

FOR INDEX OF SHEETS, SEE SHEET NO. 3
 FOR SUMMARY OF QUANTITIES, SEE SHEET NO. 4

I-57 FRANKLIN COUNTY STATION EQUATIONS

STA 507+60.66 (BK) = STA 477+00.00(AH)
 STA 670+75.59 (BK) = STA 0+00.00 (AH)
 STA 47+92.98 (BK) = STA 48+09.50 (AH)
 STA 289+26.45 (BK) = STA 0+00.00 (AH)

TRAFFIC DATA

I 57	2017 ADT
JOHNSTON CITY TO WEST FRANKFORT	39,890 WITH 30.3% TRUCKS
WEST FRANKFORT TO WEST CITY	37,960 WITH 30.3% TRUCKS
WEST CITY TO IL 154	34,920 WITH 31.5% TRUCKS
IL 154 TO INA	35,020 WITH 29.5% TRUCKS

TOWNSHIPS

- DENNING
- BROWNING
- BENTON
- EWING

DESIGN DESIGNATION : N/A
 COORDINATE SYSTEM : N/A
 POSTED SPEED : 70 MPH

J.U.L.I.E.
 JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION
 1-800-892-0123
 OR 811

PROJECT ENGINEER CHARLES STEIN - (618) 351-5210
 PROJECT DESIGNER EHREN KIRBY

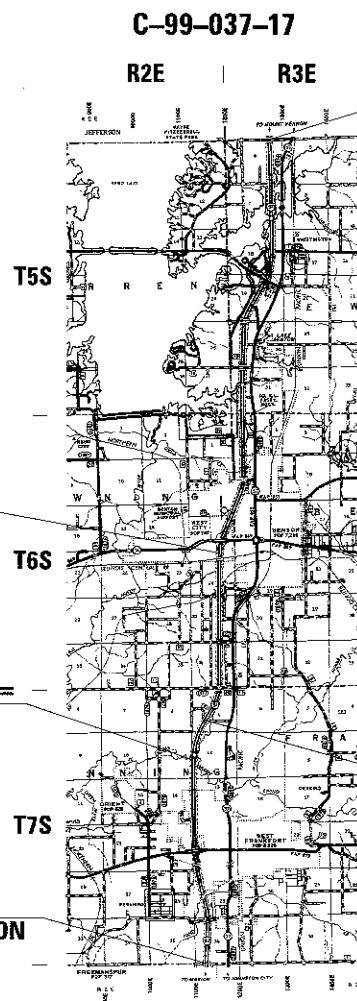
CONTRACT NO. 78585

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

**PROPOSED
 HIGHWAY PLANS**

FAI ROUTE 57 (I-57)
 SECTION D9 PATCH 2018-1

**PATCHING
 FRANKLIN COUNTY**



EQ. STA. 507 + 60.66 BK =
 STA. 477 + 00.00 AH

EQ. STA. 47 + 92.98 BK =
 STA. 48 + 09.47 AH

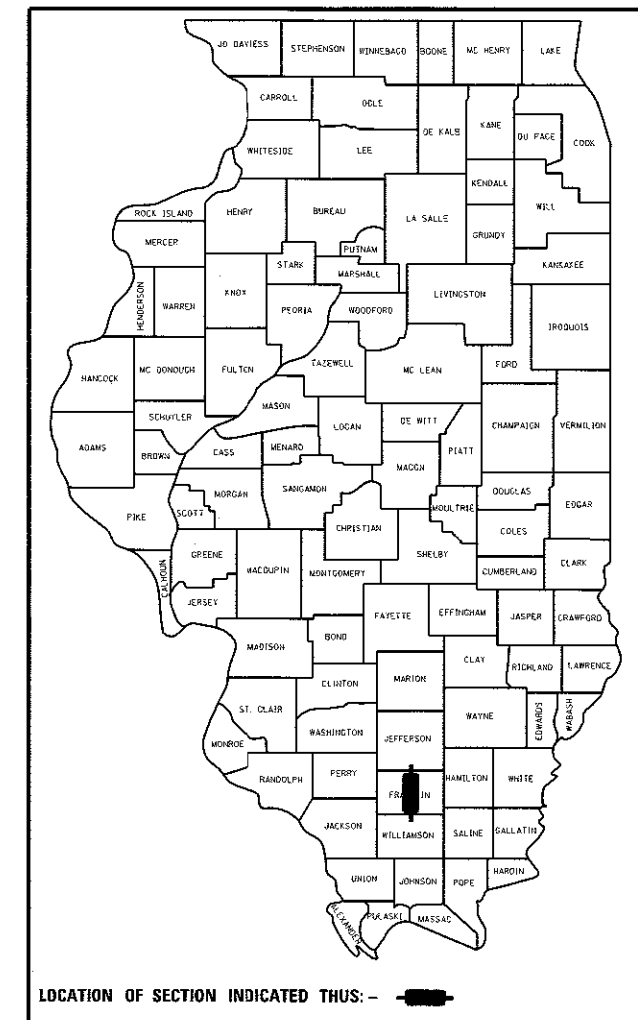
EQ. STA. 670 + 75.59 BK =
 STA. 0 + 00.00 AH

