

**INDIANA
DEPARTMENT OF TRANSPORTATION**

CONTRACT INFORMATION
CONSTRUCTION PLANS
SPECIAL PROVISIONS
ADDITIONAL CONTRACT REQUIREMENTS

FOR

CONTRACT NO. _____

LETTING DATE: _____

Certified By _____

Date _____

CONTRACT INFORMATION
TABLE OF CONTENTS

CONTRACT NO.

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.

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SCHEDULE OF PAY ITEMS	1 -
CONSTRUCTION PLANS	1 -
TRAFFIC CONTROL DEVICE REPORT	1
SPECIAL PROVISIONS	1 -

CONTACT FOR CONTRACTORS

DISTRICT CONSTRUCTION ENGINEER:

* *

***QUESTION FORM**

Contractors shall submit contract specific questions by completing the Question Form accessed from <http://netservices.indot.in.gov/cqa/>. The Department will attempt 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. <https://netservices.indot.in.gov/ViewDocs2.0/> will display the interface used for selection of contract letting documents. For the document category, select "Q and A Form".

CONTACTS FOR DISTRICT PERSONNEL ONLY

PHONE:

PHONE:

PHONE:

PROPOSAL
TO THE
INDIANA DEPARTMENT OF TRANSPORTATION

DATE OF LETTING: July 13, 2011

TIME OF LETTING: 10:00 AM EASTERN DAYLIGHT SAVING 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: RS-32682-A

PROJECT NUMBER(S): 0800937

STRUCTURE NUMBER(S):

ROUTE: 18

LOCATION: ON SR 18 FROM 1.13 MILES WEST OF SR 9 TO 2.01
MILES EAST OF SR 9

DESCRIPTION: ASPHALT RESURFACE

FT. WAYNE DISTRICT

COUNTY : GRANT

CONTRACT COMPLETION INFORMATION

CONTRACT COMPLETION DATE:

June 23, 2012

DBE GOAL: A contract provision goal of 3 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:

2010 STANDARD SPECIFICATIONS EFFECTIVE

LIST OF APPROVED OR PREQUALIFIED MATERIALS

STANDARD DRAWINGS LISTED ON STANDARD DRAWING INDEX EFFECTIVE 9-1-09

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.

INDIANA DEPARTMENT OF TRANSPORTATION PAGE: 1
SCHEDULE OF PAY ITEMS

CONTRACT ID: RS-32682-A

LETTING DATE: July 13, 2011
REVISED:

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS

SECTION 0001 ASPHALT RESURFACE				

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	109-09377 QUALITY ADJUSTMENT, PAVEMENT TRAFFIC MARKINGS	1.000 DOL	1.00000	1.00
0008	109-09489 PAYMENT ADJUSTMENT, PG ASPHALT BINDER	1.000 DOL	1.00000	1.00
0009	110-01001 MOBILIZATION AND DEMOBILIZATION	LUMP	LUMP	.
0010	202-90277 DETECTOR HOUSING, REMOVE	21.000 EACH	.	.

INDIANA DEPARTMENT OF TRANSPORTATION PAGE: 2
 SCHEDULE OF PAY ITEMS

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	207-08267 SUBGRADE TREATMENT, TYPE IIIA	53.000 SYS	.		.	
0012	301-07448 COMPACTED AGGREGATE, NO. 53, BASE	492.000 TON	.		.	
0013	303-07449 COMPACTED AGGREGATE, NO. 73	150.000 TON	.		.	
0014	304-07491 HMA PATCHING, TYPE C , FULL DEPTH	3897.000 TON	.		.	
0015	304-07491 HMA PATCHING, TYPE C , PARTIAL DEPTH	737.000 TON	.		.	
0016	306-08034 MILLING, ASPHALT, 1 1/2 IN	96566.000 SYS	.		.	
0017	306-08432 MILLING, APPROACH	9421.000 SYS	.		.	
0018	401-07328 QC/QA-HMA, 3, 70, SURFACE, 9.5 mm	7409.000 TON	.		.	
0019	402-07434 HMA SURFACE, TYPE C	560.000 TON	.		.	
0020	406-05520 ASPHALT FOR TACK COAT	34.000 TON	.		.	
0021	604-07894 CURB RAMP, CONCRETE, A	140.000 SYS	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0022	604-07896 CURB RAMP, CONCRETE, B	343.000				
		SYS	.		.	
0023	604-07897 CURB RAMP, CONCRETE, C	301.000				
		SYS	.		.	
0024	604-07897 CURB RAMP, CONCRETE, C , MODIFIED	4.000				
		SYS	.		.	
0025	604-07898 CURB RAMP, CONCRETE, D	3.000				
		SYS	.		.	
0026	604-07899 CURB RAMP, CONCRETE, E	65.000				
		SYS	.		.	
0027	604-07899 CURB RAMP, CONCRETE, E , MODIFIED	15.000				
		SYS	.		.	
0028	604-07900 CURB RAMP, CONCRETE, F	411.000				
		SYS	.		.	
0029	604-07900 CURB RAMP, CONCRETE, F , MODIFIED	50.000				
		SYS	.		.	
0030	604-07901 CURB RAMP, CONCRETE, G , MODIFIED	10.000				
		SYS	.		.	
0031	604-07902 CURB RAMP, CONCRETE, H	39.000				
		SYS	.		.	
0032	604-07902 CURB RAMP, CONCRETE, H , MODIFIED	8.000				
		SYS	.		.	

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 SCHEDULE OF PAY ITEMS

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0033	604-07903 CURB RAMP, CONCRETE, K	54.000 SYS	.		.	
0034	610-07488 HMA FOR APPROACHES, TYPE C	815.000 TON	.		.	
0035	628-08520 CELLULAR TELEPHONE/RADIO	2.000 EACH	.		.	
0036	628-08521 CELLULAR TELEPHONE/RADIO SERVICE	24.000 MOS	.		.	
0037	628-08524 CELLULAR TELEPHONE/RADIO, ADDITIONAL MINUTES	1.000 DOL	1.00000			1.00
0038	628-09402 FIELD OFFICE, B	12.000 MOS	.		.	
0039	720-44000 CASTING, ADJUST TO GRADE	62.000 EACH	.		.	
0040	720-94840 CASTING, WATER VALVE, ADJUST TO GRADE	33.000 EACH	.		.	
0041	801-01504 TEMPORARY PAVEMENT MESSAGE MARKING, LANE INDICATION ARROW	27.000 EACH	.		.	
0042	801-03290 CONSTRUCTION SIGN, C	2.000 EACH	.		.	
0043	801-06203 TEMPORARY PAVEMENT MARKING, 4 IN.	7205.000 LFT	.		.	

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 SCHEDULE OF PAY ITEMS

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0044	801-06207 TEMPORARY PAVEMENT MARKING, REMOVABLE, 4 IN.	7205.000 LFT	.		.	
0045	801-06216 TEMPORARY TRANSVERSE PAVEMENT MARKING 24"	1045.000 LFT	.		.	
0046	801-06218 TEMPORARY TRANSVERSE PAVEMENT MARKING, REMOVABLE, 24 IN	1045.000 LFT	.		.	
0047	801-06640 CONSTRUCTION SIGN, A	87.000 EACH	.		.	
0048	801-06710 FLASHING ARROW SIGN	600.000 DAY	.		.	
0049	801-06775 MAINTAINING TRAFFIC	LUMP		LUMP		.
0050	801-92448 CONSTRUCTION SIGNS, MOBILE	600.000 DAY	.		.	
0051	802-05701 SIGN POST, SQUARE, TYPE 1, REINFORCED ANCHOR BASE	12.000 LFT	.		.	
0052	802-07060 SIGN, SHEET, RELOCATE	1.000 EACH	.		.	
0053	805-02441 SIGNAL CABLE, ROADWAY LOOP, 1C 14 GA.	8442.000 LFT	.		.	
0054	805-78510 SIGNAL CABLE, 2C 16GA., SHIELDED	300.000 LFT	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0055	805-78785 SIGNAL DETECTOR HOUSING	21.000 EACH	.		.	
0056	805-78795 SAW CUT FOR ROADWAY LOOP AND SEALANT	2927.000 LFT	.		.	
0057	808-06068 PAVEMENT MESSAGE MARKING, PREFORMED PLASTIC, (HANDICAP) SYMBOL	8.000 EACH	.		.	
0058	808-08258 TRANSVERSE MARKINGS , PREF. PLASTIC, PARKING LINES	1500.000 LFT	.		.	
0059	808-09381 RETRO-REFLECTIVITY TESTING	LUMP		LUMP		.
0060	808-10031 LINE, MULTI-COMP, BROKEN, WHITE, 4 IN	5830.000 LFT	.		.	
0061	808-10033 LINE, MULTI-COMP, SOLID, WHITE, 4 IN	12773.000 LFT	.		.	
0062	808-10034 LINE, MULTI-COMP, SOLID, YELLOW, 4 IN	8248.000 LFT	.		.	
0063	808-10042 TRANSVERSE MKG MULTI-COMP SOLID YELLOW CROSSHATCH LINE, 12"	144.000 LFT	.		.	
0064	808-10053 PAVEMENT MESSAGE MKG, MULTI-COMP, (R X R)	6.000 EACH	.		.	
0065	808-10058 LINE, MULTI-COMP, SOLID, YELLOW, 8 IN	442.000 LFT	.		.	

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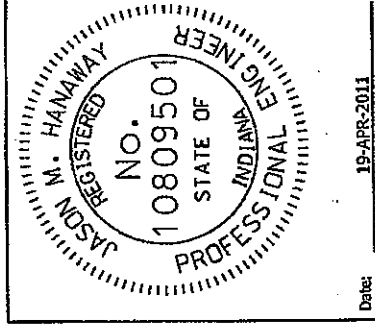
CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS CTS	BID AMOUNT DOLLARS CTS
0066	808-75067 TRANSVERSE MARKING, PREFORMED PLASTIC, STOP LINE , WHITE 24 IN	 1045.000 LFT	 .	 .
0067	808-75069 TRANSVERSE MARKING, PREFORMED PLASTIC, CROSSWALK LINE, 6"	 2879.000 LFT	 .	 .
0068	808-75071 PAVEMENT MESSAGE MARKING, PREFORMED PLASTIC LANE INDICATION ARROW	 27.000 EACH	 .	 .
	SECTION 0001 TOTAL			.
	TOTAL BID			.

Federal Road Region 5	
TRAFFIC DATA	
A.D.T. (2010)	13950 V.P.D.
A.D.T. (2020) Proj.	19650 V.P.D.
D.R.V. (%)	1108 V.P.H.
Directional Distribution	40% EB
Trucks	5 % A.D.T.
3 % D.R.V.	
DESIGN DATA	
Design Speed	35 M.P.H.
Project Design Criteria	PARTIAL 3R (NON-FREEWAY)
Functional Class	PRINCIPAL ARTERIAL
Rural/Urban	URBAN (BUILT-UP)
Terrain	LEVEL

LATITUDE:	88°39'52" W
LONGITUDE:	40°33'32" N

PLANS PREPARED BY: Jason M. Hanaway, P.E. & Taylor A. Ruble



Date: 19-APR-2011

Jason M. Hanaway

Jennifer Brown

CERTIFIED BY:

APPROVED FOR LETTING:

INDIANA DEPARTMENT OF TRANSPORTATION

ROAD PLANS

PROJECT DESCRIPTION

Preventive Maintenance, HMA Overlay

PROJECT LOCATION

SR 18 from 1.13 miles W of SR 9 to 2.01 miles E of SR 9 (East Limits Marion)

Gross Length 5.03 mi.

Net Length 4.81 mi.

END LINE "B" WB
STA. 165+22

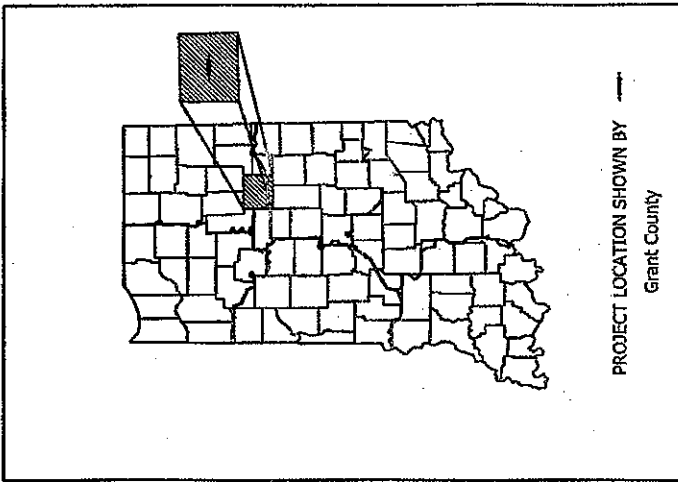
BEGIN LINE "A"
STA. 5+70

END LINE "A" EB
STA. 130+56



STATION EQUATION
LINE "A" EB STA 24+88 =
LINE "B" WB STA 24+88

CONTRACT NO. RS-32682



PROJECT LOCATION SHOWN BY
Grant County

DES. NO. 0800937



PAVING EXCEPTIONS

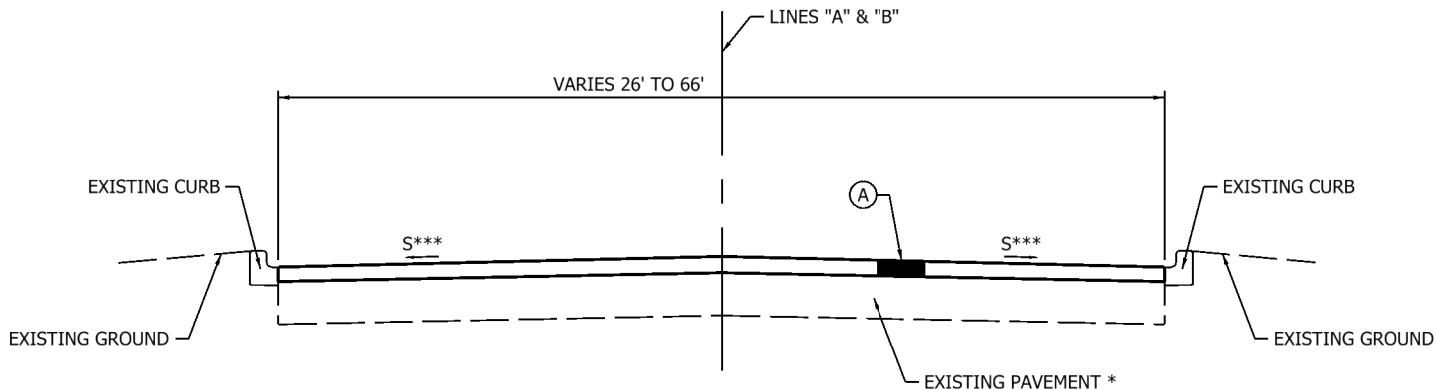
- EAST BOUND**
 - STA. 42+90 TO STA. 42+99 - RXR
 - STA. 64+70 TO STA. 65+28 - SR 9
 - STA. 98+05 TO STA. 98+78 - BRIDGE
 - STA. 108+83 TO STA. 109+81 - WASH. ST
 - STA. 112+18 TO STA. 113+01 - ADAMS ST
 - STA. 121+12 TO STA. 121+18 - RXR
- WEST BOUND**
 - STA. 57+85 TO STA. 58+46 - SR 9
 - STA. 92+61 TO STA. 93+36 - BRIDGE
 - STA. 103+27 TO STA. 104+14 - WASH. ST
 - STA. 108+67 TO STA. 107+50 - ADAMS ST
 - STA. 115+38 TO STA. 115+45 - RXR
 - STA. 138+00 TO STA. 143+07 - BRIDGE

Indiana Department of Transportation
Standard Specification dated 2010
to be used with these plans.

INDEX SHEET

PAGE(S)	DESCRIPTION
1	TITLE SHEET
2	INDEX SHEET
3	TYPICAL CROSS SECTIONS
4-5	CONSTRUCTION SIGN LAYOUT
6-21	QUANTITY SUMMARY TABLES

TYPICAL CROSS SECTIONS

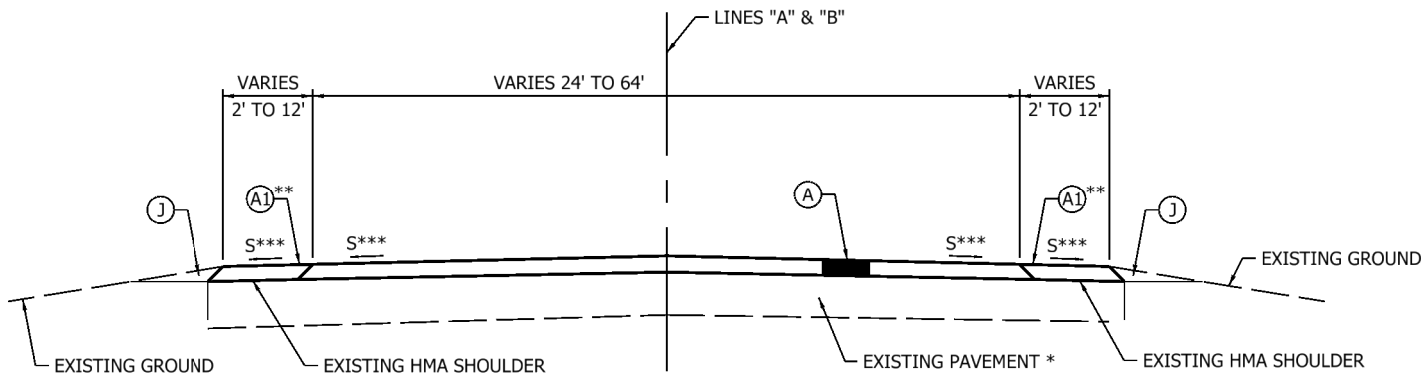


SR 18

EASTBOUND / WESTBOUND
STA. 24+17 "A" TO STA. 24+88 "A"

EASTBOUND
STA. 24+88 "A" TO STA. 126+55 "A"

WESTBOUND
STA. 24+88 "B" TO STA. 143+07 "B"



SR 18

EASTBOUND / WESTBOUND
STA. 5+70 "A" TO STA. 24+17 "A"

EASTBOUND
STA. 126+55 "A" TO STA. 130+66 "A"

WESTBOUND
STA. 143+07 "B" TO STA. 165+22 "B"

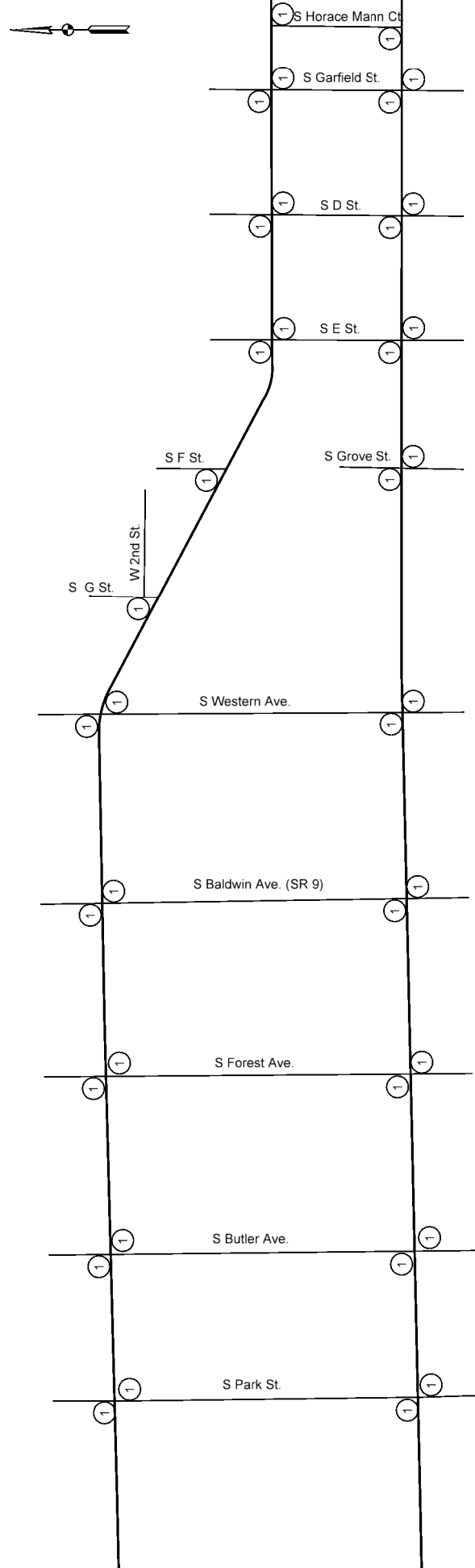
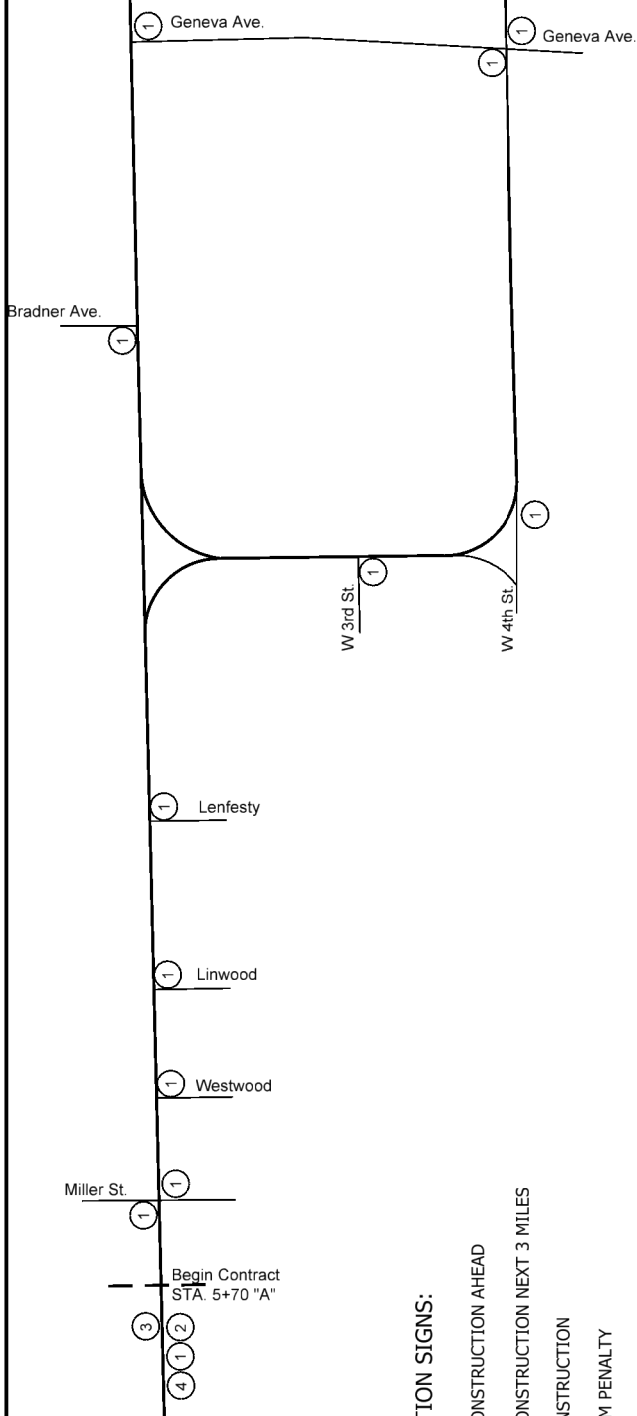
LEGEND:

- (A) 165 #/SYS QC/QA-HMA, 3, 70, SURFACE, 9.5mm ON 1.5" ASPHALT MILLING
- (A1) 165 #/SYS HMA SURFACE, TYPE C ON 1.5" ASPHALT MILLING
- (J) COMPACTED AGGREGATE, NO. 73 (AS DIRECTED)

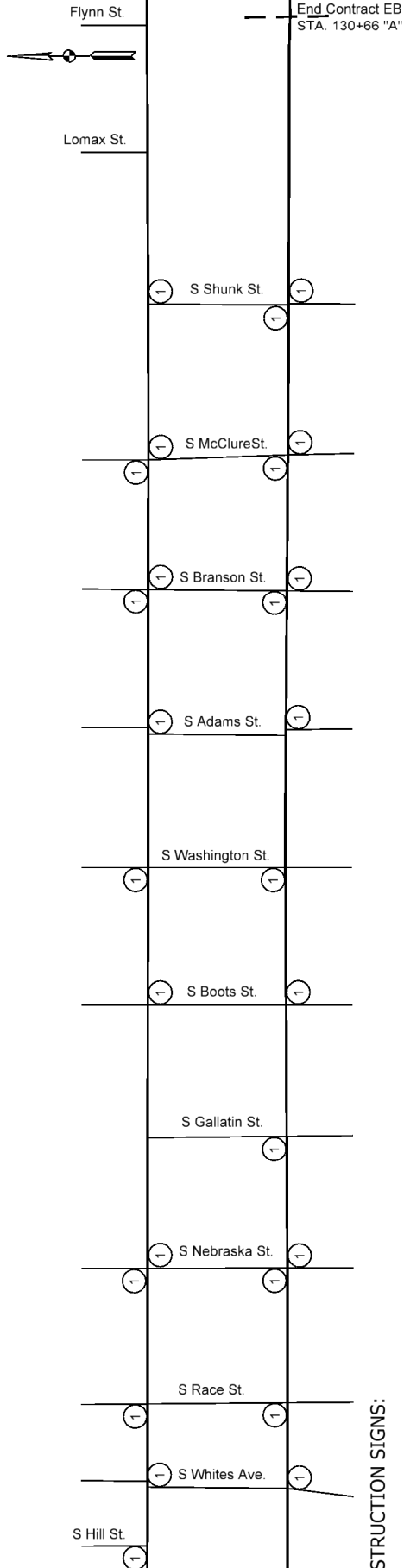
NOTES:

- * BRICK MAY EXIST BENEATH HMA PAVEMENT. SEE PAVEMENT CORE SUMMARY TABLE.
- ** FOR WIDTHS 4' AND LESS, USE (A) @ 2% FOR WIDTHS > 4', USE (A1) @ 4%
- *** MATCH EXISTING CROSS SLOPES

CONSTRUCTION SIGN LAYOUT

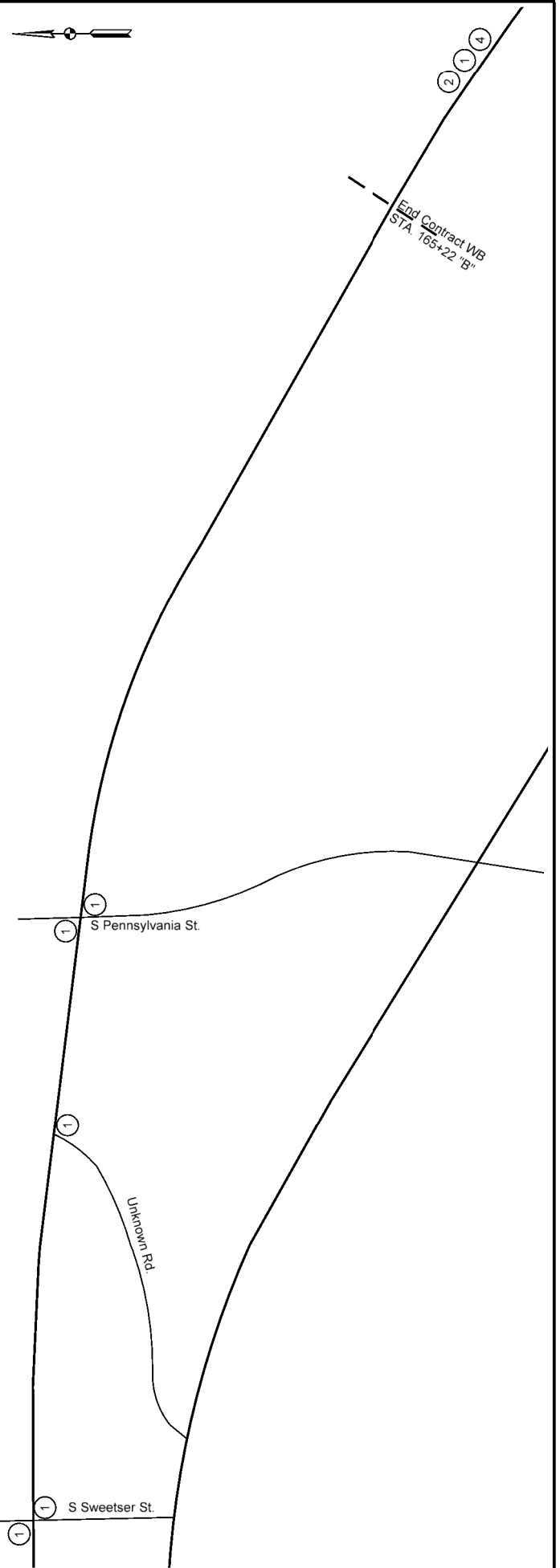
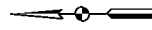


