Engineer shall be notified in writing and the Contractor and the Engineer will agree on temporary field office arrangements prior to the start of work. A temporary field office will not be accepted by the Department for more than two months, at which time a permanent field office shall be ready for the Department's use.

The field office shall at a minimum be the size listed below for the type field office specified.

1. *Type A – 400 sft (37 m^2)*
2. *Type B – 550 sft (51 m^2)*
3. *Type C – 650 sft (60 m^2)*

Minimum dimensions shall be 8 ft (2.4 m) wide and 7 ft (2.1 m) in height, from floor to ceiling. For a trailer, the calculation of minimum area will be based on the exterior box dimensions.

The office shall have a solid and level floor with no holes, a weatherproof roof and shall be dust-proof, and wind-tight. The field office shall have at least 2 doors for ingress and egress and shall have a minimum of 6 windows for a type A field office and 8 windows for a type B or C field office, not including any windows in the doors.

Each door shall have a satisfactory lock. At least one door must always be able to be unlocked and opened from inside the field office. If a padlock is used to secure a door, it shall be a high security type which is invulnerable to bolt cutters, hacksaws, hammers, or prybars. The padlock shall be mounted in such a manner that locking and unlocking the door is satisfactorily convenient. Installation of additional hardware to protect the

lock or use of multiple padlocks on a door will not be permitted. However, additional hardware to receive the padlock will be acceptable. The Contractor shall furnish the number of keys to the office as directed by the Engineer. The Department will maintain a list of all Department personnel who are given keys.

Windows shall be hinged or sliding and have a minimum area of 5 sft (0.45 m^2) each. Windows shall be provided with satisfactory locks and screens. Windows, including windows in the doors, shall be provided with shades, blinds, or other approved coverings.

The field office shall have heating and air-conditioning equipment capable of maintaining a uniform temperature between 68°F and 80°F (20°C and 26°C).

The field office shall have a minimum 100 amp, 120/240 volt electrical service, shall have sufficient receptacles to satisfactorily accommodate all required electrical equipment without the use of extension chords or splitters and shall be provided with satisfactory office type lighting.

The field office shall include a minimum of one separately lockable storage area suitable to store a nuclear density/moisture gauge. The storage area shall have a minimum storage volume of 63 cu ft (1.3 m^3) with a minimum floor area of 9 sft (1 m^2) .

If the field office is a trailer, the trailer shall be securely supported by adequate blocking. The blocking shall provide a foundation to prevent settlement. The trailer shall be secured to the ground with a trailer tie down system that is in accordance with all state and local requirements. Each trailer shall be furnished with steps meeting IOSHA/OSHA requirements at each doorway.

The field office location shall be selected in order to provide satisfactory parking and trash disposal facilities for Department use. Parking spaces shall be either paved or surfaced with compacted aggregate, size No. 53, or other acceptable materials suitable for all-weather usage.

(b) Field Office Equipment and Supplies

The following minimum equipment and supplies shall be furnished for each field office of the type specified.

Office Type	***A***	***B***	***C***
Pencil Sharpener	*1*	*1*	*1*
Broom and Dust Pan	*1*	*1*	*1*
Six-hook Coat Rack	*1*	*1*	*1*
Toilet Facilities	*Yes*	*Yes*	*Yes*
Drinking Water	*Yes*	*Yes*	*Yes*
Fire Extinguishers	*1*	*2*	*2*
First-Aid Kit	*1*	*1*	*1*
Bloodborne Pathogen Kit	*1*	*1*	*1*
Smoke Detector	*1*	*1*	*2*
Carbon monoxide Detector	*1*	*1*	*1*
Shelving	*16 lft (4.9 m)*	*20 lft (6.1 m)*	*24 lft (7.3 m)*
Telephones	*2*	*2*	*3*

Voice Mail	*1*	*1*	*1*
Telephones Lines	*2*	*2*	*2*
File Cabinet Drawers	*4*	*8*	*12*
Office Desks & Office Chairs	*2*	*4*	*4*
Folding Office Tables	*1*	*2*	*2*
Chairs	*4*	*8*	*12*
Drafting Tables	*1*	*1*	*1*
Drafting Stools	*1*	*1*	*1*
Waste Paper Baskets	*2*	*4*	*4*
Cleaning Supplies	*Yes*	*Yes*	*Yes*
Calculators	*1*	*2*	*2*
Paper Shredder	*1*	*1*	*1*
Microwave Oven	*1*	*1*	*1*
Refrigerator/Freezer	*1*	*1*	*1*

The office and the equipment shall be furnished in a condition satisfactory to the Department.

Adequate quantities of basic hygiene and office cleaning supplies shall be provided. These supplies shall include, but are not limited to, hand soap, hand sanitizer, paper towels, toilet paper, window cleaner, all-surface cleaner, toilet disinfectant, toilet brush and a toilet plunger.

Potable drinking water with both hot and cold water capabilities shall be furnished. Drinking cups and paper towels shall be provided.

Fire extinguishers shall be five-pound, Class ABC or higher rated and shall be maintained in a fully charged and operable condition and shall meet all IOSHA/OSHA requirements.

First-aid kits shall meet the requirements of ANSI Z308.1 current at the time of letting.

Shelving shall have a minimum width of 10 in. (250 mm).

At least one telephone shall be a cordless phone having a frequency of at least 900 MHz.

The telephone voice mail system shall be capable of providing both a minimum one minute outgoing message and 30 minute total recording time for incoming messages. It shall have a remote operation feature, which may be used to retrieve, replay, erase, and save messages. An answering machine meeting these requirements may be substituted for the voice mail system.

Filing cabinets shall at a minimum be fire resistant steel filing cabinets with a class D or higher classification established by UL or Safe Manufacturers National Association. Cabinet drawers shall have a filing depth of 25 in. (635 mm). All cabinets shall have a lock and at least four drawers shall be fire proof.

Office desktops shall be at least 48 in. (1220 mm) wide and 25 in. (635 mm) deep. All desks shall contain at least two drawers, one of which shall be provided with a lock.

Folding office tables shall be a minimum size of 30 in. x 60 in. (760 mm x 1520 mm).

Office chairs shall be height adjustable and equipped with castors. Other required chairs may be stackable or folding chairs.

Drafting tables shall contain a tilt top work table for drafting purposes. Dimensions shall be at least 30 in. x 60 in. (760 mm x 1520 mm). The drafting stool shall be proportional to each drafting table.

Supplies to be furnished shall include all items required for proper operation of the required equipment. This includes, but is not limited to, operating manuals and paper supplies.

Calculators shall be electric powered, have a printer and a minimum 12-digit capacity.

The shredder shall have a minimum capacity of 12 sheets (20 lb paper), shall be capable of shredding paper clips and staples and shall include a 5 gallon capacity waste basket.

The microwave oven shall have a minimum 1.0 cu ft capacity with a minimum 1100 watts and shall have digital controls.

The refrigerator/freezer shall have a minimum combined capacity of 12 cu ft.

The field office and all equipment and supplies shall be maintained and replenished in a satisfactory manner during the term of the contract or until released by the Engineer. If the field office or required equipment and supplies are not maintained by the Contractor, the Engineer may withhold partial payments until the field office is operational to the Department's satisfaction.

(c) Field Office Computer System

The Contractor shall provide one field office computer system for the Department's exclusive use for each field office specified. The Contractor has the option to provide either a desktop or a laptop computer system in accordance with the minimum requirements listed below.

1. Field Office Desktop Computer System

a. *Processor – Intel or AMD compatible, 2.0 GHz*
b. *Memory – 1.0 GB, 533 MHz*
c. *Hard Drive – 60 GB, 5400 rpm*
d. *Optical Drive – 24X CD-RW drive*
e. *Ports – Two USB 2.0 compliant ports*
f. *Network/Wireless – Ethernet or wireless card to be compatible with the selected internet and office network connections*
g. *Graphics – Integrated graphics card*

h. Monitor – 22 in. widescreen digital flat panel
i. Keyboard –USB enhanced multimedia keyboard
j. Mouse – USB 2-button scroll mouse

2. Field Office Laptop Computer System

a. Processor – Intel or AMD compatible, 2.0 GHz
b. Memory – 1.0 GB, 533 MHz
c. Hard Drive – 60GB, 5400 rpm
d. Module Bay Device – 24X CD-RW drive
e. Ports – Two USB 2.0 compliant ports
f. Network/Wireless – Ethernet or wireless card to be compatible with the selected internet and office network connections
g. Graphics – Integrated graphics card
h. Display – 15" XWGA LCD panel
i. Battery – 9 cell lithium ion
j. External Monitor – 22 in. widescreen digital flat panel
k. External Keyboard – USB enhanced multimedia keyboard
l. External Mouse – USB 2-button scroll mouse
m. Miscellaneous – One compatible port replicator with AC adapter, one additional AC adapter, one DC adapter and one padded carrying case

3. Computer Software

The Contractor shall provide software for the computer system in accordance with the minimum requirements listed below.

a. Operating System Software – Windows XP Professional
b. Productivity Software – Microsoft Office 2003 Small Business and Adobe Acrobat Professional
c. Security Software – McAfee Virus Scan Plus

All software shall include the most current updates and patches at the time the computer system is provided to the Department. The Contractor shall provide for installation of updates and patches for the operating system, productivity and security software during the term of use of the computer system by the Department. Updates and patches shall be provided by an automatic update method.

The Department may install and maintain proprietary software on the computer in order to run the Department's construction management programs.

4. Miscellaneous Computer Requirements

The initial condition of the computer system shall be nearly pristine. All owner installed e-mail accounts, games, spyware, online services, applications, network or other profiles previously set up on the system shall be removed prior to placement in the field office. If the system was provided for a previous Department contract, all software not specified shall be removed prior to placement in the current field office.

The Contractor shall provide an uninterruptible power supply (UPS), minimum 120 VA, 100 Watts and full time surge suppression for each field office computer system specified in the contract.

The Contractor shall provide all cables, connections and software required to connect the field office computer system to the printer and the scanner.

When more than one computer system is specified for a field office, the Contractor shall provide either an Ethernet or wireless office network to allow all computer systems in the field office to access the field office internet service, the printer and the scanner.

The Contractor shall provide appropriate dust covers for all field office desktop computer systems.

The Contractor shall provide all manuals necessary for operation of the computer system and software with the system and shall include all documentation normally furnished with the equipment and software when purchased.

The Department will be utilizing the computer system to run or access Department provided construction management software applications. These applications are known to run on Intel and AMD compatible equipment when using the Windows XP Professional operating system. If the Department experiences problems running these applications due to hardware or software compatibility, the Contractor shall replace the equipment to ensure compatibility to the satisfaction of the Engineer within five business days.

The computer system shall be maintained in good working order. If a portion of the system becomes defective, inoperable, damaged, or stolen, that portion shall be repaired or replaced within five business days after the Contractor is notified by the Engineer. If the computer system and related accessories are not maintained by the Contractor as required, the Engineer may withhold partial payments until the computer system is operational to the Department's satisfaction.

(d) Field Office Internet Service

The Contractor shall provide broadband internet service for the field office. Broadband internet service shall be capable of a minimum average upload speed of 350Kbps unless otherwise approved by the Engineer.

(e) Field Office Machines

The Contractor shall provide a fully operational copier, printer, document scanner and fax machine for the Department's exclusive use in the field office in accordance with the minimum requirements listed herein.

In lieu of separate copier, printer, scanner and fax machines, the Contractor may provide an all-in-one unit that meets all the requirements for any combination of the individual machines being provided. Separate machines shall be provided for those machine functions that are not included in an all-in-one type machine.

1. Copier

The copier shall be a dry ink copier capable of using plain paper and of making full size, black and white copies of letter, legal and ledger US paper size original documents. The copier shall be capable of reducing and increasing copy sizes. The copier shall have a self-feeding paper tray, an automatic document feeder and be capable of producing at least 12 copies per minute.

2. Printer

The printer shall be a laser printer compatible with the computer system provided by the Contractor for use by the Department in the field office. The printer shall be capable of printing single-sided, black and white letter and legal US paper size documents at a rate of 20 pages per minute and capable of automatic duplex printing.

3. Document Scanner

The document scanner shall be compatible with the computer system provided by the Contractor for use by the Department in the field office. The scanner shall be capable of scanning letter and legal size documents and shall have an automatic document feeder and be capable of 600 dpi black and white resolution.

4. Fax Machine

The fax machine shall be connected to one of the required telephone service lines in the field office. The machine shall have an automatic document feeder with a 10 page capacity and be capable of faxing letter and legal size sheets. It shall be able to automatically dial 40 preprogrammed fax numbers and have the capability to program at least 2 groups of numbers. The machine shall have a 2 MB memory, shall be equipped with a telephone handset and be capable of automatic redial.

5. Miscellaneous Office Machine Requirements

The Contractor shall provide letter, legal and ledger size paper, ink cartridges and toner as required by the Engineer for the operation of each piece of equipment provided.

If any office machine becomes defective, inoperable, damaged, or stolen, that machine shall be repaired or replaced within five business days after the Contractor is notified by the Engineer. If any of the office machines are not maintained by the Contractor as required, the Engineer may withhold partial payments until the machine is operational to the Department's satisfaction.

(f) Field Laboratory

The field laboratory shall be located as mutually agreed by the Engineer and the Contractor. The laboratory shall consist of an acceptable building or trailer in accordance with 628.02(a) in which the Department will house and use equipment to perform testing procedures for the contract.

The following equipment and supplies shall be furnished for each field laboratory of the type specified. The equipment and supplies shall meet the requirements of 628.02(a) as applicable.

Laboratory Type	***A***	***B***	***C***
Broom and Dust Pan	*1*	*1*	*1*
Six-hook Coat Rack	*1*	*1*	*1*
Toilet Facilities	*Yes*	*Yes*	*Yes*
Drinking Water	*Yes*	*Yes*	*Yes*
Fire Extinguishers	*1*	*2*	*2*
First-Aid Kit	*1*	*1*	*1*
Bloodborne Pathogen Kit	*1*	*1*	*1*
Smoke Detector	*1*	*1*	*2*
Carbon monoxide Detector	*1*	*1*	*1*
Shelving	*16 lft (4.9 m)*	*20 lft (6.1 m)*	*24 lft (7.3 m)*
Telephones	*1*	*1*	*1*
Voice Mail	*1*	*1*	*1*
Telephones Lines	*1*	*1*	*1*
File Cabinet Drawers	*4*	*4*	*4*
Office Desks & Office Chairs	*1*	*1*	*1*
Folding Office Tables	*1*	*1*	*1*
Chairs	*2*	*2*	*2*
Waste Paper Baskets	*2*	*2*	*2*
Cleaning Supplies	*Yes*	*Yes*	*Yes*

If a field office is provided that is large enough to include the required space for the laboratory, the Engineer may agree to accept the field office for use as both office and laboratory, in which case the equipment and supplies listed for the laboratory will not be required.

If the field laboratory is a separate structure that is located directly adjacent to the field office, the toilet facilities, drinking water, telephones, voice mail/answering machine, telephone lines and cleaning supplies will not be required.

628.03 Additional Computer Systems and Mobile Internet Service

When specified, the Contractor shall provide the following computer systems and internet services for the Department's exclusive use.

(a) Additional Field Office Computer System

The additional field office computer system shall be either a desktop or laptop computer system in accordance with 628.02(c)1 or 628.02(c)2 except that the monitor for a desktop system may be a 19 in. flat panel and the external monitor for a laptop system will not be required. The requirements of 628.02(c)3 and 628.02(c)4 shall apply to each additional field office computer.

(b) Mobile Laptop Computer System

The mobile laptop computer system shall be in accordance with 628.02(c)2 except that the external monitor, integrated graphics card, external keyboard and port replicator with AC adapter will not be required. Mobile laptop computers will be used by the Department for contracts that do not include a field office. The requirements of 628.02(c)3 and 628.02(c)4 shall apply to each mobile laptop computer except that those requirements specifically for a field office computer will not apply.

(c) Mobile Internet Service

The mobile broadband internet service access card will be used by the Department in a laptop computer provided by either the Contractor or the Department.

The card shall connect to the laptop via a type II PC card slot, an express card slot or a USB 2.0 compliant port. The card and service shall be capable of a minimum average upload speed of 350 Kbps. The internet service rate plan shall include unlimited data and time usage with no roaming charge for national domestic use. All software necessary for the operation of the card shall be provided to the Engineer.

The Contractor shall not purchase any card or enter into any service agreement until authorized by the Engineer. The Engineer will provide a minimum of 10 business days notice prior to the date the card will be required.

628.04 Method of Measurement

Field office and field laboratory will be measured by the month for the specified type. Partial months will be rounded up to the next half or whole month. The Department will provide two weeks advanced notice prior to when the facility will be vacated.

If a field laboratory is specified and is included in the same space as the field office, the field laboratory will not be measured for payment.

Additional field office computer system, mobile laptop computer system and mobile internet service will be measured by the month for each system or service provided. Partial months will be rounded up to the next half or whole month. The Department will provide two weeks advanced notice prior to when mobile internet service will no longer be required.

628.05 Basis of Payment

Field office and field laboratory will be paid for at the contract unit price per month, complete in place until released.

Additional field office computer system, mobile laptop computer system and mobile internet service will be paid by the month for each system or service provided.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Field Office, _____ (type)	*MOS*
Field Laboratory, _____ (type)	*MOS*
Field Office Computer System, Additional, _____ (qty.) Each	*MOS*
Mobile Laptop Computer System, _____ (qty.) Each	*MOS*
Mobile Internet Service, _____ (qty.) Each	*MOS*

The cost of all heating, cooling, electrical service, telephone service and other miscellaneous utility bills required for the field office or field laboratory shall be included in the cost of the field office or the field laboratory.

If a field office smaller than the specified type is approved by the Engineer, a new unit price will be established for the smaller field office. The new unit price will be equal to the original contract unit price multiplied by the smaller floor area and divided by the specified floor area.

If a temporary field office is provided in accordance with 628.02, payment will be 65% of the unit price during the time the temporary field office is in use by the Department.

The cost of all materials and labor necessary to setup, secure, maintain and remove the field office, including all required equipment and supplies and any material required to provide parking, shall be included in the cost of the field office.

All costs necessary to provide the field office computer system, including the required software, manuals, peripherals and related equipment, technical support and miscellaneous computer requirements shall be included in the cost of the field office.

All costs necessary to establish, install and maintain field office internet service, including any required hardware, software, fees, monthly charges, setup, installation and technical support shall be included in the cost of the field office.

All costs necessary to provide the copier, printer, document scanner and fax machine, including setup, installation, all required connections to computer systems, technical support and miscellaneous office machine requirements shall be included in the cost of the field office.

All costs necessary to establish and maintain a field office network when one or more additional field office computer systems are specified shall be included in the cost of the field office.

All cost necessary to provide an additional field office computer system, including the required software, manuals, peripherals and related equipment and technical support shall be included in the cost of the additional field office computer.

All costs necessary to provide the mobile laptop computer system, including the required software, manuals, peripherals and related equipment, technical support and miscellaneous computer requirements shall be included in the cost of the mobile laptop computer.

All costs necessary to establish, install and maintain mobile internet service, including required hardware, software, fees, monthly charges, setup, installation and technical support shall be included in the cost of mobile internet service.

801-C-157 CERTIFICATION OF TEMPORARY TRAFFIC CONTROL DEVICES

(Revised 09-01-05)

Category 1 Devices

The Contractor shall certify that the following temporary traffic control devices to be used do not exceed the maximum values shown in the table below, and are considered crashworthy at Test Level 3 in accordance with National Cooperative Highway Research Program Report No. 350.

Device	Composition	Maximum Weight (Mass)	Maximum Height
Single Piece Traffic Cones	Rubber	20 lb (9 kg)	36 in. (920 mm)
	Plastic	20 lb (9 kg)	48 in. (1220 mm)
Tubular Markers	Rubber	13 lb (6 kg)	36 in. (920 mm)
	Plastic	13 lb (6 kg)	36 in. (920 mm)
Single Piece Drums	High Density Plastic	77 lb (35 kg)	36 in. (920 mm)
	Low Density Plastic	77 lb (35 kg)	36 in. (920 mm)
Delineators	Plastic, Fiberglass	N/A	48 in. (1220 mm)

No lights, signs, flags, or other auxiliary attachments are included in the weight (mass) of the devices listed above. Reflective sheeting or reflective buttons are included on delineators. Maximum weights (masses), including ballast, do not exceed the values shown in the table. “Single piece” refers to the construction of the body of the drum exclusive of a separate base, if any.

Type A or type C warning lights in accordance with the following specifications will be allowed on drums if they are firmly attached with vandal resistant 1/2 in. (13 mm) diameter by 4 in. (95 mm) cadmium plated steel bolt with nut and a 1 1/2 in. (38 mm) high cup washer.

1. The weight (mass) shall be no more than 5 lb (2.4 kg).
2. The lens diameter shall be 7 to 8 in. (180 to 200 mm).
3. The height of the light shall be 11 to 14 in. (270 to 340 mm).

Category II Devices

Category II temporary traffic control devices include type III barricades, vertical panels, portable sign standards, and other light-weight traffic control devices.

Category II temporary traffic control devices shall be in accordance with the NCHRP Report 350, test level 3.

A form will be provided at the pre-construction conference for the Contractor to complete and return to the Engineer prior to the placement of category I or II traffic control devices.

801-M-006 MAINTAINING TRAFFIC FOR MAINTENANCE OR RESURFACE WORK

(Revised 09-01-05)

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 142, INSERT AS FOLLOWS:

Traffic shall be maintained for maintenance activities or for HMA resurface work as shown on the plans or as described herein. The Contractor shall have an extra set of construction signs and an extra flashing arrow sign on the project site so that the taper may be moved forward without suspending the operations and clearing the work area. Additional traffic control devices shall be furnished for situations determined to be more complex, for protection in hazardous areas, and when traffic conditions warrant.