CONSTRUCTION SIGN LAYOUT



CONSTRUCTION SIGNS:

- 1 ROAD CONSTRUCTION AHEAD
- 2 ROAD CONSTRUCTION NEXT 3 MILES
- 3 END CONSTRUCTION
- 4 MAXIMUM PENALTY



Resurfacing, Milling & Compacted Aggregate Summary Table

Two-Way Section and Eastbound One Way

Station	Widths (feet)*					Type of Treatment	Areas (sys)**			Milling (sys)**			Description/ Comments
	Left Shoulder		Mainline	Right Shoulder			Mainline	Shoulder		Scarification / Profile	Transition	Asphalt 1.5 in.	
	Agg.	HMA		HMA	Agg.			HMA	Agg.				
5+70 "A"	4.0	2.0	26.0	2.0	4.0							Begin Contract	
5+77 "A"	4.0	2.0	26.0	2.0	4.0	P.M.	23	6			23	Begin Taper	
7+00 "A"	3.0	2.0	36.0	5.0	3.0	P.M.	499	96			499	Begin Left Turn Taper	
7+98 "A"	3.0	2.0	44.0	2.0	3.0	P.M.	495	65			495	Begin Concrete Median/Begin Lt. Turn Lane	
7+98 "A"	3.0	2.0	40.0	2.0	3.0	P.M.							
9+17 "A"	3.0	2.0	40.0			P.M.	569	60			569	Begin Curb on Rt. Side	
9+74 "A"	3.0		40.0			P.M.	260	19			260	End Concrete Median	
9+74 "A"	3.0		64.0			P.M.						Stop Bar/ End Median	
10+80 "A"			58.0			P.M.	718	18			718	Stop Bar WB	
12+46 "A"			49.0		3.0	P.M.	987	28			987	Begin Lt. Turn Taper	
14+40 "A"			41.0	11.0	3.0	P.M.	970	119	65		1089	End Lt. Turn Taper	
18+51 "A"	3.0	12.0	39.0	10.0	3.0	P.M.	1827	754	206		2580	End Right Turn/Begin Rt. Turn Taper	
19+56 "A"	3.0	12.0	26.0	7.0	3.0	P.M.	379	239	70		618	End Taper Rt. Turn Taper	
22+90 "A"	3.0	11.0	26.0	5.0	3.0	P.M.	965	649	223		1614		
24+17 "A"			42.0			P.M.	515	78	42		593	Start Curb	
24+88 "A"			48.0			P.M.	355				355	Begin Raised Median, Begin One Way	
24+88 "A"			44.0			P.M.						Mainline Width includes EB and WB legs to EB One Way	
26+01 "A"			40.0			P.M.	527				527	Mainline Width includes EB and WB legs to EB One Way	
26+01 "A"			51.0			P.M.						End Raised Median	
26+58 "A"			32.0			P.M.	263				263		
33+15 "A"			32.0			P.M.	2336				2336		
33+15 "A"			56.0			P.M.							
34+05 "A"			32.0			P.M.	440				440		
38+25 "A"			32.0			P.M.	1493				1493		
42+90 "A"			32.0			P.M.	1653				1653	Begin Paving Exception for Railroad	
42+99 "A"			32.0			P.M.						End Paving Exception for Railroad	
49+10 "A"			32.0			P.M.	2172				2172		
49+68 "A"			26.0			P.M.	187				187		
64+34 "A"			26.0			P.M.	4235				4235		
64+55 "A"			41.0			P.M.	78				78	Stop Bar at 9	
64+70 "A"			66.0			P.M.	89				89	Begin Paving Exception for SR 9	
65+28 "A"			66.0			P.M.						End Paving Exception for SR 9	
65+39 "A"			38.0			P.M.	64				64		
65+65 "A"			25.0			P.M.	91				91		
69+65 "A"			26.0			P.M.	1133				1133		
70+22 "A"			26.0			P.M.	165				165		
98+05 "A"			26.0			P.M.	8040				8040	Begin Paving Exception for Bridge	
98+78 "A"			26.0			P.M.						End Paving Exception for Bridge	
102+26 "A"			26.0			P.M.	1005				1005		
102+88 "A"			34.0			P.M.	207				207		
103+70 "A"			34.0			P.M.	310				310		
103+70 "A"			36.0			P.M.							
104+14 "A"			36.0			P.M.	176				176		
104+14 "A"			38.0			P.M.							
105+47 "A"			38.0			P.M.	562				562		
105+60 "A"			44.0			P.M.	59				59		
106+16 "A"			49.0			P.M.	289				289		
106+90 "A"			49.0			P.M.	403				403		
106+90 "A"			41.0			P.M.							
107+72 "A"			43.0			P.M.	383				383	Begin Parking	
108+83 "A"			43.0			P.M.	530				530	End Parking / Begin Paving Exception for Washington St.	
109+61 "A"			61.0			P.M.						End Paving Exception for Washington St.	
112+18 "A"			61.0			P.M.	1742				1742	Begin Paving Exception for Adams St.	
113+01 "A"			45.0			P.M.						End Paving Exception for Adams St.	
115+56 "A"			45.0			P.M.	1275				1275		
115+56 "A"			40.0			P.M.							
116+32 "A"			36.0			P.M.	321				321		
118+93 "A"			36.0			P.M.	1044				1044		
119+80 "A"			34.0			P.M.	338				338		
120+26 "A"			34.0			P.M.	174				174		
120+26 "A"			36.0			P.M.							
121+12 "A"			36.0			P.M.	344				344	Begin Paving Exception for Railroad	
121+18 "A"			36.0			P.M.						End Paving Exception for Railroad	
121+58 "A"			36.0			P.M.	160				160		
121+58 "A"			34.0			P.M.							
122+71 "A"			34.0			P.M.	427				427		
123+37 "A"			40.0			P.M.	271				271		
124+17 "A"			26.0			P.M.	293				293		
126+55 "A"			26.0	10.0		P.M.	688	132			820		
126+98 "A"			26.0	10.0		P.M.	124	48			172		
127+43 "A"			26.0	10.0		P.M.	130	50			180		
129+46 "A"			26.0	10.0		P.M.	586	226			812		
130+14 "A"		6.0	26.0	10.0		P.M.	219	76			295	End Contract for Eastbound	
130+66 "A"		8.0				P.M.		69			69	Incidental Shoulder Repair	
Totals							43589	2439	896			46028	

* Widths are approximate and shall be field verified.

** Areas are calculated by using station in current row and the row above.

Quantity Summary

Mainline QC/QA-HMA (ton)		Shoulder HMA, Type C (ton)		Asphalt for Tack Coat (ton)	Comp. Agg. No. 73 3.0' (avg) (ton)	Milling		
Surface	Intermed.	Surface	Intermed.			Scarification (sys)	Transition (s/s)	Asphalt 1.5" (sys)
165 #/sys		165 #/sys						
3597		202		11.6	150			46028

Resurfacing, Milling & Compacted Aggregate Summary Table

Westbound One-Way

Station	Widths (feet)*				Type of Treatment	Areas (sys)**			Milling (sys)**			Description/ Comments	
	Left Shoulder		Mainline	Right Shoulder		Mainline	Shoulder		Scarification / Profile	Transition	Asphalt 1.5 in		
	Agg	HMA		HMA			Agg	HMA					Agg.
24+88 "B"			22.0									Begin Westbound One Way	
26+76 "B"			20.0		P.M.	439					439		
26+76 "B"			48.0		P.M.								
27+48 "B"			34.0		P.M.	328					328		
27+48 "B"			32.0		P.M.								
36+26 "B"			32.0		P.M.	3122					3122		
37+05 "B"			26.0		P.M.	255					255		
56+82 "B"			26.0		P.M.	5711					5711		
56+82 "B"			28.0		P.M.								
57+85 "B"			88.0		P.M.	664					664	Begin Paving Exception for SR 9	
58+46 "B"			84.0		P.M.							End Paving Exception for SR 9	
58+77 "B"			44.0		P.M.	220					220	Stop Bar/Left and Right Turn Lane Begin	
59+22 "B"			44.0		P.M.	220					220	End Left and Right Turn Lane/Begin Tapers	
59+40 "B"			41.0		P.M.	85					85	End Right Turn Lane Taper	
59+79 "B"			30.0		P.M.	154					154		
60+02 "B"			26.0		P.M.	72					72	End Left Turn Lane Taper	
63+12 "B"			26.0		P.M.	896					896		
63+48 "B"			33.0		P.M.	118					118		
64+41 "B"			33.0		P.M.	341					341		
64+41 "B"			28.0		P.M.								
64+98 "B"			28.0		P.M.	177					177		
64+98 "B"			26.0		P.M.								
69+99 "B"			26.0		P.M.	1447					1447		
69+99 "B"			28.0		P.M.								
71+48 "B"			28.0		P.M.	464					464		
71+48 "B"			26.0		P.M.								
72+54 "B"			26.0		P.M.	306					306		
72+54 "B"			28.0		P.M.								
73+10 "B"			35.0		P.M.	196					196		
73+10 "B"			33.0		P.M.								
73+92 "B"			32.0		P.M.	296					296		
74+53 "B"			32.0		P.M.	217					217		
76+34 "B"			32.0		P.M.	644					644		
76+34 "B"			34.0		P.M.								
76+53 "B"			34.0		P.M.	72					72		
76+53 "B"			36.0		P.M.								
77+63 "B"			36.0		P.M.	440					440		
77+63 "B"			33.0		P.M.								
82+28 "B"			33.0		P.M.	1705					1705		
82+28 "B"			41.0		P.M.								
83+01 "B"			41.0		P.M.	333					333		
83+01 "B"			43.0		P.M.								
84+12 "B"			43.0		P.M.	530					530		
84+12 "B"			35.0		P.M.								
84+34 "B"			35.0		P.M.	86					86		
84+34 "B"			33.0		P.M.								
90+28 "B"			33.0		P.M.	2178					2178		
90+66 "B"			41.0		P.M.	156					156		
92+25 "B"			41.0		P.M.	724					724		
92+25 "B"			34.0		P.M.								
92+61 "B"			34.0		P.M.	136					136	Begin Paving Exception for Bridge	
93+36 "B"			32.0		P.M.							End Paving Exception for Bridge	
94+02 "B"			40.0		P.M.	264					264		
96+28 "B"			40.0		P.M.	1004					1004		
96+28 "B"			43.0		P.M.								
100+45 "B"			43.0		P.M.	1992					1992		
100+45 "B"			39.0		P.M.								
103+27 "B"			39.0		P.M.	1222					1222	Begin Paving Exception for Washington St	
104+14 "B"			62.0		P.M.							End Paving Exception for Washington St	
106+67 "B"			62.0		P.M.	1743					1743	Begin Paving Exception for Adams St	
107+50 "B"			36.0		P.M.							End Paving Exception for Adams St	
109+06 "B"			36.0		P.M.	624					624		
109+06 "B"			34.0		P.M.								
109+95 "B"			34.0		P.M.	336					336		
109+95 "B"			36.0		P.M.								
111+95 "B"			36.0		P.M.	800					800		
111+95 "B"			34.0		P.M.								
115+38 "B"			34.0		P.M.	1296					1296	Begin Paving Exception for Railroad	
115+45 "B"			38.0		P.M.							End Paving Exception for Railroad	
115+80 "B"			36.0		P.M.	144					144		
116+00 "B"			33.0		P.M.	77					77		
127+95 "B"			33.0		P.M.	4382					4382		
128+63 "B"			39.0		P.M.	272					272	Start RT Turn Lane	
131+41 "B"			39.0		P.M.	1205					1205	End RT Turn Lane/Begin Rt Turn Lane Taper	
133+33 "B"			28.0	6.0	P.M.	779					779	Begin Shoulder/ End RT Turn Lane Taper	
136+82 "B"			26.0	6.0	P.M.	1047	233				1280		
138+00 "B"			30.0	6.0	P.M.	367	79				446	Begin Paving Exception for Bridge	
143+07 "B"		7.0	25.0	6.0	P.M.							End Paving Exception for Bridge	
144+92 "B"		12.0	24.0	9.0	P.M.	504	349				853		
148+00 "B"		12.0	24.0	5.0	P.M.	821	650				1472		
153+42 "B"		11.0	24.0	5.0	P.M.	1445	994				2439		
165+22 "B"		10.0	24.0	5.0	P.M.	3147	2032				5179	End Contract Westbound	
Totals						46201	4337				50537		

* Widths are approximate and shall be field verified.

** Areas are calculated by using station in current row and the row above.

Quantity Summary

Mainline QC/QA-HMA (ton)		Shoulder HMA, Type C (ton)		Asphalt for Tack Coat (ton)	Comp. Agg. No. 73 3.0" (avg) (ton)	Milling		Asphalt 1.5" (sys)
Surface	Intermed.	Surface	Intermed.			Scarification (sys)	Transition (sys)	
185 #/sys		185 #/sys						
3812		358		12.7				50537

Full Depth Patching Summary Table

Start Station	End Station	Direction	Lane	Length (ft)	Width (ft)	Area (sys)
7+98 "A"	8+72 "A"	WB	Mainline	74	17	140
24+12 "A"	24+37 "A"	EB, WB	Mainline	25	42	117
30+62 "A"	31+10 "A"	EB	Mainline RT	48	10	54
35+71 "A"	35+88 "A"	EB	Mainline Both	17	32	61
36+22 "A"	36+42 "A"	EB	Mainline LT	20	16	36
49+48 "A"	49+63 "A"	EB	Mainline LT	15	15	25
49+63 "A"	49+83 "A"	EB	Mainline RT	20	15	34
51+28 "A"	51+91 "A"	EB	Mainline RT	63	15	105
60+50 "A"	60+86 "A"	EB	Mainline RT	36	15	60
62+08 "A"	63+30 "A"	EB	Mainline RT	122	15	204
63+93 "A"	64+22 "A"	EB	Mainline Both	29	26	84
65+50 "A"	66+00 "A"	EB	Mainline RT	50	13	73
65+50 "A"	65+73 "A"	EB	Mainline LT	23	9	23
66+22 "A"	66+83 "A"	EB	Mainline LT	61	9	61
66+22 "A"	66+68 "A"	EB	Mainline RT	46	17	87
68+05 "A"	68+71 "A"	EB	Mainline Both	66	26	191
69+62 "A"	70+15 "A"	EB	Mainline RT	53	17	101
72+53 "A"	73+86 "A"	EB	Mainline RT	133	13	193
75+11 "A"	76+70 "A"	EB	Mainline RT	159	6	106
82+45 "A"	83+17 "A"	EB	Mainline RT	72	13	104
82+87 "A"	83+08 "A"	EB	Mainline LT	21	9	21
85+94 "A"	86+24 "A"	EB	Mainline LT	30	9	30
87+15 "A"	88+24 "A"	EB	Mainline RT	109	14	170
88+06 "A"	88+24 "A"	EB	Mainline LT	18	4	8
88+24 "A"	88+93 "A"	EB	Mainline LT	69	14	108
89+38 "A"	91+97 "A"	EB	Mainline RT	259	14	403
92+43 "A"	95+40 "A"	EB	Mainline RT	297	14	462
96+76 "A"	97+43 "A"	EB	Mainline Both	67	26	194
98+89 "A"	99+44 "A"	EB	Mainline RT	55	17	104
98+89 "A"	102+16 "A"	EB	Mainline LT	327	9	327
102+33 "A"	102+84 "A"	EB	Mainline RT	51	19	108
103+21 "A"	103+80 "A"	EB	Mainline LT	59	9	59
104+72 "A"	105+68 "A"	EB	Mainline RT	96	19	203
121+06 "A"	121+12 "A"	EB	Mainline Both	6	36	24
121+18 "A"	121+24 "A"	EB	Mainline Both	6	36	24
123+35 "A"	123+69 "A"	EB	Mainline RT	34	20	76
128+85 "A"	129+65 "A"	EB	Mainline RT	80	13	116
129+89 "A"	130+14 "A"	EB	Mainline RT	25	13	37
26+77 "B"	26+99 "B"	WB	Mainline LT	22	18	44
34+16 "B"	34+37 "B"	WB	Mainline Both	21	32	75
50+89 "B"	51+36 "B"	WB	Mainline LT	47	13	68
57+03 "B"	57+32 "B"	WB	Mainline RT	29	6	20
59+68 "B"	60+05 "B"	WB	Mainline Both	37	36	148
78+29 "B"	78+54 "B"	WB	Mainline RT	25	17	48
81+09 "B"	81+52 "B"	WB	Mainline LT	43	17	82
93+36 "B"	93+66 "B"	WB	Mainline Both	30	32	107
100+18 "B"	100+44 "B"	WB	Mainline LT	26	22	64
101+10 "B"	101+27 "B"	WB	Mainline LT	17	13	25
101+55 "B"	102+38 "B"	WB	Mainline LT	83	22	203
105+41 "B"	105+89 "B"	WB	Mainline LT	48	13	70
106+02 "B"	106+67 "B"	WB	Mainline LT	65	13	94
108+70 "B"	109+27 "B"	WB	Mainline LT	57	13	83
115+32 "B"	115+38 "B"	WB	Mainline Both	6	34	23
115+45 "B"	115+51 "B"	WB	Mainline Both	6	36	24
117+40 "B"	117+70 "B"	WB	Mainline LT	30	17	57
162+44 "B"	162+64 "B"	WB	Mainline Both	20	24	54

Distributed Quantity: 5622

Undistributed Quantity: 281

Total Full Depth Patching: 5903

Full Depth Patching shall consist of:

1320 #/sys HMA Patching, Type C, Full Depth on

6" Comp. Agg., No. 53, Base (as directed by project engineer)

Quantity Summary

3897 tons HMA Patching, Type C, Full Depth

4.5 tons Asphalt for Tack Coat

492 tons Compacted Aggregate, No. 53, Base

NOTES:

* Patching locations and quantities are approximate. These locations are subject to the review of the

** Cost of asphalt milling, concrete sawing, and concrete removal related to patching operations shall be included in the cost of the HMA patching item.

Partial Depth Patching Summary Table

Start Station	End Station	Direction	Lane	Length (ft)	Width (ft)	Area (sys)
11+36 "A"	12+34 "A"	WB	Mainline	98	4	44
13+03 "A"	14+37 "A"	WB	Mainline	134	6	90
14+53 "A"	15+93 "A"	EB	Mainline	140	4	63
18+35 "A"	18+95 "A"	WB	Mainline	60	5	34
20+42 "A"	20+83 "A"	WB	Mainline	41	4	19
20+90 "A"	21+62 "A"	WB	Mainline	72	6	48
22+78 "A"	23+78 "A"	WB	Mainline	100	4	45
27+62 "A"	27+94 "A"	EB	Mainline RT	32	16	57
33+99 "A"	35+22 "A"	EB	Mainline RT	123	7	96
39+51 "A"	39+70 "A"	EB	Mainline RT	19	16	34
47+15 "A"	47+35 "A"	EB	Mainline Both	20	20	45
52+03 "A"	53+61 "A"	EB	Mainline RT	158	15	264
71+95 "A"	72+53 "A"	EB	Mainline RT	58	13	84
95+40 "A"	96+57 "A"	EB	Mainline Both	117	26	338
105+98 "A"	106+62 "A"	EB	Mainline LT	64	23	164
106+90 "A"	107+20 "A"	EB	Mainline RT	30	8	27
107+39 "A"	108+39 "A"	EB	Mainline RT	100	8	89
107+39 "A"	108+14 "A"	EB	Mainline LT	75	8	67
113+01 "A"	113+39 "A"	EB	Mainline RT	38	13	55
114+12 "A"	114+40 "A"	EB	Mainline Both	28	26	81
119+92 "A"	120+78 "A"	EB	Mainline RT	86	18	172
37+51 "B"	42+06 "B"	WB	Mainline LT	455	8	405
42+35 "B"	45+01 "B"	WB	Mainline LT	266	13	385
45+01 "B"	45+73 "B"	WB	Mainline LT	72	13	104
47+25 "B"	47+90 "B"	WB	Mainline LT	65	13	94
49+49 "B"	50+30 "B"	WB	Mainline LT	81	8	72
50+58 "B"	50+99 "B"	WB	Mainline LT	41	8	37
53+91 "B"	56+57 "B"	WB	Mainline LT	266	13	385
63+90 "B"	64+41 "B"	WB	Mainline RT	51	17	97
67+66 "B"	68+00 "B"	WB	Mainline RT	34	13	50
78+03 "B"	78+29 "B"	WB	Mainline LT	26	17	50
79+61 "B"	80+55 "B"	WB	Mainline LT	94	17	178
81+52 "B"	82+18 "B"	WB	Mainline Both	66	24	176
82+75 "B"	83+13 "B"	WB	Mainline Both	38	24	102
84+00 "B"	84+63 "B"	WB	Mainline LT	63	13	91
110+16 "B"	110+35 "B"	WB	Mainline LT	19	18	38
110+99 "B"	111+60 "B"	WB	Mainline RT	61	6	41
164+98 "B"	165+22 "B"	WB	Mainline RT	24	12	32

Distributed Quantity: 4253

Undistributed Quantity: 213

 Total Partial Depth Patching: 4466

Partial Depth Patching shall consist of:

330 #/sys HMA Patching, Type C, Partial Depth

Quantity Summary

737 tons HMA Patching, Type C, Partial Depth

2.3 tons Asphalt for Tack Coat

NOTES:

1. Patching locations and quantities are approximate. These locations are subject to the review of the project engineer. Locations may be added or changed at the time of construction.
2. Cost of asphalt milling related to partial-depth patching operations shall be included in the cost of the HMA

Public Road Approach Summary Table**Two-Way Section and Eastbound One Way**

Station	Side	Road Name	Existing Road Condition	Treatment Type	Width @ Travel Lane (ft)	Width @ ROW Line (ft)	Depth (travel lane to ROW line) (ft)	Area (sys)
10+30 "A"	RT	Miller St	Improved	P.M.	120	36	61	529
10+30 "A"	LT	Miller St	Improved	P.M.	132	49	61	614
12+13 "A"	RT	Westwood Dr.	Improved	P.M.	66	32	22	120
15+12 "A"	RT	Linwood Dr.	Improved	P.M.	55	27	26	119
20+20 "A"	RT	Lenfesty Ave.	Improved	P.M.	64	21	21	100
29+45 "A"	RT	Third St.	Improved	P.M.	43	20	20	70
33+08 "A"	RT	Norton Ave/Fourth St.	Improved	P.M.	25	24	56	153
33+08 "A"	RT	Norton Ave/Fourth St.	Improved	P.M.	21	21	84	196
43+62 "A"	RT	Geneva Ave.	Improved	P.M.	30	17	17	45
43+32 "A"	LT	Geneva Ave.	Improved	P.M.	58	30	21	103
49+36 "A"	RT	Park Ave.	Improved	P.M.	42	22	25	89
49+36 "A"	LT	Park Ave.	Improved	P.M.	42	22	21	75
55+72 "A"	RT	Butler Ave.	Improved	P.M.	29	29	18	58
55+72 "A"	LT	Butler Ave.	Improved	P.M.	29	29	18	58
60+41 "A"	RT	Forest Ave.	Improved	P.M.	30	30	21	70
60+41 "A"	LT	Forest Ave.	Improved	P.M.	30	30	22	74
65+00 "A"	RT	Baldwin Ave. (SR 9)	Improved	P.M.	No Work Required			
65+00 "A"	LT	Baldwin Ave. (SR 9)	Improved	P.M.	No Work Required			
69+92 "A"	LT	Western Ave.	Improved	P.M.	51	28	10	44
69+92 "A"	RT	Western Ave.	Improved	P.M.	51	28	10	44
76+27 "A"	LT	Grove St.	Improved	P.M.	30	25	10	31
76+27 "A"	RT	Grove St.	Improved	P.M.	30	25	10	31
79+70 "A"	LT	E St.	Improved	P.M.	35	30	10	37
79+70 "A"	RT	E St.	Improved	P.M.	35	30	10	37
82+98 "A"	LT	D St.	Improved	P.M.	35	30	10	37
82+98 "A"	RT	D St.	Improved	P.M.	35	30	10	37
86+30 "A"	LT	Garfield Rd.	Improved	P.M.	31	28	10	33
86+30 "A"	RT	Garfield Rd.	Improved	P.M.	31	28	10	33
87+90 "A"	LT	Horace Mann Ct.	Improved	P.M.	33	30	10	35
93+94 "A"	LT	Whites Ave.	Improved	P.M.	30	25	10	31
93+88 "A"	RT	Whites Ave.	Improved	P.M.	30	25	10	31
96+00 "A"	LT	Race St.	Improved	P.M.	28	25	10	30
96+00 "A"	RT	Race St.	Improved	P.M.	28	25	10	30
99+29 "A"	LT	Nebraska St.	Improved	P.M.	59	33	10	52
99+29 "A"	RT	Nebraska St.	Improved	P.M.	52	33	10	48
102+58 "A"	LT	Gallatin St.	Improved	P.M.	46	31	8	35
102+58 "A"	RT	Gallatin St.	Improved	P.M.	51	33	8	38
105+81 "A"	LT	Boots St.	Improved	P.M.	56	39	8	43
105+81 "A"	RT	Boots St.	Improved	P.M.	51	44	8	43
109+22 "A"	RT	Washington St.	Improved	P.M.	No Work Required			
109+22 "A"	LT	Washington St.	Improved	P.M.	No Work Required			
112+64 "A"	RT	Adams St.	Improved	P.M.	No Work Required			
112+64 "A"	LT	Adams St.	Improved	P.M.	No Work Required			
116+00 "A"	LT	Branson St.	Improved	P.M.	41	34	8	34
116+00 "A"	RT	Branson St.	Improved	P.M.	61	43	8	47
119+38 "A"	LT	McClure St.	Improved	P.M.	67	46	8	51
119+38 "A"	RT	McClure St.	Improved	P.M.	71	46	8	52
123+08 "A"	LT	Shunk St.	Improved	P.M.	98	82	8	80
123+08 "A"	RT	Shunk St.	Improved	P.M.	48	34	8	37

Improved appr. within the PM limits shall consist of:
 165 #/sys HMA Surface, Type C on
 Milling, Approach

Unimproved approaches shall consist of:
 165 #/sys HMA Surface, Type C on
 275 #/sys HMA Intermediate, Type C on
 880 #/sys HMA Base, Type C on
 Subgrade Treatment, Type IIIA

Quantity Summary

294 tons HMA for Approaches, Type C
 0.9 tons Asphalt for Tack Coat
 3554 sys Milling, Approach
 Subgrade Treatment, Type IIIA

Public Road Approach Summary Table**Westbound Approaches Only**

Station	Side	Road Name	Existing Road Condition	Treatment Type	Width @ Travel Lane (ft)	Width @ ROW Line (ft)	Depth (travel lane to ROW line) (ft)	Area (sys)
31+25 "B"	LT	Bradner Ave.	Improved	P.M.	70	29	21	116
36+80 "B"	RT	Geneva Ave.	Improved	P.M.	45	35	26	116
42+61 "B"	RT	Park Ave.	Improved	P.M.	30	30	22	74
42+61 "B"	LT	Park Ave.	Improved	P.M.	25	25	15	42
48+88 "B"	RT	Butler Ave.	Improved	P.M.	30	30	20	67
48+88 "B"	LT	Butler Ave.	Improved	P.M.	30	30	26	87
53+58 "B"	RT	Forest Ave.	Improved	P.M.	30	30	23	77
53+58 "B"	LT	Forest Ave.	Improved	P.M.	30	30	24	80
58+15 "B"	RT	Baldwin Ave. (SR 9)	Improved	P.M.	No Work Required			
58+15 "B"	LT	Baldwin Ave. (SR 9)	Improved	P.M.	No Work Required			
63+12 "B"	RT	Western Ave.	Improved	P.M.	62	31	13	68
63+12 "B"	LT	Western Ave.	Improved	P.M.	41	30	12	48
66+30 "B"	LT	2nd St./G St.	Improved	P.M.	93	74	12	112
70+40 "B"	LT	F St.	Improved	P.M.	66	44	10	62
74+10 "B"	RT	E St.	Improved	P.M.	33	30	14	49
74+10 "B"	LT	E St.	Improved	P.M.	33	30	14	49
77+43 "B"	RT	D St.	Improved	P.M.	34	30	14	50
77+43 "B"	LT	D St.	Improved	P.M.	38	30	14	53
80+68 "B"	RT	Garfield Rd.	Improved	P.M.	31	28	14	46
80+68 "B"	LT	Garfield Rd.	Improved	P.M.	31	28	14	46
82+33 "B"	RT	Horace Mann CT.	Improved	P.M.	34	31	14	51
83+96 "B"	LT	Hill Rd.	Improved	P.M.	36	30	7	26
88+36 "B"	RT	Whites Ave.	Improved	P.M.	28	25	14	42
88+51 "B"	LT	Whites Ave.	Improved	P.M.	28	25	14	42
90+42 "B"	RT	Race St.	Improved	P.M.	28	25	14	42
90+42 "B"	LT	Race St.	Improved	P.M.	34	28	14	49
93+74 "B"	RT	Nebraska St.	Improved	P.M.	51	34	14	67
93+74 "B"	LT	Nebraska St.	Improved	P.M.	51	34	14	67
97+07 "B"	RT	Gallatin St.	Improved	P.M.	43	30	7	29
100+28 "B"	RT	Boots St.	Improved	P.M.	43	36	14	62
100+28 "B"	LT	Boots St.	Improved	P.M.	40	31	14	56
103+71 "B"	RT	Washington St.	Improved	P.M.	No Work Required			
103+71 "B"	LT	Washington St.	Improved	P.M.	No Work Required			
107+09 "B"	RT	Adams St.	Improved	P.M.	No Work Required			
107+09 "B"	LT	Adams St.	Improved	P.M.	No Work Required			
110+50 "B"	RT	Branson St.	Improved	P.M.	46	36	14	64
110+50 "B"	LT	Branson St.	Improved	P.M.	82	46	26	185
113+70 "B"	RT	McClure St.	Improved	P.M.	64	43	14	84
113+70 "B"	LT	McClure St.	Improved	P.M.	64	43	14	84
117+59 "B"	RT	Shunk St.	Improved	P.M.	105	52	15	131
120+39 "B"	LT	Lomax St.	Improved	P.M.	No Work Required			
124+19 "B"	LT	Flynn St.	Improved	P.M.	No Work Required			
128+34 "B"	RT	Sweetser St.	Improved	P.M.	95	33	31	221
128+26 "B"	LT	Sweetser St.	Improved	P.M.	67	29	35	187
137+70 "B"	RT	Unknown Rd	Improved	P.M.	66	23	46	228
144+32 "B"	RT	Pennsylvania St.	Improved	P.M.	110	43	93	791
144+32 "B"	LT	Pennsylvania St.	Improved	P.M.	118	34	80	676

Improved appr. within the PM limits shall consist of:

165 #/sys HMA Surface, Type C on
Milling, Approach

Unimproved approaches shall consist of:

165 #/sys HMA Surface, Type C on
275 #/sys HMA Intermediate, Type C on
880 #/sys HMA Base, Type C on
Subgrade Treatment, Type IIIA

Quantity Summary

366 tons HMA for Approaches, Type C
1.2 tons Asphalt for Tack Coat
4426 sys Milling, Approach
Subgrade Treatment, Type IIIA

Minor Road Approach Summary Table

Two-Way Section and Eastbound One Way

Minor Approach Type	Quantity Improved (ea)	Quantity Unimproved (ea)	Avg. Area Each Appr. (sys)	Total Area Improved (sys)	Total Area Unimproved (sys)
Driveways					
Residential	2		14	28	
Commercial	17	2	27	453	53
Alley	7		35	245	
Field Entrance			18		
Mailbox					
Stand-Alone			168		
Combo (before drive)			106		
Combo (after drive)			97		
Totals				726	53

NOTE: Build minor approaches to Standard Drawings E 610-DRIV-21 and E 610-MBAP-01 (W= up to 8 ft), where drainage ditches and right-of-way permit.