All non-fixed signs shall be removed at the completion of each day's operations. All lanes shall be open to normal traffic during hours other than daylight hours. If a traffic lane is directed to remain closed during hours other than daylight hours, traffic shall be maintained on the remaining lanes as shown on the plans.

All fixed signs shall remain in place until all temporary pavement markings have been removed. Work days will not be charged from the time of completion of other work until the markings have been removed.

801-R-542 WORKSITE ADDED PENALTY SIGNS

(Revised 06-25-07)

Worksite Added Penalty signs shall be placed as shown in the plans or as directed by the Engineer. The signs shall typically be placed in advance of the first Road Construction Ahead signs at either end of the project. The actual location and quantity of the signs will be determined by the Engineer in coordination with the Worksite Traffic Control Supervisor.

The XG20-7a "WORKSITE ADDED PENALTY SIGN, 60 x 36" shall only be installed on projects in urban areas that have a posted speed limit of 35 MPH or less and also meet one of the following conditions:

1. The existing surfaces outside the edge of pavement make installation of driven posts impractical, or
2. The width of the Right-of-Way outside of the edge of pavement is not sufficient to accommodate the larger XG20-7 "WORKSITE ADDED PENALTY SIGN, 78 x 42"sign.

The XG20-7b and XG20-7c "WORKSITE ADDED PENALTY SIGNS, 48 x 48" shall be used in series with each other and shall only be used on projects that meet one of the following conditions:

1. Rural projects where the width of the Right-of-Way outside of the edge of pavement is not sufficient to accommodate the larger XG20-7 "WORKSITE ADDED PENALTY SIGN, 78 x 42" sign, or

2. Contracts using only moving operations where construction signs are set and removed each day to accommodate the changing location of the work.

The XG20-7 "WORKSITE ADDED PENALTY SIGN, 78 x 42" shall be installed on all projects in all cases not otherwise described above.

Worksite Added Penalty signs will be measured and paid for as Construction Sign, Type C in accordance with 801.17 and 801.18.

801-T-165 TEMPORARY PAVEMENT MARKINGS

(Adopted 7-19-07)

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 25, INSERT AS FOLLOWS:

Temporary Pavement Marking Tape 923.01
Temporary Raised Pavement Markers.....923.02

SECTION 801, BEGIN LINE 547, DELETE AND INSERT AS FOLLOWS:

801.12 Temporary Pavement Marking

Temporary pavement markings shall be *new materials placed* in accordance with 808.04 and 808.05. However, *when temporary markings are to be in place for 14 calendar days or less* the dashed line pattern used on center line and lane lines may be 4 ft (1.2 m) line segments on 40 ft (12 m) centers~~.~~ *and gore* ~~Gore~~ areas shall be marked by outline only and may be 5 in. (125 mm) wide lines. *No-passing zones on all undivided two-way roadways shall be identified with signs and centerline markings.* ~~However, the dashed line pattern used on center line and lane lines may be 4 ft (1.2 m) line segments on 40 ft (12 m) centers. Gore areas shall be marked by outline only and may be 5 in. (125 mm) wide lines.~~ All temporary markings shall be maintained and replaced until they are no longer applicable.

~~Temporary markings placed on the final surface course shall be temporary marking tape type 1.~~ *Where possible, where non-removable temporary markings are used on a final surface, such markings shall be placed at the same location where permanent markings will later be affixed or parallel to and within 12 in. (300 mm) of the permanent marking pattern.*

Where temporary pavement markings are to be placed on a pavement which has existing markings, the existing markings which conflict with the temporary markings shall be removed in accordance with 808.10.

When working under traffic, the temporary pavement markings shall be placed before opening the lane to traffic. This shall include, but not be limited to, the marking patterns of gore areas, outside edge line of deceleration and acceleration lanes, narrow bridge markings, lane reduction transitions, lane lines, centerlines, and transverse markings as appropriate.

~~If a pavement course is to be in place for a period greater than 14 calendar days, all temporary pavement markings shall be placed in accordance with 808.04 and stop lines shall be placed in accordance with 808.05. No-passing zones on all undivided two-way roadways shall be identified with signs and centerline markings.~~

~~If the temporary~~ *Temporary* pavement markings *which* are to be in service from December 1 through the following March 31 *shall be painted markings*.~~, such~~ *Such* markings shall be placed in the standard pavement marking pattern and applied prior to the suspension of the work, or within seven work days after the Contractor is directed to place the markings. *Adjustments to these dates to accommodate actual seasonal suspension and continuance of work are subject to approval by the Engineer upon written request.*

SECTION 801, BEGIN LINE 589, DELETE AND INSERT AS FOLLOWS:

1. Paint

Painted ~~lines~~ *markings* ~~on new HMA courses~~ shall require a second application of paint *and beads* as soon as practical after the first application is dry.

2. Temporary Pavement Marking Tape

Temporary pavement marking tape shall be applied in accordance with the manufacturer's recommendations. Temporary marking tape shall be new type I or type II material.

All temporary pavement marking tape shall be removed prior ~~to placement of an HMA overlay or final pavement markings~~ *to placing the next pavement course, prior to placing an overlay, prior to recycling the pavement, or prior to placing the final pavement markings, except as otherwise described herein*.

a. Type I

Type I tape is a removable material. It may be used for longitudinal and transverse markings. ~~It shall be used for longitudinal and transverse markings on the final surface.~~

Type I tape shall be removed without the use of solvents, grinding, abrasive blasting, or other methods which may damage the pavement. All visible adhesive residue shall be removed without use of solvents or grinding.

b. Type II

Type II tape is a non-removable material. It may be used on PCCP to be removed or *on PCCP to be* overlaid with an HMA course greater than ~~110~~ *165* lb/sq yd (~~60~~ *90* kg/m^2). ~~If it is~~ *Type II tape* placed on HMA pavement~~, the tape~~ shall be removed prior to ~~the recycling of the HMA material~~ *placing the next pavement course*.

If it is necessary to remove type II tape, it shall be removed without the use of solvents. All damage to the pavement shall be repaired.

3. Temporary Raised Pavement Marker

The temporary raised pavement marker shall be grade 1 or grade 2. When used, it shall be a supplement to other temporary pavement markings. The color of the reflector shall be in accordance with the other temporary pavement marking. The color of the shell of the grade 1 marker shall be in accordance with the color of the other temporary pavement marking.

Temporary raised pavement markers shall be removed before the next layer of pavement is placed and before the final pavement markings are applied. All damage to the pavement shall be repaired.

4. Temporary Buzz Strips

Temporary buzz strips shall be a set of transverse markings *constructed of removable or durable marking material.* Durable marking material shall be used in accordance with 808.07(b). ~~Temporary buzz strips shall be removed in accordance with 808.10 when no longer required or as directed.~~

SECTION 801, BEGIN LINE 860, INSERT AS FOLLOWS:

with 621.13. Removal and subsequent replacement of permanent pavement markings and snowplowable raised pavement markers *for temporary crossovers* will be measured in accordance with 808.12. Removal and resetting of guardrail, if required for temporary crossovers, will be measured in accordance with 601.13.

SECTION 801, BEGIN LINE 872, INSERT AS FOLLOWS:

Temporary *pavement message markings will be measured by the number of each type placed. Longitudinal and transverse temporary* pavement markings will be measured by the linear foot (meter) of material actually placed. Temporary buzz strips will be measured by the linear foot (meter) for each *8 in. (200 mm)* strip *placed*, without regard to the number of passes required to attain the specified height.

Removal, when necessary, of any type of non-removable temporary pavement markings will be measured in accordance with 808.12. Removal of removable temporary pavement markings will not be measured for payment.

Where temporary pavement markings are to be placed on a pavement which has existing markings, removal of existing markings which conflict with the temporary markings will be measured in accordance with 808.12.

~~If, due to a Department initiated change or an approved expedited construction schedule, it is necessary to remove temporary non-removable pavement markings, such removal will be measured in accordance with 808.12. The removal of existing pavement markings which are in conflict with temporary markings, will be measured in accordance with 808.11.~~

The removal and replacement of *prismatic* reflectors on existing snowplowable raised pavement markers will be measured in accordance with 808.12.

SECTION 801, BEGIN LINE 896, INSERT AS FOLLOWS:

801.18 Basis of Payment

The accepted quantities of construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, *permanent road closure sign assemblies* and temporary raised pavement markers will be paid for at the contract unit price per each. Payment for temporary worksite speed limit assemblies and temporary changeable message signs will be made for the maximum number of such assemblies in place at any

one time during the life of the contract. Type III-A, type III-B, and permanent type III barricades will be paid for at the contract unit price per linear foot (meter).

SECTION 801, BEGIN LINE 933, INSERT AS FOLLOWS:

Removal and subsequent replacement of permanent pavement markings and snowplowable raised pavement markers *for temporary crossovers* will be paid for in accordance with 808.13. Removal and resetting of guardrail, if required for temporary crossovers, will be paid for in accordance with 601.14.

SECTION 801, BEGIN LINE 950, DELETE AND INSERT AS FOLLOWS:

Temporary pavement message markings placed will be paid for at the contract unit price per each, for the message specified. Longitudinal and transverse temporary ~~Temporary~~ pavement markings and temporary buzz strips, will be paid for at the contract unit price per linear foot (meter) of material, complete in place~~, except as set out below~~.

Removal, when necessary, of non-removable temporary pavement lines and message markings will be paid for in accordance with 808.13. The cost of removal of removable temporary pavement markings shall be included in the cost of the pay item for placement of the markings.

Where temporary pavement markings are to be placed on a pavement which has existing markings, removal of the existing markings which conflict with the temporary markings will be paid for in accordance with 808.13.

Permanent tubular markers *and permanent drums* will be paid for at the contract unit price per each.

~~The removal of temporary non-removable pavement markings caused by a Department initiated change or an approved expedited construction schedule, and the removal of existing pavement markings which are in conflict with temporary markings will be paid for in accordance with 808.13.~~

SECTION 801, BEGIN LINE 1056, INSERT AS FOLLOWS:

The cost of furnishing, installing, maintaining, and subsequent removal *of temporary raised pavement marker* shall be included in the cost of temporary raised pavement marker.

The cost of placement, maintenance and replacement of temporary pavement markings shall be included in the cost of the markings.

SECTION 801, BEGIN LINE 1071, DELETE AND INSERT AS FOLLOWS:

The cost of the second application of *paint and beads for painted* temporary *markings* ~~painted lines on new HMA courses~~ shall be included in the cost of *the first application of painted* temporary pavement markings.

SECTION 801, BEGIN LINE 1103, DELETE AS FOLLOWS:

The cost of necessary flaggers; protection of traffic at structure foundations; and furnishing, erecting, placing, maintaining, relocating, and removing lights, cones, flexible channelizers, tubular markers, drums, delineators, ~~temporary pavement markings,~~ or other devices as directed shall be included in the cost of maintaining traffic.

SECTION 808, BEGIN LINE 348, DELETE AS FOLLOWS:

~~On Federal aid contracts, the 180 day warranty shall apply only to thermoplastic pavement marking material.~~

SECTION 808, BEGIN LINE 351, DELETE AND INSERT AS FOLLOWS:

808.10 Removal of Pavement Markings

Pavement markings which conflict with revised traffic patterns and may confuse motorists shall be removed immediately before, or immediately following, any change in traffic patterns as directed or approved.

Removal of pavement markings shall be to the fullest extent possible without materially damaging the pavement surface. Pavement marking removal methods shall be sandblasting, steel shot blasting, waterblasting, grinding or other approved mechanical means. Grooving will not be permitted. Grinding will only be permitted ~~when removing thermoplastic or epoxy pavement markings.~~ *under the following conditions:*

(a) when removing durable pavement markings, or

(b) when removing non-durable markings where another course of material is to be placed on the existing course.

Painting over existing pavement markings to obliterate them will not be permitted.

SECTION 808, BEGIN LINE 544, INSERT AS FOLLOWS:

No additional payment will be made for the second application of traffic paint and glass beads as required in 808.07(a)1.

No additional payment will be made for the replacement of markings that fail to meet the warranty conditions of 808.09.

801-T-166 TEMPORARY WORKSITE SPEED LIMIT REPORTING

(Adopted 02-21-08)

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 68, INSERT AS FOLLOWS:

801.03 General Requirements

The applicable requirements of the MUTCD shall apply to the installation and materials for traffic control devices subject to the requirements of 107.08 and 107.12. When the plans do not include a maintenance of traffic plan, the Engineer will provide such a plan to the Contractor. The Contractor shall be responsible for the field layout, placement, operation, maintenance, and removal of temporary traffic control devices. A worksite traffic supervisor certified by the American Traffic Safety Service Association, ATSSA, or approved equal certifying organization, shall direct all field layout, placement, operation, maintenance, and removal of temporary traffic control devices. The certified worksite traffic supervisor, CWTS, shall ensure that all traffic control devices, except temporary concrete barrier, meet acceptable standards as outlined in the plans,

specifications, and ATSSA's "Quality Standards for Work Zone Traffic Control Devices" prior to installation. The CWTS shall also, prior to installation, ensure that all traffic control devices can be installed in accordance with the plans, specifications, and the MUTCD. All problems shall be reported to the Engineer so a resolution can be worked out prior to installation. The field layout will be reviewed and concurred with by the Engineer prior to placement of any temporary traffic control devices. The CWTS shall be present for the initial setup and all phase changes during the life of the project. The CWTS may designate responsible Contractor personnel to perform day to day operation and maintenance of the temporary traffic control devices. These responsible personnel shall work under the direction of the CWTS and their names shall be given to the Engineer on the project. A copy of the CWTS's certification shall be provided to the Engineer prior to the start of construction or placement of temporary traffic control devices or if the worksite traffic supervisor changes.

Regulatory control devices shall be erected only as directed.

Advisory speeds to be posted will be determined by the Department.

The names and telephone numbers of the superintendent and one other responsible employee shall be furnished. Such employees shall be on call or available at night, on weekends, or during other non-working periods to repair or replace all traffic control devices which may become damaged or inoperative.

When traffic lanes are restricted and when specified as a pay item, a patroller shall inspect and maintain traffic control devices. The patroller shall patrol the construction zone and shall immediately correct, maintain, and repair traffic control devices or notify the Contractor designated persons for immediate repair to such traffic control devices. A full time patroller shall be on duty during periods when work is not in progress.

Temporary traffic control devices shall be maintained continuously, except as described herein, to ensure visibility and to protect the public. All reflective sheeting backgrounds and lights shall be kept clean of foreign matter. The Contractor shall complete a "Traffic Control Device Report" weekly. This report is supplied in the Proposal Book for the contract and is to insure that the traffic control devices are looked at daily. The report does not always need to be filled out by the CWTS but must be reviewed by the CWTS for completeness and accuracy. The report shall be signed by the person who filled it out and initialed by the CWTS that it was reviewed. The Engineer will sign and date the report when received. The Engineer will not be responsible for the report's completeness and accuracy. If the CWTS feels that a situation exists where the temporary traffic control devices do not need to be checked daily for a certain period of time, the CWTS and the Engineer must agree on how often they should be checked.

The location by reference post and the date and time of operation of Temporary Worksite Speed Limit sign assemblies shall be recorded daily on a form provided by the Department. The completed report shall be submitted weekly to the Engineer. The report shall be completed and signed by the CWTS or their designee and shall be reviewed by the CWTS for completeness and accuracy.

Except for construction warning lights and temporary signals, the ATSSA brochure titled Quality Standards For Work Zone Traffic Control Devices will be used as a guide to determine if temporary traffic control devices are Acceptable, Marginal, or Unacceptable as defined in the brochure. Upon initial setup and phase changes of temporary traffic control devices, all individual devices shall be of the Acceptable classification. A device not completely covered or removed when the message does not apply or when directed, will be considered unacceptable.

A temporary traffic control device will be deemed to be in non-compliance when considered Unacceptable. A type of temporary traffic control device will be deemed to be in non-compliance when 25% or more of the individual devices are considered Marginal. Damages may be assessed in accordance with 105.14 for non-compliance.

Non-compliance of construction warning lights will be in accordance with 801.14.

All barricades, signs, or flashing arrow signs shall be moved from one location and re-erected at another location as shown on the plans or as directed.

Where two-way traffic is to be maintained on a one-way pavement, and where the existing shoulders on such roadway are earth, aggregate No. 73 shoulders shall be compacted in accordance with 303.06 as shown on the plans. Compacted aggregate shoulders shall remain in place unless subsequent construction activities on the contract require its removal.

Temporary drainage structures, temporary concrete median barrier units, and other temporary devices required and used for traffic maintenance shall remain the property of the Contractor.

801-T-170 CONSTRUCTION ZONE ENERGY ABSORBING TERMINAL, CZ

(Adopted 12-18-08)

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 479, INSERT AS FOLLOWS:

801.10.1 Construction Zone Energy Absorbing Terminal, CZ

The construction zone energy absorbing terminal, cz shall have passed NCHRP 350 level 3 crash test for all Interstate and other construction sites having a construction zone speed limit in excess of 45 mph and level 2 for non-Interstate construction sites having a construction zone speed limit of 45 mph or less. All energy absorbing terminal, cz shall have redirect capabilities and shall be approved by the FHWA. A copy of the crash test results and a copy of the FHWA approval letter shall be furnished to the Engineer prior to the installation of the unit. The Contractor may also use the Guard Rail Energy Absorbing Terminal cz, manufactured by Energy Absorption Systems, Inc. *until January 1, 2011. All units of this type in use shall be replaced with a compliant product immediately after this date regardless of the date of letting. No additional payment will be made for this replacement.*

805-T-169 TRAFFIC SIGNALS

(Adopted 05-05-08)

The Standard Specifications are revised as follows:

SECTION 805, BEGIN LINE 1 , DELETE AND INSERT AS FOLLOWS:

SECTION 805 - TRAFFIC SIGNALS

805.01 Description

This work shall consist of furnishing miscellaneous materials, not furnished by the Department, and installing traffic signals in accordance with these specifications and in reasonably close conformance with the lines, grades, and locations shown on the plans or as directed.

MATERIALS

805.02 Materials

Materials shall be in accordance with the following:

Castings for Handhole.....910.05(b)
Coarse Aggregate, Class E or Higher, Size No. 8.904
Concrete, Class A, B, or C.....702
Loop Detector Sealant.....906.02(a)
Reinforced Concrete Pipe.....907.02
Traffic Signal Materials and Equipment.....922
Treated Lumber.....911.02

The proposed work shall be examined in order to determine what materials not furnished by the Department are required to complete the contract. The Department will furnish only the materials specified on the Department Furnished Materials special provision. If materials to be furnished by the Contractor are listed, the list is only a guide for estimating purposes. All additional materials required to complete an operating installation as specified shall be furnished.

Signal handholes shall be class III reinforced concrete pipe as shown on the plans.

Joint sealant material shall be compatible with the roadway materials. If polyethylene duct loop wire is used, only sealant in accordance with 906.02(a)1 shall be used.

Preformed pave-over loops shall be designed for use with HMA, SMA or PCCP as applicable.

Wood poles to be furnished shall be in accordance with the current ANSI specifications and dimensions. They shall be of the length and class specified, be fully treated in accordance with 922.05(b), and dry. Minimum circumference at the top and at a point 6 ft (1.8 m) from the butt shall be in accordance with ANSI specifications.

Steel strain poles greater than 24 ft (7.3 m) in length shall be in accordance with 922.05(a).

CONSTRUCTION REQUIREMENTS

805.03 General Requirements

The Contractor shall maintain existing traffic signals in operation until the Engineer determines that the progress of the work necessitates their removal. The new installation shall not interfere with the operation of the existing signal. The work shall proceed in such a manner that the signals are not out of service at any two adjacent intersections at any time. When the operation of an existing traffic signal must be interrupted before the new signal is placed in operation, the traffic shall be controlled at all times. The work shall be scheduled so that the interruption is limited to a minimum amount of time and at off peak hours. When a new span, catenary, and tether are to be installed on an existing structure, the work shall be done so as not to damage the structure. ~~Tether cable will not be required on a flasher installation.~~ If an existing structure is damaged, it shall be repaired or replaced as directed with no additional payment. The new span and catenary installation shall not interfere with the operation of the existing traffic signal. Traffic shall be controlled at all times during the changeover when the existing traffic signal is turned off and the new signal is turned on. This changeover shall take place such that the interruption is limited to a minimum amount of time.

When directed, temporary stop signs shall be erected at the intersection. When no work is in progress, the intersection shall have at least two operating signal faces for each approach. When the new installations are completed, all existing signal equipment and materials including wood poles, steel poles, and cast-iron handhole rings and covers which have not been used in the new installation shall be carefully removed. Regardless of the right to materials found on the project, as set out in other sections of these specifications, items designated in the contract documents, and field identified by the Department, as traffic signal equipment to be salvaged by the Department or local unit of government shall be stored at a secure site until such time as it is transported to the District Office, when designated as a pay item, or salvaged by the Department or local unit of government. The Contractor shall verify that the field identification placed by the Department has not been removed by vandalism or natural causes. If the Contractor has reason to believe field identifications have been removed, it shall contact the Department. The Contractor shall be responsible for all damage or loss of this equipment and shall repair or replace the damaged or lost equipment as directed. All signal equipment removed and not designated to be salvaged shall become the property of the Contractor and shall be disposed of in accordance with 202.

All existing painted signal equipment to be reused, such as pedestals, bases, controller cabinets, signal heads, signal weatherheads, pipe arms, shall be cleaned and painted with two coats of highway yellow enamel. Aluminum poles and mast arms shall not be painted.

Existing concrete foundations, which have not been used in the new installation, shall be removed to a minimum of 4 in. (100 mm) below the adjacent grade. The openings shall be filled with concrete and the surface finished and broomed, if they are located in sidewalk areas. Otherwise, they shall be filled with acceptable material conforming with the surrounding area. Existing signal handholes to be removed, shall be filled after removing rings and covers, with B borrow with a

minimum of 4 in. (100 mm) of concrete on top to bring it up to grade in a sidewalk area. Surfaces shall be finished and broomed. Otherwise, they shall be filled with acceptable material conforming with the surrounding area.