All improved minor approaches shall consist of:

165 #/sys HMA Surface, Type C on
Milling, Approach

Unimproved minor approaches shall be as follows:

Residential & Mailbox: 165 #/sys HMA Surface, Type C on
385 #/sys HMA Intermediate, Type C on
Subgrade Treatment, Type IIIA

Commercial & Industr.: 165 #/sys HMA Surface, Type C on
275 #/sys HMA Intermediate, Type C on
880 #/sys HMA Base, Type C on
Subgrade Treatment, Type IIIA

Field Entrance: 165 #/sys HMA Surface, Type C on
275 #/sys HMA Intermediate, Type C on
440 #/sys HMA Base, Type C on
Subgrade Treatment, Type IIIA

Quantity Summary

96 tons HMA for Approaches, Type C
0.3 tons Asphalt for Tack Coat
726 sys Milling, Approach
53 sys Subgrade Treatment, Type IIIA
Mailbox Assembly, Single, Reset (Undistributed)

Minor Road Approach Summary Table

Westbound Only

Minor Approach Type	Quantity Improved (ea)	Quantity Unimproved (ea)	Avg. Area Each Appr. (sys)	Total Area Improved (sys)	Total Area Unimproved (sys)
Driveways					
Residential			14		
Commercial	15		27	400	
Alley	9		35	315	
Field Entrance			18		
Mailbox					
Stand-Alone			168		
Combo (before drive)			106		
Combo (after drive)			97		

Totals 715

NOTE: Build minor approaches to Standard Drawings E 610-DRIV-21 and E 610-MBAP-01 (W=up to 8 ft), where drainage ditches and right-of-way permit.

All improved minor approaches shall consist of:

165 #/sys HMA Surface, Type C on
Milling, Approach

Unimproved minor approaches shall be as follows:

Residential & Mailbox: 165 #/sys HMA Surface, Type C on
385 #/sys HMA Intermediate, Type C on
Subgrade Treatment, Type IIIA

Commercial & Industr.: 165 #/sys HMA Surface, Type C on
275 #/sys HMA Intermediate, Type C on
880 #/sys HMA Base, Type C on
Subgrade Treatment, Type IIIA

Field Entrance: 165 #/sys HMA Surface, Type C on
275 #/sys HMA Intermediate, Type C on
440 #/sys HMA Base, Type C on
Subgrade Treatment, Type IIIA

Quantity Summary

59 tons HMA for Approaches, Type C
0.2 tons Asphalt for Tack Coat
715 sys Milling, Approach
Subgrade Treatment, Type IIIA
Mailbox Assembly, Single, Reset (Undistributed)

**Concrete Curb Ramp Summary Table
Eastbound Approaches Only**

Side Street Station	Side Street	Quadrant	Curb Ramp Type	Area	Remarks
				(sys)	
49+36 "A"	S. Park Ave.	NE	C	2.7	
49+36 "A"	S. Park Ave.	SE	C	2.7	Relocate Stop Sign
49+36 "A"	S. Park Ave.	SW	C	2.7	
49+36 "A"	S. Park Ave.	NW	C	2.7	
55+72 "A"	S. Butler Ave.	NE	C	2.7	
55+72 "A"	S. Butler Ave.	SE	C	2.7	
55+72 "A"	S. Butler Ave.	SW	C	2.7	
55+72 "A"	S. Butler Ave.	SW	C	2.7	
55+72 "A"	S. Butler Ave.	NW	C	2.7	
55+72 "A"	S. Butler Ave.	NW	C	2.7	
60+41 "A"	S. Forest Ave.	NE	C	2.7	
60+41 "A"	S. Forest Ave.	SE	C	2.7	
60+41 "A"	S. Forest Ave.	SW	C, Mod.	4.0	
60+41 "A"	S. Forest Ave.	NW	C	2.7	
65+00 "A"	SR 9/SR 15	NE	F	21.6	
65+00 "A"	SR 9/SR 15	SE	F	21.6	
65+00 "A"	SR 9/SR 15	SW	F	21.6	
65+00 "A"	SR 9/SR 15	NW	F	21.6	
69+92 "A"	S. Western Ave.	NE	E	10.7	ADJ CASTING
69+92 "A"	S. Western Ave.	SE	E	10.7	
69+92 "A"	S. Western Ave.	SW	E	10.7	
69+92 "A"	S. Western Ave.	NW	E	10.7	
76+27 "A"	S. Grove St.	NE	C	2.7	
76+27 "A"	S. Grove St.	NE	C	2.7	
76+27 "A"	S. Grove St.	NW	C	2.7	
76+27 "A"	S. Grove St.	NW	C	2.7	
76+27 "A"	S. Grove St.	SE	C	2.7	
76+27 "A"	S. Grove St.	SE	C	2.7	
76+27 "A"	S. Grove St.	SW	C	2.7	
76+27 "A"	S. Grove St.	SW	C	2.7	
76+27 "A"	S. Grove St.	SW	C	2.7	
79+70 "A"	S. E St.	NE	C	2.7	
79+70 "A"	S. E St.	NE	C	2.7	
79+70 "A"	S. E St.	SE	C	2.7	
79+70 "A"	S. E St.	SE	C	2.7	
79+70 "A"	S. E St.	SW	C	2.7	
79+70 "A"	S. E St.	SW	C	2.7	
79+70 "A"	S. E St.	NW	C	2.7	
79+70 "A"	S. E St.	NW	D	2.7	
82+98 "A"	S. D St.	SW	C	2.7	
82+98 "A"	S. D St.	NW	C	2.7	
82+98 "A"	S. D St.	NW	C	2.7	
86+30 "A"	S. Garfield St.	NE	C	2.7	
86+30 "A"	S. Garfield St.	NE	C	2.7	
86+30 "A"	S. Garfield St.	SE	C	2.7	
86+30 "A"	S. Garfield St.	SE	C	2.7	
86+30 "A"	S. Garfield St.	SW	C	2.7	
86+30 "A"	S. Garfield St.	SW	C	2.7	
86+30 "A"	S. Garfield St.	NW	C	2.7	
86+30 "A"	S. Garfield St.	NW	C	2.7	
87+90 "A"	Horace Mann Ct.	NE	C	2.7	
87+90 "A"	Horace Mann Ct.	SW	K	8.9	
87+90 "A"	Horace Mann Ct.	NW	C	2.7	
93+88 "A"	S. Whites Ave.	NE	C	2.7	
93+88 "A"	S. Whites Ave.	NE	C	2.7	
93+94 "A"	S. Whites Ave.	SE	C	2.7	
93+94 "A"	S. Whites Ave.	SE	C	2.7	
93+94 "A"	S. Whites Ave.	SW	H	6.3	
93+88 "A"	S. Whites Ave.	NW	C	2.7	
93+88 "A"	S. Whites Ave.	NW	C	2.7	
96+00 "A"	S. Race St.	SE	C	2.7	
96+00 "A"	S. Race St.	SE	C	2.7	
96+00 "A"	S. Race St.	SW	C	2.7	
96+00 "A"	S. Race St.	SW	C	2.7	
96+00 "A"	S. Race St.	NW	C	2.7	
96+00 "A"	S. Race St.	NW	C	2.7	
102+58 "A"	S. Gallatin St.	NE	B	21.4	
102+58 "A"	S. Gallatin St.	SE	B	21.4	
102+58 "A"	S. Gallatin St.	SW	B	21.4	
102+58 "A"	S. Gallatin St.	NW	B	21.4	
105+81 "A"	S. Boots Ave.	NE	B	21.4	
105+81 "A"	S. Boots Ave.	SE	F	21.6	
105+81 "A"	S. Boots Ave.	SW	A	7.0	
105+81 "A"	S. Boots Ave.	SW	A	7.0	
105+81 "A"	S. Boots Ave.	NW	F	21.6	
116+00 "A"	S. Branson St.	NE	A	7.0	
116+00 "A"	S. Branson St.	NE	A	7.0	
116+00 "A"	S. Branson St.	SE	B	21.4	
116+00 "A"	S. Branson St.	SW	B	21.4	
116+00 "A"	S. Branson St.	NW	F	21.6	Remove Existing Non-Compliant Curb Ramp
119+38 "A"	S. McClure St.	NE	F	21.6	
119+38 "A"	S. McClure St.	SE	B	21.4	
119+38 "A"	S. McClure St.	SW	B	21.4	
119+38 "A"	S. McClure St.	NW	A	7.0	
119+38 "A"	S. McClure St.	NW	A	7.0	
123+08 "A"	S. Shunk St.	SE	C	2.7	
123+08 "A"	S. Shunk St.	NE	C	2.7	
123+08 "A"	S. Shunk St.	NW	H	6.3	
123+08 "A"	S. Shunk St.	SW	C	2.7	

Quantity Summary

42.0 sys	Curb Ramp, Concrete, A	Curb Ramp, Concrete, A, Mod.
192.6 sys	Curb Ramp, Concrete, B	Curb Ramp, Concrete, B, Mod.
151.2 sys	Curb Ramp, Concrete, C	4.0 sys Curb Ramp, Concrete, C, Mod.
2.7 sys	Curb Ramp, Concrete, D	Curb Ramp, Concrete, D, Mod.
42.8 sys	Curb Ramp, Concrete, E	Curb Ramp, Concrete, E, Mod.
172.8 sys	Curb Ramp, Concrete, F	Curb Ramp, Concrete, F, Mod.
	Curb Ramp, Concrete, G	Curb Ramp, Concrete, G, Mod.
12.6 sys	Curb Ramp, Concrete, H	Curb Ramp, Concrete, H, Mod.
8.9 sys	Curb Ramp, Concrete, K	Curb Ramp, Concrete, K, Mod.
	Curb Ramp, Concrete, L	Curb Ramp, Concrete, L, Mod.

Concrete Curb Ramp Summary Table
Westbound Approaches Only

Side Street Station	Side Street	Quadrant	Curb Ramp Type	Area	Remarks
				(sys)	
31+25 "B"	Bradner Ave.	SE	H	6.3	
31+25 "B"	Bradner Ave.	NE	H	6.3	
36+80 "B"	Geneva Ave.	SE	C	2.7	
36+80 "B"	Geneva Ave.	NE	H	6.3	
42+61 "B"	S. Park Ave.	NE	C	2.7	
42+61 "B"	S. Park Ave.	SE	C	2.7	
42+61 "B"	S. Park Ave.	SW	C	2.7	
42+61 "B"	S. Park Ave.	NW	C	2.7	
48+88 "B"	S. Butler Ave.	NE	C	2.7	
48+88 "B"	S. Butler Ave.	SE	C	2.7	
48+88 "B"	S. Butler Ave.	SE	C	2.7	
48+88 "B"	S. Butler Ave.	SW	C	2.7	
48+88 "B"	S. Butler Ave.	SW	C	2.7	
48+88 "B"	S. Butler Ave.	NW	C	2.7	
48+88 "B"	S. Butler Ave.	NW	C	2.7	
53+58 "B"	S. Forest Ave.	NE	C	2.7	
53+58 "B"	S. Forest Ave.	NE	C	2.7	
53+58 "B"	S. Forest Ave.	SE	C	2.7	
53+58 "B"	S. Forest Ave.	SE	C	2.7	
53+58 "B"	S. Forest Ave.	SW	C	2.7	
53+58 "B"	S. Forest Ave.	SW	C	2.7	
53+58 "B"	S. Forest Ave.	NW	C	2.7	
53+58 "B"	S. Forest Ave.	NW	C	2.7	
58+15 "B"	SR 9/15	NE	F	21.6	
58+15 "B"	SR 9/15	SE	F	21.6	
58+15 "B"	SR 9/15	SW	F	21.6	
58+15 "B"	SR 9/15	NW	F	21.6	
63+12 "B"	S. Western Ave.	NE	F	21.6	
63+12 "B"	S. Western Ave.	SE	F, Mod.	25.0	
63+12 "B"	S. Western Ave.	SW	B	21.4	
63+12 "B"	S. Western Ave.	NW	C	2.7	
63+12 "B"	S. Western Ave.	NW	C	2.7	
66+30 "B"	Second St/G St.	NE	F, Mod.	25.0	
66+30 "B"	Second St/G St.	NW	G, Mod.	10.0	
70+40 "B"	S. F St.	NE	E	10.7	
74+10 "B"	S. E St.	NE	C	2.7	
74+10 "B"	S. E St.	NE	C	2.7	
74+10 "B"	S. E St.	SE	C	2.7	
74+10 "B"	S. E St.	SE	C	2.7	
74+10 "B"	S. E St.	SW	C	2.7	
74+10 "B"	S. E St.	SW	C	2.7	
74+10 "B"	S. E St.	NW	C	2.7	
74+10 "B"	S. E St.	NW	C	2.7	
77+43 "B"	S. D St.	NE	A	7.0	
77+43 "B"	S. D St.	NE	A	7.0	
77+43 "B"	S. D St.	SE	A	7.0	
77+43 "B"	S. D St.	SE	A	7.0	
77+43 "B"	S. D St.	SW	A	7.0	
77+43 "B"	S. D St.	SW	A	7.0	
77+43 "B"	S. D St.	NW	B	21.4	
80+68 "B"	S. Garfield St.	NE	C	2.7	
80+68 "B"	S. Garfield St.	NE	C	2.7	
80+68 "B"	S. Garfield St.	SE	C	2.7	
80+68 "B"	S. Garfield St.	SE	C	2.7	
80+68 "B"	S. Garfield St.	SW	C	2.7	
80+68 "B"	S. Garfield St.	SW	C	2.7	
80+68 "B"	S. Garfield St.	NW	C	2.7	
80+68 "B"	S. Garfield St.	NW	C	2.7	
82+33 "B"	Horace Mann Ct.	SE	C	2.7	
83+96 "B"	Hill St.	NW	H, Mod.	8.0	
83+96 "B"	Hill St.	NE	C	2.7	
83+96 "B"	Hill St.	NE	C	2.7	
88+51 "B"	S. Whites Ave.	NE	C	2.7	
88+51 "B"	S. Whites Ave.	NE	C	2.7	
88+36 "B"	S. Whites Ave.	SE	C	2.7	
88+36 "B"	S. Whites Ave.	SE	C	2.7	
88+36 "B"	S. Whites Ave.	SW	C	2.7	
88+36 "B"	S. Whites Ave.	SW	C	2.7	
88+51 "B"	S. Whites Ave.	NW	C	2.7	
88+51 "B"	S. Whites Ave.	NW	C	2.7	
90+42 "D"	S. Race St.	NE	E, Mod.	15.0	
90+42 "B"	S. Race St.	SE	C	2.7	
90+42 "B"	S. Race St.	SE	C	2.7	
90+42 "B"	S. Race St.	SW	C	2.7	
90+42 "B"	S. Race St.	SW	C	2.7	
90+42 "B"	S. Race St.	NW	A	7.0	
90+42 "B"	S. Race St.	NW	C	2.7	
93+74 "B"	S. Nebraska St.	NE	F	21.6	
93+74 "B"	S. Nebraska St.	SE	F	21.6	
93+74 "B"	S. Nebraska St.	SW	E	10.7	
97+07 "B"	S. Gallatin St.	SE	A	7.0	
97+07 "B"	S. Gallatin St.	SW	A	7.0	
100+28 "B"	S. Boots St.	NE	B	21.4	
100+28 "B"	S. Boots St.	SE	B	21.4	
100+28 "B"	S. Boots St.	SW	B	21.4	
100+28 "B"	S. Boots St.	NW	B	21.4	
110+50 "B"	S. Branson St.	NE	F	21.6	
110+50 "B"	S. Branson St.	SE	B	21.4	
110+50 "B"	S. Branson St.	SW	A	7.0	
110+50 "B"	S. Branson St.	SW	A	7.0	
110+50 "B"	S. Branson St.	NW	A	7.0	
110+50 "B"	S. Branson St.	NW	K	8.9	
113+70 "B"	S. McClure St.	NE	K	8.9	
113+70 "B"	S. McClure St.	NE	K	8.9	
113+70 "B"	S. McClure St.	SE	K	8.9	
113+70 "B"	S. McClure St.	SE	A	7.0	
113+70 "B"	S. McClure St.	SW	K	8.9	
113+70 "B"	S. McClure St.	SW	A	7.0	
113+70 "B"	S. McClure St.	NW	F	21.6	
117+59 "B"	S. Shunk St.	SE	C	2.7	
128+34 "B"	Sweetster	NE	F	21.6	
144+32 "B"	Pennsylvania	NE	H	6.3	
144+32 "B"	Pennsylvania	NW	F	21.6	

Quantity Summary

98.0 sys	Curb Ramp, Concrete, A	Curb Ramp, Concrete, A, Mod.
149.8 sys	Curb Ramp, Concrete, B	Curb Ramp, Concrete, B, Mod.
148.5 sys	Curb Ramp, Concrete, C	Curb Ramp, Concrete, C, Mod.
	Curb Ramp, Concrete, D	Curb Ramp, Concrete, D, Mod.
21.4 sys	Curb Ramp, Concrete, E	15.0 sys
237.6 sys	Curb Ramp, Concrete, F	50.0 sys
	Curb Ramp, Concrete, G	10.0 sys
25.2 sys	Curb Ramp, Concrete, H	8.0 sys
44.5 sys	Curb Ramp, Concrete, K	Curb Ramp, Concrete, K, Mod.
	Curb Ramp, Concrete, L	Curb Ramp, Concrete, L, Mod.

Traffic Signal Equipment Summary Table

Approximate Station/ Location	# of 4-Loop Installations	# of Single Loop Installations	Quantity					Remarks
			Signal Cable, Roadway Loop, 1C 14 Ga.	Saw Cut for Roadway Loop and Sealer	Signal Detector Housing	Detector Housing, Remove	Signal Cable, 2C 16 Ga., Shielded	
			ft	ft	ea	ea	ft	
SR 18 @ Miller Ave	8		3,680	1,280	8	8		
SR 18 (WB) @ Penn. Ave.	4	2	2,002	687	5	5		
SR 18 (EB) @ SR 9	2		920	320	3	3	Loops on SR 18 Only	
SR 18 (WB) @ SR 9	4		1,840	640	5	5	Loops on SR 18 Only	
Undistributed							300	
Totals			8,442	2,927	21	21	300	

Notes: All stationing is approximate and shall be verified.

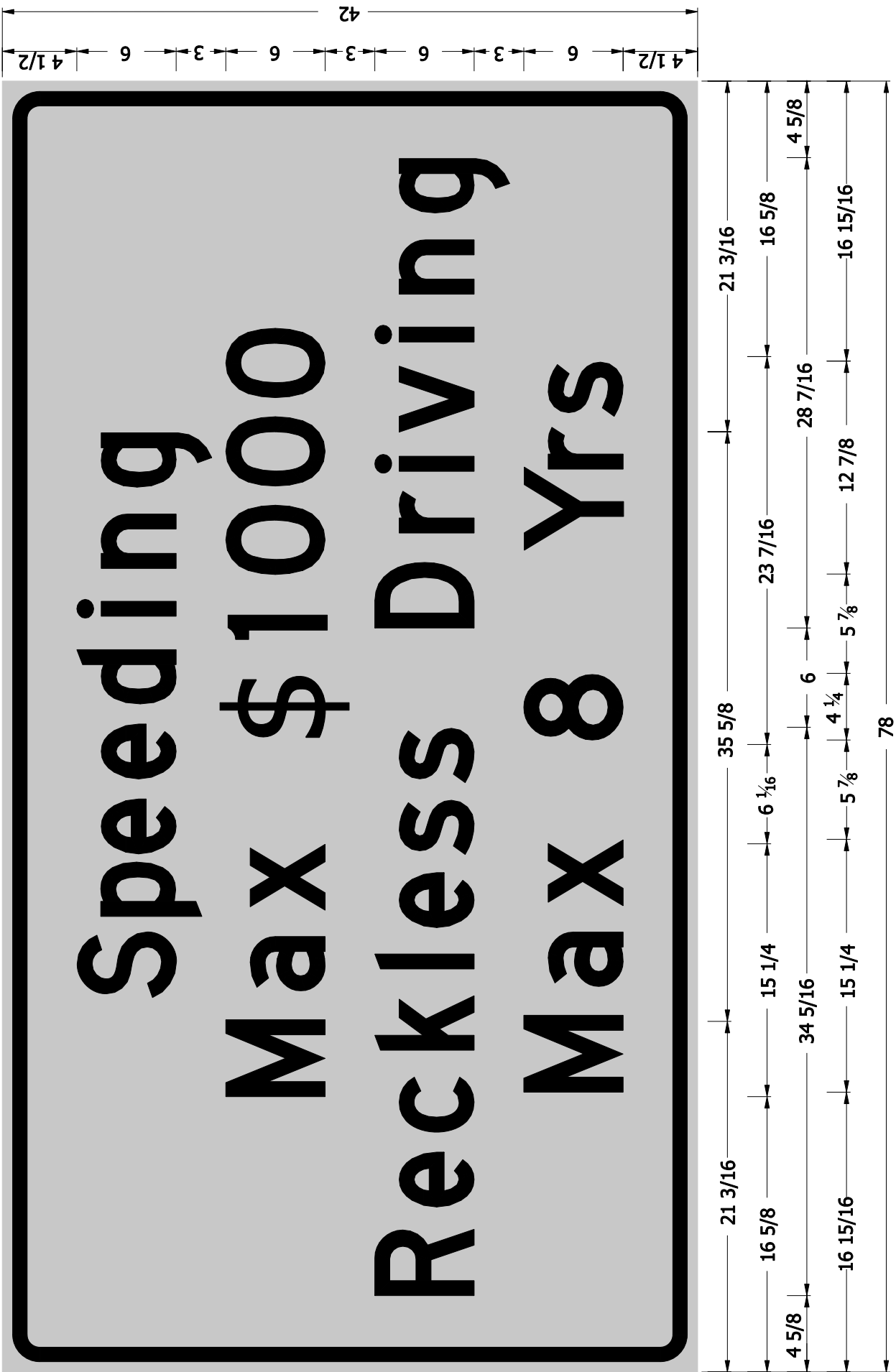
Pavement Markings Summary Table

Transverse Markings & Pavement Message Markings												
Start Station	End Station	Transverse Markings,							Pavement Message Markings,			Remarks
		Pref. Plastic Stop Line, 24 in.	Pref. Plastic Crosswalk Line, 6 in.	Pref. Plastic Crosswalk Line, 12 in.	Multi-Comp., Solid, Yellow, Crosshatch Line, 12 in.	Pref. Plastic Solid, Yellow, Crosshatch Line, 24 in.	Pref. Plastic Solid, White, Crosshatch Line, 12 in.	Pref. Plastic Solid, White, Crosshatch Line, 24 in.	Pref. Plastic Lane Ind. Arrow	Pref. Plastic Word ONLY	Pref. Plastic Word RXR	
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ea)	(ea)	(ea)	
5+77 "A"	7+98 "A"				144							
10+30 "A"		75							4			Miller St. Stop Bars and Lt. Turn Arrows
7+98 "A"	9+74 "A"	25							2			
10+80 "A"	12+46 "A"	36							4			Lt and Rt Turn Arrows
13+43 "A"									1			Rt Turn Arrow
10+30 "A"									4			2-Lt Turn Arrows on each approach
Eastbound												
40+27 "A"											2	Railroad
65+00 "A"		41	162									SR 9/SR 15
69+92 "A"		54	240									Western Ave
99+29 "A"		59	240									Nebraska St.
105+81 "A"		70	272									Boots St.
106+90 "A"	108+83 "A"								2			Rt Turn Arrows
110+89 "A"	112+18 "A"								2			Lt Turn Arrows
108+83 "A"		36										Washington St.
112+18 "A"		36										Adams St.
116+00 "A"		84	288									Branson St.
118+80 "A"											2	Railroad
Westbound												
27+30 "A"	30+22 "A"								2			Lt Turn Arrows
58+15 "A"		44	344						2			SR 9/SR 15-1 Lt Turn Arrow, 1 Rt Turn Arrow
63+12 "A"		63	300									Western Ave
93+74 "A"		82	305									Nebraska St.
100+28 "A"		79	324									Boots St.
104+14 "A"		43										Washington St.
104+14 "A"	105+22 "A"								2			Lt Turn Arrows
107+50 "A"		36										Adams St.
110+50 "A"		74	336									Branson St.
113+70 "A"		40	68									McClure St.
120+35 "A"											2	Railroad
128+63 "A"	131+41 "A"								2			Rt Turn Arrows
144+32 "A"		68										Pennsylvania
Totals		1045	2879		144				27		6	

Note: All stationing is approximate and shall be verified.

Pavement Core Summary Table

Core Number	Ref. Post	Direction	Lane	Dist. from Centerline	Pavement Depth (in)		Remarks
					Concrete	Asphalt	
1	105+00	WB	Mainline	6.0'	6.5"	10.0"	
3	104+30	WB	Mainline	6.0'		12.0"	
4	104+30	EB	Mainline	4.5'		12.0"	
5	104+00	WB	Mainline	4.5'		4.0"	4" Brick
6	104+00	EB	Mainline	4.5'		5.5"	3.5" Brick
7	102+90	WB	Mainline	4.0'		7.0"	3.5" Brick
8	102+90	EB	Mainline	6.0'		12.0"	
9	102+20	WB	Mainline	6.0'		15.0"	

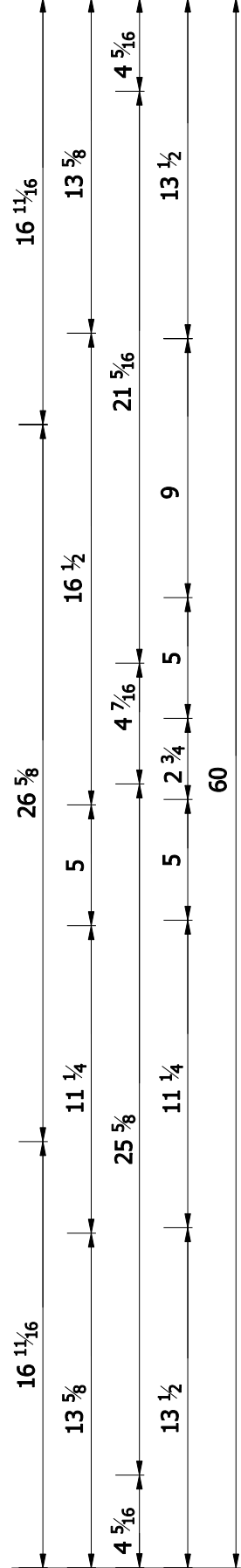
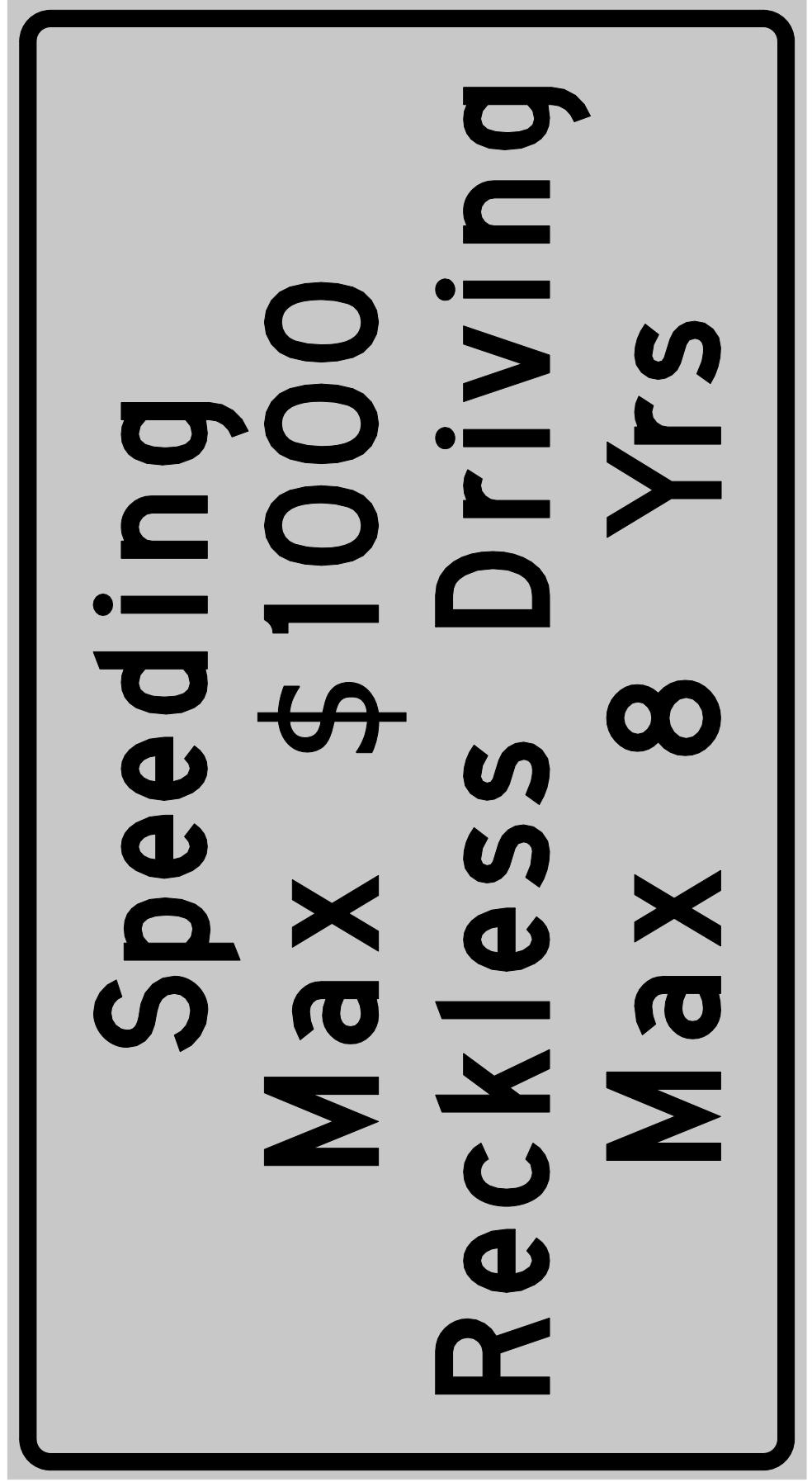
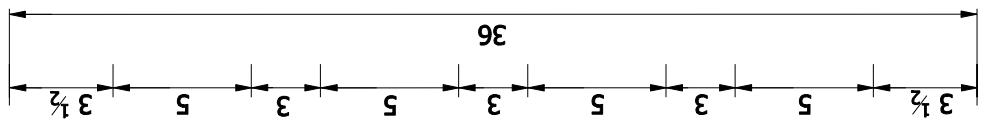


6 D UPPER AND LOWER; 2.250" Radius, 0.875" Border, 0.625" Indent, Black on Orange;
 [Speeding] D; [Max \$1000] D; [Reckless Driving] D; [Max 8 Yrs] D;

XG 20-7

INDIANA DEPARTMENT OF TRANSPORTATION

WORKSITE ADDED
 PENALTY SIGN 78 x 42

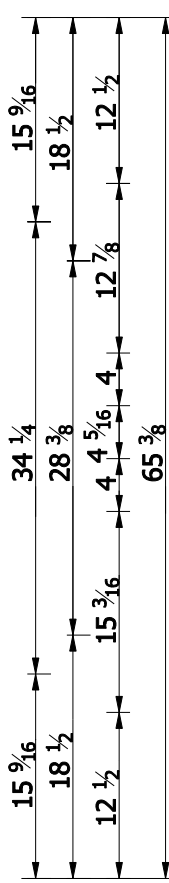
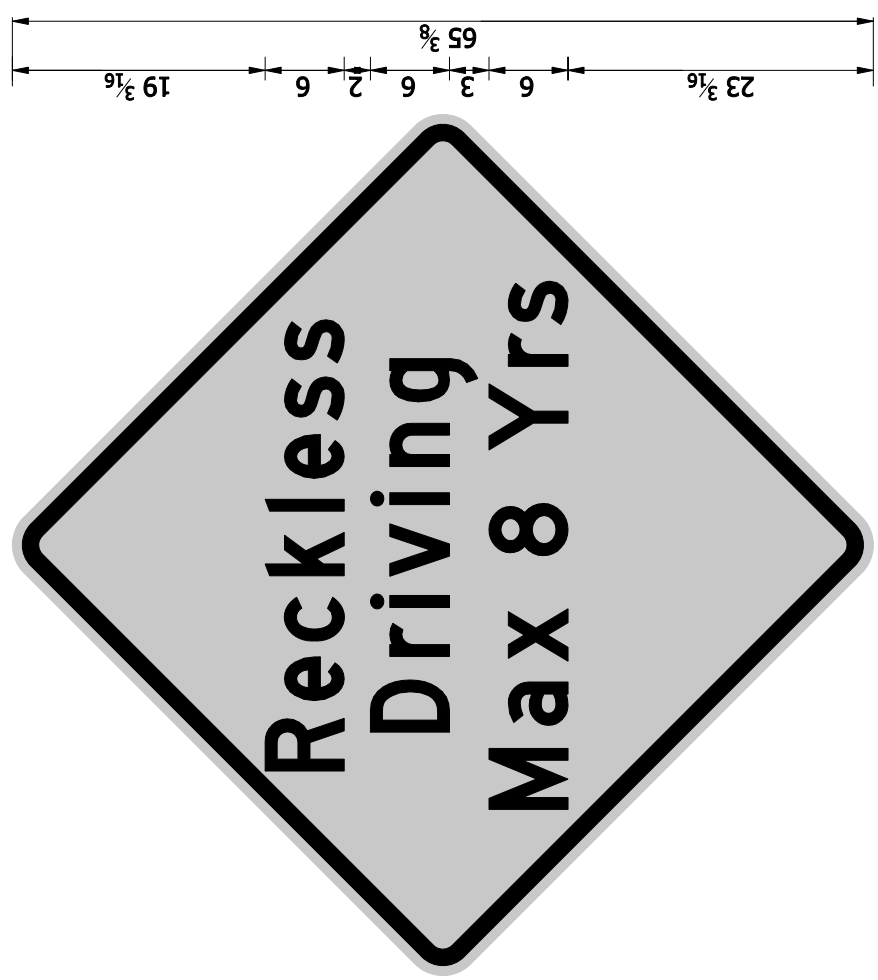


5 C UPPER AND LOWER; 2.250" Radius, 0.875" Border, 0.625" Indent, Black on Orange;
[Speeding] C; [Max \$1000] C; [Reckless Driving] C; [Max 8 Yrs] C;

XG 20-7a

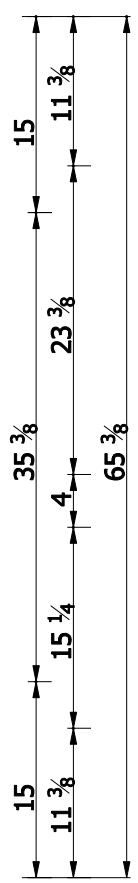
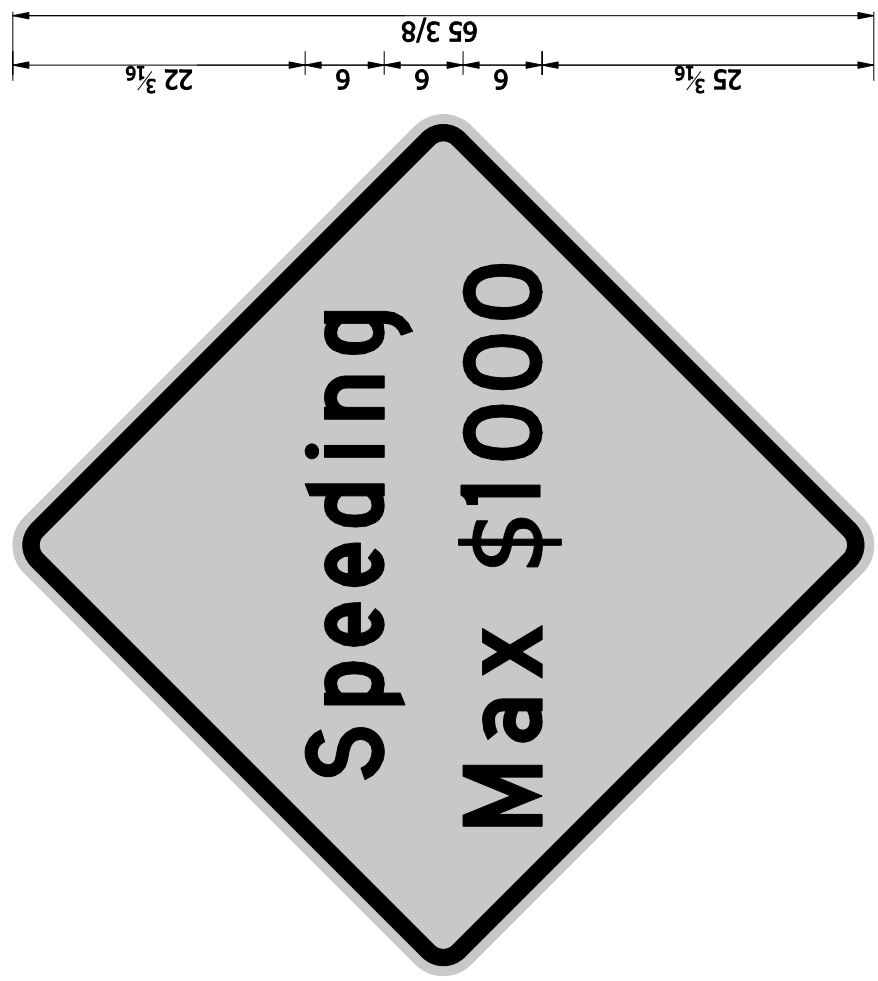
INDIANA DEPARTMENT OF TRANSPORTATION

WORKSITE ADDED
PENALTY SIGN 60 x 36



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

NOTE:

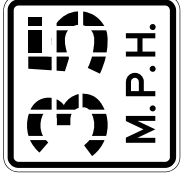
① See Standard Drawing E 801-TCSN-11 for additional general notes.



XW3-5



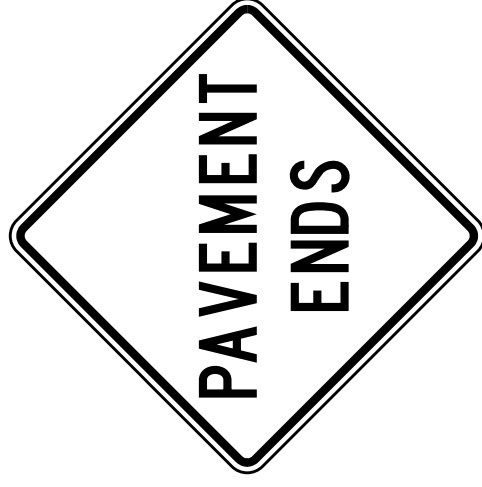
XW3-5a



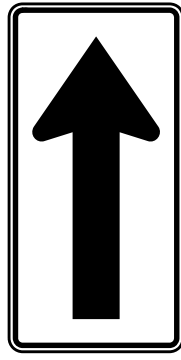
XW13-1-A
(To be used below a warning sign only.)



XW6-2a-A
XW6-2a-B ①



XW8-3-A



XW1-6
XW1-6-A ①

INDIANA DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL
SIGNS

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE ①	PCT. ①	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY								HEAD	SHAFT		ONE	TWO
XG20-1	"Road Construction Next ____ Miles"	*	B	60 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C					2 1/4		X
XG20-2	"End Construction"	*	B	60 x 24	Orange	Black	3/4	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-2a	"End Road Work"	*	B	48 x 18	Orange	Black	1/2	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-4	"Flat Car Follow Me"	*	B	36 x 18	Orange	Black	1/2	3/8	5 - Series C	5 - Series C						1 1/2		X
XG20-5	(Route number or) "Lane Closed" ____ (date)	*	B	48 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XG20-5-B	"Worksite" plate	-	B	48 x 16	Orange	Black	1/2	3/8	8 - Series C							1 1/2	---	---
XW20-6	"Lane Restrictions On Or After *** ** 2007"	*	B	60 x 30	Orange	Black	3/4	1/2	5 - Series C	5 - Series C						1 7/8		X
XW20-6a	"Lane Restrictions On Or After *** ** 2007"	*	B	72 x 36	Orange	Black	7/8	5/8	6 - Series C	6 - Series C						2 1/4		X
XW4-9 (R or L)	"Detour" (above black arrow)	*	A	30 x 24	Orange	Black	1 1/4	3/8	10 - Series D			"Detour"				1 1/2		X
XW4-10 (R or L)	"Detour" (inside orange arrow)	*	B	48 x 18	Black & Orange	Black	---	3/8	6 - Series D			"Detour"				1 1/2		X
XW1-1-A (R or L)	(Turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2								7 x 8	11 x 3 1/2	X
XW1-1-B (R or L)	(Turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								14 3/4 x 16	21 3/4 x 7	X
XW1-2-A (R or L)	(Curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2								12 x 13 3/8	29 3/4 x 8	X
XW1-2-B (R or L)	(Curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								14 1/8 x 16	7	X
XW1-3-A (R or L)	(Reverse turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2								10 5/8 x 12	5 1/4	X
XW1-3-B (R or L)	(Reverse turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								14 1/8 x 16	7	X
XW1-4-A (R or L)	(Reverse curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2								10 5/8 x 12	5 1/4	X
XW1-4-B (R or L)	(Reverse curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								14 1/8 x 16	7	X
XW1-6	(Single headed arrow)	*	B	48 x 24	Orange	Black	3/4	3/4								13 1/8 x 15	26 x 6 1/2	X
XW1-6-A	(Single headed arrow)	*	B	60 x 30	Orange	Black	3/4	1/2								16 3/8 x 18	32 1/2 x 8	X
XW4-2 (R or L)	(Lane ends merge ____ symbol)	*	A	36 x 36	Orange	Black	3/4	1/2									2 1/4	X
XW4-2-B (R or L)	(Lane ends merge ____ symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4									1 1/2	X
XW6-2a-A	(Divided highway ends symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	5 - Series D	5 - Series D						2 1/4		X
XW6-2a-B	(Divided highway ends symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D						3		X
XW3-5-A	Arrow - "Speed Limit ____"	*	A	36 x 36	Orange	Black	7/8	5/8	3 - Series E	3 - Series E	12 - C					2 1/4		X
XW3-5-B	Arrow - "Speed Limit ____"	*	B	48 x 48	Orange	Black	1 1/4	3/4	4 - Series E	4 - Series E	15 C					3		X
XW3-5a-A	"____" MPH - Speed Zone Ahead"	*	A	36 x 36	Orange	Black	7/8	5/8	5 - Series C	5 - Series C						2 1/2		X
XW3-5a-B	"____" MPH - Speed Zone Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C						3		X

*Wood post permitted.

NOTES:

- ① Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.
2. See Standard Drawing E801-TCSN-11 for additional general notes.
3. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION
SIGN DESIGN DETAILS
(Sheet 1 of 2)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE	PCT. Ⓢ	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY							HEAD	SHAFT		ONE	TWO
XW65-9B	(Two way traffic symbol)	*	B	48 x 48	Orange	Black	3/4	10 - Series D					11 5/8 x 13 3/4	23 1/2 x 6	3		X
XW68-1-A	"Bump"	*	A	36 x 36	Orange	Black	3/4	12 - Series D							2 1/4		X
XW68-1-B	"Bump"	*	B	48 x 48	Orange	Black	3/4	10 - Series D							3		X
XW68-2-A	"Dip"	*	A	36 x 36	Orange	Black	3/4	12 - Series E							2 1/4		X
XW68-2-B	"Dip"	*	B	48 x 48	Orange	Black	3/4	12 - Series E							3		X
XW68-3-A	"Pavement Ends"	*	A	36 x 36	Orange	Black	3/4	6 - Series C	6 - Series C						2 1/4		X
XW68-4-A	"Soft Shoulder"	*	A	36 x 36	Orange	Black	3/4	6 - Series C	6 - Series C						2 1/4		X
XW68-4-B	"Soft Shoulder"	*	B	48 x 48	Orange	Black	3/4	8 - Series C	8 - Series C						3		X
XW68-5-A	"Truck Crossing"	*	A	36 x 36	Orange	Black	3/4	6 - Series C	6 - Series C						2 1/4		X
XW68-5-B	"Truck Crossing"	*	B	48 x 48	Orange	Black	3/4	8 - Series C	8 - Series C						3		X
XW69-1-A (R or L)	"... Lane Ends"	*	A	36 x 36	Orange	Black	3/4	6 - Series D	6 - Series D						2 1/4		X
XW69-1-B (R or L)	"... Lane Ends"	*	B	48 x 48	Orange	Black	3/4	8 - Series D	8 - Series D						3		X
XW69-2-A (R or L)	"Lane Ends Merge"	*	A	48 x 48	Orange	Black	3/4	6 - Series C	8 - Series D						2 1/4		X
XW69-2-B (R or L)	"Lane Ends Merge"	*	B	48 x 48	Orange	Black	3/4	6 - Series C	8 - Series D						3		X
XW12-1-C	(Double headed arrow)	*	B	48 x 48	Orange	Black	3/4						12 1/2 x 15	12 x 5 1/4	3		X
XW13-1-A	"... MPH" (Advisory speed plate)	*	A	24 x 24	Orange	Black	1/2	10 - Series E	4 - Series E		"Construction"	25			1 1/2		X
XW20-1	"Road Construction Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series C	7 - Series C		"Construction"	25			3		X
XW20-1-A	"Road Construction Ahead"	*	B	60 x 60	Orange	Black	1 1/2	8 - Series C	8 - Series C		"Construction"	25			95		X
XW20-1-B	"Road Repairs Next ... Miles"	*	B	48 x 48	Orange	Black	1 1/4	8 - Series C	8 - Series C			25			3		X
XW20-2	"Detour Ahead"	*	B	48 x 48	Orange	Black	1 1/4	8 - Series D	8 - Series D		"Detour"	25			3		X
XW20-3	"Road Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series D	7 - Series D			25			3		X
XW20-4	"One Lane Road Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series C	7 - Series C			2			3		X
XW20-5 (R, C, or L)	"... Lane Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series C	7 - Series C			2			3		X
XW20-7-A	(Flagger symbol)	*	B	48 x 48	Orange	Black	1 1/4	6 - Series C	6 - Series C						1 1/2		X
XW21-1-A	(Workers symbol)	*	A	36 x 36	Orange	Black	3/4	6 - Series D							2 1/4		X
XW21-2	"Fresh Oil"	*	A	30 x 30	Orange	Black	3/4	6 - Series D	6 - Series D		"Fresh"	2/4			1 7/8		X
XW21-2-A	"Fresh Oil"	*	A	36 x 36	Orange	Black	3/4	7 - Series D	7 - Series D		"Fresh"	3/4			2 1/4		X
XW21-3-A	"Road Machinery Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series D	7 - Series D		"Machinery"	25			3		X
XW21-4-A	"Road Work Ahead"	*	B	48 x 48	Orange	Black	1 1/4	7 - Series D	7 - Series D			25			3		X
XW21-5-A	"Shoulder Work"	*	A	36 x 36	Orange	Black	3/4	6 - Series C	6 - Series C		"Shoulder"	1			2 1/4		X
XW21-5-A	"Shoulder Work"	*	A	36 x 36	Orange	Black	3/4	6 - Series C	6 - Series C						2 1/4		X

*Wood post permitted.

NOTES:

- Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.
- See Standard Drawing E801-TCSN-11 for additional general notes.
- All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS
(Sheet 2 of 2)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	LETTER HEIGHT SERIES-LINE 4	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4	STEEL		BACKGROUND	COPY							HEAD	SHAFT		ONE	TWO
XW101-1	"Moving Crews Ahead"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C	6 - Series C			2 1/4		X
XW102-1-A	"Moving Crews Next ____ Miles"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	8 - Series C	8 - Series C			3		X
XW102-1	"Moving Crews Next ____ Miles"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C	6 - Series C			2 1/4		X
XW103-1-A	"Watch For Stopped Traffic"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	8 - Series C	8 - Series C			3		X
XW103-1	"Watch For Stopped Traffic"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	8 - Series C	8 - Series C			3		X
XW104-1	"Overhead Sign Installation"	*	B	60 x 24	Orange	Black	1/2	3/8	6 - Series C	6 - Series C	6 - Series C	6 - Series C			1 1/2		X
XW105-1-A	"Right Lane Exit Open"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	7 - Series C			3		X
XW105-1	"Exit Closed"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	7 - Series C			3		X
XW106-2-A	"Exit Open"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	7 - Series C			3		X
XW106-2	"Exit Closed"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	7 - Series C			3		X
XW108-1	"Utility Work Ahead"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C	6 - Series C			2 1/4		X
XW108-1-A	"Utility Work Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	8 - Series C	8 - Series C			3		X
XW109-1	"EXIT" (above black arrow)	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series D	12 - Series D	12 - Series D	12 - Series D			3		X
R2-1	"Speed Limit _____"	*	A	24 x 30	White	Black	1/2	3/8	4 - Series E	4 - Series E	4 - Series E	4 - Series E			1/2		X
R2-1-B	"Speed Limit _____"	*	B	48 x 60	White	Black	1 1/4	3/4	8 - Series E	8 - Series E	8 - Series E	8 - Series E			3		X
R3-2-A (R or L)	"No ____ Turn Symbol"	*	A	30 x 30	White	Black	3/4	3/8							2		X
R3-2-C (R or L)	"No ____ Turn Symbol"	*	B	48 x 48	White	Black	1 1/4	3/4							3		X
R4-1	"Do Not Pass"	*	A	24 x 30	White	Black	1/2	3/8	6 - Series D	6 - Series D	6 - Series D	6 - Series D			1 7/8		X
R4-1-B	"Do Not Pass"	*	B	48 x 60	White	Black	1 1/4	3/4	10 - Series D	10 - Series D	10 - Series D	10 - Series D			3		X
RS-1-A	"Do Not Enter" (inside symbol)	*	A	36 x 36	Red	White	Radius 17 1/2	1/2	5 - Series D	5 - Series D	5 - Series D	5 - Series D			2 1/4		X
RS-1-B	"Do Not Enter" (inside symbol)	*	B	48 x 48	Red	White	Radius 23 1/2	1/2	6 - Series D	6 - Series D	6 - Series D	6 - Series D			3		X
R6-1 (R or L)	"One Way" (inside white arrow)	*	A	36 x 36	Black & White	Black	---	3/8	4 - Series D	4 - Series D	4 - Series D	4 - Series D			1 1/2		X
R6-2-A (R or L)	"One Way" (above black arrow)	*	A	24 x 30	White	Black	1/2	3/8	6 - Series D	6 - Series D	6 - Series D	6 - Series D			1 1/2		X
R6-2-B (R or L)	"One Way" (above black arrow)	*	B	48 x 30	White	Black	3/4	3/8	8 - Series D	8 - Series D	8 - Series D	8 - Series D			1 7/8		X
R11-2	"Road Closed"	*	B	60 x 30	White	Black	3/4	3/8	6 - Series C	6 - Series C	6 - Series C	6 - Series C			1 7/8		X
R11-3	"Road Closed Miles Ahead"	*	B	60 x 30	White	Black	3/4	3/8	6 - Series C	6 - Series C	6 - Series C	6 - Series C			1 7/8		X
R11-4	"Road Closed To Thru Traffic"	*	B	60 x 30	White	Black	3/4	3/8	6 - Series C	6 - Series C	6 - Series C	6 - Series C			1 7/8		X
R12-1	"Weight Limit _____ Tons"	*	A	24 x 30	White	Black	1/2	3/8	4 - Series D	4 - Series D	4 - Series D	4 - Series D			1 1/2		X
R12-1-A	"Weight Limit _____ Tons"	*	B	36 x 48	White	Black	3/4	1/2	6 - Series D	6 - Series D	6 - Series D	6 - Series D			2 1/4		X
S 4-1	"When Flashing" plate	---	---	48 x 20	White	Black	1/2	3/8	5 - Series D	5 - Series D	5 - Series D	5 - Series D			1 1/2		---

* Wood post permitted.

GENERAL NOTES

1. See Standard Drawing E 801-TCSN-11 for additional general notes.
2. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS

805-T-039d LOOP TESTING TABLE

(Adopted 09-01-05)

INTERSECTION _____ Contract No. _____

TEST PERFORMER-CONTRACTOR (C) _____ Date _____

TEST PERFORMER-STATE (S) _____ Date _____

		LOOP DESIGNATION												
NUMBER OF TURNS														
INDUCTANCE		READINGS AT DETECTOR HOUSING BEFORE SPLICED												
80 to 800 μ H														
RESISTANCE # 8 Ω														
VOLTAGE # 3 v														
MEGOHM (LOOP) > 100 M Ω														
MEGOHM (LEAD IN) >100 M Ω														
		READINGS AT CABINET AFTER SPLICED												
INDUCTANCE														
80 to 800 μ H		C												
		S												
RESISTANCE														
# 8 Ω		C												
		S												
VOLTAGE														
# 3 v		C												
		S												
MEGOHM														
WEST SPLICE >100 M Ω		C												
		S												
VEHICLE														
SIMULATOR		C												
		S												

DISTRIBUTION: Project File, District Traffic, Contractor

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
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100-C-147 PAYMENT OF PREDETERMINED MINIMUM WAGE DETERMINATION
(DAVIS-BACON ACT)
General Decision Number IN100006

(Revised 03-16-10)

General Decision Number IN100006 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)

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ATTACHMENTS

- A. Employment Preference for Appalachian Contracts
(included in Appalachian contracts only)

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 than the applicable wage rate and fringe benefits or cash equivalent for the classification of work 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 than \$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-151B DISADVANTAGED BUSINESS ENTERPRISE PROCEDURE AND GOOD FAITH EFFORTS

(Revised 09-09-10)

The Standard Specifications are revised as follows:

SECTION 103, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

103.01 Disadvantaged Business Enterprise Program

This requirement will apply only to a federal aid contract.