The signal controller timings will be provided and the Engineer shall be present when the signal intersection is to be placed in operation.

All electrical wiring terminations and splices; controller and cabinet set-up; and testing, review, and turn-on of all operational apparatus at each location shall be done by or in the presence of and under the responsible charge of an employee of the Contractor who holds a Level II Traffic Signal Electrician certification which has been granted by the International Municipal Signal Association. Supervision of non-electrical, traffic signal related construction work and traffic control shall be done by a person holding a Level I Work Zone Traffic Safety Specialist certification which has been granted by the International Municipal Signal Association, or an equivalent certification approved by the Department.

Before starting work, the Contractor shall provide the names of the Level II Traffic Signal Electricians and Level I Work Zone Traffic Safety Specialists who have been assigned to perform signal related work, and a photocopy of each such person’s certification card. If the Level II Traffic Signal Electricians or Level I Work Zone Traffic Safety Specialists are dismissed from the work, all signal related work requiring such certified personnel on the project site shall cease until the names and photocopies of certification cards for replacement personnel are provided to the Engineer.

Electrical work shall be executed in accordance with the requirements of the National Board of Fire Underwriters, the State Fire Marshal, and the power company which will furnish the electric service. The work shall be in accordance with any local regulations that may apply. The Department will arrange and provide for power service which the power company will bring to the point designated on the plans. Prior to the start of construction, the schedule of activities shall be coordinated with the power company and they shall be contacted again at least 14 days prior to the time the service work is to be completed.

The Department will obtain permits from local officials, companies, or individuals for the use of poles, right-of-way, or other property incidental to the installation of traffic signal. Although entering into the contract implies permission and authority to cut into and push under pavement, sidewalks, and alleys, any damage to underground utilities or interruption of such service shall be the responsibility of the Contractor. The Contractor shall be in accordance with local regulations as well as 107.08. Protective devices shall be in accordance with 107.12 and 801.

The location of signal heads, controllers, signal poles, signal cantilever structures, detector housing, disconnect hangers, and other installation items will be shown on the plans. However, a change in the location of an item may be ordered during the progress of the work. The work shall be completed as shown on the plans except for those changes specifically authorized in writing.

805.04 Pole Installation

Metal poles shall be erected on concrete foundations and shall be reasonably plumb after installation of signal heads. The handhole side of the pole shall be at right angles to the direction of the mast arm or span, catenary, and tether. Signal cables shall be brought up inside the poles. Any steel pole, mast arm, or hardware not galvanized or painted with baked enamel shall be painted with two coats of rust inhibiting aluminum paint. Paint shall be applied in accordance with 619 with the exception that commercial blast cleaning of the steel will not be required. All rust, scale, and dirt shall be cleaned from the metal surface so that paint adheres to the surface.

The construction of concrete foundations shall be in accordance with 805.13. Wood poles shall be set a minimum of 7 ft (2.1 m) in the ground and raked 12 in. (300 mm).

805.05 Placing Signal Heads

Mast arm and span mounted signal heads shall have 17 ft (5.2 m) minimum and 19 ft (5.8 m) maximum clearance over the roadway unless there are visual obstructions which require lowering the signal head. A signal head over the roadway shall not have a clearance of less than 15 ft (4.6 m). Such signal heads shall be located over the intersection as shown on the plans. Such signal heads shall have a uniform clearance, which will be determined. Signal heads not mounted over a paved roadway, on the top or side of a pole, shall not be less than 10 ft (3 m) nor more than 15 ft (4.6 m) above the sidewalk or, if none, above the pavement grade at the center of the roadway. Signal faces shall be directed to the proper approach lane in each direction. Pedestrian signal faces shall be mounted with the bottom of the housing at not less than 7 ft (2.1 m) nor more than 10 ft (3 m) above the sidewalk. The pedestrian signal shall be in line with the pedestrian’s vision at the appropriate crosswalk being used. Pedestrian push-buttons shall be mounted at a height of 3 1/2 to 4 ft (1.1 to 1.2 m) above the sidewalk as shown on the plans. A pedestrian actuated signal sign shall be mounted immediately above the push-button.

Signal heads shall be assembled and wired with one conductor, THW, stranded wire. Where splices are made, a 2 ft (0.6 m) minimum length of cable or wire in excess of that required for a continuous run shall be provided. Splices shall be twisted together and soldered or approved type connectors used. Each splice shall be completely insulated by wrapping with an approved tape and sealed with an approved electrical coating material. Splices shall be made in such manner that the connections are moisture proof. The cables coming out of the signal weatherhead shall be looped to form a drip loop. The drip loop shall be made so that the cables coming out of the weatherhead loop down below the elevation of the weatherhead to prevent water from following the cable into the weatherhead. If used, the splice indicated above shall be located in the top of the coils of cable forming the drip loop.

Signal heads shall not be installed until all other work has been completed. If it becomes necessary to mount signal heads for more than 2 h before the lights are to be turned on, the signal heads shall be hooded by placing sacks or similar cover over them so as to conceal them from traffic. Hooded signal heads are not permitted to be in place for more than five days. No signal head shall be left over night with the lights out unless it is hooded. Signal heads shall be securely mounted. The polycarbonate signal face shall be used only when securely

supported on both ends of the assembly. In a span cable installation, a tether cable would satisfy this requirement.

805.06 Grounding

All signal supports, signal controller supports, and entrance switches shall be grounded in accordance with the applicable requirements of 807.12.

805.07 Wire and Cable Installations

All cable runs attached to utility poles shall have code clearance relative to utility cables. They shall be no less than 18 ft (5.5 m) above the ground level except over railroad tracks when a minimum of 27 ft (8.2 m) clearance shall be maintained. All cable runs shall be installed in continuous lengths without splices between terminals except when necessary at handholes, junction boxes, pole signal bases, and pedestal bases. The type of cable and the number of conductors as well as the gage shall be as shown on plans unless otherwise specified.

Cable rings shall be used to support the signal cable on the signal span cable. They shall be spaced 12 in. (300 mm) on center. Cable shall be pulled through the conduit to the terminal panel in the controller cabinet. Caution shall be used to prevent damage to the cable when it is being pulled through conduit.

Coded cable conductors shall be used throughout the installation. Cable conductors shall be tagged at all detector housing*s*, handholes, ~~pole~~ signal *pole* bases, and controller cabinets. *At the ends of each cable, the tag shall be placed between 4 in. (100 mm) and 8 in. (200 mm) from the end of the wire and on the outer jacket. At all other locations, the tag shall be placed in the middle of the length of cable stored at the location. The tag shall be one-half inch wide, thermal printed black on yellow or black on white, polyester or nylon tape with permanent adhesive and shall be water, chemical and scratch resistant. The font shall be arial, size 10. Tags shall be installed flag style around the cable with the backs of the tag ends placed together.* Tags ~~shall consist of an aluminum blank of sufficient size to be stamped with not less than 3/16 in. (5 mm) high all upper case letters which~~ *shall* identify the cables by their use ~~and phase~~. The following are the uses which shall be indicated by the tags:

(a) Power

(b) Pedestrian Signal

(c) Pedestrian Actuation

(d) Signal~~ Phase Identification~~

(e) Detection Loop Identification

(f) Interconnect

Signal cables shall be tagged to identify the direction of travel. Detector lead-in cables shall be tagged throughout the installation with the corresponding loop tag information.

~~Loop identification shall consist of the following:~~

~~Inside of the Detector Housing, the loop wires of each loop shall be tagged with, in _____, out _____, as shown on the plans.~~

~~Loop Number Loop Number~~

~~Inside of the Controller Cabinet, each lead-in cable shall be tagged within 6 in. (150 mm) of the terminal strip connection with: Lane designation, Phase Number, Loop Number, and when applicable with loop system number, and speed trap according with the plans.~~

~~Phase identification shall consist of the single number "1", "2", "3", etc., which corresponds to the phase diagram for the respective intersection. Tags shall be securely fastened to the cable with a non-corroding material.~~ The tagging material and fastening shall be approved prior to proceeding with this work. The color coded wires shall be connected properly. The white wire shall be the common or ground. Wire used for all identical indications of any individual phase shall be color coded and, where possible, shall use red wire to connect red lenses, orange wire to connect yellow lenses, and green wire to connect green lenses. Signal heads shall be assembled and wired before being installed. The testing of the loops shall be documented in the Loop Testing Table provided by the State.

805.08 Controller Cabinet, Signal Service, and Detector Housing Installation

Three document packets shall be prepared in accordance with 922.02(b) for each cabinet. Each packet shall be labeled with the name of the contract number, the intersection, the commission number of the signal and the date of installation. One packet shall be placed in the cabinet and the remaining two packets shall be submitted to the Engineer within 2 days after the signal is turned on. Information in the packets shall include all approved changes to the signal installation. All detector loop lead-in tags and detector rack labels shall reflect all approved changes to the signal installation.

Additional detector loop amplifier units and detector racks shall be supplied as directed by the Engineer. Additional detector racks shall include all cables or harnesses including, but not limited to a SDLC cable for each added rack, interface panels and a BIU to provide a complete and functional installation. Additional auxiliary BIU panels shall include all cables or harnesses including, but not limited to a SDLC cable for each additional auxiliary BIU panel, terminal strip on BIU panel and BIU to provide a complete and functional installation.

For signal cabinets installed by the Contractor, where no detector loop or lead-in work is included in the contract, the Contractor shall perform detector loop tagging, testing and vehicle simulator testing in accordance with 805.09, only to the extent of documenting the test readings and confirming that all existing detector loops are connected correctly and all detector related equipment in the cabinet is operating correctly.

The controller cabinet shall be mounted securely on a pole, pedestal, or concrete foundation. All cabinets on concrete foundations shall be installed with the anchor bolts inside. Controller cabinets on poles or pedestals shall be mounted at a height of 38 in. ± 2 in. (970 mm ± 50 mm). Pole mounted controller cabinets shall be fastened with two stainless steel bands as shown in the plans. Signal cables and lead-in cable shall be run in conduit from the controller cabinet to

the signal support base and to detector housing as indicated on the plans. Galvanized steel elbows shall be used on the detector housing as shown on the plans.

The Contractor shall wire the entrance switch and bring service cable up the riser and out the weatherhead and leave 4 ft (1.2 m) of cable outside the weatherhead. The utility company, at their option, may bring the service cables to the load side of the entrance switch. Meter bases, if required, shall be obtained from the power company ~~and any service connection or miscellaneous charges shall be assumed by the Contractor~~.

A minimum of 12 in. (300 mm) and a maximum of 18 in. (450 mm) of loop wire duct will be permitted in the detector housing for each loop lead. Concrete used in the installation of detector housings shall be in accordance with 506, except 506.05 will not apply. A CMDS in accordance with 502.03 shall be submitted, however, utilization of the Department provided spreadsheet is not required. Where a portion of the road is closed or where there is no vehicular traffic, then class A concrete in accordance with 702 may be used. The concrete shall be placed flush with existing surface and shall be covered with a steel plate during the setting time.

805.09 Loop Wire Detector Installation

This work shall consist of placement and testing of loop wire detectors in accordance with the installation details shown on the plans.

~~MATERIALS~~

~~Loop wire shall be in accordance with 922.06(c)7b. Loop detector sealant shall be in accordance with 922.06(c)7c.~~

(a) Layout

The number, size, arrangement, and locations of loops shall be as shown on the plans except that loop spacing shall be adjusted to avoid PCCP joints. Loops shall be of a regular octagon shape with sides of 2.5 ft (0.75 m) in length or a circular shape with a diameter of 6 ft (1.8 m). Loops placed longitudinally adjacent in the same lane shall be spaced 15 ft (4.57 m) from the center of one loop to the center of the next loop. Loops shall be arranged so that no loop wire will be bent at an angle less than 120°. Regardless of configuration, the loop installation shall match the intention of the loop tagging table.

~~Loops~~ *Prior to installation, loop layout* shall be ~~of a regular octagon shape with side of 2.5 ft (0.75 m)~~ *approved* in ~~length. An outline shall be laid out and painted where the loops shall be sawed. The loop locations shall be subject to the review and approval of the~~ *writing by the* District Traffic Engineer. The *Contractor shall notify the* District Traffic Engineer ~~shall be notified 48 h~~ *a minimum of two business days* prior to ~~such field review~~ *the date that loop layout approval is required. All roadway centerlines, edge-lines and stop-bars pertinent to loop layout shall be accurately and clearly identified at the time loop layouts are reviewed for approval. An outline shall be painted where the loops are to be placed. The Contractor shall ensure that the final installed location of each loop matches the intention and functionality of the approved layout for loop spacing, lane width and geometry.*

(b) Installation

All loops and lead-in cables shall be tagged according to the plans and 805.07.

1. Saw-cut Loops

The slots shall be saw-cut as shown on the plans. *A diamond cutting blade shall be used for sawing all loops. All saw-cut loops shall have individual saw cuts to the detector housing. Joints shall be overlapped such that the saw cut at the corner is full depth.* ~~Slots shall be thoroughly cleaned and dried before the installation of loop wires.~~ *Prior to installing roadway loop wire in the roadway saw cuts, the saw cuts shall be cleaned in accordance with the manufacturer's requirements for the joint sealant to be used. After proper cleaning, the loop wire shall be installed. All loops shall be wired clockwise as viewed from above. Loops shall be wired with four turns or as specified then gently tamped with a blunt non-metallic tool. Backer rod 2 in. to 4 in. in length shall be spaced every 12 in. around the saw cut above the wire and gently tamped to hold the loop wire snugly in the bottom of the saw cut. Backer rod shall not be continuous around the saw cut. After installation of the loop wire, the saw cut shall be sealed with a joint sealant material. The sealant shall be poured into the saw cut making a water tight seal. The joint sealant material shall be installed in accordance with the manufacturer's recommendations and 906.02. However, the joint configuration shall not apply. A copy of the sealant manufacturer's written application instructions shall be submitted to the Engineer prior to any sealant operations. If the Contractor elects to use a sealant complying with 906.02(a)2, the sealant material shall be heated in a kettle or melter constructed as a double boiler with the space between the inner and outer shells filled with oil or other heat-transfer medium. This melter shall have a positive temperature control and a mechanical agitator. A backer rod shall be used for both cold applied sealants and hot poured sealants. The sealant material shall fill the saw cut as shown on the plans. All excess joint sealant on the pavement surfaces shall be promptly removed.*

~~The specified number of turns shall be placed in the slot and gently tamped with a blunt non-metallic tool. A sash cord or backer rod shall be placed above the wire after tamping. The number, size, arrangement, and locations of loops shall be as shown on the plans. Loop spacing shall be adjusted to avoid pavement joints. Loop wire shall be pressed into the saw slot with a blunt non-metallic tool. Loop wire shall only be bent at angles of 120° or greater. All loops shall be wired clockwise as viewed from above. Loops shall be wired with four turns and in a series unless otherwise specified. Joints shall be overlapped such that the saw cut at the corner is full depth. The sealant shall be poured into the saw cut making a water tight seal. The splice of the loop wire and lead-in cable shall be soldered and waterproofed at the detector housing. Waterproofing shall consist of the use of heat shrink tubing which has an internal coating sealant material. The heat shrink tubing shall not be heated by means of a direct flame tool.~~ Loop wire and lead-in cable shall be tagged according to the plans and 805.07. The black lead-in wire shall be spliced to the loop wire which goes back to the field. Such wire shall be tagged as "Out/Loop (No.)". The white lead-in wire shall be spliced to the loop wire which comes in from the field. Such wire shall be tagged as "In/Loop (No.)".

2. Preformed Pave-over Loops

Preformed pave-over loops may be installed as a 1, 2, 3 or 4 loop configuration. Pave-over loops shall be secured in place prior to paving.

(c) Splices

For each loop cable and lead-in cable entering a handhole, there shall be 6 ft (1.8 m) of cable jacket remaining on each wire after the splice is complete. For each loop cable and lead-in cable entering a detector housing, there shall be 2 ft (0.60 m) of cable jacket remaining on each wire after the splice is complete. For all loop splices, there shall be a maximum of 0.5 in. (12 mm) of non-jacketed wire measured from the end of each cable jacket to the edge of the splice waterproofing material. The splice of the loop wire and lead-in cable shall be soldered and waterproofed at the detector housing or handhole. Waterproofing shall consist of the use of heat shrink tubing which has an internal coating sealant material. The heat shrink tubing shall not be heated by means of a direct flame tool.

(d) Testing and Acceptance

All testing and acceptance procedures performed by the Contractor shall be performed in the presence of the Department personnel assigned by the Engineer. The Contractor shall notify the Engineer a minimum of two business days prior to the date testing is to be performed.

~~TESTING~~

The Contractor shall meter all new loop wire detectors or a new bank of loop wire detectors by means of instruments capable of measuring electrical values for installed loop wires and lead-in cables. The instruments shall measure inductance in microhenries, resistance in ohms, induced A.C. voltage in volts, and leakage resistance in megohms. All measuring tests shall be performed at the detector housing before the loop wire is spliced to the lead-in cable, and at the cabinet after the loop wire is spliced to the lead-in cable.

1. Electrical Testing

~~(a)~~ *a.* Megohm Test Before Splice is Made at Detector Housing for Loop Wire

One of the megohm probes shall be connected to ground and the other probe shall be connected to the "in" or "out" loop wire. The remaining loop wire shall be isolated. The test shall then be performed.

~~(b)~~ *b.* Megohm Test Before Splice is Made at Detector Housing for Lead-in Cable

~~The two wires of the lead-in cable at the cabinet shall be twisted together and taped. The shield of the lead-in cable shall be grounded in the cabinet. At the detector housing, one megohm probe shall be connected to ground and the other probe shall be connected to one of the lead-in wires. The remaining lead-in wire shall be isolated. The test shall then be performed.~~

The two wires and shield of the lead-in cable at the cabinet shall be isolated and taped. The test shall consist of recording four readings taken at the detector housing or handhole as follows:

(1) Connect the first megohm probe to ground and the second probe to the shield. Record the reading.

(2) Connect the first megohm probe to the first lead-in wire and the second probe to the shield. Record the reading.

(3) Connect the first megohm probe to the second lead-in wire and the second probe to the shield. Record the reading.

(4) Connect the first megohm probe to the first lead-in wire and the second probe to the second lead-in wire. Record the reading.

The lowest of the four readings taken above shall be recorded on the testing document for acceptance.

~~(c)~~ *c.* Megohm Test After Splice is Completed at Cabinet

This test shall be performed after the splice at the detector housing is completed. A water solution of one tablespoon (15 ml) of baking soda per pint (0.5 L) of water shall be placed in a metal container. The metal container shall be grounded and the splice shall be fully submerged in the solution for 2 min. With the splice submerged, the *shield of the lead-in shall be connected to ground at the cabinet. One* megohm *probe shall then be connected to ground and the other probe connected to one of the lead-in wires* ~~test shall be performed at the cabinet on the end of the lead-in cable~~ *and the reading recorded*.

~~(d) Vehicle Simulator Test~~

~~This test shall be performed after all other tests are completed and after all connections have been made at the controller in the cabinet. This test shall be performed by dragging a test vehicle across the loops using a non-conducting string. The test vehicle shall be fabricated with an 8 ft (2.4 m) length of No. 6 bare copper wire formed into a circle. The two ends shall then be electrically spliced. The detector unit amplifier shall record a call as the test vehicle is dragged across the loop. It shall cancel the call as the test vehicle leaves the loop.~~

2. Delay Amplifier Settings and Vehicle Simulator Test

After all detector loop testing is complete, the detector amplifiers shall be installed and settings adjusted for proper operation at the intersection.

The frequency setting shall be adjusted using the amplifier's display so that adjacent loops in the roadway that are connected to different loop amplifiers have a minimum difference of 5 khz. This operating frequency setting does not apply to loops that are adjacent to each other in the roadway but are connected to the same loop amplifier.

The sensitivity setting shall be adjusted using the amplifier's display. With an average size front wheel drive vehicle with the front axle centered over the back loop of a series of loops, the sensitivity shall be adjusted in accordance with the manufacturer's recommendations.

The count output shall be enabled for all loops designated as counting loops. The number of loops setting shall be set for loops designated for counting purposes and shall be set to the number of loops connected to that loop amplifier.

This test shall be performed by dragging a test vehicle across the loops using a non-conducting string. The test vehicle shall be fabricated with an 8 ft (2.4 m) length of No. 6 bare copper wire formed into a 2.5 ft (0.76 m) diameter circle. The two ends shall then be electrically spliced. The test shall be started with all detector amplifiers turned off except for one (1) approach. All amplifiers for that approach shall be turned on and adjusted to the proper settings as per 805.09(d)4. All traffic for the approach being tested shall be stopped and not allowed to cross any loops during the test procedure for that approach. The simulator shall be dragged slowly across each loop system in the same direction as to simulate a vehicle driving through the loop system. As the simulator crosses each loop an IMSA level II certified Signal Technician shall verify that a call is displayed exclusively on the corresponding loop amplifier, controller detector input and controller phase(s). After completely verifying the loops on the first approach the amplifiers shall be left on, and the amplifiers for the next approach to be tested shall be turned on and adjusted to the proper settings. The same procedure shall be followed for each remaining approach. With large intersections, as the test proceeds, it may become difficult to verify that the calls are going to the correct detector inputs. In this case, traffic control shall be used to stop vehicles before reaching the loops for as many approaches as needed to accurately complete the testing to the inspector's approval. Testing may be paused between lanes to allow traffic to clear.

~~(e)~~ *3.* Acceptance Criteria

The Contractor shall record all test readings, in triplicate, on tabular forms provided by the Department or by copying the one included elsewhere herein. The Contractor shall complete, sign, and date the forms before submitting them to the District Traffic Engineer. The District Traffic Engineer will use these forms for recording the Department's readings on the corresponding space provided.

In order for the loop detector installation to be accepted, the electrical values shall be as follows:

~~1.~~ *a.* .....Inductance shall be between 80 and 800 µH. Inductance shall be determined by means of digital readout meter which drives the field loop system.