(a) General Requirements

Failure to carry out the requirements set forth in 49 CFR ~~23.43(a)~~ 26, as outlined in the Department's DBE Program Manual, shall constitute a breach of contract and, after notification may result in ~~termination of the contract or such remedy as the State deems appropriate~~ such contract sanctions as the Department 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.

The above referenced CFR section requires the following policy and disadvantaged business enterprise obligation to be included in all subsequent agreements between the Contractor and all subcontractors as follows:

1. It will be the policy of the Department ~~that disadvantaged business enterprises, as defined in 49 CFR Part 23, shall have the maximum opportunity to participate in the performance of contract work financed in whole or in part with Federal funds provided under this contract to create a level playing field on which DBE's can compete fairly for federally funded contracts.~~ Consequently, the disadvantaged business enterprise requirements of 49 CFR Part ~~23~~ 26, *as outlined in the Department's DBE Program Manual*, apply to this contract.
2. ~~The Contractor agrees to ensure that disadvantaged business enterprises certified by the State shall have the maximum opportunity to participate in the performance of contract work or subcontract work financed in whole or in part with Federal funds provided under this contract. In this regard, the Contractor shall take all necessary and reasonable steps, in accordance with 49CFR Part 23, to ensure that disadvantaged business enterprises have the maximum opportunity to compete for and perform work in this contract.~~

The Contractor shall not discriminate on the basis of race, color, national origin, or sex, in the award and performance of this contract. *The Contractor shall carry out the applicable DBE requirements in the award and administration of federally funded contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or such other remedy as the Department or the Federal Highway Administration deems appropriate. The Contractor shall include language prohibiting discrimination on the basis of race, color, national origin, or sex in the performance of this contract in all subcontracts.*

SECTION 103, BEGIN LINE 59, DELETE AND INSERT AS FOLLOWS:

4. Certified DBE

A business enterprise which has completed and filed a request for certification with the ~~Indiana~~ Department of Administration, and that the business enterprise has been reviewed and determined to comply with the guidelines established in 49 CFR Part ~~23~~ 26. Business enterprises which are determined to be eligible will be certified as DBEs *to perform specific types of work.*

(c) Goal

A contract provision *DBE* goal may be shown on the Proposal sheet. Such goal, if required, has been established as the *desired minimum* amount to be contracted to DBEs. The Contractor shall meet or exceed the goal, or demonstrate that it could not be met despite ~~best~~ *good faith* efforts. Achievement of the ~~contract provision~~ goal does not relieve the Contractor of the requirement for affirmative action on subsequent subcontracting on this contract.

Only work with listed DBEs ~~which~~ that are certified prior to the date of the letting will count toward the goal. *Credit towards contract goals will be given only for work performed by certified DBEs in the work areas for which they have been certified. The same requirements with respect to obtaining the goal apply for a Contractor that is certified as a DBE. A DBE Contractor must either achieve the goal utilizing other DBE firms or demonstrate that the goal could not be met despite good faith efforts.*

Contracting may be in the form of a subcontract, lease agreement, or material supply agreement. Full credit will be given for subcontracts and lease agreements. Credit for utilization of a DBE material supplier will be limited to those DBEs certified as suppliers prior to the letting at the rate of 60% of the expenditure to the supplier unless the supplier is also the manufacturer. Suppliers that do not manufacture the items shall also perform a commercially useful function in order for credit to be received.

A written request for changes in utilization of race/gender conscious DBE firms listed in the Affirmative Action Certification shall be approved prior to start of listed services or purchase of listed materials. Requests to reduce or eliminate the services or material provided by a listed race/gender conscious DBE that include written approval by the DBE will be considered sufficient justification if the committed DBE utilization after the requested change will meet or exceed the contract goal or a lesser percentage approved prior to execution of the contract. If the committed DBE utilization after the change does not meet or exceed the contract goal or a lesser percentage approved prior to execution of the contract, or the listed race/gender conscious DBE does not approve the change, the Contractor shall submit documented evidence that the DBE is unable to perform successfully. Disposition of the request for change will be determined on the basis of the affirmative actions taken as required herein.

When a race/gender conscious DBE firm is removed from eligibility, the Contractor shall take the following steps:

- 1. If a subcontract has not yet been executed, the Contractor shall not count work performed by the firm toward the contract goal. The Contractor will be directed to meet the contract goal with an eligible DBE firm or demonstrate that it has made a good faith effort to do so.*
- 2. If a subcontract has been executed before the firm has been declared ineligible, the Contractor shall continue to count work performed by the firm toward the contract goal.*

SECTION 103, BEGIN LINE 95, DELETE AND INSERT AS FOLLOWS:

DBE joint ventures type A do not require DBE joint venture certification. DBE joint venture type B do require DBE joint venture certification. A request for DBE joint ventures type B certification shall be submitted not later than 9:00 a.m. local time the last ~~work~~ business day before the letting and shall be approved prior to bidding in order to receive credit toward the DBE goal. The DBE shall be certified with the Department prior to requesting DBE joint venture certification. The work for the DBE shall be identified, performed, managed, and supervised by its forces.

SECTION 103, DELETE LINES 102 THROUGH 119.

SECTION 103, DELETE LINES 143 THROUGH 242.

SECTION 103, AFTER LINE 243, INSERT AS FOLLOWS:

(e) Determination of Good Faith Efforts

Appendix A of 49 CFR Part 26 has been used for guidance in preparing the Department's procedures to determine the adequacy of good faith efforts. Additional factors consistent with 49 CFR Part 26, and the Department's policies and procedures have also been utilized.

1. Good Faith Efforts Prior to Award

The following factors will be considered in determining good faith efforts prior to award of a contract. The Contractor, including DBE Contractors, shall submit evidence on each of the factors.

- 1. The Contractor shall make reasonable effort to contact all ready, willing, and able DBEs who express a desire to work on any of the pay items of the contract.*
- 2. To effectively participate, the DBE shall have the opportunity to analyze the contract and submit quotations prior to letting. Information provided by the Contractor to the DBEs shall include, at a minimum, the contract number, pay items, quantities for those pay items to be subcontracted, and the date the subcontract bid is desired.*
- 3. The Contractor shall select the portions of the work to be performed by DBEs in order to increase the likelihood of DBE participation. This shall include, where appropriate, an attempt to break down the contract into economically feasible units to facilitate DBE participation.*
- 4. The Contractor shall provide the interested DBEs with complete information about the plans, specifications, and requirements of the contract. Attempts shall be made to have plans available or to notify the DBE of the location of available plans. The Contractor shall notify the DBE of revisions to the contract.*
- 5. It will be considered unacceptable to avoid subcontracting to DBEs if such subcontracting to DBEs results in the need to further subdivide remaining work items.*
- 6. The Contractor shall negotiate in good faith with interested DBEs and not reject such DBEs as unqualified without sound reasons based on thorough investigation of their capabilities. Confirmed documentation that a DBE has not been able to perform previous work through no fault of others will be considered to be sound reason. Unacceptable criteria include, but are not limited to, unsubstantiated oral statements and unsigned documentation.*

7. *The Contractor shall make efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance required by the State. However, the Contractor shall affirmatively consider waiving requirements it may have in order to assist the DBE.*
8. *Only firms certified as DBEs prior to the letting date can be used to meet the contract goal for the Department's DBE program.*

The Contractor will be considered to have made good faith efforts if it either:

1. *Documents that it has obtained enough DBE participation to meet the goal, or*
2. *Documents that it made adequate good faith efforts in accordance with the factors set out above to meet the goal even though it did not succeed in obtaining enough DBE participation to do so.*

If a DBE goal has been established for the contract, the Contractor shall take good faith efforts to achieve the established goal prior to the bid opening. The Affirmative Action Certification shall be completed and submitted with the Proposal Book to indicate both race/gender conscious and race/gender neutral proposed DBE utilization.

The award of the contract will be made to the lowest and best bidder when all other requirements have been met and good faith efforts have been taken toward meeting the DBE goal, if required, in accordance with these requirements.

If the apparent low bidder has not achieved the contract DBE goal, the bidder shall respond in writing within three business days after notification by the Department of the failure to meet the DBE goal. The response shall provide evidence identifying the bidder's good faith efforts and all affirmative actions taken prior to letting to achieve the required DBE goal. Failure to respond within the three business day period will result in rejection of the bid, and may result in forfeiture of the bid bond, and the referral of the bidder to the Prequalification Committee.

Responses shall be sent to the Department's Division of Contract Administration. The Department will review the bidder's good faith efforts for compliance with these requirements.

If the Department determines that adequate good faith efforts have been made, and the bidder has met all other bidding requirements, the contract will be awarded.

If the Department determines that good faith efforts were inadequate, the Department will issue written notification of the determination to the bidder. The determination will outline the reasons for determination of non-compliance with good faith effort requirements.

The bidder may request a review of a determination of non-compliance by making a written submittal within five business days of the bidder's receipt of notification of non-compliance from the Department. The request for review shall include evidence disputing the Department's reasons for issuing a determination of non-compliance. The request shall be sent to the Department's Division of Contract Administration.

Upon receipt of a request, the Department will contact the bidder to schedule a review. The review will be held by the Department's Deputy Commissioner and Chief Counsel, or a designee who did not participate in the original determination of non-compliance. The review will be conducted in accordance with the Department's policy for review of good faith efforts requirements. A copy of the policy is available on the Department's website or through the Division of Contract Administration.

If the Deputy Commissioner's finding determines that the bidder's good faith efforts were adequate, and the bidder has met all other bidding requirements, the contract will be awarded and the Department will adjust the contract time by the number of calendar days from the date of the original determination of non-compliance to and including the date of the Deputy Commissioner's findings.

If the Deputy Commissioner's finding determines that the bidder's good faith efforts were inadequate, the finding will be forwarded to the Commissioner. The Commissioner will review the Deputy Commissioner's finding and issue a written Contract Award Determination.

If the Commissioner's Contract Award Determination finds that the bidder's good faith efforts were adequate, and the bidder has met all other bidding requirements, the contract will be awarded and the Department will adjust the contract time by the number of calendar days from the start of the original determination of non-compliance to and including the date of the Commissioner's determination.

If the Commissioner's Contract Award Determination finds that the bidder's good faith efforts were inadequate, at the Commissioner's sole option and without further proceedings, either all bids will be rejected or the contract will be awarded to the next lowest and qualified bidder. An apparent low bidder who has not met the DBE goal and requirements for good faith efforts may be requested not to rebid on this contract during subsequent lettings.

The Commissioner's Contract Award Determination will be the final decision of the Department.

2. Good Faith Efforts for Extra Work

When extra work in accordance with 104.03 is added to a contract with a DBE goal, the Contractor shall hire or make good faith efforts to hire a DBE subcontractor to perform significant extra work.

For purposes of DBE good faith efforts, significant extra work is defined as new pay items added to a Contract that result in a new contracting opportunity not reasonably related to existing pay items being performed by the Contractor or a subcontractor.

When significant extra work related to existing pay items being performed by a DBE subcontractor is added to a contract with a DBE goal, the Contractor shall offer that same DBE subcontractor the opportunity to perform the extra work whether or not the existing pay items are counted toward the DBE goal. The Contractor shall consider other DBE subcontractors if the extra work would result in the original DBE subcontractor exceeding its prequalification limits. The Department may consider an exception to a DBE subcontractor's prequalification limit. If the DBE subcontractor is unable to perform the extra work, the Contractor shall hire or make good faith efforts to hire an alternate DBE subcontractor to perform the work.

When significant extra work related to existing pay items being performed by a non-DBE subcontractor is added to a contract with a DBE goal, the non-DBE subcontractor may perform the extra work. If the non-DBE subcontractor is unable to perform the extra work, the Contractor may self-perform the extra work. If the Contractor chooses not to self-perform the extra work, the Contractor shall hire or make good faith efforts to hire a DBE firm to perform the work.

When significant extra work related to existing pay items being performed by the Contractor is added to a contract with a DBE goal, the Contractor may self-perform the extra work. If the Contractor chooses not to self-perform the extra work, the Contractor shall hire or make good faith efforts to hire a DBE firm to perform the work.

The Contractor shall forward documentation of good faith efforts to hire a DBE subcontractor to perform extra work to the District Equal Employment Opportunity (EEO) Officer for review. The EEO Officer will determine if good faith efforts have been met in accordance with 103.01(e)1.

If the EEO Officer determines that the Contractor failed to make good faith efforts to hire a DBE firm when required as a result of significant extra work, written notice will be sent to the Contractor. The Contractor may appeal the determination in accordance with 103.01(e)1.

(f) Affirmative Action Certification

The Affirmative Action Certification, included in the Proposal book, shall be completed when the Proposal book is submitted to the Department. The certification shall list ~~DBEs or shall state the reasons DBEs are not listed~~ all DBE firms the Contractor plans to utilize, either race/gender consciously or race/gender neutrally. Blank certifications shall cause the bid to be rejected. If a portion of a pay item is to be performed by a DBE, an explanation shall be included stating exactly what the DBE is performing or supplying. Failure to do so may affect the award of the contract. The Contractor shall ensure that DBE firms listed on the Affirmative Action Certification are certified DBE firms as listed in the Department's DBE directory at the time of letting. In addition to the listing of DBE firms that will be used race/gender consciously to meet the goal, the Contractor shall also provide a total for the amount of work that it anticipates will be performed by other DBE firms used race/gender neutrally on the contract beyond the goal requirements.

Race/gender neutral awards involve the utilization of a DBE firm because the DBE firm is the best firm to perform the work. Race/gender conscious awards involve the utilization of a DBE firm primarily to achieve the contract DBE goal.

SECTION 103, BEGIN LINE 269, DELETE AND INSERT AS FOLLOWS:

Upon receipt of notification from the Department, a Disadvantaged Business Enterprise Utilization Affidavit, Form ~~MBE-3~~ DBE-3, shall be completed by the Contractor and returned to the Department. The Contractor and the subcontractor/lessor/supplier shall certify on Form ~~MBE-3~~ DBE-3 that specific amounts have been paid and received. *A DBE-3 Form certification shall be completed and submitted for every DBE utilized on the contract, not just those listed on the Affirmative Action Certification.*

SECTION 103, BEGIN LINE 285, DELETE AND INSERT AS FOLLOWS:

by the DBE, or leased from another DBE, that are utilized on the project. ~~DBE hauling lessors who sublease a portion of their hauling shall take positive affirmative actions to sublease to DBEs and shall provide Form MBE-2 to the Department, evidencing those efforts prior to commencing work.~~ *Trucks that are leased by a DBE for a period of at least 12 months will be considered the same as trucks owned by the DBE. In addition, DBE credit will also be given for any fee or commission the DBE receives as a result of the lease arrangement for any additional non-DBE trucks.*

In order to count leased trucks toward the goal, the lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from being used by others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting the DBE goals.

The Contractor shall provide the Engineer copies of any lease agreements between DBE trucking subcontractors and any DBE or non-DBE trucking firms or owner/operators that will be used to supplement the DBE trucking subcontractor's trucks for the purpose of meeting the DBE goal. Copies of these lease agreements shall be provided by the time of use of any supplemental trucks on the Contract.

In addition to delivery ticket information required by Section 106, the following information shall be included on each ticket for material delivered to the job site by a DBE trucking subcontractor or lessee:

- 1. Name of trucking firm*
- 2. Printed name of the driver*

The Contractor shall submit weekly reports to the Engineer on forms provided by the Department, documenting the number of DBE trucks utilized and a breakdown of the dollar amount credited toward the Contract DBE goal. The reports shall be submitted within 5 business days of the end of the week being reported. Forms are available on the Department's website or from the Division of Contract Administration.

SECTION 103, BEGIN LINE 304, DELETE AND INSERT AS FOLLOWS:

(i) Records and Reports

The Contractor shall keep such records as necessary to determine compliance with its DBE utilization obligations and compliance with Determination of Good Faith Efforts for Goal Contracts. The records kept by the Contractor shall indicate the minimum requirements as follows:

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.

- (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 783, 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 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

<i>Dekalb</i>	4.4	<i>Madison</i>	4.9	<i>Tippecanoe</i>	2.7
<i>Delaware</i>	5.3	<i>Marion</i>	12.5	<i>Tipton</i>	4.4
<i>Dubois</i>	3.5	<i>Marshall</i>	7.1	<i>Union</i>	3.9
<i>Elkhart</i>	4.0	<i>Martin</i>	9.7	<i>Vanderburgh</i>	4.8
<i>Fayette</i>	3.9	<i>Miami</i>	3.7	<i>Vermillion</i>	3.1
<i>Floyd</i>	11.2	<i>Monroe</i>	3.1	<i>Vigo</i>	3.1
<i>Fountain</i>	1.5	<i>Montgomery</i>	1.5	<i>Wabash</i>	3.7
<i>Franklin</i>	9.2	<i>Morgan</i>	12.5	<i>Warren</i>	1.5
<i>Fulton</i>	6.2	<i>Newton</i>	18.4	<i>Warrick</i>	4.8
<i>Gibson</i>	4.8	<i>Noble</i>	4.4	<i>Washington</i>	9.6
<i>Grant</i>	3.7	<i>Ohio</i>	9.2	<i>Wayne</i>	3.9
<i>Greene</i>	9.7	<i>Orange</i>	9.6	<i>Wells</i>	4.4
<i>Hamilton</i>	12.5	<i>Owen</i>	9.7	<i>White</i>	1.5
<i>Hancock</i>	12.5	<i>Parke</i>	2.5	<i>Whitley</i>	4.4
<i>Harrison</i>	9.6	<i>Perry</i>	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

(Revised 10-05-10)

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, national origin, disability/handicap, or income status 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, age, national origin, disability/handicap, or income status.
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 STANDARD SPECIFICATIONS

(Revised 04-09-09)

Wherever in the contract documents the 1999, 2006 or 2008 Standard Specifications are referenced, it shall be interpreted to mean the 2010 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.

106-C-126 BUY AMERICA REQUIREMENT

(Adopted 03-18-10)

The Standard Specifications are revised as follows:

SECTION 106, BEGIN LINE 82, INSERT AS FOLLOWS:

(c) Buy America Requirement

All contracts, whether financed entirely or partially with State or Federal funds, shall comply with IC 5-16-8 and the 23CFR 635.410.

Except for pig iron and processed, pelletized, and reduced iron ore, steel shall be made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer, or other steel making process. Except for pig iron and processed, pelletized, and reduced iron ore, all steel *and cast iron* materials and products permanently incorporated in the contract shall be manufactured in the United States. Manufactured products include those which are rolled, formed, shaped, drawn extruded, forged, cast, or fabricated. The United States includes all territories, continental and insular, subject to the jurisdiction of the United States of America.

Except for pig iron and processed, pelletized, and reduced iron ore, no steel *or cast iron* products produced in the United States may be modified in a foreign country and still comply with the Buy America Requirement.

A Buy America Certification shall be submitted in accordance with 916.02(g) and 916.03(a).

SECTION 916, BEGIN LINE 68, INSERT AS FOLLOWS:

(g) Buy America Requirement

All steel *and cast iron materials and* products used in the contract shall be certified to be in accordance with 106.01(c).

916.03 Sample Forms

(a) For Buy America Requirement

BUY AMERICA CERTIFICATION

In accordance with Indiana Department of Transportation Specification 106.01(c), I hereby certify that all steel *and cast iron materials and* products incorporated in Contract No. _____ were produced and manufactured in the United States of America or territories subject to its jurisdiction.

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

(Adopted 03-30-07)

SECTION 107, BEGIN LINE 428, 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 267, 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-225 ARCHAEOLOGICAL ARTIFACTS

(Revised 02-28-11)

The Standard Specifications are revised as follows:

SECTION 104, BEGIN LINE 544, DELETE AND INSERT AS FOLLOWS:

~~If archaeological artifacts are encountered during excavation operations, these operations shall be ceased in the immediate vicinity and the Engineer shall be notified construction shall be addressed in accordance with 107.10. An archaeologist will be provided by the Department and a determination will be made as to the significance and the disposition of such findings. In no event shall an employee of the Contractor or the State of Indiana share in such ownership, or profit from salvaged archaeological findings. Unless otherwise agreed to in writing, compliance with this requirement will not be paid for directly. The cost thereof shall be included in the cost of the pay items.~~

SECTION 107, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

107.10 Blank Archaeological Artifacts

If archaeological artifacts, including cultural features or skeletal remains are discovered, all work within a minimum 100 foot (30 m) radius of the discovery shall cease immediately, the area shall not be further disturbed and the Contractor shall notify the Engineer immediately.

In accordance with IC 14-21-1-27, if skeletal remains are encountered, the Contractor shall notify the local law enforcement agency immediately and the Engineer immediately thereafter. The Department will notify IDNR within 2 days. Work within the area of the discovery shall not resume without written authorization.

For discoveries other than skeletal remains, the Department will coordinate with IDNR to mitigate impacts to the discovery. Work within the area of the discovery shall not resume without written authorization.

In no event shall an employee of the Contractor or the State of Indiana share in ownership or profit from salvaged archaeological findings.

SECTION 203, BEGIN LINE 117, DELETE AND INSERT AS FOLLOWS:

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.

Archaeological artifacts encountered during construction shall be addressed in accordance with 107.10.

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:

<i>IDEM</i>	<i>Indiana Dept. of Transportation</i>
<i>Rule 5 Coordinator</i>	<i>Senior Environmental Manager</i>
<i>100 N. Senate Avenue</i>	<i>Room N642</i>
<i>Mail Code 65-42 Room 1255</i>	<i>100 N. Senate Avenue</i>
<i>Indianapolis, IN 46204</i>	<i>Indianapolis, IN 46204</i>

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 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 is 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 StoneTON (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-202 WORKING RESTRICTIONS DURING MEMORIAL DAY, JULY FOURTH, AND LABOR DAY WEEKENDS

(Adopted 02-07-07)

The Standard Specifications are revised as follows:

SECTION 108, AFTER LINE 212, INSERT AS FOLLOWS:

This Special Provision concerns Summer Holiday Weekends. Contracts that already have language in the Contract Proposal referring to this subject will be governed by that language.

For all other Contracts, unless prior approval is received from the District Construction Engineer, Contractors will not be permitted to work as follows:

Memorial Day Weekend: No work from Noon Friday before Memorial Day, to Sunrise Tuesday after Memorial Day.

July 4th Weekend:

If July 4th is: Sunday – No work from Noon Friday, July 2nd, to Sunrise Tuesday, July 6th.

Monday – No work from Noon Friday, July 1st, to Sunrise Tuesday, July 5th.

Tuesday – No work from Noon Friday, June 30th, to Sunrise Wednesday, July 5th.

Wednesday – No work from Sunset Tuesday, July 3rd, to Sunrise Thursday, July 5th.

Thursday – No work from Noon Wednesday, July 3rd, to Sunrise Monday, July 8th.

Friday – No work from Noon Thursday, July 3rd, to Sunrise Monday, July 7th.

Saturday – No work from Noon Thursday, July 2nd, to Sunrise Monday, July 6th.

Labor Day Weekend: No work from Noon Friday, before Labor Day, to Sunrise Tuesday, after Labor Day.

This includes all traffic coming from the Suppliers.

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.

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-219 PG ASPHALT BINDER MATERIAL COST ADJUSTMENTS

(Revised 12-11-08)

The Standard Specifications are revised as follows:

SECTION 109, AFTER LINE 892, 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:

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

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:

<i>Pay Item</i>	<i>Pay Unit Symbol</i>
<i>Payment Adjustment, PG Asphalt Binder</i>	<i>DOL</i>

111-C-178 STOCKPILED MATERIALS

(Revised 04-08-09)

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 reinforcement~~ *reinforcing bars*, 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 reinforcement~~ *reinforcing bars* 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 51, 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 areas 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 289, 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.

207-R-577 SUBGRADE AND CHEMICALLY MODIFIED SOILS

(Revised 12-16-10)

The Standard Specifications are revised as follows:

SECTION 207, BEGIN LINE 9, INSERT AS FOLLOWS:

207.02 Materials

Materials shall be in accordance with the following.

Chemical Modifiers

<i>Cement By-Products</i>	913.05
Fly Ash.....	901.02
Lime	913.04(b)
Portland Cement, Type I.....	901.01(b)

SECTION 207, BEGIN LINE 26, DELETE AS FOLLOWS:

207.03 General Requirements

The subgrade shall be constructed uniformly transversely across the width of the pavement including ~~2 ft (0.6 m) outside the edge of~~ shoulders or curbs unless shown otherwise on the plans, by one of the following methods:

SECTION 207, BEGIN LINE 43, INSERT AS FOLLOWS:

Soils containing greater than 3% by dry weight calcium, magnesium carbonate or organic material, or with a maximum dry density of less than 100 pcf (1600 kg/m³), or with liquid limit of greater than 50, will not be permitted within the specified thickness of the subgrade *treatment in cut sections and will not be permitted within 24 in. (600 mm) of the finished subgrade elevation in fill sections.* Density shall be determined in accordance with AASHTO T 99 and loss of ignition shall be determined in accordance with AASHTO T 267. Liquid limits shall be determined in accordance with AASHTO T 89.

SECTION 207, BEGIN LINE 82, DELETE AND INSERT AS FOLLOWS:

Type I. ~~16 14~~ in. (~~400 350~~ mm) chemical soil modification, 12 in. (300 mm) of the subgrade excavated and replaced with coarse aggregate No. 53, or by 24 in. (600 mm) of soil compacted to density and moisture requirements.

Type IA. ~~16 14~~ in. (~~400 350~~ mm) chemical soil modification or 12 in. (300 mm) of the subgrade excavated and replaced with coarse aggregate No. 53.

Type IB. 14 in. (350 mm) chemical soil modification.

Type IC. 12 in. (300 mm) of the subgrade excavated and replaced with coarse aggregate No. 53.

Type II. 8 in. (200 mm) chemical soil modification, 6 in. (150 mm) of the subgrade excavated and replaced with coarse aggregate No. 53, or 12 in. (300 mm) of soil compacted to density and moisture requirements.

Type IIA. 8 in. (200 mm) chemical soil modification or 6 in. (150 mm) of the subgrade excavated and replaced with coarse aggregate No. 53.

SECTION 215, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 215 – CHEMICAL MODIFICATION OF SOILS

215.01 Description

This work shall consist of the modification of soils by uniformly mixing ~~dry~~ portland cement, fly ash, lime, *cement by-product* or a combination of the materials with soil to aid in achieving the workability of soils having excessive moisture content.

MATERIALS

215.02 Materials

Materials shall be in accordance with the following:

<i>Cement By-Products</i>	913.05
Fly Ash.....	901.02
Lime	913.04(b)
Portland Cement, Type I.....	901.01(b)
Water	913.01

Soils containing greater than 6% by dry weight calcium, magnesium carbonate or organic material, or having a maximum dry density of less than 95 pcf (1520 kg/m3), or with a soluble sulfate content greater than 1000 ppm will not be permitted in the subgrade. The density shall be determined in accordance with AASHTO T 99, the loss on ignition shall be determined in accordance with AASHTO T 267, and the sulfate content shall be determined in accordance with AASHTO T 289.

CONSTRUCTION REQUIREMENTS

215.03 Testing and Mix Design

The Contractor shall be responsible for all tests required to determine the chemical modifier type and optimum chemical modifier content for modification of the soils. The modifier selection, laboratory testing, and mix design shall be performed by an approved geotechnical consultant in accordance with the Department’s Design Procedures for Soil Modification or Stabilization.

The quantities for hydrated lime, quicklime, or portland cement shall be based on 4.0 ± 0.5% by dry unit weight (mass) of the soils. The quantities for lime *and cement* by-products shall be based on 5.0 ± 1.0% by dry unit weight (mass) of the soils. The quantities for fly ash class C shall be based on 12.0 ± 2.0% by dry unit weight (mass) of the soils. Class F fly ash shall not be used except in combination with lime or cement.

If hydrated lime, quick lime, or *portland* cement are used, test results *and the geotechnical consultant* recommendations, ~~and a type A certification for the chemical modifiers, except for cement,~~ shall be submitted to the Engineer prior to use. If fly ash, ~~lime,~~ lime by-products, *cement by-products* or any combination of chemical modifiers are used, *the test results; and the geotechnical consultant* recommendations, ~~and type A certifications for the chemical modifiers~~ shall be submitted to the Engineer and to the ~~Materials and Tests Division~~ *Office of Geotechnical Engineering* for approval at least ~~five~~5 business days prior to use. *If the modifier as bid is not an appropriate chemical modifier for the soils encountered on the project, a cement by-product shall be tested if the cement by-product was not the modifier as bid by the Contractor. If the cement by-product is not appropriate, portland cement shall be used. Portland Cement, fly ash, lime and cement by-products if used,* shall be from the Department's list of approved ~~Cement~~ Sources.