~~2.~~ *b.* Resistance shall be less than or equal to 8 ohms.

~~3.~~ *c. Induced AC voltage* ~~Voltage~~ shall be less than or equal to 3 V.

~~4.~~ *d.* ~~Induced A.C. voltage and leadage~~ *Leakage* resistance shall be greater than 100 megohms.

Loop wire and/or lead-in cable failing to meet this requirement shall be replaced at no cost to the State.

805.10 Magnetometer and Microloop Detectors

Before installation of Magnetometer or Microloop probes the Contractor shall confirm the adequacy of the magnetic field intensity, to be sure that the range is suitable for their operation. Arrangement of probes shall be located at maximum distance from steel support under bridges. Probes shall be installed with their long dimension vertical, and with the cable end at the top. Probes shall be firmly supported, so the lateral and vertical motion is restricted. Probes shall be connected in series. The splice shall be soldered by means of hot iron, or pouring or dripping without flames, with rosin core solder and shall be insulated and waterproofed in accordance with the manufacturer's specifications.

805.11 Steel Conduit

Conduit shall be installed to a depth of no less than 2 ft (0.6 m) or more than 5 ft (1.5 m) below the finished grade unless otherwise specified or approved. Pockets or traps where moisture might accumulate shall be avoided. Conduit shall be placed under existing pavement by approved jacking or drilling methods. Pavement shall not be disturbed without permission. If permission is granted, cuts in pavement areas shall be no greater than 24 in. (600 mm) wide. All cuts in the pavement and sidewalk areas shall be sawed. Sidewalk removal and replacement shall be to the nearest tooled joint. Jacking and drilling pits shall be kept at least 2 ft (0.6 m) clear of the edge of any type of pavement or paved shoulder. Excessive use of water that may cause undermining of the pavement shall be avoided. Continuous conduit runs shall not exceed 250 ft (76 m) in length, unless otherwise indicated on the plans.

Expansion fittings as detailed on structure plans shall be installed where conduit crosses an expansion joint in the structure. Where it is deemed inadvisable to install expansion fittings in closely confined areas, the installation of approved flexible tubing may be permitted. Such expansion joints or tubing shall be the same size as the conduit. Any existing underground conduit to be incorporated into a new signal installation shall be cleaned with a mandrel and blown out with compressed air before cable is drawn into pipe. All new conduit runs shall be cleaned and swabbed before cables are installed. All conduit ends shall be capped and shall remain capped until the Contractor is ready to pull cable into the conduit, at which time the caps shall be removed and conduit bushings placed on each end to protect the cable. The inside surface of the conduit shall be kept clean. Conduit to be installed, indicated on the plans for future use of signal cables, shall be left in place with a pull cord on its entire length.

Larger size conduit may be used with no additional payment, but when it is used, it shall be for the entire length of the run from outlet to outlet. Conduit runs as shown on the plans are for bidding purposes only and may be changed, with permission, to avoid underground obstructions. A change order may be authorized if the conduit runs can be made on the opposite side of the street to that shown on the plans in order to avoid obstruction and traffic inconvenience or to avoid unnecessary tearing up of existing pavement.

805.12 PVC Conduit

The method of installing PVC conduit underground shall be the same as for steel conduit where applicable except trenches for the conduit shall be backfilled with 2 in. (50 mm) of sand before the conduit is placed in the trench. Materials excavated may be used for

backfill, if approved. If the Engineer deems it necessary, approved B borrow shall be placed over the conduit to a depth of 12 in. (300 mm) and the remainder of the trench shall be filled with excavated material.

805.13 Foundations

Foundations for traffic signal poles, cabinets, and pedestals of the type specified shall be constructed, or existing M foundations shall be modified, as shown on the plans or as directed. Pedestal bases shall be plumb and firmly attached to the anchor bolts either by using leveling nuts or shims if top of the foundation is not level. Grouting shall be used when necessary to fill any gap between pedestal base and foundation. Pipe pedestals shall be screwed tightly into the bases and secured with a stainless steel pin. Power and signal cables shall then be pulled from the base into the cabinet. Curing of concrete shall be in accordance with 702.22.

During excavation of the foundation, all material shall be removed to the full depth as shown on the plans, except if class X material is encountered, the work shall be performed in accordance with 206.02(b).

805.14 Final Clean-Up

When the installation is completed, all disturbed portions of sidewalk, pavement, shoulders, driveways, sod, etc., shall be cleaned and any excess excavation or other materials shall be disposed. All cutting in the sidewalk and pavement areas shall be done with a saw. Sidewalk removal and replacement shall be to the nearest tool joint. Unless otherwise directed, cuts in pavement areas shall be no greater than 12 in. (300 mm) in width.

805.15 Method of Measurement

Traffic signal head, pedestrian signal head, pedestrian push button, controller cabinet foundation, M foundation modified to P-1 foundation signal steel strain pole, signal wood pole, signal cantilever structure, signal support foundation, signal service, disconnect hanger, magnetometer detector, microloop detector, loop detector delay amplifier, *loop detector delay counting amplifier, loop detector rack, auxiliary BIU panel,* signal handhole, signal detector housing, span catenary and tether, and span catenary for flasher will be measured by the number of units installed.

Conduit of the type specified will be measured by the linear foot (meter) from outside to outside of foundations. Signal cable and signal interconnect cable will be measured by the linear foot (meter).

Preformed pave-over loops will be measured by the number of loops placed. Each loop will be measured only once, regardless of the number of signal cable turns. Signal cable from preformed pave-over loops to handholes, detector housings or from loop to loop will not be measured for payment.

The accepted quantities for payment for electrical signal or loop lead-in cable will be the quantities shown in the Schedule of Pay Items. Such quantities may be corrected if they are in error by more than 25%.

Saw cut for roadway loop detector and sealant will be measured by the linear foot (meter) for the full depth of slot cut in the pavement as shown on the plans or as directed.

If class X material is encountered during foundation excavation, measurement will be made in accordance with 206.10.

Traffic signal installation or modernization, flasher installation or modernization, miscellaneous equipment for traffic signals, and final cleanup in accordance with 805.14 will not be measured for payment.

Traffic signal equipment removal and transportation of salvageable signal equipment will not be measured.

805.16 Basis of Payment

Traffic signal installation, flasher installation, traffic signal modernization, and flasher modernization, all of the type and the location number specified, will be paid for at a contract lump sum price.

If specified as pay items, traffic signal controller and cabinet, traffic signal head, pedestrian signal head, pedestrian push button, controller cabinet foundation, M foundation modified to P-1 foundation, signal steel strain pole, signal wood pole, signal cantilever structure, signal support foundation, signal pedestals, signal service, disconnect hanger, magnetometer detector, microloop detector, loop detector delay amplifier, *loop detector delay counting amplifier, loop detector rack, auxiliary BIU panel,* signal handhole, signal detector housing, span catenary and tether, and span catenary for flasher will be paid for at the contract unit price per each. Conduit of the type specified, signal cable, interconnect cable, electrical signal cable, loop lead-in cable, and saw cut for roadway loop detector and sealant will be paid for at the contract unit price per linear foot (meter).

Preformed pave-over loops will be paid at the contract unit price per each.

The removal of existing traffic signal equipment designated to be removed will be paid for at the contract lump sum price for traffic signal equipment, remove. When designated as a pay item, the transportation of salvageable signal equipment will be paid for at the contract lump sum price for transportation of salvageable signal equipment.

Class X excavation will be paid for in accordance with 206.11.

Miscellaneous equipment for traffic signals will be paid for at a contract lump sum price.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Controller and Cabinet, _____, _____ Phase (type / no.)	EACH
Controller and Cabinet, Flasher, _____ (type)	EACH
Controller Cabinet Foundation, _____ (type)	EACH
Controller Cabinet Foundation, M, Modify to P-1	EACH
Disconnect Hanger	EACH
Flasher Installation, Location No. _____	LS

Flasher Modernization, Location No. _____.....LS
Handhole, Signal.....EACH
Loop Detector Delay *Counting* Amplifier, _____ Channel.....EACH

no.
Loop Detector Rack.....*EACH*
Magnetometer Detector.....EACH
Microloop Detector.....EACH
Miscellaneous Equipment for Traffic Signals.....LS
Pedestrian Push Button.....EACH
Pedestrian Signal Head, _____, _____.....EACH
type lens size
Saw Cut for Roadway Loop and Sealant.....LFT (m)
Signal Cable, _____, No. _____ Copper, _____ C/ _____...LFT (m)
type
conductors/size
Signal Cable, Preformed Pave-Over Loop.....*EACH*
Signal Cantilever Structure, Mast Arm _____ ft (m).....EACH

length
Signal Detector Housing.....EACH
Signal Interconnect Cable, ____, No. ____
type
Copper, ____ C/ ____.....LFT (m)
conductors/size
Signal Pedestal, _____ ft (m).....EACH
length
Signal Pole, Wood, _____, _____ ft (m).....EACH
class length
Signal Service.....EACH
Signal Strain Pole, Steel, _____ ft (m).....EACH
length
Signal Support Foundation, _____ in. (mm) x _____ in. (mm)
x _____ in. (mm).....EACH
Span and Catenary for Flasher.....EACH
Span, Catenary, and Tether.....EACH
Traffic Signal Equipment, Remove.....LS
Traffic Signal Head, _____ Way, _____ Section, _____..EACH
no. no.
lens sizes & colors EACH
Traffic Signal Installation, _____, Location No. _____.....LS
type
Traffic Signal Modernization, _____, Location No. _____.....LS
type
Transportation of Salvageable Signal Equipment.....LS

The cost of all wiring, hardware, anchor bolts, and associated equipment required to operate the intersections shall be included in the cost of controller and cabinet, flasher.

The cost of signal face hook-up wire, pole plates and arms for side mounts, mid-mast arm mount, pipe arms, signal brackets, visors, louvers, bulbs, span hanger, backplates, balance adjuster, weatherhead, and all additional hardware required to assemble a combination of signal faces as shown on the plans shall be included in the cost of traffic signal head or pedestrian signal head.

The cost of the push button, pedestrian actuated signal sign, and all hardware required to complete the installation shall be included in the cost of pedestrian push button.

The cost of concrete, conduits, grounding bushings, ground rod, ground wire, drainage, and all hardware required to complete the installation shall be included in the cost of controller cabinet foundation.

The cost of the base plate, metal skirt base plate, anchor bolts, handhole and cover grounding lug, 2 in. (50 mm) pipe cable entrance, J hook, and top cover as shown on the plans shall be included in the cost of signal strain pole, steel.

The cost of downguys, anchor rods, downguy guards, and hub-eyes as shown on the plans, and all hardware required to complete the installation shall be included in the cost of signal pole, wood.

The cost of all hardware including the metal skirt base plate, where necessary, to complete the installation as shown on the plans shall be included in the cost of signal cantilever structure.

The cost of concrete, reinforcing steel, conduits, ground rod, ground wire, grounding bushings, and all hardware required to complete the installation shall be included in the cost of signal support foundation.

The cost of the pedestal metal base, pedestal pole, pole cap when necessary, anchor bolts, and all hardware required to complete the installation shall be included in the cost of signal pedestal.

The cost of weatherhead, 1 in. (25 mm) conduit riser, entrance switch, 1 in. to 2 in. (25 mm to 50 mm) conduit reducer, ground rod, ground wire, and all hardware required to complete the installation, including the meter base when required and supplied by the utility company shall be included in the cost of signal service.

The cost of the detector unit, lead-in cable, and all work necessary for proper installation shall be included in the cost of magnetometer detector or microloop detector.

The cost of the slot cut on the pavement, ~~sash cord,~~ backer rod, loop sealant, and all testing in accordance with 805.09 shall be included in the cost of saw cut for roadway loop and sealant.

The cost of signal cable from preformed pave-over loops to handholes, detector housings or from loop to loop shall be included in the cost of the preformed pave-over loop.

The cost of all work and hardware required to properly install overhead or underground signal cable as shown on the plans or as directed shall be included in the cost of signal cable and signal interconnect cable.

~~The cost of the independent shelf mount unit or card-rack unit, and power module shall be included in the cost of loop detector delay amplifier.~~

The cost of concrete reinforcing pipe, ring and cover eye bolts, hardware, handhole bottom, and aggregate under the handhole bottom as shown on the plans shall be included in the cost of handhole, signal.

The cost of aluminum casting, enclosure concrete, steel conduit and elbow, and all hardware required to complete the installation shall be included in the cost of signal detector housing.

The cost of steel pole bands or straight eye bolts, span, catenary, and tether of wire rope cables, cable rings, type A support cable, wire rope clips, safety cable, thimble, service sleeve, and all hardware required to complete the installation as shown on the plans shall be included in the cost of span, catenary, and tether for signal, or span and catenary for flasher.

The cost to repair or replace damaged or lost salvageable traffic signal equipment shall be at the Contractor's expense.

The cost of excavation, backfill, final cleanup in accordance with 805.14, and necessary incidentals shall be included in the cost of the pay items in this section.

904-R-560 AGGREGATES

(Adopted 11-20-08)

The Standard Specifications are revised as follows:

SECTION 904, BEGIN LINE 65, DELETE AND INSERT AS FOLLOWS:

Steel furnace (SF) slag ~~shall only~~ *may* be used in aggregate shoulders, HMA surface or SMA surface mixtures, dumped riprap, and snow and ice abrasives. *SF slag coarse aggregate may be used in HMA base and HMA intermediate mixtures if the deleterious content is less than 4.0 % when tested in accordance with ITM 219. RAP with steel slag may be used in accordance with 401.06, 402.08 and 410.06.*

SECTION 904,BEGIN LINE 205, DELETE AND INSERT AS FOLLOWS:

(a) Classification of Aggregates

Characteristic Classes	AP	AS	A	B	C	D	E	F
Quality Requirements								
Freeze and Thaw Beam Expansion, % Max. (Note 1)	.060							
Los Angeles Abrasion, %, Max. (Note 2)	40.0	30.0	40.0	40.0	45.0	45.0	50.0	
Freeze and Thaw, AASHTO T 103, Procedure A, % Max (Note 3)	*12.0*	*12.0*	*12.0*	*12.0*	*16.0*	*16.0*	*20.0*	*25.0*
Sodium Sulfate Soundness, %, Max. (Note 3)	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Brine Freeze and Thaw Soundness, %, Max. (Note ~~4~~*3*)	30	30	30	30	40	40	50	60
Absorption, % Max. (Note ~~5~~*4*)	5.0	5.0	5.0	5.0	5.0			
Additional Requirements								
Deleterious, %, Max.								
Clay Lumps and Friable Particles	1.0	1.0	1.0	1.0	2.0	4.0		
Non-Durable (Note ~~6~~*5*)	4.0	4.0	4.0	4.0	6.0	8.0		
Coke					(See	Note ~~7~~*6*)		
Iron					(See	Note ~~7~~*6*)		
Chert (Note ~~8~~*7*)	3.0	3.0	3.0	5.0	8.0	10.0		

Weight per Cubic Foot for Slag, (lbs), Min. (Mass per Cubic Meter for Slag, (kg))	75.0 (1200)		75.0 (1200)	75.0 (1200)	70.0 (1120)	70.0 (1120)	70.0 (1120)	
Crushed Particles, % Min. (Note ~~9~~*8*)								
Asphalt Seal Coats			70.0	70.0				
Compacted Aggregates			20.0	20.0	20.0	20.0		

Notes:
1. Freeze and thaw beam expansion shall be tested and re-tested in accordance with ITM 210.
2. Los Angeles abrasion requirements shall not apply to BF.
3. Aggregates may, at the option of the Engineer, ~~be subjected to 50 cycles of freezing and thawing in accordance with AASHTO T 103, Procedure A, and may~~ be accepted~~, provided they do not have a loss greater than specified for~~ *by the* Sodium Sulfate Soundness *or Brine Freeze and Thaw Soundness requirements.*

~~4~~. ~~Brine freeze and thaw soundness requirements are subject to the conditions stated in Note 3.~~

~~5~~*4*. Absorption requirements apply only to aggregates used in PCC and HMA mixtures except they shall not apply to BF. When crushed stone coarse aggregates from Category I sources consist of production from ledges whose absorptions differ by more than two percentage points, the absorption test will be performed every three months on each size of material proposed for use in PCC or HMA mixtures. Materials having absorption values between 5.0 and 6.0 that pass AP testing may be used in PCC. If variations in absorption preclude satisfactory production of PCC or HMA mixtures, independent stockpiles of materials will be sampled, tested, and approved prior to use.

~~6~~*5*. Non-durable particles include soft particles as determined by ITM 206 and other particles which are structurally weak, such as soft sandstone, shale, limonite concretions, coal, weathered schist, cemented gravel, ocher, shells, wood, or other objectionable material. Determination of non-durable particles shall be made from the total weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve. Scratch Hardness Test shall not apply to crushed stone coarse aggregate.

~~7~~*6*. ACBF and SF coarse aggregate shall be free of objectionable amounts of coke, iron, and lime agglomerates.

~~8~~*7*. The bulk specific gravity of chert shall be based on the saturated surface dry condition. The amount of chert less than 2.45 bulk specific gravity shall be determined on the total weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve for sizes 2 through 8, 43, 53, and 73 and on the total weight (mass) of material retained on the No. 4 (4.75 mm) sieve for sizes 9, 11, 12, and 91.

~~9~~*8*. Crushed particle requirements apply to gravel coarse aggregates used in compacted aggregates, and seal coats except seal coats used on shoulders. Determination of crushed particles shall be made from the weight (mass) of material retained on the No. 4 (4.75 mm) sieve in accordance with ASTM D 5821.

914-R-555 CERTIFICATION OF SOD

(A 08-27-08)

The Standard Specifications are revised as follows:

SECTION 914, BEGIN LINE 283, DELETE AND INSERT AS FOLLOWS:

Nursery sod shall meet applicable requirements as set out above and shall be a variety or blend of Kentucky bluegrass or fescue. It shall comply with nursery inspections and plant quarantine regulations of the states of origin and destination as well as with Federal regulations governing interstate movement of nursery stock. ~~A valid copy of the certification of nursery inspection shall accompany each shipment~~ *Material furnished under this specification shall be covered by a type C certification in accordance with 916.*

922-T-168 TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

(Adopted 05-05-08)

The Standard Specifications are revised as follows:

SECTION 922, DELETE LINES 1 THROUGH 1856.

SECTION 922, AFTER LINE 1857, INSERT AS FOLLOWS:

SECTION 922 – TRAFFIC SIGNAL MATERIALS

922.01 Description

All traffic signal materials and equipment shall be in strict accordance with the NEMA TS 2-2003 Standards Publication, and be fully compatible with the Department's current inventory of signal equipment, unless specifically outlined in the following specification.

922.02 Traffic Signal Control Equipment

Models shall be selected from the Department's list of approved Traffic Signal Control Equipment, unless otherwise specified.

(a) Model Approval

Each model of controller assembly (CA) and all major units, as defined in NEMA TS2-2.1.1, will be tested and evaluated by the Department's Logistical Support Center, and approved prior to use. The CA, as defined by NEMA TS2-1.1.7, as being a complete electrical unit, shall include major units operational in a TS2 environment. Major units of the CA are defined as Controller Unit (CU), Malfunction Management Unit (MMU), Bus Interface Unit(s) (BIU), Cabinet Power Supply, Load Switches, Vehicle Detector equipment, Cellular Modems, Radio Modems, and Flasher. The evaluation of a product will be considered when the Department receives the preliminary product evaluation submittal form. The Department will advise the manufacturer or vendor, of the date of delivery at which time a presentation of the product will be required accompanied by the product brochure(s), the operational manual(s) containing procedures for all features incorporated in the CU's design, and the maintenance manual(s) containing all schematics, pictorial parts layouts, components parts listings, and documented theory of operation. Certification in accordance with 922.02(d) shall also accompany the preliminary product evaluation form. If a product has TS2 communicative capabilities, then a data analysis interpretation offered in a decimal form expressing frames by an SDLC Protocol Analyzer shall accompany the initial documentation as well. When accuracy of documentation is validated, the evaluation period may commence. In addition, all computer system software applicable to a manufacturer's product shall work with the Department's current operating systems so that upgrades will not be needed to recognize the full potential of the product. Any product under evaluation that has an operational failure occurring during the bench test procedure will be rejected and returned to the submitter. The product will not be considered for future evaluation without a cover letter documenting failures encountered and changes to the design to correct the failures. A presentation by the manufacturer of the product in question and explanation of why the product failed will be required. Resubmittal of the original product will be expected for testing, evaluation, and approval. Furthermore, two more rejections of a product submitted for evaluation will be cause to deny approval of that model permanently.

Continued failures indicative of a trend, repeated random malfunctions, or NEMA non-compliance of an approved product shall be cause to remove that model from the Department's list of approved Traffic Signal Control Equipment. If the manufacturer makes any changes to an approved model of major unit and/or controller cabinet terminal/facilities to correct a non-NEMA compliant or safety issue, the Department is to be notified immediately. The manufacturer will be required to correct all existing equipment purchased by the Department either directly, by contract, or through agreement prior to the change being incorporated at the manufacturer's production level.

A design change to an approved model of a CA or any major unit will require a submittal of documented changes. At the discretion of the Department, resubmission of the model for testing, evaluation, and approval may be required. The permanent addition or removal of component parts or wires, printed circuit board modifications, or revisions to memory or processor software, are examples of items that are considered to be design changes.

(b) Controller Assemblies or Major Units Furnished and Installed by the Contractor

A CA, as defined by NEMA TS2-1.1.7, shall be provided by the Contractor and shall be built to the specifications of the intersection design.