The quantity of chemical modifier may be adjusted for different soil types. However, the source or type of chemical modifier shall not be changed during the progress of the work without approval. A change in source or type shall require a new mix design.

215.04 Storage and Handling

The chemical modifier shall be stored and handled in accordance with the manufacturer's recommendations.

215.05 Weather Limitations

The chemical soil modification shall be performed when the soil has a minimum temperature of 45°F (7°C), measured 4 in. (100 mm) below the surface, and with the air temperature rising. The chemical modifier shall not be mixed with frozen soils or with soil containing frost.

215.06 Preparation of Soils

The soils shall be prepared in accordance with 207.03. All aggregates which are larger than approximately 3 in. (75 mm) encountered before or after mixing the soils and chemical modifiers shall be removed.

215.07 Spreading of Chemical Modifiers

Where type A-6 or A-7 soils are used or encountered, the surface shall be scarified or disked to the specified depth prior to distribution of the chemical modifier. If a combination of modifiers is used, it shall be mixed mechanically prior to being incorporated. The chemical modifier shall be distributed uniformly by a cyclone, screw-type, or pressure manifold type distributor. The chemical modifier shall not be applied when wind conditions create problems in adjacent areas or create a hazard to traffic on any adjacent roadway. The spreading of the chemical modifier shall be limited to an amount which can be incorporated into the soil within the same work day. If weather causes stoppage of work or exposes the chemical modifier to washing or blowing, additional chemical modifier may be spread when the work resumes.

215.08 Mixing

The chemical modifier, soil, and water when necessary, shall be thoroughly mixed by rotary speed mixers or a disc harrow. The mixing shall continue until a homogenous layer of the required thickness has been obtained. One hundred percent of the material, exclusive of rock particles, shall pass a 1 in. (25 mm) sieve and at least 60% shall pass a No. 4 (4.75 mm) sieve. The mixing depth shall be ~~16~~14 in. (~~400~~350 mm).

215.09 Compaction

The moisture content of the mixture shall be at the optimum moisture content or above the optimum moisture content as determined by the mix design in accordance with 215.03. Moisture content will be determined in accordance with ITM 506. Aeration or drying by further mixing, or the addition of water and further mixing, may be done to obtain the required moisture content.

Compaction of the mixture shall begin as soon as practicable after mixing. Compaction after mixing shall be as follows:

- (a) For *portland* cement modified soils, mixing shall be completed within 30 min of *portland* cement placement and compaction shall be completed within 3 h after mixing.
- (b) Fly ash or cement by-product modified soils shall be compacted within 4 h.
- (c) Lime modified soils shall be compacted within 24 h.

Compactive efforts shall be in accordance with 203 or 207.03 as applicable.

~~Maximum dry densities will be determined in accordance with AASHTO T 272 at the same time and location as each in-place density test is performed when in-place densities do not meet AASHTO T 99. The field in-place dry density shall be in accordance with AASHTO T 191 or AASHTO T 310.~~

~~The moisture content of the mixture shall be between the optimum moisture and the optimum moisture plus 2.0%. Aeration or drying by further mixing, or the addition of water and further mixing, may be required to obtain the optimum moisture content.~~

Acceptance testing for compaction of chemically modified soils will be performed on the finished grade with a Dynamic Cone Penetrometer (DCP) in accordance with ASTM D 6951. A 17.6 lbm (8 kg) hammer and disposable cone tip shall be used. The chemically modified soil lift shall meet the following requirements for compaction:

- (a) *A minimum DCP blow count of 17 for the top 6 in. (150 mm) of a 14 in. (350 mm) lift*

- (b) *A minimum DCP blow count of 16 for the bottom 8 in. (200 mm) of a 14 in. (350 mm) lift*
- (c) *A minimum DCP blow count of 20 for an 8 in. (200 mm) lift*
- (d) *A minimum of one passing test for each 1500 lft (450 m) of chemically modified soil for each two-lane pavement*

Construction traffic or equipment shall not be on the treated soils within 72 h after compaction.

215. 10 Method of Measurement

The accepted quantity of chemically modified soils will be measured by the square yard (square meter), complete in place. All excavation required to modify the soils below the specified depth will be measured in accordance with 203.27(b).

215. 11 Basis of Payment

The accepted quantity of chemically modified soils will be paid for by the square yard (square meter), complete in place. All excavation required to modify the soils below the specified depth will be paid for in accordance with 203.28.

Adjustment of materials for chemical modification that exceeds the limits of 215.03 will be included in a change order for materials only and paid for as chemical modifier adjustments. ~~If mix design test results show that hydrated lime, quicklime, lime by-products, or fly ash are the chemical modifier as bid by the Contractor is not appropriate and the strength of the modified soil-moisture density compaction can not be achieved, a price adjustment will be made for the use of a cement by-product or portland cement, whichever is appropriate.~~ The price adjustment will be calculated at a cost equal to the difference in the invoice cost of the ~~element~~ *chemical modifier found to be appropriate for use* and the invoice or quoted delivered cost of the ~~hydrated lime~~ *hydrated lime chemical modifier as bid by the Contractor*. This adjustment will be included in a change order and will be paid for as chemical modifier adjustments. Payment for chemical modifier adjustments will be made for direct *delivered* material costs incurred by the Contractor and shall not include any other markups.

Payment will be made under:

Pay Item	Pay Unit Symbol
Chemical Modification, Soils.....	SYS (m2)

The cost of performing the laboratory tests, providing an approved geotechnical consultant, scarification of the subgrade, spreading and mixing of the chemical modifier and soil, compaction of the resultant mixture, shaping the subgrade, work required due to adjustments of modifier proportioning, additional modification required due to weather conditions, correction of deficient areas, water required for the modification process, modified subgrade trimming, and all operations needed to meet the requirements of this specification shall be included in the cost of the pay items of this section.

SECTION 913, BEGIN LINE 33, DELETE AND INSERT AS FOLLOWS:

913.04 Lime

Lime shall be a hydrated lime when used in masonry or a hydrated lime, quicklime, or lime by-product when used for soil modification.

(a) Hydrated Lime for Masonry

Hydrated lime used in masonry shall be in accordance with ASTM C 207, Type N.

(b) Lime for Soil Modification

Hydrated lime, quicklime, or lime by-product used for soil modification shall be approved in accordance with ITM 806, Procedure P and shall meet the following requirements.

1. Hydrated Lime and Quicklime

Hydrated lime and quicklime shall be in accordance with AASHTO M 216.

2. Lime By-Products

Lime by-products shall be hydrated lime or quicklime by-products in accordance with ASTM C 25 having the following requirements.

- a. The lime by-products shall contain a minimum of 60% total ~~available~~ calcium and magnesium oxides (non-volatile basis).
- b. Available calcium hydroxide plus magnesium oxide calculated as calcium hydroxide shall be a minimum of 30%.
- c. Sieve analysis shall be performed in accordance with ASTM C 110. The lime by-products gradation shall be as follows:

Sieve	% Retained (Max)
No. 4 (4.75 mm)	5
No. 30 (600 μm)	10
No. 100 (150 μm)	25

913.05 Cement By-Products

Cement by-products used for soil modification shall be approved in accordance with ITM 806, Procedure P and shall meet the following requirements.

- (a) The cement by-product shall contain a minimum of 50% calcium oxide as reported.*
- (b) Available free lime (CaO) shall be a minimum of 5%.*
- (c) Loss on ignition shall be a maximum of 30%.*

Sieve analysis shall be performed in accordance with ASTM C 110. The cement by-products gradation shall be as follows:

<i>Sieve</i>	<i>% Retained (Max)</i>
<i>No.4 (4.75 mm)</i>	<i>5</i>
<i>No. 30 (600 μm)</i>	<i>10</i>
<i>No. 100 (150 μm)</i>	<i>25</i>

300-R-580 LIFT DEPTH FOR SHOULDERS

(Adopted 04-15-10)

The Standard Specifications are revised as follows:

SECTION 301, BEGIN LINE 16, DELETE AND INSERT AS FOLLOWS:

301.03 Preparation of Subgrade

Subgrade shall be compacted in accordance with 207.04, *except for shoulders where the subgrade shall be compacted in accordance with 203.23 or 207.04 as shown on the plans.* In areas of 500 ft (150 m) or less in length, or for temporary runarounds, proofrolling will not be required. Proofrolling will not be required in trench sections where proofrolling equipment cannot be used.

301.04 Temperature Limitations

Aggregate shall not be placed when the air temperature is less than 35°F (2°C). Aggregate shall not be placed on a frozen subgrade. Frozen aggregates shall not be placed.

301.05 Spreading

The aggregate shall be spread in uniform lifts with a spreading and leveling device approved by the Engineer. The spreading and leveling device shall be capable of placing aggregate to the depth, width, and slope specified. The compacted depth of each lift shall be a minimum of 3 in. (75 mm) and a maximum of 6 in. (150 mm), *except where utilized as a base under shoulder pavement. The compacted depth of each lift under shoulder pavement shall be a minimum of 3 in (75 mm) and a maximum of 9 in (225 mm).* The aggregate shall be handled and transported to minimize segregation and the loss of moisture. In areas inaccessible to mechanical equipment, approved hand spreading methods may be used.

SECTION 303, BEGIN LINE 18, INSERT AS FOLLOWS:

303.03 Preparation of Subgrade

Subgrade shall be compacted in accordance with 207.04, *except for shoulders where the subgrade shall be compacted in accordance with 203.23 or 207.04 as shown on the plans.* In areas of 500 ft (150 m) or less in length, or for temporary runarounds, proofrolling will not be required. Proofrolling will not be required in trench sections where proofrolling equipment cannot be used.

303.04 Temperature Limitations

Aggregate shall not be placed when the air temperature is less than 35°F (2°C). Aggregate shall not be placed on a frozen subgrade. Frozen aggregates shall not be placed.

303.05 Spreading

The aggregate shall be spread in uniform lifts with a spreading and leveling device approved by the Engineer. The spreading and leveling device shall be capable of placing aggregate to the depth, width, and slope specified. The compacted depth of each lift shall be a minimum of 3 in. (75 mm) and a maximum of 6 in. (150 mm), *except where utilized as a shoulder. The compacted depth of a lift for a shoulder shall be a minimum of 3 in (75 mm) and a maximum of 9 in (225 mm).* The aggregate shall be handled and transported to minimize segregation and the loss of moisture. In areas inaccessible to mechanical equipment, approved hand spreading methods may be used.

306-R-524 MILLING DEPTH REQUIREMENTS

(Adopted 04-15-10)

The Standard Specifications are revised as follows:

SECTION 306, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:

306.02 General

Milling operations shall be described in the QCP in accordance with ITM 803. Where the milling operation in a partial-day closure results in a *longitudinal* vertical or near vertical face exceeding ~~1.5 in. (38 mm)~~ 2 in (50 mm) in height, the adjacent lane shall be milled during the same day, the milled lane resurfaced during the same day, or the vertical face tapered at a 45° angle or flatter. Where located within 3 in. (75 mm) of a curb, surface material that cannot be removed by the cold-milling machine shall be removed by other approved methods.

400-R-553 HMA PROVISIONS

(Revised 02-21-11)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 46, INSERT AS FOLLOWS:

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

QC/QA HMA may be produced as warm-mix asphalt, WMA, by using a water-injection foaming device for ESAL category 1, 2 and 3 mixtures. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.

SECTION 401, BEGIN LINE 48, DELETE AND INSERT AS FOLLOWS:

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 AASHTO R 35 and the respective AASHTO references as listed below.

Bulk Specific Gravity and Density of Compacted Asphalt
 Mixtures Using Automatic Vacuum Sealing~~ASTM D 6752~~
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
* The mix design gradation shall be less than or equal to the PCS control point for 9.5 mm category 4 and 5 surface mixtures.					
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

SECTION 401, BEGIN LINE 71, DELETE AND INSERT AS FOLLOWS:

may be used for open graded mixtures. The maximum specific gravity of the uncompact mixture shall be *mass* determined in water in accordance with AASHTO T 209, Section 9.5.1.

SECTION 401, BEGIN LINE 118, DELETE AND INSERT AS FOLLOWS:

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.~~

~~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.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS, 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. The RAP coarse aggregate shall pass the maximum size sieve for the mixture being produced and the RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP for the ESAL category 3, 4 and 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.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$Binder\ Replacement,\% = \frac{(A \times B) + (C \times D)}{E} \times 100\%$$

where:

- A = RAP, % Binder Content
- B = RAP, % in Mixture
- C = RAS, % Binder Content
- D = RAS, % in Mixture
- E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in HMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. HMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

HMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

Maximum Binder Replacement, %									
Mixture Category	Base and Intermediate					Surface			
	Dense Graded				Open Graded	Dense Graded			
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
1	40.0*				25.0	40.0*			
2	40.0*				25.0	40.0*			
3	40.0*				25.0	15.0			
4	40.0*				25.0	15.0			
5	40.0*				25.0	15.0			

*RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 401.05 for the HMA mixture specified.

HMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

HMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6°C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any HMA mixture.

SECTION 401, BEGIN LINE 158, INSERT AS FOLLOWS:

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 $300 \pm 9^{\circ}\text{F}$ ($150 \pm 5^{\circ}\text{C}$) for dense graded mixtures and $260 \pm 9^{\circ}\text{F}$ ($125 \pm 5^{\circ}\text{C}$) for open graded mixtures. *The JMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.* The JMF for each mixture shall be submitted to the Engineer and shall use the same MAF as the DMF.

SECTION 401, BEGIN LINE 180, DELETE AND INSERT AS FOLLOWS:

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 *mass determined in water* in accordance with AASHTO T 209, ~~Section 9.5.1.~~

SECTION 401, BEGIN LINE 392, DELETE AND INSERT AS FOLLOWS:

AASHTO T 166, Method A. The maximum specific gravity will be *mass determined in water* in accordance with AASHTO T 209, ~~Section 9.5.1.~~

SECTION 401, BEGIN LINE 405, DELETE AND INSERT AS FOLLOWS:

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 *as described below.*

(a) Profilograph

When a pay item for Profilograph, HMA is included in the contract, the Contractor shall furnish, calibrate, and operate an approved profilograph in accordance with ITM 912 on the mainline traveled way and ramps, including adjacent acceleration or deceleration lane, where all of the following conditions are met:

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

- ~~(a)~~1. ~~†~~The design speed is greater than 45 mph (70 km/h).
- ~~(b)~~2. ~~†~~The ~~pavement traveled way or ramp lanes are~~ width is ~~full~~ constant width and is 0.1 mi (0.16 km) ~~in length~~, ~~and~~.
- ~~(c)~~3. ~~†~~The HMA is placed on a milled surface or the total combined planned lay rate of surface, intermediate, and base courses 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 45 mph (70 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 project area, less paving exceptions and areas exempt from profilograph operation in accordance with ITM 912, will be divided into individual smoothness sections measuring 0.1 mi (0.16 km) in length for each lane. Partial length smoothness sections adjacent to project limits, paving exceptions, or areas exempt from profilograph operation will be considered in accordance with ITM 912.

If the posted speed limit for an entire smoothness section is less than or equal to 45 mph, the section will be exempt from profilograph operation and the smoothness within the section will be accepted by a 16 ft (4.9 m) straightedge.

If the posted speed limit is greater than 45 mph for a portion of a smoothness section and is less than or equal to 45 mph for the remainder, the section smoothness acceptance will be as follows:

- 1. By profilograph for the portion of the section with a posted speed limit greater than 45 mph.*
- 2. By 16 ft (4.9 m) straightedge for the portion of the section with a posted speed limit less than or equal to 45 mph.*

At locations where the profilograph is required, it shall be used on the surface course and on any dense graded intermediate courses immediately below the surface course.

(b) 16 ft (4.9 m) Straightedge and 10 ft (3 m) Straightedge

The Department will furnish and operate 16 ft (4.9 m) and 10 ft (3 m) straightedges as described below. The 16 ft (4.9 m) straightedge is used to accept smoothness along the direction of mainline traffic and the 10 ft (3.0 m) straightedge is used to accept smoothness transverse to the direction of mainline traffic. This includes longitudinal smoothness on public road approaches and median crossovers.

For contracts which include the Profilograph, HMA pay item, the 16 ft (4.9 m) long straightedge will be used to accept longitudinal smoothness on surface courses at the following locations:

1. *All mainline traveled way lanes shorter than 0.1 mi (0.16 km).*
2. *All mainline traveled way lanes within smoothness sections with posted speed limits less than or equal to 45 mph throughout the entire section length.*
3. *All mainline traveled way lanes at locations exempted from profilograph operation in accordance with ITM 912.*
4. *All tapers.*
5. *All turn lanes, including bi-directional left turn lanes.*
6. *All ramps with design speeds of 45 mph (70 km/h) or less.*
7. *All acceleration and deceleration lanes associated with ramps with design speeds of 45 mph (70 km/h) or less.*
8. *All shoulders.*

For contracts where the profilograph is not used for smoothness acceptance, the 16 ft (4.9 m) straightedge will be used to accept longitudinal smoothness on all dense graded courses at the above locations as well as all mainline travel way lanes and ramps with design speeds of greater than 45 mph (70 km/h). Smoothness acceptance on ramp acceleration or deceleration lanes will also be based on operation of the 16 ft (4.9 m) straightedge.

~~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 item, the 16 ft (4.9 m) long straightedge shall be used on 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 transverse slopes, across travel lanes and shoulders, approaches, and crossovers.

(c) Smoothness Correction

~~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.~~

At locations where 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.

At locations where the profilograph is being used on a surface course, all areas having a high or low point deviation in excess of 0.3 in. (8 mm) shall be corrected. All smoothness sections with a deficient profile index in accordance with 401.19(d) shall be corrected. Underlying courses that are exposed by corrective action shall be milled to a depth of 1 1/2 in (38 mm) and replaced with surface course. After the corrective action is taken on a surface course, the profilograph shall be operated throughout the entire affected smoothness section to verify the adequacy of the corrective action.

At locations where the 16 ft (4.9 m) straightedge is used, 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.

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.~~

SECTION 401, BEGIN LINE 493, INSERT AS FOLLOWS:

If the Lot PWL for any one of the properties is less than 50 or a subplot has an air void content less than 1.0% or greater than 7.0%, 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.

SECTION 401, BEGIN LINE 578, DELETE AND INSERT AS FOLLOWS:

(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.~~

Smoothness pay adjustments will only be applied when the smoothness is measured by a profilograph. The pay adjustment will be based on the profile index generated on the surface course only.

At locations where a profilograph is used to accept smoothness, a quality assurance adjustment will be determined for each 0.1 mi (0.16 km) section of each lane. This adjustment will be applied to all QC/QA HMA pay items within the pavement section. The adjustment for each section will be calculated using the following formula.

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

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 (m²)
- S = planned spread rate for material, lb/syd (kg/m²)
- T = conversion factor: 2000 lb/ton (1000 kg/Mg)
- U = unit price for the material, \$/ton (\$/Mg)

For smoothness sections that are less than 0.1 mi (0.16 km) in length or require profilograph operation along both lane edges, the profile index used to obtain the smoothness pay factor used in the above formula will be determined in accordance with ITM 912.

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

$$Q_s = \sum q_s$$

When smoothness is measured by a profilograph, payment adjustments will be made based on a zero blanking band on the final profile index in accordance with the following table. Regardless of the tabulated value, the maximum pay factor for a smoothness section where corrective action has been performed will be 1.00.

<i>PAY FACTORS ADJUSTMENT FOR SMOOTHNESS (PI_{0.0}) ZERO BLANKING BAND</i>	
Design Speed Greater Than 45 mph (70 km/hr)	
Profile Index in./0.1 mi. (mm per 0.16 km)	Pay Factor, <i>PF_s</i>
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 a profile index less than or equal 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 adjustments 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 subplot 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~~7 calendar days of receipt of the Department’s written results for ~~that the~~ *lot accepted under 401.19(a) or the subplot accepted under 401.19(b)*. The subplot and specific test(s) shall be specified at the time of the appeal request. Only one appeal request per *lot for mixture accepted under 401.19(a) or subplot for mixture accepted under 401.19(b)* 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~~ *mass determined in water* in accordance with AASHTO T 209, ~~Section 9.5.1.~~

SECTION 402, BEGIN LINE 18, DELETE AS FOLLOWS:

402.03 Materials

Materials shall be in accordance with the following:

Asphalt Materials	
PG Binder, PG 58-28*, PG 64-22,	
PG 64-28*, PG 70-22, PG 76-22	902.01(a)
Coarse Aggregates	904
Base Mixtures, – Class D or Higher	
Intermediate Mixtures – Class C or Higher	
** Surface Mixtures – Class B or Higher*	
Fine Aggregates	904
* Only for use in mixtures containing greater than 15% RAP. Refer to 402.05.	
* * Surface aggregate requirements are listed in 904.03(d).	

SECTION 402, BEGIN LINE 39, 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	4.75 mm	4.75 mm	4.75 mm	4.75 mm
	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	9.5 mm	9.5 mm	9.5 mm	9.5 mm
	12.5 mm	12.5 mm	12.5 mm	12.5 mm
	19.0 mm	19.0 mm	19.0 mm	19.0 mm
	25.0 mm	25.0 mm	25.0 mm	25.0 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

HMA may be produced as warm-mix asphalt, WMA by using a water-injection foaming device for temporary HMA mixtures and type A, B and C mixtures. The DMF shall list the minimum plant discharge temperature for HMA and WMA as applicable to the mixture.

SECTION 402, BEGIN LINE 87, DELETE AND INSERT AS FOLLOWS:

(c) Composition Limits for Temporary HMA Mixtures

Temporary HMA mixtures shall be *the* type ~~B~~ specified in accordance with 402.04. A MAF in accordance with 402.05 will not apply.

SECTION 402, BEGIN LINE 102, DELETE AND INSERT AS FOLLOWS:

402.08 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 JMF.~~

~~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.~~

~~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 402.03.~~

~~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.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS 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. The RAP coarse aggregate shall pass the maximum size sieve for the mixture being produced and the RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP for the type C and D 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.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$\text{Binder Replacement, \%} = \frac{(A \times B) + (C \times D)}{E} \times 100\%$$

where:

A = RAP, % Binder Content

B = RAP, % in Mixture

C = RAS, % Binder Content

D = RAS, % in Mixture

E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in HMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. HMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

HMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

<i>Maximum Binder Replacement, %</i>							
<i>Mixture Category</i>	<i>Base and Intermediate</i>				<i>Surface</i>		
	<i>Dense Graded</i>				<i>Dense Graded</i>		
	<i>25.0 mm</i>	<i>19.0 mm</i>	<i>12.5 mm</i>	<i>9.5 mm</i>	<i>12.5 mm</i>	<i>9.5 mm</i>	<i>4.75 mm</i>
<i>A</i>	<i>40.0*</i>				<i>40.0*</i>		
<i>B</i>	<i>40.0*</i>				<i>40.0*</i>		
<i>C</i>	<i>40.0*</i>				<i>15.0</i>		
<i>D</i>	<i>40.0*</i>				<i>15.0</i>		

*RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 401.05 for the HMA mixture specified.

HMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

HMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6°C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any HMA mixture.

SECTION 402, BEGIN LINE 350, DELETE AND 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 *mass* determined in water in accordance with AASHTO T 209, ~~Section 9.5.1.~~

SECTION 402, BEGIN LINE 392, INSERT AS FOLLOWS:

HMA for Temporary Pavement, Type * TON (Mg)

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 AASHTO M 325 and R 35 46.

SECTION 410, BEGIN LINE 54, DELETE AND INSERT AS FOLLOWS:

The optimum binder and aggregate gradation content shall produce 4.0% air voids. The maximum specific gravity of the uncompact mixture shall be *mass* determined *in water* 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, BEGIN LINE 93, DELETE AND INSERT AS FOLLOWS:

410.06 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 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.~~

Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS 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. RAS shall be 100% passing the 1/2 in. (12.5 mm) sieve. RAP shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.

Recycled materials may be used as a substitute for a portion of the new materials required to produce SMA mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:

$$\text{Binder Replacement, \%} = \frac{(A \times B) + (C \times D)}{E} \times 100\%$$

where:

- A = RAP, % Binder Content
- B = RAP, % in Mixture
- C = RAS, % Binder Content
- D = RAS, % in Mixture
- E = Total, % Binder Content in Mixture

RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in SMA mixtures and shall be stockpiled separately from other materials.

The recycled material percentages shall be as specified on the DMF. SMA mixtures utilizing recycled materials shall be limited to the binder replacement percentages in the following table:

SMA mixtures utilizing RAP or RAS or a blend of RAP and RAS

<i>Maximum Binder Replacement, %</i>		
<i>SMA Surface</i>		
<i>Mixture Category</i>	<i>12.5 mm</i>	<i>9.5 mm</i>
<i>1</i>	<i>40.0*</i>	<i>40.0*</i>
<i>2</i>	<i>40.0*</i>	<i>40.0*</i>
<i>3</i>	<i>15.0</i>	<i>15.0</i>
<i>4</i>	<i>15.0</i>	<i>15.0</i>
<i>5</i>	<i>15.0</i>	<i>15.0</i>

**RAS materials shall not contribute more than 25% by weight (mass) of the total binder content for any HMA mixture.*

The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with ~~401.05~~410.05 for the SMA mixture specified.

SMA mixtures with a binder replacement less than or equal to 25.0% by weight (mass) of the total binder content by utilizing RAP or RAS or a blend of RAP and RAS materials shall use the specified binder grade.

SMA mixtures with a binder replacement greater than 25.0% and less than or equal to 40.0% by weight (mass) of the total binder content by utilizing RAP or a blend of RAP and RAS shall use a binder grade with upper and lower temperature classifications reduced by 6° C from the specified binder grade. RAS materials shall not contribute more than 25.0% by weight (mass) of the total binder content for any SMA mixture.

SECTION 410, BEGIN LINE 139, DELETE AND INSERT AS FOLLOWS:

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 *mass* determined *in water* in accordance with AASHTO T 209, ~~Section 9.5.1~~. 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.

SECTION 410, BEGIN LINE 313, DELETE AND INSERT AS FOLLOWS:

The Engineer will determine the BSG of the cores in accordance with AASHTO T 166, Method A. The maximum specific gravity will be *mass* determined *in water* in accordance with AASHTO T 209, ~~Section 9.5.1~~. The target value for density of SMA mixtures of each subplot 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 *mass* determined *in water* in accordance with AASHTO T 209, ~~Section 9.5.1~~. Density shall not be less than 92.0%.

SECTION 410, BEGIN LINE 406, 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. Additional 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~~7 calendar days of receipt of the Department’s written results for that subplot. *The request for the appeal for MSG, BSG of the density cores or binder content and gradation shall be submitted within seven7 calendar days of receipt of the Department’s written results for that subplot.* The subplot and specific tests shall be specified at the time of the appeal request. Only one appeal request per subplot is permitted. Upon approval of the appeal, the Engineer will perform additional testing.

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) MSG

The backup ~~maximum specific gravity~~ *MSG sample* will be dried in accordance with ITM 572 and ~~tested~~ *mass determined in water* in accordance with AASHTO T 209, ~~section 9.5.1~~.

SECTION 902, AFTER LINE 16, INSERT AS FOLLOWS:

A PG 58-28 or PG 64-22 binder may be modified by in-line blending with styrene butadiene rubber, SBR, polymer latex at the HMA plant in accordance with ITM 581. A PG 58-28 may be modified to a PG 64-28 and a PG 64-22 may be modified to a PG 70-22.

The SBR polymer latex shall be in accordance with the following:

<i>SBR POLYMER LATEX</i>	
<i>Total Polymer Solids, % by weight</i>	<i>60 – 72</i>
<i>Butadiene, % by weight</i>	<i>68 minimum</i>
<i>Residual Styrene, % by weight</i>	<i>0.1 maximum</i>
<i>Ash, % of total polymer solids by weight</i>	<i>3.5 maximum</i>
<i>pH</i>	<i>9 – 11</i>
<i>Viscosity, Brookfield model RVF, Spindle No. 2 @ 20 rpm @ 25°C</i>	<i>2000 maximum</i>

A type A certification for the SBR polymer latex shall be furnished in accordance with 916.