Each CA shall be supplied with three documentation packets. The documentation shall be provided in both paper hard copy and electronically as specified for each document. Each packet shall consist of:

1. *One complete set of wiring and schematic diagrams for all of the CA's panels, racks and wiring; the electronic document shall be Adobe (.pdf) and have a minimum of one indexed page for each paper sheet.*

2. *A Parts List indicating Contract Number, Vendor, Category, Manufacturer, Model, Serial number, Software/Firmware version as applicable, and Inventory number of all major units incorporated in the CA; the electronic document shall be MS Excel (.xls) and the blank worksheet shall be obtained from the Department's Logistical Support Center.*

3. *An 11 in. x 17 in. intersection design plan; the electronic document shall be Adobe (.pdf).*

4. *A completed Department approved Loop Tagging Table; the electronic document shall be MS Excel (.xls) and the blank worksheet shall be obtained from the Department's Logistical Support Center.*

5. *Packet number 2 shall also include a paper hard copy and an indexed and searchable electronic pdf format file of the instructional programming manual(s) identical in nature to that approved for use during the evaluation of each product and shall include a TS2 type 2 to TS2 type 1 adapter harness.*

All electronic documents shall be saved to CD (compact disk, CD-R or CD-RW) in the specified format for each document. Each packet shall be labeled with the name of the intersection, the contract number, the commission number and the date of installation. Packet destinations shall be as per 805.08.

A 60 day burn-in period of traffic control equipment shall be required prior to acceptance of the contract. The Contractor shall be r

(c) Warranty

A five-year manufacturer's or vendor's warranty shall be provided for all major units operating in a TS2 environment. Light Emitting Diode (LED) signal indications shall have a five-year manufacturer's or

vendor's warranty. Video detection equipment shall have a 10-year manufacturer's or vendor's warranty period on processors, integrated camera/processor units, rack mount cards, hubs, minihubs and camera interface panels. CCD video cameras shall have a five year manufacturer's or vendor's warranty. Load switches and flashers, shall have a two year manufacturer's or vendor's warranty. Warranty periods shall commence from the date of field placement of the device or on the date of signal turn-on as shown on the I.C. 636a form if purchased through a contracting agent.

(d) Certification of NEMA TS2 Traffic Control Equipment

The following certifications shall be furnished.

1. Certification of a Production Run Model

A certification representing each model of approved major unit of a CA shall be on file with the Department. A certification of a production run model for a CU will be valid for a maximum period of five years from the date of approval or unless a significant change is made in the CU. If a significant change is made, a new certification shall be submitted. A significant change shall be the addition or deletion of any function or feature in the control unit, or any other change as defined in 922.02(a) to the circuitry in the product.

2. Certification of Environmental Testing

A certification shall be furnished with each major unit approval request indicating it has been tested and is in accordance with the tests from NEMA TS2-2. The certification shall specify the model and serial number of the product being tested. A complete log of each test shall be provided to the Department and will be maintained by the Department. The log shall show which, if any, controller component failed during the test, when it failed, and what steps were taken to repair the controller. The log shall include the date of testing, name and title of person conducting the tests, a record of conditions throughout the tests, and a temperature and humidity verses time chart. The maximum report interval of any chart shall be 24 h. The chart shall be from a recording machine used to monitor the status of the environmental chamber during testing.

(e) NEMA TS2 Fully Actuated Solid State Controller Unit (CU)

The following requirements are the minimum for the design and operation of a 16 channel fully-actuated solid state CU. The NEMA TS2 configuration will consist of two types of CU's, type A1 and type A2, as defined in NEMA TS2-3.2.

The CU shall be in accordance with NEMA TS2 Standards, all provisions contained herein, and the Department's specifications. Manufacturer specific enhancements are acceptable, however no function or device shall preclude the interchangeability of a CU with another CU of like NEMA specification within a controller assembly.

1. General Requirements

The CU shall be microprocessor based and both versions shall contain a three port configuration and shall operate in the NEMA TS2 type A1 environment.

The CU shall include provisions for time-of-day programming. The CU shall be capable of a minimum of 50 programmed events and be in accordance with NEMA TS2-3.8.

A removable nonvolatile EEPROM module shall be utilized in each CU to maintain all programmed data. A real-time clock shall be battery-

backed and active during a power outage so as to provide complete time keeping functions and leap year corrections. A switch or other means shall be provided to turn off or disconnect battery power during storage. This shall be accomplished without physical removal of the battery. Batteries within the CU shall be turned off or disconnected during storage and shipment.

Programming and maintenance manuals for approved CU's shall be identical in nature to that approved for use during the evaluation period of the CU. The Department shall be notified of any changes to the manuals.

Serial number and model numbers shall be permanently applied on or near the front of circuit boards of the CU and viewable without removing or disconnecting the board. Serial number and model number of the main frame shall be permanently applied externally on top or on the front panel.

2. CU Requirements

The requirements set forth herein refer to a type A1 and A2 CU. Where differences occur between types, it will be designated.

The CU shall have, as a minimum, the internal diagnostics defined by NEMA TS2-3.9.3.

The CU shall monitor and log the status of events as specified in NEMA TS2-3.9.3.1.5 in non-volatile memory and shall be selectable via program entry and be retrievable by the system computer via NEMA Port 2 or 3. In addition, the CU shall have the ability to log an MMU fault as it occurs. A minimum of 16 entries shall be stored in non-volatile memory. When capacity is exceeded, the oldest entry will be replaced by the newest. Logged entries shall at minimum contain the date and time denoted in military style with minute resolution, description of the fault as it would appear on the MMU, and the status of each of the channel inputs at the time the fault occurred, clearly denoting the presence of activity on a channel.

The CU shall be capable of all inputs and outputs listed by controller type in NEMA TS2-Section 3. Pedestrian timing shall be provided on all phases of a CU. Unless otherwise indicated on the plans, the CU, when delivered, shall be programmed to initialize in phase 2 and phase 6 green, however, the CU shall be keyboard programmable to permit initialization in any color and phase. Initialization shall occur after a recognized power interruption, upon MMU reset, or upon return from manual or time-of-day flash. The CU shall be programmable from a closed loop computer system, a laptop computer using the RS232 port, front panel programming, and by downloading from another like CU through the RS232 port.

Keystroke buttons shall be clearly marked as to function. All programming buttons and indicators pertinent to the operation of a ph

The TS2 Type A2 version CU shall be in accordance with all applicable requirements for a Type A2 CU as defined by NEMA TS2-3 and shall contain a full compliment of connectors.

3. Internal Modules

All plug-in modules shall be equipped for easy removal or installation without the use of tools and shall be readily accessible for maintenance. All internal module plugs and edge card plugs shall have the corresponding pin connector position labeled with the first and last numbers or the first and last letters.

4. CU Enclosure

The enclosure shall be of adequate strength to protect the components during normal handling. The keypad, liquid crystal display

and all interface connectors required for the operation and standard field adjustments shall be mounted on the front panel. Fusing shall be on the front panel of the CU and shall provide protection from internal or external overload.

The front panel of the controller shall be fastened to the frame such that no special tools shall be required to remove or replace printed circuit board modules nor to gain access through the front panel. All hinges shall have stainless steel pins.

5. Firmware and Software Revisions

The Department's Logistical Support Center shall be notified each time an update or revision of the firmware or software is released, explain the changes, and the benefits of the change. The Department will determine if and to what extent a revision is to be placed into field operation and may fully re-evaluate the CU with the revision.

(f) NEMA TS2 Cabinet, Auxiliary Equipment, and Terminal and Facilities (TF) Requirements

These standards define the minimum requirements for a TS2 Type A1 cabinet, both inside and out. The performance and construction of the cabinet shall be in accordance with the applicable requirements of NEMA TS2 sections 4, 5, 6, & 7. The serial number and model number of the auxiliary equipment shall be permanently applied externally on or near the front of the product. Programming and maintenance manuals for approved products shall be identical in nature to that approved for use during the evaluation period of the product. The Department shall be notified of all changes to the documentation. Manufacturer specific enhancements are acceptable, however no function or device shall preclude the interchangeability of an auxiliary product with another product of like NEMA specification within a controller assembly.

1. Controller Cabinet Requirements

The NEMA TS2 Type A1 controller cabinet shall be in accordance with the following requirements.

a. General

The cabinet and the shelf or shelves shall be fabricated of aluminum. The cabinet shall be 0.125 in. (3.175 mm) minimum thickness sheet aluminum or 0.25 in. (6.35 mm) minimum thickness die-cast aluminum. The cabinet exterior and interior including shelves shall have a sandblasted, roughened, or chemically etched finish that reduces gloss, reflection, and glare.

The main cabinet door shall use a Corbin Lock No. 2 and each cabinet shall be furnished with two No. 2 keys. The lock shall op hinged on the right side of the cabinet. The main door and the police panel door shall close against a weatherproof and dustproof gasket seal, which shall be permanently bonded to the cabinet. A standard police panel key shall be provided with each cabinet.

A rain channel shall be incorporated into the design of the main door panel to prevent liquids from entering the enclosure. A 1.5 in. (38 mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one complete set of cabinet prints and manuals. This drawer shall support 50 lb (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 24 in. (610 mm) wide.

b. Switches, Auxiliary, and Environmental Feature Requirements

The cabinet shall have a police door and a police control panel within the main door. The police panel shall have two different

switches, one switch for field indication cutoff and one switch to transfer between automatic signal control and flashing operation. The switches shall be protected from water when the cabinet door is open.

A test switch panel shall be mounted on the inside of the main door. The test switch panel shall include, as a minimum, the following switches. An Auto/Flash Switch shall be installed so that when in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. A Stop Time Switch shall be installed so that when in the 'On' position the controller shall be stop timed in the current interval. A Controller Equipment Power On/Off Switch shall be installed which shall control AC power to the CU, MMU, and cabinet power supply. All switches mounted on the switch panel on the inside of the main door shall have in place a mechanism to prevent accidental activation of the switch. "Locking bat" type switches or side switch guards are acceptable. Switch guards, if used, shall be in place for each switch, shall be made of the same material as the cabinet, and shall permit the operation of the switch without the use of tools.

All switch functions shall be permanently and clearly labeled. Hand written labeling will not be permitted.

The cabinet shall include all required wiring, connectors and adapters to provide full compatibility and interchangeability with either a TS2 type A1 or type A2 controller.

c. Receptacle

The cabinet shall contain one duplex convenience outlet and a lamp receptacle that is actuated and turns on when the door is open and goes off upon closing of the door and an internal ON/OFF switch which can override the preceding. The convenience outlet shall be duplex, three-prong, NEMA Type 5-15R grounding outlet in accordance with NEMA WD-6, with ground-fault circuit interruption as defined by the National Electric Code. These units shall be protected with a 15-amp cartridge fuse wired ahead of the multi-breakers.

Master cabinets shall have an additional duplex, three prong, NEMA type 5-15R grounding outlet. This outlet shall be powered by the 10-amp circuit breaker and through a separate power interrupt switch providing separate control of the master CU power supply.

d. Fan and Filter

The cabinet shall contain a thermostatically controlled ventilating fan and a vent with a commercially classified uniform 1 in. (25 mm) thick filter. The thermostat shall be manually adjustable from 90 to 115°F (33 to 45°C). The fan shall be mounted internally at the top and toward the front of the cabinet to exhaust out the front top lip of the cabinet. The fan shall be rated at a minimum of 100 ft^3 (3 m^3) per minute as designated by NEMA TS2, Section 7.9.1. The thermostat shall be located within 6 in. (150 mm) of the fan.

The filter size will be according to the provisions for the type of cabinet as stated in NEMA TS2, Section 7.9.2.3 and shall be a replaceable pleated air filter with a Minimum Efficiency Reporting Value (MERV) rating of 5 or higher as defined by the ASHRAE 52.2-1999 specification. The cabinet ventilation shall be in accordance with NEMA TS2-7.9.

Each inductive device, including the fan, shall have a separate power surge protection.

2. Load Switch and Flasher Requirements

The cabinet shall contain a jack mounted type 3 solid state non-repairable flasher in accordance with NEMA Standards TS2-6.3 electrical and physical dimensions.

The pedestrian load switch and the signal load switch shall be an approved unit meeting all electrical and physical dimension requirements in accordance with NEMA TS2-6. The load switch shall not use a printed circuit board to transmit the 115 volts AC line input or signal buss output. Each load switch shall offer three indicators, one for each circuit indicating the status of the input to the load switch.

The load switch signal outputs shall be brought to a separate terminal strip for hook-up of the signal displays. Load switches inputs shall be capable of being programmed for flash, overlap, vehicular, or pedestrian phases with the use of a standard slotted or phillips screwdriver via the cabinet terminal strip. The load switch input programming of the TS2 Type A1 CA shall be accomplished through front panel data entry of a TS2 Type A1 or a TS2 Type A2 CU.

3. Terminal and Facilities Requirements

a. General Requirements

The TF layout shall be in accordance with NEMA TS2-5.2.7. The cabinet shall contain a main TF panel complying with NEMA TS2 section 5 standards. The model number of the main panel shall be permanently applied to the front of the panel, where it is easily readable, without removing or disconnecting the panel. Each controller input and output circuit shall terminate on the main TF panel or on a supplementary panel. The phase arrangement of the controller shall coincide with the channel arrangement of the load switches and MMU. All outputs on channels 9 through 12 field connections shall have a 1-microfarad capacitor placed at each output terminal on the front of the TF panel. All TFs within the cabinet shall be readily accessible for field connection without removing the controller or associated equipment and for maintenance in the cabinet. All stranded wiring shall be tinned. A 24 volt relay shall be used on the TF to remove 24 volt DC from the common side of the load switches, effectively taking the mercury relay out of the circuit when the signal is put in mechanical flash. The TF panel shall be hinged at the bottom and capable of swinging down, to allow accessibility of the wiring and terminals at the rear of the panel. The backpanel shall be attached to the cabinet such that access to the backside of the backpanel, for maintenance purposes, shall be accomplished without the use of special tools or removal of auxiliary panels, shelving, or other cabinet appurtenances. A bracket extending at least half the length of the NEMA load switch shall support all load switches.

Terminals shall be consecutively numbered on both sides of the TF panel and shall be in compliance with the appropriate schematic diagrams. All positions for load switches, flasher, and mechanical relays shall have reference designators on both sides of the TF panel. All nomenclature shall be on or adjacent to the component or terminal. All nomenclature shall be machine produced and not handwritten. Cabinet prints shall identify the function of each terminal position.

CU and MMU harness cables shall be of sufficient length to allow units to be placed on either shelf or on top of the cabinet whil cable. The TF panel shall contain a Resistor/Capacitor Network Circuit which will provide an external restart pulse to initiate the startup sequence upon initialization from flash.

Remote flashing shall be provided for all signal circuits. Unless otherwise indicated on the plans, phases 2 and 6 shall be wired to flash yellow. All other phases shall be wired to flash red. Flashing for signal circuits shall be activated on one circuit for odd numbered phases and on the other circuit for even numbered phases.

b. Power Panel Requirements

A transparent plexiglass cover shall be provided over the CA power supply panel. The cover shall leave the switches on the breakers exposed as well as leave access to terminals at the bottom of the panel for wiring purposes. No terminals on the power panel shall have silicon protectant on them in lieu of the plexiglass cover. The panel shall contain a multi-breaker with one 10-ampere circuit breaker to provide overload protection to the CU, MMU, BIU, +12/24 VDC cabinet power supply, and detection devices. It shall also contain one main circuit breaker of 35 or 40 ampere, to provide over-load protection to the signal and flash buss load. All breakers shall have line and load terminals clearly labeled. The signal bus shall be connected to the incoming AC line through a mercury contact switch or a solid state control device functionally equivalent to the NEMA 5.4.2.3 specified contact switch. The terminals for AC + and - input to the cabinet shall be capable of accepting a No. 6 wire.

With the CA 10 ampere and Main 35-40 ampere circuit breakers off (tripped), all units inside the cabinet and the intersection display shall be off. With the 10-amp breaker on and main 35-40 ampere circuit breaker off, the signal output shall be off and the major units within the cabinet shall function. With the 10-amp breaker off and main 35-40 ampere circuit breaker on, the intersection shall be in flash mode and all units within the cabinet will be off.

The cabinet shall contain a 50 kA 8 x 20 µs surge suppressor. The surge suppressor shall be a 120 vac 15 amp, minimum two-stage parallel/series type device and protect lines: Line-Neutral, Line-Ground and Neutral-Ground, have a maximum continuous operating voltage of 140 VAC, maximum clamp voltage of 350 volts and device status indicators of green/good and red/failed. The device shall plug into a Nema 12 position terminal base wired before and in parallel with the 35-40 amp main signal buss circuit breaker and in series with the 10-amp circuit breaker for the solid state equipment and provide for a tool-free replacement of the device. There shall be a minimum of two electrical receptacles on the equipment side of the device for tuture auxiliary equipment. The surge suppressor shall operate between -30 to 165°F (-34 to 74°C). The dimensions of the unit shall not exceed 4.5 in. (114 mm) wide by 7 in. (178 mm) long by 3.5 in. (89 mm) deep.

All equipment capable of operating at 12 or 24 vdv typically powered by an individual receptacle type power supply shall have a power cable permanently wired into the cabinet and the device shall be powered by the cabinet TS2 power supply

4. MMU Requirements

The cabinet shall contain a MMU and shall be in accordance with the standards of NEMA TS2-Section 4. The MMU shall be wired to monitor each load switch output.

5. BIU Requirements

All BIU's shall be in accordance with NEMA TS2 1998, Section 8. Edge mounted printed circuit boards and rack cards shall not have jumper wire modifications unless the jumper wires are permanently bonded to the PCB over its entire length. BIU's shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed.

6. Loop Amplifier Units and Rack Requirements

a. General

All loop amplifier units shall be in accordance with NEMA TS2-Section 6 and shall follow type C, 2 channel with delay and extend, as stated in NEMA TS2-6.5.2.2.1. All amplifiers shall be selected from the Department's List of Approved or Prequalified materials for each type of amplifier. In addition, loop amplifiers shall have an LCD display or a RS-232 serial data connection and software interface capable of displaying loop status including but not limited to operating frequency and -ΔL/L, diagnostics, and all amplifier settings and operating parameters. Edge mounted printed circuit boards and rack cards shall not have jumper wire modifications unless the jumper wires are permanently bonded to the PCB over its entire length.

All detection components including amplifiers, racks, auxiliary BIU, interface panels, lead-ins, and all connecting harnesses shall provide one count output channel per lane of each approach within project limits.

All loop amplifiers designated for counting shall meet all requirements as above and shall additionally transmit channel 1 & 2 count pulses on the edge connection assigned to channels 3 & 4 respectively. Counting amplifiers shall be configured with count outputs mapped to and recorded in the CU detector logs.The status output of each active counting channel (3 and/or 4) shall be set to logic ground by software configuration within the amplifier or externally by use of jumper card in the adjacent slot.

An auxiliary BIU panel may be used strictly for count outputs (channels 3 and/or 4 only); in this configuration, the status outputs for those count output channels may be wired to logic ground on the BIU panel. The status outputs for all standard output channels shall provide accurate status data at all times. All detector input data to the CU shall remain accurate at all times.

All size 5 (M) & size 6 (P-1) cabinets shall incorporate a 16 channel detector rack, configuration #2, as per NEMA TS2-5.3.4 and shall allow operation of a two channel detector in each slot and the capability of operation of a two channel counting amplifier in each even-numbered slot with the respective count outputs in each odd numbered slot. The number of detector racks provided shall be determined by the loop tagging table. All size 3 (G) cabinets shall incorporate an 8 channel detector rack, configuration #1, as per NEMA TS2-5.3.4.

All detector loop panels and detector racks shall be labeled according to the loop tagging table and as follows.

All detection shall be labeled in such a way that the numbering for any one loop is consistent throughout the cabinet; the Loop

terminated as Loop or Detector 17 shall be Detector Channel 17 in the detector rack and Detector Input 17 to the controller.

b. Loop Termination Panel

Each loop lead-in panel shall be labeled on the upper left corner with the loop numbers that are terminated on that panel as follows: (1-16), (17-32), (33-48), (49-64). Each loop termination point shall be labeled with the corresponding loop number. Example: For panel 17-32; loops terminated on this panel will start with 17 and end with 32.

c. Detector Rack

Each detector rack shall be labeled at the bottom of the rack with one continuous label. The label shall be one 1 in. wide, thermal printed black on clear, white or matte polyester tape with permanent adhesive, water, chemical and scratch resistant printed with four lines of arial, size 10 font. Below the BIU shall be the BIU number and detector channel numbers that are contained within the rack as follows: (1-16), (17-32), (33-48), (49-64). This area shall also be contain the Intersection for diamond interchanges controlled from one cabinet. Each slot shall be labeled below the module with the corresponding loop tag information; the count output number portion of the information shall be under the first part of the tag information. For each 2 channel module, channel 2's label shall be below channel 1's label.

7. Cabinet Power Supply Requirements

The TS2 cabinet power supply shall adhere to the guidelines of NEMA TS2-5.3.5. The power supply shall be encased on all sides so that no circuitry is exposed to the user.

8. Cellular Modems

a. Service Provider

All data, power and antenna cables and all supplemental hardware shall be provided. The modem shall be compatible with the Department's current cellular carrier/provider (Verizon as of 07/07) and the traffic control device and closed loop communications software that it is supplied for.

b. Modem Hardware

Cell modems shall be Airlink Raven CDMA C3211 or similar modem with the following specifications: The Cellular Modem shall be capable operating in CDMA dual mode (both 800 MHz cellular and 1.9 GHz PCS bands), supporting both circuit switched and 1XRTT packet switched services. The operating voltage range shall include 12v and 24v DC and shall draw less than 250 ma while transmitting and receiving at 12v DC. The modem shall have LED indications for power, signal status/strength, and TX/ RX either separately or combined. The serial interface shall be RS-232 with a DB-9 (m or f) connector.

c. Modem Antenna

The RF Antenna connection shall be a 50 ohm TNC connector. The antenna shall be a low profile, puck style, flat mount Dual Band, (800 and 1900 MHz) with Low Loss RG-58 cable and TNC connector.

d. Modem Software

The modem configuration shall be editable and viewable with MS-Windows provided software or with proprietary software that is included and designed to run on a MS-Windows operating system. The software shall auto-detect connection parameters and display settings when connected.

e. Installation

Service and activation shall be requested and/or confirmed for each cellular device to be installed prior to installation. The ESN and 10 digit phone number shall be clearly labeled on the exterior of the modem. The cellular modem shall be installed, configured and tested to allow data communication from the central closed loop software to the field master and subsequent secondary controllers, or directly to a secondary controller per the design. All data, power and antenna cables and all supplemental mounting hardware shall be installed. The modem shall be powered by the cabinet power supply from a terminal location on the cabinet back panel or the power distribution panel. A low profile antenna shall be mounted externally and the mounting location includes a watertight seal. The antenna shall have no more than 3 ft excess RG-58 cable in the cabinet.

9. Radio Interconnect Using Spread Spectrum Radio Modems

Spread spectrum radio modems for communications between local controllers and the system master controller shall be on the Department's list of approved Traffic Signal Control Equipment and shall be in accordance with ASTM E 2158, and as set out herein.

The spread spectrum radio modems shall provide all the needed features to communicate with NEMA TS-2 type 1 and type 2 traffic signal controllers in a coordinated closed loop system. The radio modems shall be software configurable to be either a master, repeater, repeater/slave, or slave radio. The radio modem shall require no user license from the FCC; operate in the 900 MHz range, and be of FHSS (frequency hopping spread spectrum) technology; support data rates from 1.2 kbps to 115.2 kbps asynchronous; have a receiver sensitivity of at least -110 dBm; have a minimum RF output level of 1 watt; have a minimum of 50 user-selectable hopping patterns and a minimum of 50 RF non-overlapping channels allowing multiple systems to operate in the same line-of-sight path; operate as a transparent RS-232, or RS422/RS485, or FSK 1200 Baud types of links for use in a point-to-multipoint system; have an external SMA female type or N-female RP-TNC female antenna connector; and be supplied with power supply for 120v AC operation. The modems shall be rack or shelf mounted in standard NEMA TS-2 type 1 or type 2 cabinets. The modems shall have an operation temperature of -40 to +176°F (-40 to 80°C), have a maximum current draw of 500 mA for the transmission of 1 watt of RF output power, while operating on 12v DC. Lighting and transient protection on all data lines and antenna connector, and AC/DC power distribution, shall be provided with the system.

The spread spectrum radio modems must include a Windows based, configuration software package, which will include a GUI, graphical user interface, allowing for ease of programming, through pre-written drivers for all Department approved traffic controllers and have the ability to automatically determine, and connect, at their radios baud, stop and parity settings. The configuration software must allow for signal level, RSSI, data integrity, message polling, and spectral analysis testing. The software must also permit all the radios within a system to be configured from a single location. All radio equipment and cables shall be delivered preconfigured and ready for field operation.

The manufacturer, or vendor, shall supply with each modem, the operational manual(s) containing procedures for all features incorporated in the modem.

a. Transient Protection

Transient protection shall be installed between the radio modem and the field antenna. The transient protection shall be flange mounted in the cabinet and have a minimum transient current of 40 kA for 8 x 20 µs pulse, an insertion loss or ≤ 0.1 dB, have an operating frequency in the 900 MHz range, allow throughput energy to be ≤ 220 µJ for 6 kV / 3 kA @ 8/20 µs waveform, have throughput voltage ≤ 144 Vpk, and turn-on voltage shall be ± 600 volts. The unit impedance shall be 50 Ω.

b. Antennas

The antenna for the radio modem at the system master/local controllers shall be capable of providing a transmission range adequate for communication with all radio modems or repeaters in the system and must be configured as a single omni, single-yagi, or dual-yagi (two single-yagi antennas on differing alignments) for each radio as described below.

(1) Omni Antennas

All omni antennas shall be capable of producing between 6 dBd and 10 dBd (8.15 dBi and 12.15 dBi) of gain while operating in, and covering the entire 902-930 MHz frequency range. The Voltage Standing Wave Ratio (VSWR) of the omni antenna shall be 1.5: 1 or less when the antenna coax feed impedance is 50 ohms. Omni antennas shall be fabricated of fiberglass, brass, copper, and/or aluminum and shall be rated for wind velocities of at least 100 mph. The minimum length of the omni antenna shall be 60 in. and it shall be designed and fabricated with a fiberglass radome with a minimum diameter of 2 in. to prevent ice from collecting directly on the driven element. All omni antennas shall have a cableless N-female connector directly affixed and sealed to the antenna body. All hardware and fastenings devices shall be fabricated from stainless steel.

(2) Yagi / Dual-Yagi Antennas

All yagi antennas shall be capable of producing between 10 dBd and 13 dBd (12.15 dBi and 15.15 dBi) of gain while operating in, and covering the entire 902-930 MHz frequency range. The Voltage Standing Wave Ratio (VSWR) of the omni antenna shall be 1.5: 1 or less when the antenna coax feed impedance is 50 ohms. The front to back ratio must be at least 20 dB for each yagi antenna. Yagi-directional antennas shall be fabricated of either anodized or powder coated 6061/T6 aluminum rod and seamless drawn pipe and shall be rated for wind velocities of at least 100 mph. All yagi antennas shall have a cableless N-female connector directly affixed and sealed to the antenna body. The yagi antenna shall be designed and fabricated so that polarization changes (vertical to horizontal) can be made on the antenna mount without adjusting the mast. Single yagis shall be connected by a low loss N-female "T" splitter/coupler and LMR-400 cable to form dual-yagi systems. All hardware and fastenings devices shall be fabricated from stainless steel.

c. Antennas Cable and Hardware

The coaxial cable used as the transient protection to antenna lead shall have no greater than 3.8 dB loss per 100 ft of length and shall be LMR-400.

All LMR-400 connections are to be stripped, deburred, and crimped using the ST-400-EZ LMR-400 stripping tool, DBT-01 LMR-400 deburring tool, and a 0.429 in. hex crimp die for solderless LMR-400 connections respectively. All connections shall be completely sealed by heat

shrinking double walled, adhesive lined shrink tubing for weather proofing and strain relief.

Cables shall be included to interface the radio equipment to the transient protection. The antenna mounting hardware shall securely attach the antenna to the strain pole/cantilever arm. The coaxial cable fitting on the antenna shall not support the weight of the coaxial cable run to the base of the strain pole/cantilever arm.

d. Data Cables

Cables shall be included to interface the radio equipment to the system master, co-located secondary controller, remote secondary controllers and any communication interface panels as needed. Cables shall include strain relief back shells designed to mate and lock with the telemetry connector on the system master and local controllers. All radio equipment and cables shall be delivered preconfigured and ready for field operation.

All miscellaneous equipment necessary to complete the installation shall be as specified by the radio modem manufacturer.

(g) Cabinets

1. Size 3 (G) Cabinet

The size 3 (G) cabinet shall be pedestal-mounted or pole-mounted. As per NEMA TS2-5.3, the TS2 Type-1 G cabinet, at minimum, shall house an 8-load switch bay (configuration 2) terminal and facilities panel and shall have one adjustable shelf located 12 in. (305 mm) below the top of the cabinet. The bottom of the cabinet shall be reinforced to ensure a secure pedestal mounting. The G cabinet shall have dimensions of 25 in. (635 mm) wide, 38 in. (965 mm) high, 18 in. (460 mm) deep with a tolerance of + 4 in. (100 mm) in any or all dimensions.

A cabinet slipfitter shall be used to attach the cabinet to the pedestal. The slipfitter shall fit a 4 1/2 in. (114 mm) outside diameter pipe and shall have a minimum of three set screws equally spaced around the slipfitter.

A vent of adequate size shall be provided. The size of the vent and the filter requirements shall be in accordance with the manufacturer's recommendations.

2. Size 5 (M) Cabinet

As per NEMA TS2-5.3, The TS2 type-1 size 5 (M) cabinet, as a minimum, shall house at minimum an 8-load switch bay (configuration 2) terminal and facilities panel and shall have two adjustable shelves with the first shelf located 15 in. (380 mm) below the top of the cabinet and the second located 7 in. (180 mm) below the first shelf.

The M cabinet shall be ground-mounted on a concrete foundation at locations and dimensions as shown on the plans.

The M cabinet shall have dimensions of 30 in. (760 mm) wide, 48 in. (1220 mm) high, and 16 in. (410 mm) deep with a tolerance of ± 2 in. (± 50 mm) in any or all dimensions.

Anchor bolts shall be steel in accordance with ASTM A 36 (ASTM A 36M). Diameter of the bolt shall be 1/2 in. (13 mm) or 5/8 i

The top 6 in. (150 mm) of the bolt shall be threaded with 13 NC threads on 1/2 in. (13 mm) bolts and 11 NC threads on 5/8 in. (1
class C.

3. Size 6 (P-1) Cabinet

The Size 6 (P-1) cabinet shall be ground mounted on a concrete foundation at locations and dimensions as shown on the plans with anchor bolts in accordance with 922.02(g)2. As per NEMA TS2-5.3, The TS2 type 1 P cabinet, at minimum, shall house a 16 load switch bay (configuration 3) terminal and facilities panel and shall have two adjustable shelves with the first shelf located 20 in. (510 mm) below the top of the cabinet and the second located 7 in. (178 mm) below the first shelf a minimum of 30 in. (762 mm) above the bottom of the cabinet, the second located 12 in. (305 mm) above the first shelf.

The cabinet shall be 44 in. (1120 mm) wide, 52 in. (1320 mm) high, and 24 in. (610 mm) deep with a tolerance of ± 3 in. (± 75 mm) in any or all dimensions. Maximum exterior dimensions shall be 47 in. (1195 mm) wide, 63 in. (1600 mm) high, and 34 in. (860 mm) deep.

4. Size 7 (R) Cabinet

The Size 7 (R) cabinet shall be ground mounted on a concrete foundation at locations and dimensions as shown on the plans with anchor bolts in accordance with 922.02(g)2. As per NEMA TS2-5.3, The TS2 type 1 R cabinet, at minimum, shall house a 16-load switch bay (configuration 3) terminal and facilities panel and shall have three adjustable shelves with the first shelf located a minimum of 30 in. (762 mm) above the bottom of the cabinet, the second located 12 in. (305 mm) above the first shelf and the third located 8 in. above the second shelf. All shelves shall be adjusted so that the second shelf is located 63 in. ±3 in. (1600 mm ±75 mm) above the top of the concrete footpad.

The cabinet shall be 44 in. (1120 mm) wide, 72 in. (1830 mm) high, and 24 in. (610 mm) deep with a tolerance of ± 3 in. (± 75 mm) in any or all dimensions. Maximum exterior dimensions shall be 47 in. (1195 mm) wide, 83 in. (2110 mm) high, and 34 in. (860 mm) deep.

5. Flasher- Two Circuit Alternating Flasher

Two circuit alternating flasher shall be solid state.

a. General

The solid state flasher shall periodically interrupt a source of alternating current line power. Solid state shall mean electrical circuits, the active components of which are semi-conductors, to the exclusion of electromechanical devices or tubes.

The flasher shall be a type 3 solid state flasher conforming to Section 8 of the NEMA Standards Publication TS 1-1983. The flasher output circuit carrying the signal load shall consist of opto or photo isolated solid state power relays and shall be hard wired to the flasher connector.

Three schematic diagrams and three descriptive parts lists shall be furnished with each flasher.

Two circuit alternating flashers shall be plug-in design. The flasher design shall not permit the unit to be inserted improperly into the plug-in base. The flasher shall have heavy-duty plugs and jacks capable of handling the rated load current. The rate of flash shall be 50 to 60 flashes per minute.

The flasher shall operate between 95 volts and 135 volts AC 60 Hertz. No degradation of performance shall be experienced in environmental changes from -20°F to 165°F (-29°C to 74°C) and 0 to 90% relative humidity.

b. Cabinet Requirements

The cabinet shall be weatherproof and fabricated from cast aluminum or aluminum sheeting with a minimum thickness of 0.125 in. (3.18 mm). The cabinet door shall be the entire front of the cabinet and shall be hinged on the right or left side of the cabinet. A Corbin No. 2 lock and two No. 2 keys shall be furnished. The lock shall be located near the center of the door on the side opposite the hinge.

Minimum dimensions for the cabinet shall be 12 in. (305 mm) deep, 12 in. (305 mm) wide, and 12 in. (305 mm) high. The maximum dimensions shall be 18 in. (460 mm) deep, 15 in. (380 mm) wide, and 18 in. (460 mm) high.

The cabinet shall have two pole plates for stainless steel band mounting of the cabinet on a pole with a minimum diameter of 4 in. (100 mm) and a maximum diameter of 18 in. (460 mm). Two blank cover plates shall be provided. Two hub plates for 1 in. (25 mm) diameter conduit shall be provided with gaskets, eight bolts at four bolts per plate, nuts, and washers for attaching the hub plates to the cabinet. The cabinet shall be drilled for the mounting of the pole plates or hub plates as shown on the plans.

It shall have a screened vent in the bottom with a minimum size of 1 3/4 in. (1129 mm^2), and a minimum of one louvered and screened vent towards the top of the cabinet.

The panel in the cabinet shall be capable of being removed and reinstalled with simple hand tools. A 25 amp radio interference filter and surge arrestor wired ahead of a 15 amp circuit breaker shall be mounted on the panel. A terminal block capable of the following electrical connections shall be mounted on the panel.

Circuit 1 - for connection of field signals (Flash circuit 1)
Circuit 2 - for connection of field signals (Flash circuit 2)
Circuit 3 - for connection of field signals (Field Neutral)
AC plus - capable of accepting a No. 6 wire
AC minus - capable of accepting a No. 6 wire
Ground lug - capable of accepting a No. 6 wire

922.03 Signal Head Components

The components shall be in accordance with the Institute of Transportation Engineers for Adjustable Face Vehicular Traffic Control Signal Heads. All new traffic signal and flasher installations that include new indications shall be fitted with LED (Light Emitting Diode) modules. All LED indications shall be selected from the Department's list of approved Traffic Signal Control Equipment.

(a) General

The signal faces shall be sectional in construction, requiring one section for each lens and furnished in the nominal size of 12 in. (305 mm). Each section of a face shall have a rectangular silhouette when viewed from the front or the rear.

(b) Housing, Door, and Visor

The top and bottom of each housing shall have an integral locking ring with 72 serrations to permit rotation of the signal housing in 5 degree increments. Hub openings in the top and bottom of the signal housing shall accommodate standard 1 1/2 in. (38 mm) bracket arms. The thickness of the hub at the top and bottom of the housing shall be a maximum of 1 in. (25 mm) and a minimum of 3/8 in. (10 mm). The 12 in. (305 mm) door shall have two simple locking devices. The door on the hinged side shall be attached with hinge pins. Each lens shall have the standard cap type visor. All screws, latching bolts, locking devices, and hinge pins shall be stainless steel.

(c) LED Traffic Signal Indicator

All LED indications shall be selected from the Department's list of approved Traffic Signal Control Equipment.

All LED indications shall have a permanent indelible sticker affixed to the back of the module indicating month and year of initial installation.
lens.

All LED indications provided shall be individually listed on a Parts List indicating the Contract Number, Vendor, Category, Manufacturer, Model, Serial Number and Inventory Number. Hard-copy and electronic copies shall be provided. The electronic document shall be MS Excel (.xls) format and the blank worksheet shall be obtained from the Department's Logistical Support Center.

(d) Wiring

The field wiring leads shall be terminated with screw spade lug type connectors. The LED module wiring leads shall be terminated with 1/4 in. female type connectors for ease of connection to the terminal block.

(e) Section Coupling

Any method to connect two or more sections together may be used, if the following requirements are met:

1. *Two or more sections, when jointed together, shall maintain structural integrity when loaded to Institute of Transportation Engineers Standards.*

2. *The opening between joined sections shall accommodate two 1/2 in. (13 mm) cables.*

3. *The maximum length of bolts used to connect sections together shall be 4 in. (100 mm).*

Nuts, bolts, and lock washers shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and be in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class C.

(f) Terminal Block

The yellow section of the 3-section or 2-section signal head and each 1-section signal head shall be equipped with a 5 position terminal block for termination of field wiring. Each section shall have provisions for two 5 position terminal blocks. Each terminal screw shall have a 1/4 in. corresponding spade tab. The terminal block shall

have a minimum spacing between screw connections of 1/2 in. (13 mm). The height of the insulating ridge between screw connections shall be a minimum of 19/32 in. (15 mm) from the base of the terminal blocks.

(g) Material Requirements

1. Polycarbonate Signal Head

The housing, door, and visor of the section shall be made of ultraviolet and heat stabilized polycarbonate. The color shall be permanently molded into the components except the inside surface of the visor shall be painted non-reflecting flat black. The color shall be yellow in accordance with 909.02(b)4.

2. Die-Cast Aluminum Signal Head

The housing, door, and visor of the section shall be made of a die-cast, corrosion resistant, copper free, non-ferrous metal which shall be in accordance with ASTM B 85. All surfaces of the housing, doors, and visor shall receive a prime coat of zinc chromate paint in accordance with 909.02(a) or shall be anodized with a chromate aluminum oxide coating process. The finish shall be highway yellow enamel, two coats, oven baked and in accordance with 909.02(b) except the inside surface of the visor shall be painted non-reflecting flat black.

(h) Certification

A material certification shall accompany each order certifying that a signal head from a normal production run within the past 12 months, passed the Institute of Transportation Engineers criteria for breaking strength and deflection. Deflection testing is not required in the certification for polycarbonate signal heads.

922.04 Pedestrian Signal Head

A pedestrian signal shall be one section and rectangular in shape. The dimensions of each side may vary from 18 to 19 in. (460 to 485 mm), including the visor and the hinges. The signal shall contain two figures with two different colored messages. The first figure shall transmit an upraised hand symbol message, and the second figure shall transmit a walking person symbol message. All new installations including new pedestrian indications shall use Light Emitting Diodes. All pedestrian LED indications shall be selected from the Department's list of approved Traffic Signal Control Equipment. The pedestrian signal shall be in accordance with the standard of the Institute of Transportation Engineers for Pedestrian Traffic Control Signal Indications.

(a) Housing, Door, and Visor

The housing shall be equipped with mounting device hardware, such as clamshell, and round openings at top and bottom for mounting with brackets made of iron pipe standard, to fit the 1 1/2 in. (38 mm) pipe. The openings shall have a common vertical centerline through the housing to permit 360° rotation after it is mounted. The openings shall have a serrated ring which permits locking of the housing in 5° increments throughout the entire 360° of rotation. The brackets or the clamshell shall serve as the electrical conduit for the pedestrian signal. The housing shall be made of die-cast, corrosion resistant, copper free, non-ferrous metal which shall be in accordance with ASTM B 85.

~~*The door on the front of the housing may be hinged from any side. The door shall be gasketed to maintain a weather-tight enclosure when secured to the housing. The door and the visor shall be made of the same material as the housing or of polycarbonate. All materials shall be clean, smooth, and free from flaws, cracks, blowholes, or other imperfections.*~~

Each signal shall be provided with a visor.

~~*The exterior of the housing shall be Federal yellow in color. The polycarbonate components shall be black in color, impregnated throughout. The metal components shall be painted with enamel in accordance with 909.02(c).*~~

(b) Message

The upraised hand and walking person symbols shall each be a minimum of 11 in. (280 mm) in height. The width of the upraised hand symbol shall be a minimum of 7 in. (178 mm). The width of the walking person symbol shall be a minimum of 6 in. (150 mm). Message configuration, color, and size shall be in accordance with the standard of the Institute of Traffic Engineers for Pedestrian Traffic Control Signal Indications.

Each pedestrian signal shall be completely wired internally, and ready for connection of the field wiring. A suitable terminal block for connection of the internal wiring and the incoming field wires to the pedestrian signal head shall be provided in the signal housing.

The light source shall be designed and constructed so that if an electrical or mechanical failure occurs, the upraised hand and walking person symbols shall also remain dark.

922.05 Signal Bulbs

All new traffic signal and flasher installations that include new indications shall be fitted with LEDs in accordance with 922.03. The minimum design requirements for replacement light bulbs to be used in a traffic signal face shall be in accordance with the Institute of Transportation Engineers standard for traffic signal bulbs and as follows:

(a) Incandescent Bulbs

1. *Bulbs shall be 67 watt, 116 watt, or 150 watt for different kinds of indications, as specified below.*

INDICATION	*WATTAGE*
9 in. (230 mm) pedestrian	*67*
12 in. (305 mm) 18 in. (455 mm) pedestrian	*116*
18 in. (455 mm) pedestrian	*116*
8 in. (200 mm) red, yellow and green	*67*
12 in. (305 mm) red	*150*
12 in. (305 mm) yellow and green	*116*
12 in. (305 mm) yellow and green arrows	*150*
Optically programmed heads	*150*

All bulbs shall have medium size, brass bases.

2. *Bulbs shall be designed for use in a horizontal position or a base-down position.*

3. *The light center length shall be 2 7/16 in. (62 mm) for 67 watt bulbs and 3 in. (75 mm) for 116 watt and 150 watt bulbs.*

4. *The filament shall be C9 design with a minimum of seven supports. The 2 voltage supply leads may be counted as two of the seven supports.*

5. *The maximum, overall bulb length for 67 watt and 116 watt bulbs shall be 4 3/8 in. (110 mm) and for 150 watt bulbs shall be 4 3/4 in. (120 mm).*

6. *All bulbs shall be clear and shall be 130 volt.*

7. *The 150 watt bulb shall be P25 or A21 size and shape.*

8. *The 67 watt and 116 watt bulbs shall be A21 size and shape.*

9. *All bulbs shall have 6000 h minimum burning life.*

922.06 Disconnect Hanger Junction Box

Traffic signal disconnect hanger junction boxes shall consist of a span hanger, a balance adjuster, a disconnect hanger clevis, and a housing with a hinged door with a positive latching device. The span hanger, balance adjuster, and all related hardware shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153. The housing shall be made of a die-cast, corrosion resistant, copper free, non-ferrous metal which shall be in accordance with ASTM B 85. The balance adjuster fitting shall be made of ferrous or non-ferrous metal. When made of ferrous metal it shall be galvanized in accordance with the requirements for the components and related hardware as set out above.