The minimum SBR polymer latex content shall be 2.5 %. The SBR polymer latex content may be reduced below the minimum content provided, if the following requirements are met:

- 1. An AASHTO accredited laboratory shall blend the PG binder and SBR polymer latex at the proposed SBR polymer latex content and test and grade the modified PG binder in accordance with AASHTO M 320.*
- 2. The laboratory test results verifying the blend and compliance with 902.01(a) shall be submitted to the Engineer for approval.*
- 3. The source of the PG Binder or SBR polymer latex shall not be changed.*

SECTION 902, AFTER LINE 149, INSERT AS FOLLOWS:

902.02 Sampling and Testing Asphalt Materials

The tests and AASHTO references are as follows:

- (a) Sampling Bituminous MaterialsAASHTO T 40

The following exceptions to AASHTO T 40 shall apply:

1. Samples may be obtained at any time before material is incorporated into the work.
2. Samples for all grades of asphalt emulsion shall be a minimum of 1/2 gal. (1.9 L). The size of samples of other liquid material may be 1 qt (1.0 L).
3. Samples of liquid materials shall be obtained at one of the following:
 - a. bulk storage tanks from sampling valves located in the tank or line and asphalt plant storage tanks from sampling valves located in the tank
 - b. transports from sampling valves
 - c. distributors from valves
 - d. other storage or locations as approved
 - e. sampling by other recognized devices may be approved
 - f. sampling valves beyond the in-line blending location*

SECTION 902, BEGIN LINE 87, DELETE AND INSERT AS FOLLOWS:

AE-F is a medium setting, hard penetration, diluted emulsion intended for fog sealing.

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	AE-F	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 72T 59			50				20	50				20+
Viscosity, Saybolt Furol at 25°C, max.	T 72T 59					100	100	100		100	115	100	
Viscosity, Saybolt Furol at 50°C, min.	T 72T 59	75	75		50				75				
Viscosity, Saybolt Furol at 50°C, max.	T 72T 59	400	400						300				
Demulsibility w/35 mL, 0.02N CaCl ₂ , %, min.	T 59	50	50		30		25						
Demulsibility w/50 mL, 0.10N CaCl ₂ , %, 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	4.0	7.0	7.0	3.0	3.0	3.0
Residue by Distillation, %, min.	T 59	68	68	68	65 ⁽⁵⁾	54	27	57	68	60	30		
Residue by Distillation, % max.	T 59					62	35			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	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	40				50	300+
Penetration (0.1 mm) at 25°C, 100g, 5 s, max. ⁽⁴⁾	T 49	200	200	200	150	200	90	90				200	
Penetration (0.1 mm) at 25°C, 50g, 5 s, min. ⁽⁴⁾	T 49								100	100			
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	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.													

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-R-253 MOBILE CONSTRUCTION SIGNS

(Adopted 09-01-05)

This work shall consist of furnishing and placing mobile construction signs for a moving operation. The mobile construction signs shall be in close proximity to the operation as shown on the plans.

This work will be measured per each day that each sign is in use. This work will be paid for at the contract unit price per day for construction signs, mobile, for each day that each sign is used. Payment will be made without regard to the sizes of signs used.

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.

805-T-169 TRAFFIC SIGNALS

(Revised 10-28-10)

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
<i>Loop Detector Sealant.....</i>	<i>906.02(a)</i>
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).

The battery cabinet and program timing module for solar powered flashing beacons shall be from the Department's Approved List of Traffic Signal Control Equipment.

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~~ *Construction Technician Level II* certification which has been granted by the International Municipal Signal Association. *Installation inspections, troubleshooting, maintenance and repair of these systems shall be accomplished by or in the presence of and under the responsible charge of an employee of the Contractor who holds a Traffic Signal Construction Technician Level II certification or a Traffic Signal Field Technician Level II 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, *at a minimum*, 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 ~~Electrician~~ *Construction Technicians*, the *Level II Traffic Signal Field Technicians* 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 ~~Electrician~~ *Construction or Field Technicians* 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.

Flashing beacons shall flash at a rate for each beacon of 50 to 60 times per minute with the illuminated period from 1/2 to 2/3 of the total cycle. If a second beacon is specified, the 2 beacons shall flash alternately.

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.

Flasher signal faces that supplement signs shall be mounted with the bottom of the housing at not less than 3 ft (0.9 m) nor more than 13 ft (3.9 m) above the edge of pavement. Flasher signal faces that supplement signs shall be directed towards oncoming traffic. 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 housings, 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. \pm 2 in. (970 mm \pm 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(e)7b. Loop detector sealant shall be in accordance with 922.06(e)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 Pavement Loops

Preformed pavement loops may be installed as a 1, 2, 3 or 4 loop configuration. Pavement 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.

(e) 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 μ H. 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).

Performed 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 performed 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.....	EACH
type no.	
Controller and Cabinet, Flasher, _____	EACH
type	
Controller Cabinet Foundation, _____.....	EACH
type	
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 Amplifier, _____ Channel	EACH
no.	
Loop Detector Delay <i>Counting</i> 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 the solar panel, battery cabinet, program timing module, signal heads, wiring, and all hardware required to complete the installation shall be included in the cost of flasher installation or flasher modernization.

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.

808-B-114 REPAINTING NO-PASSING ZONE PAVEMENT MARKINGS

(Revised 09-01-05)

The Standard Specifications are revised as follows:

SECTION 808, BEGIN LINE 61, INSERT AS FOLLOWS:

The plan quantities for pavement markings will be undistributed quantities. The actual repainting limits for no-passing zone markings will be as determined by the District Traffic Engineer.

808-R-551 PERFORMANCE BASED PAVEMENT MARKINGS

(Revised 03-18-10)

The Standard Specifications are revised as follows:

SECTION 109, AFTER LINE 808, INSERT AS FOLLOWS:

(f) Pavement Traffic Markings, PTM
Quality adjustments will be calculated in accordance with 808.07

SECTION 801, BEGIN LINE 602, INSERT AS FOLLOWS:

(a) Temporary Pavement Marking Methods
Pavement markings shall be installed in accordance with 808.07 except that measurement of retro-reflectivity is not required by the Contractor and quality adjustments will not apply. All other performance measures shall apply.

SECTION 808, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 808 – PAVEMENT TRAFFIC MARKINGS

808.01 Description

This work shall consist of furnishing and installing, or removing, pavement traffic markings and snowplowable raised pavement markers in accordance with the MUTCD, these specifications and as shown on the plans. Markings shall be installed as required unless written approval is obtained from the District Traffic Engineer to make modifications at specific locations.

MATERIALS

808.02 Materials

Materials shall be in accordance with the following:

Cones.....	801.08
Epoxy Multi-Component.....	921.02(c)
Glass Beads.....	921.02(e)
Preformed Plastic.....	921.02(b)
Extended Warranty Preformed Plastic.....	921.02(b)
Snowplowable Raised Pavement Markers.....	921.02(d)1
Thermoplastic.....	921.02(a)
Traffic Paint.....	909.05

A certification which shows the paint meets all IDEM and EPA regulatory requirements for VOC levels and lead, chromium or other heavy metals from the paint manufacturer shall be provided.

CONSTRUCTION REQUIREMENTS

808.03 General Requirements

Permanent pavement markings shall be placed on the surface course in a standard pavement marking pattern. Center lines shall be placed on two-way two-lane roads, lane lines shall be placed on multi-lane divided roads, and both center lines and lane lines shall be placed on multi-lane undivided roads. ~~The markings shall be of the same material as the existing pavement markings or any durable pavement marking material.~~

The pavement shall be cleaned of all dirt, oil, grease, excess sealing material, excess pavement marking material and all other foreign material prior to applying new pavement traffic markings. New paint pavement markings may be placed over sound existing markings of the same color. New thermoplastic, preformed plastic, or ~~epoxy~~ *multi-component* markings may be applied over sound existing markings of ~~the same~~ *a compatible* type if permitted by manufacturer's recommendations, a copy of which shall be supplied to the Engineer prior to placement; otherwise, existing markings shall be removed in accordance with 808.10 prior to placement of the new markings. Removal of pavement marking material shall be in accordance with 808.10. The pavement surface shall be dry prior to applying pavement traffic markings.

SECTION 808, BEGIN LINE 131, DELETE AND INSERT AS FOLLOWS:

808.07 Pavement Marking Material Application, ~~and Equipment, and Performance~~ Requirements

All double line markings, such as a no passing zone or the center line of an undivided multi-lane roadway, shall be applied in one pass. *When a hand propelled machine is used, the single pass application of double line markings will not be required and control points shall be spaced at a maximum of 10 ft longitudinally.*

~~Stop lines and crosswalk lines for new or modernized traffic signal installations shall be durable pavement marking material. For this application, preformed plastic may be used on concrete if permitted by manufacturer's recommendations. However, f~~*For new or modernized traffic signal installation contracts with completion dates in winter months when conditions do not permit application of durable markings, traffic paint markings may be substituted with an appropriate unit price adjustment if approved by the Engineer.*

Markings shall be installed in accordance with the manufacturer's recommendations, except that the minimum requirements stated herein shall also apply. Products specifically designed for application temperatures below the stated minimums herein are not required but may be used if approved by the Engineer. When directed, the Contractor shall provide the Department with original copies of all necessary current manufacturer's installation manuals prior to beginning installation work, and no installation work shall begin prior to the Department's receipt of these manuals. These manuals shall become the property of the Department.

The markings shall be protected from traffic until dry to eliminate tracking.

The markings shall meet or exceed the following performance criteria:

1. Color.

The daytime and nighttime color of the applied markings shall be in accordance with ASTM D 6628 when determined in accordance with ASTM E 811 and E 1349.

2. Durability.

The pavement markings shall have a minimum resistance to wear of 97% in accordance with ASTM D 913.

3. Retro-reflectivity.

Contracts with 50,000 lft (15 000 m) or more of longitudinal paint line or 10,000 lft (3 000 m) or more longitudinal durable marking line shall have retro-reflectivity measured. Longitudinal lines shall meet required minimum initial and retained average retro-reflectivity measurements. All other contracts and markings shall meet the required longitudinal line minimum measurements and will be measured by the Department at the discretion of the Engineer, except that quality adjustments will not apply. Retained retro-reflectivity is the value at the time of the warranty expiration in accordance with 808.09 and will be measured by the Department at the discretion of the Engineer.

Retro-reflectivity testing equipment shall be furnished, calibrated, and operated in accordance with ITM 931. The markings shall be tested in a period of not less than 14 days to not more than 30 days after the materials are applied. The retro-reflectivity equipment shall remain the property of the Contractor. The measurement of retro-reflectivity shall be supervised or performed at all times by an operator trained and certified by the unit’s manufacturer. A report as described in the ITM and including the specified test results and calculations shall be prepared and provided to the Engineer within 3 days of each day of testing.

Quality adjustments will be applied to the payment of markings which fail to meet the required minimum initial average retro-reflectivity values. The required minimum initial and retained average retro-reflectivity values for longitudinal line measured in mcd/m²/lx are as follows:

<i>Material Type</i>	<i>White</i>	<i>Yellow</i>	<i>Quality Adjustment*</i>	<i>Retained White</i>	<i>Retained Yellow</i>
<i>Paint</i>	<i>≥ 250</i>	<i>≥ 175</i>	<i>1.00</i>	<i>n/a</i>	<i>n/a</i>
<i>Required Minimum</i>	<i>150 to 249</i>	<i>125 to 174</i>	<i>0.70</i>		
<i>Thermoplastic</i>	<i>≥ 300</i>	<i>≥ 200</i>	<i>1.00</i>	<i>200</i>	<i>150</i>
<i>Required Minimum</i>	<i>250 to 299</i>	<i>150 to 199</i>	<i>0.70</i>		
<i>Multi-Component</i>	<i>≥ 300</i>	<i>≥ 200</i>	<i>1.00</i>	<i>200</i>	<i>150</i>
<i>Required Minimum</i>	<i>250 to 299</i>	<i>150 to 199</i>	<i>0.70</i>		
<i>Preformed Plastic</i>	<i>≥ 300</i>	<i>≥ 200</i>	<i>1.00</i>	<i>200</i>	<i>150</i>
<i>Required Minimum</i>	<i>250 to 299</i>	<i>150 to 199</i>	<i>0.70</i>		
<i>Ext. Warranty Preformed Plastic</i>	<i>≥ 650</i>	<i>≥ 450</i>	<i>1.00</i>	<i>See 808.09.1</i>	<i>See 808.09.1</i>
<i>Required Minimum</i>	<i>550 to 649</i>	<i>350 to 449</i>	<i>0.70</i>		

** Quality Adjustments do not apply to the retained retro-reflectivity values.*

(a) Traffic Paint**1. Application**

~~Standard dry and fast dry traffic paint shall be applied only when the pavement temperature is 40°F (5°C) or above.~~

Waterborne traffic paint shall be applied only when the *ambient air and pavement* temperature is 50° F (10°C) or ~~above~~ *higher and will remain 50° F (10°C) or higher for two hours after application.* ~~Standard dry or fast dry traffic paint will only be permitted between October 1 and the following April 30. Traffic paints which are not waterborne shall be applied only when the ambient air and pavement temperature is 40° F (5° C) or higher and will remain 40° F (5°C) or higher for two hours after application.~~

The wet film thickness of the traffic paint shall be a minimum of 15 mils (380 µm). Painted lines and markings shall be immediately reflectorized by applying glass beads at a uniform minimum rate of 6 lb/gal. (0.7 kg/L) of traffic paint. *Only standard or modified standard beads shall be used for paint markings.*

~~Painted markings on newly constructed surfaces shall receive two applications of paint and glass beads. The second application shall be applied as soon as practical after the first application dries.~~

2. Equipment

Traffic paint shall be applied with a spray type machine capable of applying the traffic paint under pressure through a nozzle directly onto the pavement. The *truck-mounted* machine shall be equipped with the following: ~~an air blast device for cleaning the pavement ahead of the painting operation; a guide pointer to keep the machine on an accurate line; at least two spray guns which can be operated individually or simultaneously; paint agitator(s); a control device to maintain uniform flow and application; an automatic device which will provide a broken line of the required length; and an automatic glass bead dispenser which is synchronized with the marking application.~~ When fast drying traffic paint or waterborne traffic paint is used, the machine shall be capable of heating the paint to application temperatures in accordance with 909.05.

- a. *air blast device for cleaning the pavement ahead of the application;*
- b. *guide pointer to keep the machine on an accurate line;*
- c. *spray guns which can be operated individually or simultaneously;*
- d. *agitator(s) or recirculation system as appropriate;*
- e. *control device to maintain uniform flow and application;*
- f. *capability of heating the material to application temperatures;*
- g. *automatic device which will provide a line of the required pattern; and*
- h. *automatic bead dispenser which is synchronized with the marking application.*

A ~~brush or small hand propelled machine, designed for that purpose,~~ may be used if approved to apply some ~~paint~~ markings. *A brush may be used if approved to apply some markings.*

3. Performance Requirements

The color and durability requirements shall be met for a minimum of 90 days after application.

Pavement marking segments which are found to have an average retro-reflectivity reading below the minimum required shall be re-stripped with no additional payment. Pavement markings segments which have more than 5 of 20 individual readings below the minimum required shall be re-stripped with no additional payment. The re-stripping shall begin within 14 calendar days of the completion of the retro-reflectivity measurement. Line segments may be re-stripped with no additional payment. Following each re-stripping, additional retro-reflectivity measurements shall be made with no additional payment. Quality adjustments will be based on the final retro-reflectivity measurements. The alignment of all re-stripped pavement markings shall be placed within ± 0.25 inches in width and ± 2.0 inches in length of the original placed markings. Re-stripping will not be permitted more than two times, after which removal and replacement of the markings will be required.

(b) Durable Pavement Marking Material

Durable pavement marking material consists of thermoplastic, preformed plastic, or ~~epoxy~~ multi-component markings.

1. Thermoplastic

a. Application

~~Thermoplastic marking material shall be used on asphalt pavements unless otherwise specified or directed. The pavement surface shall be primed with a binder material in accordance with the manufacturer's recommendations.~~ Thermoplastic marking shall be applied in molten form by ~~spray, conventional extrusion, or ribbon type extrusion~~ *airless spray* when the pavement and ambient air temperatures ~~is~~ are 50°F (10°C) or above; *or by ribbon type extrusion or spray when the pavement and ambient air temperatures are 60°F (16°C) or above.* Heat bonded preformed thermoplastic may be used for transverse or message markings. The average final thickness of each 36 in. (910 mm) length of thermoplastic marking shall be no less than ~~3/32 in.~~ *90 mil* (2.53 mm) nor more than ~~3/16 in.~~ *125 mil* (3.2 mm). Immediately following the application of the thermoplastic markings, additional retro-reflectorization shall be provided by applying glass beads to the surface of the molten material at a uniform minimum rate of ~~68~~ *68* lb/100 sq ft ($23.9 \text{ kg}/10 \text{ m}^2$) of marking. *Individual passes of markings shall not overlap or be separated by gaps greater than 1/4 in (6 mm) longitudinally.*

b. Equipment

The ~~machine~~ equipment used for the ~~spray~~ application of thermoplastic markings shall consist of a kettle for melting the material and an applicator for applying the markings. All of the equipment required for ~~preheating~~ *melting* and applying the material shall maintain a uniform material temperature within the *manufacturer* specified limits, without scorching, discoloring or overheating any portion of the material.

~~The~~ *A truck-mounted machine shall be equipped with the following: an air blast device for cleaning the pavement ahead of the marking operation; a guide pointer to keep the machine on an accurate line; at least two spray guns which can be operated individually or simultaneously; agitators; a control device to maintain uniform flow and application; an automatic device which will provide a broken line of the required length; and an automatic glass bead dispenser which is synchronized with the marking application.*

A hand-propelled machine may be used to apply markings.

The equipment for applying heat bonded preformed plastic shall be in accordance with the manufacturer's recommendations. An open flame shall not come into direct contact with the pavement.

c. Performance Requirements

When the initial average retro-reflectivity measurement is below the required minimum the segment of line shall be removed and replaced with no additional payment. Pavement markings segments which have more than 5 of 20 individual readings below the minimum required shall be removed and replaced with no additional payment.

2. Preformed Plastic and Extended Warranty Preformed Plastic

a. Application

~~The Contractor shall provide the Department with original copies of all necessary current manufacturer's installation manuals prior to beginning installation work. No installation work shall begin prior to the Department's receipt of these manuals. These manuals will become the property of the Department.~~

The installation method for extended warranty preformed plastic markings shall be the overlay method for PCCP and the inlay or overlay method for HMA. The overlay method is defined as placement of preformed plastic markings on the finished pavement surface. The inlay method is defined as placing preformed plastic markings on newly placed HMA immediately prior to the last roller pass. The pavement shall be grooved prior to the placement using the overlay method. This groove shall not exceed 110 mils (3 mm) in depth or one inch (25 mm) wider than the pavement marking to be placed. The equipment used for grooving shall not damage pavement joints.

For non-extended warranty preformed plastic, the overlay installation method is acceptable for both HMA and PCCP pavements, and no grooving is required.

~~Preformed plastic~~ *The markings shall be applied when the air temperature is a minimum of 60°F (16°C) and rising, and the pavement temperature is a minimum of 70°F (21°C). Preformed plastic* *The markings shall not be applied if the ambient air temperature is expected to drop to below 45°F (7°C) within 24 h after application. The pavement surface shall be primed with a binder material in accordance with the manufacturer's recommendations. The pavement surface shall be primed prior to the placement of preformed plastic transverse markings.*

If there is a dispute regarding installation, the manufacturer shall provide a properly trained representative to ensure that the installation is *properly performed in accordance with the manufacturer's recommendations*.

b. Equipment Performance Requirements

~~The equipment for applying preformed plastic, furnished in rolls, shall be a portable hand propelled machine capable of carrying and applying at least two rolls of 4 in. (100 mm) to 16 in. (50 mm) widths. The machine shall be equipped with a guide pointer to keep the machine on an accurate line. The machine shall also be equipped with guide rollers and a pressure roller. The pressure roller may be a separate unit. The machine shall feed the marking material from its original carton through the guide rollers and under the pressure roller onto the pavement. The pressure roller shall be a minimum of 2 in. (50 mm) wider than the width of the marking material and shall weigh a minimum of 200 lb (91 kg). The machine shall also be capable of removing the backing paper from the marking material during the application process. Preformed plastic furnished in strip, symbol, or legend form shall be applied with suitable equipment such as hand rollers.~~

When the initial average retro-reflectivity measurement is below the required minimum the segment of line shall be removed and replaced with no additional payment. Pavement markings segments which have more than 5 of 20 individual readings below the minimum required shall be removed and replaced with no additional payment.

3. Epoxy Multi-Component

a. Application

~~Epoxy shall be used on portland cement concrete pavement unless otherwise specified or directed. This material shall be applied only when the pavement and ambient air temperatures are 40°F (5°C) or above. The wet film thickness of the epoxy marking material shall be a minimum of 1520 mils (389510 µm). Immediately following the application of the epoxy markings, additional reflectorization shall be provided by applying glass beads to the surface of the wet marking at a uniform minimum rate of 20 lb/100 sq ft gal (9.82.4 kg/10 m²L) of marking.~~

b. Equipment

~~The machine used to apply the epoxy marking material shall precisely meter the two each components, and produce and maintain the necessary mixing head temperature within the required tolerances, all in accordance with the manufacturer's recommendations. The machine shall be equipped with a high pressure water blast device ahead of a high pressure air blast device, both as an integral part of the gun carriage, for cleaning the pavement ahead of the marking application in accordance with 808.07(a)2. The machine shall also be equipped with the following: a guide pointer to keep the machine on an accurate line; at least two spray guns which can be operated individually or simultaneously; an automatic device which will provide a broken line of the required length; and automatic glass bead dispensers which is synchronized with the marking application.~~

c. Performance Requirements

Pavement marking segments which are found to have an average retro-reflectivity reading below the required minimum shall be re-stripped with no additional payment. Pavement markings segments which have more than 5 of 20 individual readings below the minimum required shall be re-stripped with no additional payment. The re-stripping shall begin within 14 calendar days of the completion of the retro-reflectivity measurement. Line segments may be re-stripped with no additional payment. Following each re-stripping, additional retro-reflectivity measurements shall be made with no additional payment. Quality adjustments will be based on the final retro-reflectivity measurements. The alignment of all re-stripped markings shall be placed within ±0.25 inches in width and ±2.0 inches in length of the original placed markings. Re-stripping will not be permitted more than two times, after which removal and replacement of the markings will be required.

SECTION 808, BEGIN LINE 328, DELETE AND INSERT AS FOLLOWS:

808.09 Warranty for Durable Pavement Marking Material

Durable pavement marking material shall be warranted against failure resulting from material defects, method of application, *or the result of snowplowing and deicing activities*. The material shall be warranted to retain its color, retro-reflectivity, ~~adherence to the pavement durability~~ and shall be free of other obvious defects or failures.

All pavement traffic markings which have failed to meet the warranted conditions shall be replaced with no additional payment.

For the terms of the warranty a unit shall be defined as a 1,000 ft (~~305~~ 300 m) section of line of specified width in any combination or pattern.

The warranty period shall be 180 days beginning with the last working day for the total contract as defined in the final acceptance letter, but not prior to November 1 of the calendar year in which the last pavement markings were installed. If more than 3% of a unit or 3% of the total of any one intersection or set of transverse markings fails, the failed portion shall be replaced. All pavement markings required to be replaced under the terms of this warranty shall be replaced within 60 days of the notification of failure.

808.09.1 Extended Warranty for Preformed Plastic Pavement Marking Material

Extended warranty markings shall be warranted for a period of two years beginning with the last working day for the total contract as defined in the final acceptance letter. The markings will be subject to snowplowing and deicing chemicals. The material shall be warranted to retain its color, retro-reflectivity, and durability and shall be free of other obvious defects or failures.

For the terms of the warranty a unit shall be defined as a 1,000 ft (300 m) section of line of specified width in any combination or pattern.

The retained retro-reflectivity (mcd/m²/lx) as determined by ITM 931 shall meet or exceed the minimum values at all times during the warranty period as follows:

<i>Year</i>	<i>White</i>	<i>Yellow</i>
<i>1</i>	<i>400</i>	<i>300</i>
<i>2</i>	<i>300</i>	<i>200</i>

When a unit of markings is found to have an average retro-reflectivity reading below the required value, the entire unit of markings shall be removed and replaced. If more than 5% of a unit of markings fails due to color or durability, the entire unit shall be removed and replaced.

All pavement markings required to be replaced under the terms of this warranty shall be replaced within 60 days of the notification of failure.

SECTION 808, BEGIN LINE 402, INSERT AS FOLLOWS:

(d) Installation

Marker installation shall be in accordance with the manufacturer's recommendations. The pavement surface temperature and the ambient *air* temperature shall be at least 50°F (10°C). The pavement surface shall be dry at the time of marker installation. The installation slot shall be clean and dry before the adhesive is applied. The slot shall be filled with sufficient adhesive to provide a water tight seal between the marker base and the pavement, and to fill all voids between the marker base and the surfaces of the slot. The marker shall be placed in the slot so that the tips of the snowplow deflecting surfaces are below the pavement surface.

SECTION 808, BEGIN LINE 422, DELETE AND INSERT AS FOLLOWS:

(e) Removal of Markers

Markers designated for removal shall be as located on the plans or as otherwise specified or directed. If the pavement surface or bridge deck surface is to be removed, the markers shall be removed prior to any surface removal operation.

The markers shall be removed with a jack hammer or other approved equipment. ~~Care shall be taken so as not to damage the marker base during its removal.~~ The area of the pavement or bridge deck disturbed by the marker removal shall not exceed 3 in. (75 mm) in depth nor 3 in. (75 mm) out from all sides of the marker base. The marker removal operation shall stop if it is determined that excessive damage is occurring to the pavement, *or* bridge deck ~~or marker base~~.

The resulting holes shall be filled with the appropriate patching material as described herein or as otherwise directed. Concrete pavement which is to be overlaid as part of the contract and HMA pavement shall be patched with HMA intermediate materials. Concrete pavement which is not to be overlaid as part of the contract and concrete bridge decks shall be patched with magnesium phosphate concrete patching material. Overlaid bridge decks and bridge decks which are to be overlaid as part of the contract shall be patched with patching material which is compatible with the deck overlay material. All patching material shall be placed in accordance with the appropriate specifications for the patching material.

Removed markers shall ~~remain~~ *become* the property of the ~~Department unless otherwise specified~~ *Contractor and removed from the jobsite prior to the completion of the work.*

~~Removed snowplowable raised pavement markers shall be delivered to the District Traffic Division. The markers shall be delivered in 55 gal. (210 L) metal containers with lids which may be sealed. The metal containers shall be furnished either by the Contractor or by the District Traffic Division as specified in the contract. Approximately 50 markers shall be placed in each container. Each container shall be labeled as to how many markers it contains.~~

~~All metal containers used for delivering removed markers will remain the property of the Department when no longer required for the contract.~~

SECTION 808, BEGIN LINE 472, DELETE AS FOLLOWS:

Transverse marking lines will be measured as the total distance in linear feet (meters) of lines placed or removed. Curb markings will be measured by the linear feet (meters) along the front face of the curb. ~~The “No Parking Any Time” sign will be measured in accordance with 802.~~ Pavement message markings will be measured by the total number of each type placed. A railroad crossing pavement message marking shall include the two R’s, the X, and the three stop lines per traffic lane. Railroad crossing pavement message markings will be measured by the total number of each marking place. Lane indication arrow pavement message markings will be measured by the number of lane indication arrowheads placed. Removal of pavement message markings will be measured in square yards (square meters) using areas shown in the following table. The material will not be considered when measuring such markings for pavement.

SECTION 808, BEGIN LINE 510, DELETE AND INSERT AS FOLLOWS:

808.13 Basis of Payment

Lines and transverse markings placed will be paid for at the contract unit price per linear foot (meter) for the material, type, color, and width specified. Curb markings will be paid for at the contract unit price per linear foot (meter) for curb painting, of the color specified. ~~The “No Parking Any Time” sign will be paid for in accordance with 808.13.~~ Pavement message markings placed will be paid for at the contract unit price per each, for the material and message specified. Lines and transverse markings removed will be paid for at the contract unit price per linear foot (meter). Pavement message markings removed will be paid for at the contract unit price per square yard (square meter).

Snowplowable raised pavement markers, furnished and installed, or removed will be paid for at the contract unit price per each. Prismatic reflectors will be paid for at the contract unit price per each. ~~e~~Each 2-way prismatic reflector will be paid for as one reflector.

Payment for furnishing, calibrating, and operating retro-reflectivity testing equipment will be paid for at the contract price for lump sum. The cost of report preparation shall be included in the cost of retro-reflectivity testing. Adjustments to the contract payment with respect to retro-reflectivity of performance based pavement markings will be included in a quality adjustment in accordance with 109.05.1. The Engineer may waive retro-reflectivity testing due to weather limitations. Retro-reflectivity testing will be waived for markings applied after October 31 and before April 1. If retro-reflectivity testing is waived, no payment will be made for retro-reflectivity testing and no quality adjustment for retro-reflectivity will be made. If retro-reflectivity testing is not performed and is not waived by the engineer due to weather, no payment will be made for retro-reflectivity testing and payment for the marking items will be made at 0.70 of the required minimum level, per 808.07(c).