The disconnect hanger shall be designed so that the maximum allowable space or play between the span hanger and the eye-bolt of the balance adjuster and between the balance adjuster and the disconnect hanger clevis, at points where they are attached to each other by rivet pins or hex head bolts and nuts with lock washers, shall be 0.062 in. (1.6 mm). The span hanger bolt where the eye-bolt or the balance adjuster is attached shall be 5/8 in. (16 mm) diameter.

When serrated locking rings are not integrally cast in the components, the component and locking ring shall be designed so that when the locking ring is placed flush against the component, the component and locking ring shall not rotate or slide when torque is applied. The serrated components shall have 72 serrations to permit rotation of the disconnect hanger clevis, hub plate, or signal head in 5° increments. There shall be no thread in contact with a wearing surface. Locking rings shall have a minimum thickness of 3/16 in. (4.8 mm) and a maximum thickness of 1/4 in. (6.4 mm) from the base of the ring to the serration peaks. The inside diameter shall be 2 in. (50 mm) and the outside diameter shall be 2 7/8 in. (73 mm).

The terminal block shall have an 18 point terminal block permanently engraved or etched with sequential numbers indicating the circuits. The terminal block shall not have a method of connection which allows a screw point to damage wires when the wires are securely connected. Each point of connection shall accommodate a minimum of four No. 14 gauge (2.0 mm) wires.

The disconnect hanger shall have two side entrance holes on opposite sides capable of receiving a 1 1/2 in. (38 mm) plastic or rubber insert to reduce water infiltration. It shall be capable of supporting signal faces in the ambient temperature range of -35 to 120°F (-35 to 49°C) without failure.

The balance adjuster shall have hex head bolts, lock washers, and nuts for securing the main body of the balance adjuster firmly onto and around the eye-bolt to prevent any twisting or turning of the head suspended below it. The span hanger shall have two J-bolts, lock washers, and hex head nuts adequate in size to securely fasten the hanger to a messenger cable up to 1/2 in. (13 mm) in diameter.

A type C certification in accordance with 916 shall be provided.

922.07 Free Swinging Signal Support Assemblies

(a) Clearance

The maximum allowable space or play between the hanger assembly and the eyebolt of the balance adjuster and between the balance adjuster and the weatherhead clevis, at points where they are attached to each other by rivet pins or hex head bolts and nuts with lock washers, shall be 0.062 in. (1.6 mm). No bushings or shims will be allowed in this assembly.

(b) Balance Adjuster

The balance adjuster shall consist of a hex head bolt, a lock washer, and nuts for securing the main body of the balance adjuster onto and around the threads of the eye-bolt to prevent any twisting or turning of the adjuster.

(c) Span Hanger

The span hanger, balance adjuster, weatherhead, and all related hardware shall be made of a non-corrosive metal or shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153. The weatherhead shall have a minimum of 2 1/2 in. (64 mm) of exposed threads. The weatherhead shall have two set screws to fasten the nipple to the weatherhead. If the weatherhead and threaded pipe has a slipin connection, the locking device shall be a double nut assembly. If the weatherhead and threaded pipe has a screw-in connection, the locking device shall be a double set screw assembly.

The span hanger shall be furnished with two each of J-bolts, lock washers, and hex head nuts. The J-bolt shall be a minimum of 1/4 in. (6.4 mm) diameter and shall have sufficient threads to be able to secure the hanger to a 1/4 in. (6.4 mm) or to a 1/2 in. (13 mm) span cable.

(d) Tether Bracket

The tether bracket shall attach to a 1/8 in. to 1/4 in. messenger cable and prevent the bottom of the head from moving side-to-side on the cable. Where backplates are installed on the signal heads; the tether bracket shall be of the proper length for the backplate so that the cable is mounted below the bottom of the backplate to avoid interference with head alignment and damage to the backplate.

(e) Pipe Arm Assemblies

The multiple pipe arm assembly shall consist of a span hanger assembly, a balance adjuster, a signal weatherhead, a 2, 3, or 4 way pipe arm, 1 1/2 in. (38 mm) pipe, a lower arm assembly, and all related hardware necessary for a complete assembly.

The 2, 3, or 4 way pipe arms shall have a minimum of 2 in. (50 mm) of exposed thread. Each arm of the pipe arm shall be furnished with

two 72 serration locking rings. One locking ring shall have a 3 in. (75 mm) outside diameter and one locking ring shall have a 2 3/8 in. (60 mm) outside diameter.

ASSEMBLY	*MAXIMUM ALLOWABLE WEIGHT*
2 Way	*19 lbs (8.6 kg)*
3 Way	*25 lbs (11.3 kg)*
4 Way	*28 lbs (12.7 kg)*

922.08 Mid-Mast Arm Mount Signal Bracket

The bracket shall permit the following 4 adjustments:

(a) rotational adjustment about bracket axis;

(b) vertical adjustment;

(c) rotational adjustment about mast arm; and

(d) rotational adjustment right and left from vertical plane

The bracket shall be fastened to the supporting arm or structure with stainless steel bands. The bracket shall adjust to fit all sizes of round, octagonal, elliptical, or other shape structure without special tools or equipment.

The bracket shall attach to the signal by clamping the signal head both top and bottom and shall be designed to accommodate the specified signal configuration. Each bracket shall be complete with all necessary hardware to attach the traffic signal to the bracket and the bracket to the support.

All electrical wiring shall be concealed within the bracket, except that which runs from the bracket to the mast arm.

Upper and lower arms shall be cast from aluminum in accordance with ASTM B 26 (ASTM B 26M), alloy 713.0-T5 or 356.0-T6. The vertical support tube shall be extruded from aluminum in accordance with to ASTM B 241 (ASTM B 241M), alloy 6063-T6 or 6061-T6, and the strapping to attach the bracket to the arm shall be stainless steel. All steel or malleable iron parts shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C.

922.09 Pedestal Poles and Cast Aluminum Pedestal Bases

The pedestal base used for mounting pedestrian signal heads or control cabinets shall be in accordance with 922.09(a). The length of the pedestal pole shall be as shown in the plans.

(a) Cast Aluminum Pedestal Base

A pedestal mounted G cabinet shall have a cast aluminum pedestal base. The cabinet and pedestal base shall be ground mounted on a concrete type A foundation at locations and dimensions as shown on the plans.

The cast aluminum base shall be made of aluminum in accordance with ASTM B 179, alloy ANSI 319.1 or 319.2, or in accordance with ASTM B 26 (ASTM B 26M), alloy ANSI 356.0-T6. The square base shall include an access door and anchor bolts with nuts and washers. The base shall

be 13 3/8 in. (8630 mm) square and 15 in. (380 mm) in height ± 1/4 in. (± 6 mm). The weight shall be 22 lbs ± 5% (10.0 kg ± 2.2 kg).

The base shall be designed to support a 150 lbs (68 kg) axial load and 11 ft^2 (1.0 m^2) of signal head area rigidly mounted. For design purposes, the distance from the bottom of the base to the center of the signal head area is 18 ft (5.5 m). In addition to the dead load, the base shall be designed to withstand wind and ice loads on the specified signal head area and on all surfaces of the support, in accordance with the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Wind speeds used for design shall be based on a 10 year mean recurrence interval and a wind drag coefficient of 1.2 or as shown in the plans. The base shall contain an access door, which is 8 in. by 8 1/4 in. ± 1/4 in. (200 mm by 210 mm ± 6 mm) with a stainless steel hex head bolt for attaching the door.

The base shall be attached to a foundation by four anchor bolts, with an anchor bolt circle of 12 3/4 in. (324 mm). Slotted lugs shall be integrally cast into the four corners of the base for attachment of the anchor bolts. The anchor bolts shall be steel in accordance to ASTM A 36 (ASTM A 36M). The diameter of the anchor bolt shall be 3/4 in. (19 mm) with a minimum length of 18 in. ± 1/2 in. (460 mm ± 13 mm), plus 2 1/2 to 3 in. (64 to 75 mm) right angle hook on the unthreaded end. The top 4 in. (100 mm) of the bolt shall be threaded with 10 NC threads. The threads, plus 3 in. (75 mm), shall be coated after fabrication in accordance with ASTM A 153 or be mechanically galvanized and in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class C. Each anchor bolt shall be provided with two hex head nuts in accordance with ASTM A 325 (ASTM A 325M) and three washers. Two of the washers shall have a minimum 2 in. (50 mm) and maximum 2 1/8 in. (54 mm) outside diameter and be in accordance to ANSI B 27, Type B regular series and one shall be a nominal 3/4 in. (19 mm) series W washer, in accordance with ASTM F 436 (ASTM F 436M).

The cast aluminum pedestal base shall be in accordance with the dimensions and requirements shown in the plans. The casting shall be true to pattern in form and dimensions; free from pouring faults, sponginess, cracks, and blowholes; and free from other defects in positions affecting the strength and value of the intended use for the casting. The base shall not have sharp unfilleted angles or corners. The surface shall have a workmanlike finish.

The door and bolt for the door shall be interchangeable on cast bases from the same manufacturer.

(b) Pedestal Pole

The top of the base shall accommodate a pole having a 4 1/2 in. (114 mm) outside diameter. The threads inside the top of the base shall be 4 in. (100 mm) national standard pipe threads. The pole shall be either a steel pedestal pole or an aluminum pedestal pole.

A steel pedestal pole shall be a seamless schedule 40 carbon steel pipe in accordance with ASTM A 53, grade B. The pole shall have an outside diameter of 4 1/2 in. (114 mm). The pole shall weigh approximately 10.8 lbs/ft (16 kg/m). The length of the pole shall be as shown on the plans. The pole shall have full depth national standard pipe threads on one end of the pole. The length of threads shall be 2 1/2 in. (64 mm). The pole shall be galvanized, after threading, in accordance with ASTM A 123. The threads shall be cleaned of all excess galvanizing and protected by a suitable shield.

An aluminum pedestal pole shall be in accordance with ASTM B 241 (ASTM B 241M) for seamless aluminum alloy, schedule 40, 6061-T6. The outside diameter of the pole shall be 4 1/2 in. (114 mm). The length of the pole shall be as shown on the plans. The pole shall weigh approximately 3.7 lbs/ft (5.5 kg/m). The pole shall have full depth national standard pipe threads on one end of the pole. The length of threads shall be 2 1/2 in. (64 mm) and protected by a suitable shield. The pole shall have a spun finish.

(c) Pole Cap

A pole cap shall be supplied for the top of the pole if the pole is used for the mounting of pedestrian signal faces or side mounted signal control cabinets. The pole cap shall be either a cast pole cap of aluminum or a pole cap of spun aluminum.

A cast pole cap shall be made of aluminum, in accordance with ASTM B 179, alloy ANSI 319.1 or 319.2. The cap shall fit freely o

A pole cap made from spun aluminum shall be in accordance with ASTM B 209 (ASTM B 209M), alloy 1100-0. The cap shall fit tightly when placed on the end of the pole.

922.10 Signal Supports

(a) Steel Strain Pole

The steel strain pole shall be an anchor base type pole and shall include a handhole and a pole top or cap. The poles shall be furnished in lengths specified.

The pole shall have a reinforced handhole within 18 in. (460 mm) of the base. The handhole minimum size shall be 5 in. (130 mm) by 8 in. (200 mm) with a cover and latching device. The pole shall have a top or cap with a set screw that can be removed with small hand tools.

The pole material shall be in accordance with ASTM A 595 or A 572 with a minimum yield strength of 50,000 psi (345 kPa). The pole shall be galvanized after fabrication in accordance with ASTM A 123.

All hardware, handhole cover and latching device, band type steel polebands, steel bolts, nuts, and washers shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C. All nuts and bolts, except anchor bolts, shall be in accordance with ASTM A 307. If a cast pole top or cap is used it shall be in accordance with ASTM A 126 and shall be galvanized with a minimum coating of 2 oz/ft^2 (0.610 kg/m^2).

The polebands shall fit the pole as planned. The wire rope shall not be in contact with any 90 degree edges or with any threads on the band. The pole band material shall be in accordance with ASTM A 572, grade 50 (ASTM A 572M, grade 345); ASTM A 606; or ASTM A 36 (ASTM A 36M) with minimum yield of 50,000 psi (345 kPa). The minimum width of the bands shall be 3 in. (75 mm) and the bands shall be capable of supporting the pole design load. Each half of the band shall be stamped with the corresponding size number.

All welding shall be in accordance with 711.32. Welds shall generate the full strength of the shaft. Only longitudinal continuous welding shall be permitted on the pole shaft. Contacting joint surfaces shall be thoroughly cleaned before fabrication then completely sealed

by means of welding. Shop drawings shall be submitted in accordance with 922.10(c)4j.

The pipe coupling for the weatherhead and base plate shall be installed prior to galvanizing. The threads shall be cleaned of all excess galvanizing. An internal J-hook shall be installed near the top of the pole for wire support.

The steel strain pole shall be capable of supporting a 8000 lb (35.6 kN) load applied horizontally 18 in. (460 mm) below the top of the pole with a maximum allowable deflection of 0.16 in. (4.1 mm) per 100 lb (445 N) of load. The pole shall be tapered 0.14 in. per foot (12 mm per meter) of length.

~~*A one piece base plate shall be secured to the base of the pole and shall develop the full strength of the pole. The base plate material shall be in accordance with ASTM A 36 (ASTM A 36M), A 572 (A 572M), or A 588 (A 588M). The base plate shall have four holes of adequate size to accommodate 2 1/4 in. (57 mm) anchor bolts. The bolt circle shall have a 22 in. (560 mm) diameter and bolt square of 15 1/2 in. (394 mm).*~~

Four high strength steel anchor bolts, 2 1/4 in. (57 mm) diameter and 96 in. (2,400 mm) long, including the hook, shall be furnished with each pole. Each bolt shall have two hex nuts and two washers in accordance with ASTM A 307, grade A. The anchor bolt material shall be in accordance with ASTM A 576 or ASTM A 675 (ASTM A 675 M) with a minimum yield strength of 55,000 psi (379 kPa) or ASTM A 36 (ASTM A 36M), special quality, modified to 55,000 psi (379 kPa) or approved equal. The threaded end of the anchor bolt shall have 12 in. (305 mm) of 4 1/2 NC threads and shall be galvanized the length of the threads, plus 3 in. (75 mm). The threaded end shall be coated after fabrication in accordance with ASTM A 153 or be mechanically galvanized and be in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class C. The unthreaded end of the anchor bolt shall have a standard L bend for a distance of 9 in. (230 mm) from the centerline of the anchor bolt to the end of the L. In lieu of the standard bend a steel plate 4 1/2 in.^{2} (2900 mm^2) and 1 1/4 in. (32 mm) thick may be welded to the embedded end of the anchor bolt.

(b) Wood Strain Pole

Wood strain poles shall be made from southern yellow pine and shall be in accordance with the current ANSI Specifications and Dimensions for Wood Poles No. 05.1. They shall be of the length and class specified.

All poles shall be full length pressure treated by the full cell process in accordance with current specifications as set forth in the AWPA Standards C1 and C4, using preservative as outlined in standard P5 and set forth in 911.02(h).

Treatment, handling, and storage methods shall be in accordance with the current AWPA Standards.

(c) Signal Cantilever Structures

1. General

A signal cantilever structure shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, except where modified herein.

Where the manufacturer has wind tunnel test data, they may use drag coefficients based on actual tests. Otherwise, the manufacturer shall use the drag coefficients in Table 1.2.5c.

2. Signal Support

The traffic signal pole and mast arm shall be designed to support the loads in accordance with the plans in a 80 mph (129 km/h) wind with gusts to 104 mph (167 km/h). Loading shall assume die-cast aluminum heads.

The traffic signal pole and mast arm shall be designed to provide a 17 ft (5.3 m) minimum clearance at all signals. Clearance shall be the vertical distance from the lowest point of the signal combination to a horizontal plane 3 in. (75 mm) below the base of the mast arm pole or from the lowest point of the signal combination to the pavement surface below the signal combination, whichever governs. Adjustment of the clearance at the installation site shall be by raising or lowering the mast arm along the upper length of the pole. After the pole is anchored to the foundation, the pole design shall permit the mast arm to be rotated 90 degrees in either direction and secured. The cable inlet shall not be obstructed when a field rotation or vertical adjustment of the mast arm is made.

There shall be no threads in the wearing surface plane at the point of connection between the clevis clamp and the signal face assembly. The clevis clamp shall have a 11/16 in. (18 mm) diameter bolt hole to receive the signal face assembly.

3. Combination Signal-Luminaire Support

All requirements for a signal support shall apply to a combination signal-luminaire support.

The minimum design load of the luminaire shall be 53 lbs (24 kg) with a projected surface area subject to wind loading of 2.4 ft^2 (0.223 m^2). If heavier or larger luminaires are used, their actual values shall be used. The required luminaire mounting height shall be in accordance with the plans. Mounting height shall be defined as the vertical distance from the lowest point of the luminaire to the horizontal plane that passes through the base of the pole.

The maximum percentage of allowable stress shall be 80% of the AASHTO Standard Specifications for Group I loads. Vibration dampers shall be furnished as recommended by the manufacturer.

4. Pole Requirements

a. General

The pole shall be a round or multi-sided tapered tube, except the upper 4 to 6 ft (1.2 to 1.8 m) of a signal support pole may be non-tapered. The signal support pole shall have a reinforced handhole 4 in. (100 mm) by 6 in. (150 mm) minimum complete with cover and latching device located 18 in. (460 mm) above the base. A 1/2 in. (13 mm) 13 NC threaded grounding nut or approved equivalent shall be provided and be accessible through the handhole. The pole cap shall be secured in place with setscrews. The combination signal-luminaire pole shall have a reinforced handhole 4 in. (100 mm) by 8 in. (200 mm) minimum complete with cover and latching device, located 18 in. (460 mm) above the base. The combination signal-luminaire pole shall be provided with a removable pole cap and integral wire support hook for the luminaire

electrical cable. The cable shall be attached to the hook by a service drop clamp. A wiring hole with a 1 in. (25 mm) to 1 1/2 in. (38 mm) inside diameter grommet shall be provided where the luminaire mast arm attaches to the pole.

b. Deflection

The maximum allowable horizontal deflection of the pole under maximum loading conditions shall not exceed a deflection angle of 1° 10 ft from the vertical axis of the pole for any 1 ft (305 mm) section of the pole along the entire length of the pole.

c. Materials

The signal pole and the combination signal-luminaire pole shall be steel or aluminum. Steel poles shall be in accordance with ASTM A 595 or A 572 with a minimum yield strength of 50,000 lbs (345 kPa) and shall be galvanized in accordance with ASTM A 123. Aluminum poles shall be in accordance with ASTM B 221 (ASTM B 221M) alloy 6063-T6 or 6005-T5, or ASTM B 241 (ASTM B 241M), alloy 6063-T6.

d. Hardware

All hardware for steel poles except bolts for the mast arm clamps and anchor bolts shall be in accordance with ASTM A 307 and shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to coating thickness, adherence, and quality requirements of ASTM A 153, class C. A cast pole cap shall be in accordance with ASTM A 126 and shall be galvanized with a minimum coating of 2 oz/ft^2 (0.610 kg/m^2).

All hardware for aluminum poles shall be stainless steel in accordance with ASTM A 276, type 304 or type 305.

e. Anchor Base

A one piece anchor base shall be secured to the lower end of the pole and shall develop the full strength of the pole. The base shall be provided with 4 holes of adequate size to accommodate 1 1/4 in. (32 mm) anchor bolts equally spaced on a bolt circle of 15 in. (380 mm) diameter and shall have four tapped holes for attaching the bolt covers. Four removable bolt covers shall be provided with each base and each cover shall attach to the upright portion of the body of the base by means of one hex head cap screw. The steel for the anchor base shall be in accordance with ASTM A 36 (ASTM A 36M), A 572 (A 572 M), or A 588 (ASTM A 588 M). Aluminum for the anchor base shall be in accordance with ASTM B 26, alloy 356.0-T6 or 356.0-T7 or ASTM B 209, alloy 6061-T6.

f. Arm Requirements

(1) Signal Cantilever Arm

A signal cantilever arm shall be attached to the pole by circular clamps. One-half of the clamp shall be welded to the cantilever arm. The single member arm or the upper tapered member of the truss style arm shall have a cable inlet adjacent to the clamp complete with grommet. The cable inlet shall be a 1 3/4 in. (44 mm) diameter hole with a 1 1/2 in. (38 mm) inside diameter rubber grommet. The 20, 25, and 30 ft (6.1, 7.6 and 9.2 m) cantilever arms shall have one intermediate cable inlet with grommet located 12 ft (3.7 m) from the free end of the arm. The 35 and 40 ft (10.7 and 12.2 m) cantilever arm shall have two intermediate cable inlets with grommets located 12 ft (3.6 m) and 24 ft (7.3 m) respectively from the free end of the arm.

The intermediate cable inlet shall be 1 in. (25 mm) diameter hole with 3/4 in. (19 mm) inside diameter rubber grommet.

~~*The maximum rise of the single member arm shall be 1/2 in. (13 mm) per 1 ft (305 mm) of arm after loading. The maximum rise of the truss style arm shall be as set out in the table. The rise shall be measured vertically from the centerline of the free end of the truss to a plane through the centerline of the upper arm bracket after loading.*~~

Mast Arm Length ft (m)	*Total Rise ft - in. (m)*	*Tolerance in. (mm)*
12 - 20 (3.7 - 6.1)	*4-0 (1.2)*	*±1 (±25)*
25 (7.6)	*4-3 (1.3)*	*±1 (±25)*
30 - 40 (9.2 - 12.2)	*4-7 (1.4)*	*±1 (±25)*

~~*The end signals on the truss style arms shall be suspended and the intermediate signals shall be rigidly attached. All signals on the single member arms shall be rigidly attached as shown on the plans. The cantilever arms shall be used as an enclosed raceway for wiring and shall be free of burrs and rough edges.*~~

~~*Both parts of the clamp for the single member arms shall be stamped with the arm length prior to galvanizing.*~~

(2) Luminaire Mast Arm for Combination Support

The luminaire mast arm shall be in accordance with 922.01(a)1.

(3) Materials

The signal cantilever arm shall be of the same material as the pole. The luminaire mast arm shall be of the same material as the pole except that a truss type arm shall be in accordance with 922.01(a). Bolts for the mast arm clamp shall be stainless steel in accordance with ASTM A 276, type 304 or 305.

g. Anchor Bolts

Four steel anchor bolts, each fitted with two hex nuts and two flat washers, shall be furnished with each pole. The anchor bolt shall be 1 1/4 in. (32 mm) in diameter with a minimum of 10 in. (254 mm) of 7 NC threads on the upper end. The threads, nuts, and washers shall be galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C. The anchor bolt shall be 48 in. (1220 mm) long with a 4 in. (100 mm) right angle bend on the lower end or a square steel washer, 6 in. by 6 in. by 1/2 in. (150 mm by 150 mm by 13 mm), with a hex nut welded onto the lower end. The steel for the bolt shall be in accordance with ASTM A 576 or ASTM A 675 (ASTM A 675M), with a minimum yield strength of 55,000 psi (379 kPa), or ASTM A 36 (ASTM A 36M), special quality, modified to 55,000 psi (379 kPa) or approved equal.

h. Finish

All steel material shall be fully galvanized. Galvanizing shall take place after all welding is accomplished. Aluminum poles shall be provided with a satin finish accomplished by mechanical rotary grinding and aluminum mast arms shall be provided with a satin etched finish.

i. Certification

Unless otherwise specified, all materials covered herein shall be covered by a type C certification in accordance with 916.

j. Shop Drawings

Five sets of shop drawings and a set of design calculations shall be submitted to the Design Division for approval. A copy of the

transmittal letter shall be sent to the Engineer. The approved drawings will be distributed by the Design Division.

k. Downguys, Anchors, Rods, and Guards

Pole anchors shall be 8 way expanding with a minimum area of 135 in.^{2} (87 100 mm^2) when expanded or a 10 in. (250 mm) diameter screw anchor. They shall have a minimum holding strength of 10,000 lb (44.5 kN). They shall be painted and in accordance with ASTM A 569 (ASTM A 569M). Anchor rods for expanded anchors shall be 3/4 in. (19 mm) diameter steel and for screw anchors shall be 1 1/4 in. (32 mm) diameter steel, 8 ft (2.4 m) long, in accordance with ASTM A 659 (ASTM A 659M), and be galvanized in accordance with ASTM A 153.

Guy guards shall be made of 18 gauge galvanized steel, polyethylene, polyvinylchloride, or melamine phenolic, and shall be 7 ft (2.1 m) long. The steel guy guard shall have a tight gripping, non-scarring hook for quick attachment to the guy wire. The bottom shall have a clamp that fits over the anchor rod and securely grips by tightening the bolt. Steel guy guards shall be in accordance with ASTM A 659 (ASTM A 659M). The nonmetallic guy guard shall be a helical pigtail which shall resist upward movement, a lock strap to secure the lower end, and a guy guard sleeve. Non-metallic guy guards shall be gray or yellow.

l. Messenger Cable

Messenger cable shall be zinc-coated steel wire strand, contain seven wires, and have a nominal diameter of 3/8 in. (10 mm). The cable shall be in accordance with ASTM A 475, Siemens-Martin Grade.

m. Span, Catenary, and Downguy Cable

Span, catenary, and downguy cable, shall be aircraft cable for non-aircraft use, and shall be 3/8 in. (10 mm) nominal diameter, made of stainless steel wire, and consist of seven, 19 wire flexible steel strands. The 3/8 in. (10 mm) cable shall have a minimum breaking strength of 12,000 lb (53.4 kN). It shall be in accordance with Military Specifications MIL-W-83420D.

n. Tether and Support Cable

Tether and support cable shall be aircraft cable, for non-aircraft use, and shall be 3/16 in. (5 mm) nominal diameter, made of stainless steel wire, and consist of seven, 7-wire flexible steel strands. The 3/16 in. (5 mm) cable shall have a minimum breaking strength of 3700 lbs (16.5 kN). It shall be in accordance with Military Specifications MIL-83420D.

o. Cable Hardware

(1) Messenger Hangers

Messenger hangers shall be either a three bolt clamp or a 3/8 in. (10 mm) by 1 3/4 in. (44 mm) steel hanger with a 90 degree bend extending from the pole 3 3/4 in. (95 mm). The hanger shall have a curved groove and clamp capable of receiving a 5/16 in. to 1/2 in. (8 mm to 13 mm) cable.

The messenger shall be clamped by two 1/2 in. (13 mm) high carbon steel bolts. The angle hanger shall be mounted with a 5/8 in. (16 mm) through bolt and a 1/2 in. (13 mm) lag screw. The three bolt clamp shall be mounted with a 5/8 in. (16 mm) through bolt. The angle hanger shall be in accordance with ASTM A 575. The bolts shall be in accordance with NEMA PH 23.

(2) Cable Ring

Cable rings shall be galvanized steel in accordance with IMSA 51-1.

(3) Clamps

Clamps shall be made of 3/8 in. (10 mm) steel and in accordance with ASTM A 575.

Two bolt clamps shall be a minimum of 3 3/4 in. (95 mm) long and 1 1/4 in. (32 mm) wide with two 1/2 in. (13 mm) bolts which shall clamp cable of 1/8 to 1/2 in. (3 to 13 mm) diameter.

Three bolt clamps shall be a minimum of 6 in. (150 mm) long and 1 5/8 in. (42 mm) wide with three 5/8 in. (16 mm) bolts which shall clamp cable of 5/16 to 1/2 in. (8 mm to 13 mm) diameter.

The bolt heads shall be large enough to provide maximum clamping area and shall have oval shoulders to prevent the bolts from turning while tightening. The bolts shall be in accordance with NEMA PH 23.

(4) Servi-Sleeves

Servi-sleeves shall be 1 1/4 to 2 1/4 in. (32 mm to 57 mm) in length and shall hold the size of the cable specified. The sleeves shall be in accordance with ASTM A 659 (ASTM A 659M).

(5) Straight Eye-Bolts

Straight eye-bolts shall be 19 mm (3/4 in.) diameter drop forged steel, a minimum of 14 in. (356 mm) long, and have 6 in. (150 mm) of thread. The steel washers shall be 2 1/4 in. (57 mm) by 2 1/4 in. (57 mm) by 3/16 in. (5 mm) in size with a 13/16 in. (21 mm) hole in the center. All parts shall be in accordance with ASTM A 575 and shall be galvanized in accordance with ASTM A 123.

(6) Hub-Eyes

Hub-eyes shall be made of drop forged steel and in accordance with ASTM A 575. They shall receive a 3/4 in. (19 mm) mounting bolt and have a full rounded thimble eye for protection of the guy cable.

922.11 Signal Cable

(a) Hook-up Wire

Signal hook-up wire shall be stranded one conductor wire, type THW 7 strand No. 14 AWG, with a thermoplastic sheath 3/64 in. (1.19 mm) thick and a 600 volt rating. Insulation shall be color coded, as required, and labeled with gauge, voltage rating, and insulation type.

(b) Signal Control Cable

Signal control cable shall be in accordance with IMSA 19-1 or 20-1 and shall be stranded No. 14 AWG wire.

(c) Service Cable

Traffic signal service cable shall be color coded, stranded copper No. 8 AWG wire, 3 conductor cable, type THWN.

922.12 Signal Interconnect

(a) Integral Messenger Interconnect Cable

Integral aerial interconnect cable shall be figure "8" self-supporting type cable consisting of a messenger cable and 7 conductors No. 14 AWG signal cable in accordance with IMSA 20-3.

(b) 6 Pair/19 Telemetry Cable

6 pair telemetry cable shall contain six twisted pairs of 19 gauge conductors and shall be in accordance with IMSA 40-2 for underground application and IMSA 40-4, integral messenger, for aerial application.

(c) Fiber Optic Interconnect Cable

Fiber optic cable shall contain six stranded multimode, graded index, optic fibers with a minimum of one non-metallic central strength member. The cable shall be loose tube, all dielectric construction, suitable for outdoor use in conduit or on aerial supports.

Each individual fiber shall be 62.5/125 µm diameter, core/clad, and each fiber shall be individually encased in its own gel-filled color-coded buffer. The fiber optic cable shall be constructed with Kevlar braid and outer polyethylene jackets as a minimum. If an inner jacket is used it shall be PVC. Maximum attenuation of the cable shall be 4.0 dB/km nominal, measured at room temperature at 850 nm. The bandwidth shall not be less than 160 MHz/km, also at 850 nm. Each fiber shall be continuous with no factory splices except for joining standard length cables to form longer, continuous jacketed cable to fit installation requirements. The cable shall have standard nylon rip cords. Kevlar rip cords will not be accepted. The cable shall be in accordance with the generic requirements for optical fiber and optical fiber cable per Bellcore Technical Reference TR-TSY-000020.

The exterior of the polyethylene outer cable jacket shall be stenciled so that every fifth meter on each reel is marked with a number. The fifth meter of each reel shall be marked with a 5, the tenth meter marked with a 10, and so on until the end of the reel. The stencil shall be applied to the outer jacket using permanent ink and shall be permanently engraved into the jacket to provide long lasting readability.

922.13 Detection Wire and Sealant

(a) Loop Detector Lead-in Cable

Runs 700 ft (213 m) and less of loop detector lead-in cable shall be in accordance with IMSA 50-2 and shall be stranded 2 conductor No. 16 AWG, 19 strands of No. 29 wire. Runs greater than 700 ft (213 m) shall use 14 AWG wire.

The nominal capacitance between conductors shall be 57 pF/ft (187 pF/m) and 98 pF/ft (322 pF/m) between one conductor and the other conductor connected to the shield.

(b) Roadway Loop Wire

Roadway loop wire shall be 14 AWG gauge IMSA 51-7 duct-loop wire with polyvinyl chloride or polyethylene outer jacket of 1/4 in. (6.3 mm) diameter.

(c) Preformed Pave-Over Loops

All components of preformed pave-over loops designed for HMA paved-over application shall have a minimum temperature rating

exceeding the maximum temperature range for class B HMA mixtures in accordance with 402.07 (300 degrees Fahrenheit (150 degrees Celsius). Preformed pave-over loops shall be selected from the Department's list of approved Traffic Signal Control Equipment.

The size of a preformed pave-over loop shall be 6 ft (1.83 m) diameter, 18.9 ft (5.75 m) circumference round or 6 ft (1.83 m) octagonal, 20.0 ft (6.1 m) perimeter. The loops placed in the same lane shall be spaced 15 ft (4.57 m) from the center of one loop to the center of the next loop.

Preformed pave-over loops may be constructed as a single loop or as 2, 3 or 4 loops in series. Each individual loop shall be wired with four turns of wire unless otherwise specified. Loops constructed in a series shall also be wired in series.

922.14 Ground Wire

The ground wire shall be copper wire No. 6, AWG soft-drawn, solid copper in accordance with ASTM B 3.

922.15 Splicing Kit

Splicing kits shall contain a two piece, transparent snap-together mold body and include an epoxy and sealing compound contained in a unipak. It shall be capable of insulating and splicing nonshielded cables rated up to 5 kilovolts and multi-conductor cables rated up to 600 volts.

922.16 Ground Rod and Connections

Ground rods shall be 1/2 in. (13 mm) in diameter by 8 ft (2.4 m) long with a machined point and chamfered top. They shall be made of steel with a molecularly bonded outer layer of electrolytically applied copper. A single electrode shall have a maximum resistance to ground of 25 ohms. Single electrodes that do not have resistance to ground of 25 ohm or less shall be augmented by additional electrodes, grids, or plates until resistance to ground of 25 ohms or less is achieved. Resistance shall be measured using a 3-point ground tester using the fall of potential method. Data, graphs, resistance in ohms, date of test, make and model of ground tester, and the individual's initials performing the test shall be recorded and submitted to the District Office. Resistance in ohms shall be tagged at the ground connection.

The finished rod shall be cold-drawn and shall have the following minimum physical properties:

PHYSICAL PROPERTY	*MINIMUM*
Tensile strength	*97,000 psi (668 MPa)*
Yield strength, 0.2% offset	*85,000 psi (58.61 MPa)*
% of elongation	*13 psi (90 kPa)*

The ground rod and wire connection shall be made by a thermo weld process or approved equal. The welding material shall cover and secure the conductor to the rod and shall be porous free.

An acceptable alternate shall be a ground grid connection properly sized and shall consist of a shear head bolt, a "C" shaped body, nest, and wedge. The connector components shall be fabricated from an aluminum-bronze alloy, silicone-bronze alloy, and copper.

922.17 Castings for Handholes

The ring and cover for handholes shall be in accordance with 910.05(b).

922.18 Entrance Switch

The entrance switch shall be a double pole, 50 amp, 120 volt circuit breaker in a NEMA type 3R enclosure. The minimum dimensions of the enclosure shall be: 5 in. (127 mm) wide, 3 3/4 in. (95 mm) deep and 9 1/4 in. (235 mm) height. A 1 in. (25 mm) rain-tight detachable hub shall be supplied in the top of the enclosure. The enclosure shall have knockouts on the sides, bottom and back with diameters of 7/8 in. (22 mm) to 1 3/4 in. (44 mm). The enclosure shall contain the circuit breaker, an insulated solid bar for connection of AC Neutral, a separate lug for attachment of earthground, have provisions for a padlock, and shall be surface mounted.

The enclosure shall be made of galvanized steel with a rust inhibiting treatment and finished in the manufacturer's standard color of baked enamel.

All wire terminations and breaker to buss-bar contact points inside the enclosure shall be coated with an anti-oxidant to prevent oxidizing and corrosion of components.

922.19 Conduit and Fittings

(a) Steel Conduit

Steel conduit, couplings, and elbows shall be galvanized rigid steel conduit in accordance with UL 6. The conduit shall be galvanized by the hot dip method on the interior and exterior surfaces. Conduit threads shall be cut after galvanizing. The conduit shall be supplied with a threaded coupling attached to one end and the other threaded end protected by a suitable shield.

~~*The various conduit fittings such as bands, bodies, straps, lock nuts, and threadless connectors, shall be in accordance with Federal Specifications A-A-50553 and shall be galvanized if not stainless steel. Conduit straps shall be two hole straps with a minimum thickness of 1/8 in. (3 mm). Conduit lock nuts 3/8 in. to 1 1/2 in. (10 mm to 38 mm) in size shall be made of steel. Other sizes shall be made of either steel or malleable iron. All conduit lock nuts shall be galvanized. Other nuts shall be either stainless steel or galvanized steel.*~~

(b) Polyvinyl Chloride Conduit

PVC conduit shall be schedule 40 in accordance with ASTM D 1785. The PVC conduit fittings shall be in accordance with ASTM D 2466. Each length of pipe shall include a coupling.

922.20 Detector Housing

The entire housing casting shall be made from aluminum alloy in accordance with ANSI 320.

922.21 Certification

Unless otherwise specified, all materials covered herein shall have a type C certification in accordance with 916.

RAILROAD INFORMATION

The Standard Specifications are revised as follows:

SECTION 103, LINE 331, DELETE AND INSERT AS FOLLOWS:

103.03 ~~Blank~~ *Railroad Provision*

This project requires work to be done in the vicinity of railroad property. Railroad Protective Liability Insurance shall be required. Train speed and number of trains data was provided by the Railroad and shall be verified for accuracy.

The corporate name of the Railroad Company to be named insured shall be as follows:

Dubois County Railroad

The description of the work and the designation of the job site to be shown on the Railroad Protective Liability Insurance policy shall be as follows:

Indiana Department of Transportation Contract: SRS-30614
SR 164 from US231 to 0.47 mi E of US231
Dubois County, Indiana

AAR/DOT:	*735 716K*
INDOT FILE #:	*0800006*
MILEPOST #:	*0054.05*

Evidence of insurance as required above shall be furnished to the addresses shown below. The original policies shall be sent to the Railroad Company for its review. Copies of the transmittal letter and the policies shall be forwarded to the department.

Department	*Railroad Company*
Indiana Department of Transportation	*Mr. Alan Barnett*
Contracts Engineer - Rm. N855	*Executive Director & GM*
Government Center North	*Dubois County Railroad*
100 N. Senate Avenue	*PO Box 150*
Indianapolis, IN 46204-2217	*French Lick, IN 47432*

The number of trains through the improvement will be 2 freight trains and 0 passenger trains per day.

Trains will be operated at a maximum speed of 10 mi/hr through the project site.

SECTION 107, AFTER LINE 314, INSERT AS FOLLOWS:

Work shall be conducted in a manner that is satisfactory to the Railroad Company's Chief Engineer or authorized representative. Work shall be held open to inspection by Railroad Company inspectors at all times. All public utilities, railroad, and other companies having occasion to do work on and in connection with the project shall be cooperated with.

Unnecessary use of Railroad property shall be avoided outside the construction limits of the project without written permission of the Railroad Company. The Railroad right-of-way shall be left in a condition satisfactory to the Railroad Company's Chief Engineer. The necessary Railroad Company personnel shall be arranged for in order to ensure safety in connection with the movement of railroad traffic during and attributable to the prosecution of the contract work. Such work shall include all contract construction operations involving direct interference with the Railroad's tracks or traffic, the fouling of railroad operating clearances, or reasonable probability of accidental hazard to railroad traffic. The Railroad Company shall be reimbursed for the actual cost of such protective services furnished by it.

SECTION 107, AFTER LINE 358, INSERT AS FOLLOWS:

(c) Railroad Information

The railroad information contained herein pertaining to rate of pay and additional charges applied to payment for persons performing flagging services, number of trains, and speed of trains was furnished by the Railroad Company. This information shall be verified in order to determine costs for the contract.

1. Flagging Services

Under the terms of the agreement between the Department and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's workers or equipment are, or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging. Normally, the Railroad will assign one flagger to a project; but in some cases, more than one may be necessary, such as yard limits where three flaggers may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagger or flaggers may be required full time until the project has been completed.

2. Scheduling and Notification

Not later than the time that approval is initially requested to begin work on Railroad right-of-way, the Contractor shall furnish to the Railroad and to the Department a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the Department, and the Railroad's authorized representative. Flagger or flaggers may not be provided until the job site meeting has been conducted and the Contractor's work scheduled. The Railroad's representative will be:

Mr. Alan Barnett
Executive Director & GM
Dubois County Railroad
PO Box 150
French Lick, IN 47432
Telephone: (812) 936-2405

a. *The Contractor will be required to give the Railroad representative at least 10 working days advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Highway Engineer a copy; if notice is given verbally it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagger, or flaggers are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagger is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.*

b. *If, after the flagger is assigned to the project site, emergencies arise which require the flagger's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagger is again available.*

3. Payment

The Department will reimburse the Railroad Company directly for all cost of flagging which is required on account of construction of the grade separation project, within Railroad Company's right-of-way, which is shown in the project plans, or which is covered by an approved plan revision, supplemental agreement or change order. All flagging cost deemed to be caused by acts of omission, carelessness, or negligence or unnecessary delays by the contractor will also be borne by the Department but will be deducted from progress or final payment made to the Contractor. However, this deduction will be made only after written notification has been given the Contractor by the Engineer that these flagging costs have been determined to be the Contractor's responsibility. The Contractor will be required to reimburse the Railroad Company for all flagging required on account of work for the benefit of the Contractor, (See Paragraph 5). This includes the flagging required solely for protection of a temporary crossing constructed for the benefit of the Contractor.

4. Verification

The Railroad flagger assigned to the project will be responsible for notifying the Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Engineer will document such

notification in the project records. When requested, the Engineer will also sign the flagger's diary showing daily time spent and activity at the project site.

5. Work for the benefit of the Contractor

All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the State and the Railroad or will be covered by appropriate revisions to same which will initiated and approved by the Department and/or the Railroad. Should the Contractor desire any changes in addition to the above, he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

6. Railroad Operations

Equipment shall not be operated on railroad tracks except with proper arrangement with the Railroad Company. Equipment rented from the Railroad Company shall be arranged for with the Railroad Company. Methods and procedures for performing work on Railroad property shall be submitted for approval by the Department and by the Railroad Company's Chief Engineer or authorized representative. No additional payment will be made for the use of equipment which is rented from the Railroad Company or for protection of Railroad traffic.

7. Temporary Traffic Control at the Highway-Rail Grade Crossings

Lane restrictions, flagging or other traffic control operations shall not be performed in a manner that would cause vehicles to stop on the railroad tracks. If the traffic control operations are causing vehicles to stop on the railroad tracks the Contractor shall provide a law enforcement officer or a flagger at the highway-rail crossing(s) to deter vehicles from stopping on the railroad tracks. Automatic warning devices shall not be considered a substitute for a law enforcement officer or flagger .This work will not be measured for payment. This work will not be paid for directly but will be included in the costs of other items.

SUMMARY OF COMMITMENTS

Active Commitments Report as of 02/03/2009

Des Number: 0800006 Contract No: RS 30614
District: Vincennes
Route: SR 164
Project Desc: Wedge And Level on US 231 to 0.47 mi E of US 231

Commitment

No.	Text
1	If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law requires that the discovery must be reported to the Department of Natural Resources within two business days. Any further disturbance will cease until an INDOT CRS archaeologist is contacted and mitigation is completed.
2	Permits may be required for this project. It will be the responsibility of the designer to submit plans to OES to process permits.
3	All permit regulations will be followed.
4	If hazardous materials are found, work will cease and the Hazardous Materials Department at the Office of Environmental Services will be contacted.
5	If any scope changes take place, the Vincennes District Planning and Programming Office shall be consulted. A scope change could cause this environmental document to no longer be valid.