~~If no pay items are shown in the Schedule of Pay Items for the required permanent pavement markings, a change order will be executed.~~

SECTION 921, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 921 – PAVEMENT MARKING MATERIALS

921.01 ~~Traffic Paint~~ Blank

~~Traffic paint shall be in accordance with 909.05.~~

921.02 Durable Marking Material

Durable marking material shall be thermoplastic, preformed plastic, or ~~100% solids epoxy~~ multi-component pavement markings. The materials shall not contain any toxic heavy metals above the limits of the regulatory levels of 40 CFR 261.24, table 1, when tested in accordance with EPA TCLP, or contain any other material which will require characterization as a hazardous waste when removed from the pavement surface.

(a) Thermoplastic

This material shall be in *solid form* in accordance with AASHTO M 249 or supplied in a preformed state and shall not contain lead chromate pigments.

Heat bonded preformed thermoplastic shall be in accordance with AASHTO M 249 with the exception of the application properties outlined in section 5 of AASTHO M 249 shall not apply. Drying time and short term and long term flowability requirements are not applicable at time of installation. The material shall be capable of fusing to itself and previously applied thermoplastic pavement markings when heated. The material shall contain a minimum of 30% beads by weight. The beads must be homogeneously blended throughout the material. The marking thickness throughout its width, before the material is heated up, shall be supplied at a minimum average thickness of 90 mils (2.3 mm).

(b) Preformed Plastic and Extended Warranty Preformed Plastic

This material shall consist of a homogeneous preformed plastic film with a ~~minimum thickness of 60 mils (1.5 mm) and a width as specified. The preformed plastic material shall have a precoated adhesive and an easily removable backing which shall protect the adhesive in storage and facilitate rapid application. The adhesive shall allow the preformed plastic material to be repositioned on the pavement surface to which it is applied before permanently fixing it in its final position with downward pressure.~~ Dimensional requirements shall meet one of the following:

1. *Preformed plastic material shall have a smooth plane surface, with a minimum thickness of 60 mils (1.5 mm) throughout the entire cross section, or*
2. *Preformed plastic material shall have an embossed patterned surface with 35% to 65% of the surface area raised. The edges of the raised areas shall present a near vertical face to traffic from any direction. The minimum thickness of the raised area shall be 60 mils (1.5 mm). The area between the raised areas shall be a minimum of 20 mils (0.5 mm) measured at the thinnest section of the cross section.*

The material shall have a precoated adhesive. The adhesive shall allow the preformed plastic material to be repositioned on the pavement surface to which it is applied before permanently fixing it in its final position with downward pressure.

The plastic material shall be capable of being affixed to either HMA or PCCP by means of the precoated adhesive and, following the initial application of pressure, shall mold itself to pavement contours, breaks, and faults by traffic action at normal pavement temperatures.

The near vertical faces of patterned preformed plastic shall be coated with a layer of beads.

A type C certification in accordance with 916 shall be furnished for the marking materials except materials used for temporary pavement markings.

SECTION 921, DELETE LINES 27 THROUGH 81.

SECTION 921, AFTER LINE 82, DELETE AND INSERT AS FOLLOWS:

21. Packaging

Each package shall be marked to indicate the color of the material, specific symbol or word message, the batch number, the manufacturer's name, address, and the date of manufacture.

32. Basis For Use

A type C certification in accordance with 916 shall be furnished for the preformed plastic material except materials used for temporary pavement markings.

(c) ~~100% Solids Epoxy Multi-Component~~

~~This material shall be a two component material. Component A shall consist of pigment and epoxy resins formulated as set out by the manufacturer. The mixing ratio for the two components of the material shall be as recommended by the material manufacturer. This ratio shall not vary more than $\pm 2 \frac{1}{2}\%$ during the mixing operation or the application procedures of these materials.~~

The material shall be for use on both HMA and PCC pavements. The material shall consist of a pigmented resin system of epoxy. The multi-component pavement markings shall be ultra-violet light resistant and shall not darken during the heating conditions of application, chalk, crack, show appreciable degradation or discoloration due to sunlight exposure and aging of the markings. The cured multi-component pavement markings shall be impervious to salts, grease, oil, fuels, acids, alkalies and other common chemicals that may be found in or on HMA and PCC pavements. The pigment in the white material shall contain titanium dioxide in accordance with ASTM D 476.

The material shall be provided in containers, which are in accordance with current Federal DOT regulations. Each container shall be labeled in accordance with 29 CFR 1910.1200 and include the trade name or trade mark, formulation or product identification, date of manufacturer, color, batch or lot number, component identification and mixing instructions.

SECTION 921, DELETE LINES 99 THROUGH 186.

SECTION 921, AFTER LINE 188, DELETE AND INSERT AS FOLLOWS:

4. Basis For Use

~~Multi-component Ppavement marking material, except glass beads and material used for temporary pavement markings, furnished under this specification shall be covered by a type A C certification in accordance with 916. A type A certification shall be furnished for each batch supplied. The material manufacturer shall perform all tests included elsewhere herein on each batch and shall provide these test results as part of the type A certification.~~

(d) Raised Pavement Marker

~~The raised pavement marker shall be either snowplowable, which is inset into the pavement, or temporary, which is affixed with adhesive to the pavement surface.~~

1. (d) Snowplowable Raised Pavement Marker and Cast Metal Base

~~Snowplowable raised pavement marker shall consist of a durable cast metal base to which is attached a replaceable prismatic retro-reflector for reflecting light longitudinally along the pavement from a single or from opposite directions. Both ends of the casting shall be shaped to deflect a snowplow blade upward.~~

~~The prismatic reflectors and cast metal bases shall be in accordance with ASTM D 4383. Only prismatic reflectors and cast metal bases from the Department's list of approved snowplowable pavement markers shall be used.~~

SECTION 921, DELETE LINES 206 THROUGH 327.

SECTION 921, AFTER LINE 328, DELETE AND INSERT AS FOLLOWS:

(8) Basis For Use

~~The prismatic reflector shall be covered by a type B certification in accordance with 916. A type B certification in accordance with 916 shall be furnished for the epoxy material.~~

2. Cast Metal Base

~~The base shall be a ductile iron casting made of modular iron in accordance with ASTM A 536, Grade 70 50 05 hardened to 52 54 RHC. The cast iron base shall be marked with the manufacturer's name and model number. The maximum dimensions shall be 2.00 in. (50 mm) high, 6 in. (152 mm) wide, and 10.0 in. (250 mm) long.~~

~~The exposed height of the casting after installation shall not exceed 0.50 in. (13 mm). The bottom of the casting shall have two parallel keels and a shaped web designed to fit into an accurately sawed, grooved slot in the pavement surface as shown on the plans.~~

a1. Epoxy Adhesive

~~The epoxy adhesive shall be in accordance with AASHTO M 237, type IV, Table 3 with respect to composition and performance. For sampling purposes, a batch shall consist of a single charge of all components into a mixing chamber. A type B certification in accordance with 916 shall be furnished for the epoxy material.~~

SECTION 921, DELETE LINES 349 THROUGH 394.

SECTION 921, AFTER LINE 395, DELETE AND INSERT AS FOLLOWS:

(e) Glass Pavement Marking Beads

~~Glass beads shall be in accordance with AASTHO M 247, type I except sampling shall be in accordance with the frequency manual. The beads shall have a moisture resistant coating. A type C certification in accordance with 916 shall be furnished for the beads~~

1. Standard Beads

Beads shall be glass in accordance with AASHTO M 247, Type I. The beads shall have a moisture resistant coating.

2. Modified Standard Beads

The modified standard beads shall be glass in accordance with AASHTO M 247, Type IM. These beads shall have a moisture resistant coating and may have an adhesion promoting coating.

3. Supplemental Beads

The supplemental beads shall be glass in accordance with AASHTO M 247 except the beads shall have a minimum roundness of 80 percent by weight and the gradation shall be as follows:

<i>Sieve Size</i>	<i>Percent Passing by Weight</i>
<i>No. 10 (2.0 mm)</i>	<i>100</i>
<i>No. 12 (1.7 mm)</i>	<i>95 – 100</i>
<i>No. 14 (1.4 mm)</i>	<i>80 – 95</i>
<i>No. 16 (1.18 mm)</i>	<i>10 – 40</i>
<i>No. 18 (1.0 mm)</i>	<i>0 – 5</i>
<i>No. 20 (850 μm)</i>	<i>0 – 2</i>

These beads shall have a moisture resistant coating and may have an adhesion promoting coating.

4. Supplemental Elements

These shall be for color, skid resistance, or wet weather retro-reflectivity and may be used provided they do not exhibit a characteristic of toxicity referenced in AASHTO M 247. A type D certification in accordance with 916 shall be furnished for the supplemental elements.

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 responsible for all costs associated with vendor or manufacturer warranty service until acceptance of the contract, or acceptance of that portion of the contract where the traffic control equipment is installed.

(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 phase shall be on the front of the CU and shall have programmable phase omitting and phase skipping capabilities.

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 open in a counterclockwise motion only. The door shall be capable of being opened and stopped in at least the following two ranges of degree opening as measured from the face of the cabinet door on the hinged side: 80 to 100°, and 170 to 190°. The door shall be 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 ft³ (3 m³) 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 while remaining in operational mode. RS-485 Port 1 communications cable shall also be of sufficient length to allow any Port 1 cable to be utilized with any TS2 unit within the CA. The RS-485 harness shall be constructed of a high quality shielded communications 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 μ s 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 future 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 $-\Delta L/L$, 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 IXRTT 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 μ s pulse, an insertion loss or ≤ 0.1 dB, have an operating frequency in the 900 MHz range, allow throughput energy to be ≤ 220 μ J for 6 kV / 3 kA @ 8/20 μ s 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 in. (16 mm) and the minimum length shall be 15 in. (380 mm) plus a 3 in. (75 mm) right angle hook on the unthreaded end.

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. (16 mm) bolts. The hexagon nut, the flat washer, and the threaded end of the bolt shall be galvanized 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.

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 mm²), 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 arrester 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.*

<i>INDICATION</i>	<i>WATTAGE</i>
<i>9 in. (230 mm) pedestrian</i>	<i>67</i>
<i>12 in. (305 mm) 18 in. (455 mm) pedestrian</i>	<i>116</i>
<i>18 in. (455 mm) pedestrian</i>	<i>116</i>
<i>8 in. (200 mm) red, yellow and green</i>	<i>67</i>
<i>12 in. (305 mm) red</i>	<i>150</i>
<i>12 in. (305 mm) yellow and green</i>	<i>116</i>
<i>12 in. (305 mm) yellow and green arrows</i>	<i>150</i>
<i>Optically programmed heads</i>	<i>150</i>

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 $\pm 1/4$ in. (± 6 mm). The weight shall be 22 lbs $\pm 5\%$ (10.0 kg ± 2.2 kg).

The base shall be designed to support a 150 lbs (68 kg) axial load and 11 ft² (1.0 m²) 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. $\pm 1/4$ 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. $\pm 1/2$ 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 on the 4 1/2 in. (114 mm) outside diameter pole. A set screw using a 3/4 in. (19 mm) No. 12 hex head machine screw shall be supplied to hold the cap on the pole. A standard foundry draft will be allowed on the casting.

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/ft² (0.610 kg/m²).

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. (2900 mm) 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 ft² (0.223 m²). 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/ft² (0.610 kg/m²).

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.

<i>Mast Arm Length ft (m)</i>	<i>Total Rise ft - in. (m)</i>	<i>Tolerance in. (mm)</i>
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 mm2) 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 Pavement Loops

All components of preformed pavement 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 pavement loops shall be selected from the Department’s list of approved Traffic Signal Control Equipment.

The size of a preformed pavement 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 pavement 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:

<i>PHYSICAL PROPERTY</i>	<i>MINIMUM</i>
<i>Tensile strength</i>	<i>97,000 psi (668 MPa)</i>
<i>Yield strength, 0.2% offset</i>	<i>85,000 psi (58.61 MPa)</i>
<i>% of elongation</i>	<i>13 psi (90 kPa)</i>

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.

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 740, 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 known at the time this contract was prepared.

The facilities of AEP exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Roger Foglesong of the utility may be contacted at 765-751-6582.

The facilities of ATT exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Curtis Miller of the utility may be contacted at 765-454-4054.

The facilities of Brighthouse exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Michael Buckles of the utility may be contacted at 765-668-5461.

The facilities of RVP Fiber exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Chris Lentine of the utility may be contacted at 616-988-7194.

The facilities of Turnkey Network Solutions exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Michael Ohannesian of the utility may be contacted at 616-455-9840 ext. 319.

The facilities of Vectren exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Marky Fredrick of the utility may be contacted at 812-491-4765.

The facilities of Zayo Bandwith exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Craig Brown of the utility may be contacted at 317-524-5711 ext. 5008.

The facilities of Cable Direct exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Brandon Dickey of the utility may be contacted at 866-611-6565.

The facilities of Marion Municipal Utilities exist within the project limits, but are not expected to be affected by the proposed construction. If questions arise, Patrick Pinkerton of the utility may be contacted at 765-662-1243.

(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-095 FAILURE TO COMPLETE ON TIME FOR CALENDAR COMPLETION DATE

(Revised 09-01-05)

The Standard Specifications are revised as follows:

SECTION 108, DELETE LINES 521 THROUGH 533.

SECTION 108, AFTER LINE 534, INSERT AS FOLLOWS:

If the contract is not completed on or before the contract completion date shown on the Proposal sheet, \$1,000.00 per calendar day will be assessed as liquidated damages, not as a penalty, but as damages sustained, for each calendar day that the contract is not complete.

Extension of contract time, if required, shall be in accordance with 108.08.

108-C-127 EARLIEST DATE TO BEGIN WORK

(Revised 09-01-05)

The Standard Specifications are revised as follows:

SECTION 108, AFTER LINE 485, INSERT AS FOLLOWS:

(e) Earliest Date to Begin Work

For a contract for which the completion time is a specified number of work days, calendar days, or is a calendar completion date, the earliest date to begin work will be as agreed upon by the Contractor and the Engineer. Such date shall not be earlier than the date shown on the Proposal sheet. If the Contractor begins work before the earliest date to begin work as shown on the Proposal sheet, \$1,000.00 per calendar day will be assessed as liquidated damages, not as a penalty, but as damages sustained, for each workable calendar day on which the Contractor does work. Time will then be charged in accordance with 108.03.

Preliminary field work not involving physical construction activity, such as staking or verifying cross sections necessary to obtain information to initiate procurement of materials with lengthy delivery schedules, will not constitute work warranting time charges.

Requests for extensions to completion dates or intermediate completion dates due to delay in issuance of the notice to proceed beyond thirty days after the letting will not be considered unless the notice to proceed is issued less than fourteen calendar days prior to the earliest date to begin work stated in the contract on the Proposal sheet.

628-C-164 CELLULAR TELEPHONES/RADIOS

(Revised 10-28-10)

The Contractor shall provide radio or cellular telephone/radio equipment and services, as specified below, for use by the Department on the contract.

Each radio or cellular telephone/radio unit shall be capable of 2-way radio communication with all other units provided under this contract. Each radio or cellular telephone/radio unit shall have a service coverage area that includes the limits of the contract. Each radio or cellular telephone/radio unit shall include a belt clip system, a 120v AC charger, and a 12v DC mobile charger.

All equipment shall be covered by normal manufacturer's warranties. All radio or cellular telephone/radio units and associated equipment will remain the property of the Contractor and will be returned to the Contractor upon completion of the contract.

The Contractor shall provide the following services for each radio or cellular telephone/radio unit.

Radio Service

Radio service shall include the following:

- (a) unlimited direct connect radio service
- (b) no cellular telephone service

Cellular Telephone/Radio Service

Cellular telephone/radio service shall include the following:

- (a) 500 cellular telephone anytime minutes per month
- (b) unlimited nights and weekends service
- (c) unlimited direct connect radio service
- (d) voice mail and caller ID

The Department will be responsible for damage and/or loss of the units beyond that covered by normal manufacture's warranties, while in use by the Department. The Contractor shall provide replacement cellular telephone/radio units, batteries, chargers, etc within one business day of notification of need for the item.

The Contractor shall not enter into any agreement with any service provider or purchase any radio or cellular telephone/radio units for use by the Department until authorized by the Engineer. The Engineer will notify the Contractor a minimum of 10 business days prior to the need for the units.

Radio and cellular telephone/radio units will be paid for at the contract unit price per each. Radio and cellular telephone/radio service will be paid for at the contract unit price per month per each phone. Monthly charges for cellular telephone minutes in excess of those specified in the contract will be paid for by the dollar amount for the invoiced price per each occurrence as cellular telephone/radio, additional charges.

Pay Item	Pay Unit Symbol
Cellular Telephone/Radio.....	1 EACH
Cellular Telephone/Radio Service.....	4 MOS
Radio.....	EACH
Radio Only Service.....	MOS
Cellular Telephone/Radio, Additional Minutes.....	DOL

The Contractor shall provide a copy of the detailed invoice from the service provider for each cellular telephone/radio or radio unit each month.

RAILROAD INFORMATION

The Standard Specifications are revised as follows:

SECTION 103, LINE 342, 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:

SEE ATTACHMENT “A”

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: RS-32682
Paving project on EB & WB SR 18 (3rd & 4th Sts.) in Marion, Grant Co., Indiana at Norfolk Southern Railroad.*

<i>PROJECT:</i>	<i>RS-32682</i>
<i>AAR/DOT:</i>	<i>533708J, 533709R & 533974F</i>
<i>INDOT FILE #:</i>	<i>Des. #0800937</i>
<i>RAILROAD FILE #:</i>	<i>Norfolk Southern Railroad – Lake Division, Marion Branch mileposts MP-78.61 & MP-78.70 and Redkey Secondary milepost RK-158.30</i>

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.

<u><i>Department</i></u>	<u><i>Railroad Company</i></u>
<i>Indiana Department of Transportation</i>	<i>See Attachment “A” Titled</i>
<i>Contracts Engineer - Rm. N855</i>	<i>“Railroad Protective</i>
<i>Government Center North</i>	<i>Liability Insurance”</i>
<i>100 N. Senate Avenue</i>	
<i>Indianapolis, IN 46204-2217</i>	

The number of trains through the improvement will be 10 freight trains and 0 passenger trains per day.

Trains will be operated at a maximum speed of 50 mi/hr through the project site.

SECTION 107, AFTER LINE 331, 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 utility, 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 376, 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 in 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. Justin Brooks, Track Supervisor
Norfolk Southern Corporation
3047 W. Delphi Pike Rd
Marion IN 46952
Telephone: (765) 618-2039 office, (630) 862-7251 cellular*

- (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.

ATTACHMENT "A"**Insurance Required by Norfolk Southern Railway Company**

- A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:
1. Commercial General Liability Insurance having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include "explosion, collapse, and underground hazard" ("XCU") coverage, shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured, and shall include a severability of interests provision.
 2. Railroad Protective Liability Insurance having a combined single limit of not less than \$2,000,000 each occurrence and \$6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of \$5,000,000 each occurrence and \$10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

- a. The insurer must be rated A- or better by A.M. Best Company, Inc.
- b. The policy must be written using one of the following combinations of
- c. Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:
 - (1) CG 00 35 01 96 and CG 28 31 10 93; or
 - (2) CG 00 35 07 98 and CG 28 31 07 98; or
 - (3) CG 00 35 10 01; or
 - (4) CG 00 35 12 04; or
 - (5) CG 00 35 12 07.
- d. The named insured shall read:
Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191
Attn: Scott Dickerson, Risk Management

- e. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Department project and contract identification numbers. NOTE: Do not include any references to milepost on the insurance policy.
- f. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number.
- g. The name and address of the prime contractor must appear on the Declarations.
- h. The name and address of the Department must be identified on the Declarations as the “Involved Governmental Authority or Other Contracting Party.”
- i. Other endorsements/forms that will be accepted are:
 - (1) Broad Form Nuclear Exclusion – Form IL 00 21
 - (2) 30-day Advance Notice of Non-renewal or cancellation
 - (3) Required State Cancellation Endorsement
 - (4) Quick Reference or Index Form CL/IL 240
- j. Endorsements/forms that are **NOT** acceptable are:
 - (1) Any Pollution Exclusion Endorsement except CG 28 31
 - (2) Any Punitive or Exemplary Damages Exclusion
 - (3) Known injury or Damage Exclusion form CG 00 59
 - (4) Any Common Policy Conditions form
 - (5) Any other endorsement/form not specifically authorized in item no. 2.h above.

B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad’s right of way.

C. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Railroad at the address below for its review. A copy of the transmittal and policy shall be transmitted to the department at the address below. In addition, certificates of insurance evidencing the Prime Contractor’s and any subcontractors’ Commercial General Liability Insurance shall be issued to the Railroad and the Department, and forwarded to the Railroad and Department at the addresses below. The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Department. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

DEPARTMENT:
 Indiana Dept. of Transportation
 Contracts Engineer - Rm. N855
 Government Center North
 100 N. Senate Ave., N855
 Indianapolis, IN 46204-2249

RAILROAD:
 Risk Management
 Norfolk Southern Railway Company
 Three Commercial Place
 Norfolk, VA 23510-2191

D. The insurance required herein shall in no way serve to limit the liability of Department or its Contractors under the terms of this agreement.

INSURANCE APPROVAL REQUEST - To be sent with required evidence of insurance.

TO: _____ Date: _____

Risk Management
Norfolk Southern Railway Company
Three Commercial Place
Norfolk, VA 23510-2191

NS Agreement With: INDOT 12/14/09
(Name of Public Authority, or contractor.) (Date)

Name of Contractor: _____

(Provide both Indiana DOT Contract Number and Project Description along with NS Railroad Milepost Number when available)

Project Description: Contract: RS-32682, Paving project on EB & WB SR 18 (3rd & 4th Sts.) in Marion, Grant Co., Indiana at Norfolk Southern Railroad.

Anticipated Starting Date: _____ Completion Date _____

City: Marion County: Grant State: Indiana

Division: Lake Sub-Division: Marion Branch & Redkey Secondary M. P.: MP-78.61, MP-78.70 & RK-158.30

Attached are Original Railroad Protective Insurance Policy and certificate of general liability insurance required to be furnished to NS. Please advise if the attached evidence of insurance is satisfactory and complies with the insurance requirements of the agreement.

(Public Authority or Contractor must show address below and attach self-addressed, stamped envelope)

TO: _____ Date: _____

File: _____

Approved - this is not authority to proceed with work, Please Contact _____ at _____ to arrange clearance to enter railroad property.

Railroad Protective Not Approved. Reason:

- Insurance Company not (A-1 or higher)
- Named insured/address incorrect
- Limits of insurance inadequate (\$ _____ each occurrence \$ _____ aggregate required).
- Project description inadequate
- Contractor's name and address incorrect or missing
- Name of governmental authority for whom work is being performed incorrect or missing
- Policy not countersigned
- Policy forms incorrect
- Other

General Liability Not Approved. Reason:

- Limits inadequate (\$ _____ required).
- Railway not named as certificate holder and additional insured.
- Other:

Returned for your further handling.

Norfolk Southern Railway Company

Risk Management

cc: Division Manager -Division
Mary Williams - INDOT Contracts Services Manager - FAX: (317)-232-0676

MISSISSINEWA 1812 WORK RESTRICTIONS

The Mississinewa 1812 reenactment is Friday October 7, 2011 to Sunday October 9, 2011. The Contractor shall not conduct any work that would require a lane restriction during the dates listed above.

CONSTRUCTION ENGINEERING

This work shall consist of stationing the entire project at a maximum interval of 200 feet and layout for curb ramps.

CURB RAMP, CONCRETE

The cost of removing the existing curb ramp, curb, curb and gutter, pavement, sidewalk, and any excavation for the placement of the proposed concrete curb ramp shall be included in the cost of the proposed concrete curb ramp. In addition, the cost of curb, curb and gutter, pavement, sidewalk, casting adjustments and mulched seeding or sodding necessary for the placement of the proposed concrete curb ramp shall be included in the cost of the proposed concrete curb ramp.

HMA PATCHING, TYPE C

This work shall consist of patching the pavement to a depth as specified in the contract plan documents.

The materials used to accomplish this work shall be in accordance with 304.02.

The construction requirements shall be in accordance with 304.04. In addition, if the pavement beneath the removal depth of the partial depth patch is determined to be deteriorated by the engineer, then the patch will be considered as a full depth patch and will be measured and paid for as HMA Patching, Type C, Full Depth. A full depth patch shall extend to the bottom of the existing asphalt material and unstable or loose bricks. If the contract plan documents specify a composite pavement section, the concrete pavement shall be scarify milled. If the engineer determines that the concrete pavement is deteriorated, then the existing concrete pavement shall be removed. Further, if there are areas with unsuitable materials beneath where the full depth patch is to be placed, then the unsuitable material shall be removed and replaced with Compacted Aggregate, No. 53, Base in accordance with 301. An undistributed quantity has been included in this contract for partial depth patching, full depth patching and compacted aggregate, no. 53, base.

This work will be measured by the ton (megagram) in accordance with 304.06.

This work will be paid for at the contract unit price per ton (megagram) in accordance with 304.07.

Payment will be made under:

Pay Item	Pay Unit
HMA Patching, Type C, Partial Depth.....	TON (Mg)
HMA Patching, Type C, Full Depth.....	TON (Mg)

Cost of asphalt milling related to partial-depth patching operations shall be included in the cost of the HMA partial depth patching item.

Cost of concrete pavement scarify milling related to full depth patching operations shall be included in the cost of the HMA full depth patching item.

Compacted Aggregate, No. 53, Base will be measured and paid for in accordance with 301.

Removal and disposal of pavement shall be included in the cost of the patching items. Removal and disposal of bricks shall be included in the cost of the patching items. Removal and disposal of unsuitable material shall be included in the cost of Compacted Aggregate, No. 53, Base.

Saw cut, removal, and disposal of the deteriorated concrete pavement shall be included in the cost of HMA full depth patching item.

PLACEMENT OF CONSTRUCTION SIGNS

An estimate of Type A and Type C construction signs has been made. Due to the urban nature of most of this work, standard placement as prescribed in the Standard Drawings may not be appropriate. The Contractor shall submit a plan for the placement of all construction signs to the Engineer for review and approval before installing any construction signs. The plan is to be submitted a minimum of one (1) week prior to the desired time to install the construction signs to allow for review by the Engineer.

SIGNAL DETECTOR HOUSINGS

For those detector housings shown on the plans to be removed and replaced, the existing aluminum detector housing shall be removed, and the concrete housing for the detector shall be removed one foot below original grade. A new aluminum signal detector housing shall be installed to the existing conduit and adjusted to meet the roadway surface elevation. New concrete will then be placed around the new aluminum housing to meet the original signal detector housing dimensions on standard sheet 805-SGDH-01 and in accordance with 805.08.

Removal of the existing signal detector housing and the surrounding concrete will be paid for at the contract unit price per each as Detector Housing, Remove. Signal detector housings, including the concrete and all incidentals required to perform the work, will be paid for at the contract unit price per each.

DOCUMENTATION, REMOVAL, AND REINSTALLATION OF EXISTING PAVEMENT
MARKINGS AND TRAFFIC SIGNAL LOOPS

Prior to any pavement surface removal, overlay, or other disturbance to existing pavement markings and/or traffic signal loops, the Contractor shall prepare and submit to District Traffic and the Engineer a strip map plan showing all existing pavement markings including the contract station location and length of no passing zones, lane lines, stop bars, gore areas, "onlys", "arrows", crosswalks, parking stalls, etc., and locations of all visible traffic signal loops by station and offset to the satisfaction of District Traffic.

District Traffic will review the satisfactory submittal upon receipt and will grant permission to start potential pavement markings and/or signal loop disturbance work within seven (7) calendar days. This type of work shall not start until this permission has been received.

The Contractor shall notify Mark Bonar at least seven (7) calendar days prior to the removal of any signal loops so that the signal can be placed on recall mode. Mark can be reached at 260-341-5940.

The Contractor shall notify District Traffic and the Engineer at least seven (7) calendar days prior to the installation of permanent pavement markings and/or signal loops. District Traffic will return either the previously contractor submitted pavement marking and/or signal loop plan or a revised pavement marking and/or signal loop plan to the Contractor and the engineer within seven (7) calendar days.

Documentation of existing pavement markings and traffic signal loops shall not be measured for payment. The cost of the work shall be included in the cost of the pavement marking items or signal loop items.