PROJECT ENDS
 FRANKLIN / WILLIAMSON
 COUNTY LINE
 STA. 289 + 26.45

GROSS LENGTH = 98,068.10 FT. = 18.57 MILES (NB)
 NET LENGTH = 96,639.81 FT. = 18.30 MILES (NB)

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	D9 PATCH 2018-1	FRANKLIN	8	1
		ILLINOIS	CONTRACT NO. 78585	

D-99-037-17



STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

SUBMITTED May 16 2017
Jeffrey J. Keir
 REGION FIVE ENGINEER

June 30 2017
Mawson M. Addis
 ENGINEER OF DESIGN AND ENVIRONMENT

June 30 2017
David A. ...
 DIRECTOR OF PROGRAM DEVELOPMENT

**PRINTED BY THE AUTHORITY
 OF THE STATE OF ILLINOIS**

Prepared By: *[Signature]*
 DISTRICT STUDIES & PLANS ENGINEER

Examined By: *[Signature]*
 DISTRICT LAND ACQUISITION ENGINEER

Examined By: *[Signature]*
 DISTRICT PROGRAM DEVELOPMENT ENGINEER

Examined By: *[Signature]*
 DISTRICT OPERATIONS ENGINEER

Examined By: *[Signature]*
 DISTRICT PROJECT IMPLEMENTATION ENGINEER

Examined By: *[Signature]*
 DISTRICT CONSTRUCTION ENGINEER

Examined By: *[Signature]*
 DISTRICT MATERIALS ENGINEER

FILE NAME =	USER NAME = kirbyea	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SIGNATURE SHEET				F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
p:\11084EB10\INTEG.illinois.gov\FWIDOT\Documents\100T Offices\District 9\Projects\7858\DRAWING\CA\Sheets\PrintOrganizer.dgn		DRAWN	REVISED		SCALE:	SHEET	OF	SHEETS	STA.	TO STA.	57	D9 PATCH 2018-1	FRANKLIN	8 2
Default	PLOT SCALE = 100.0000' / in.	CHECKED -	REVISED -		CONTRACT NO. 78585									
	PLOT DATE = 5/12/2017	DATE -	REVISED -		ILLINOIS FED. AID PROJECT									

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	SIGNATURE SHEET
3	INDEX OF SHEETS, HIGHWAY STANDARDS, STATION EQUATIONS, GENERAL NOTES AND MIXTURE REQUIREMENTS, AND COMMITMENTS
4-5	SUMMARY OF QUANTITIES
6	I-57 MILL & FILL SCHEDULE
7	I-57 MILL & FILL SCHEDULE - CONT.
8	I-57 PATCHING SCHEDULE

HIGHWAY STANDARDS

000001-06_STANDARDSYMBOLSABBREVIATIONS&PATTERNS
 001006_DECIMALOFINCH&FOOT
 420701-03_PAVEMENTWELDEDWIREREINFORCEMENT
 442101-07_CLASSBPATCHES
 701400-09_APPRCHTOLNLCLOSURE-FRWAYEXPWAY
 701401-10_LNLCLOSUREFRWAYEXPWAY
 701411-09_LNLCLOSUREMUL TILN-ENTROREXITRAMP45MPHORMORE
 701426-09_LNLCLOSUREMUL TILN-INTERMITTANTORMOVINGOP45MPHORMORE
 701428-01_TRAFFICCONTROLSETUPREMOVALFREEWAYEXPRESSWAY
 701901-06_TRAFCNTRLDEVICES
 780001-05_TYPICALPVMTRKINGS
 781001-04_TYPICALAPPRAISEDREFLCPVMTMRKRS

STATION EQUATIONS

I-57 FRANKLIN COUNTY

STA 507+60.66 (BK) = STA 477+00.00(AH)
 STA 670+75.59 (BK) = STA 0+00.00 (AH)
 STA 47+92.98 (BK) = STA 48+09.50 (AH)
 STA 289+26.45 (BK) =STA 0+00.00 (AH)

GENERAL NOTES

QUANTITIES SHOWN IN THE PLANS FOR PATCHING ARE ESTIMATES. THE ACTUAL AMOUNT OF PATCHING REQUIRED WILL BE DETERMINED BY THE ENGINEER.

FACTORS USED FOR ESTIMATING PLAN QUANTITIES ARE AS FOLLOWS AND SHALL NOT BE USED FOR THE BASIS OF FINAL QUANTITIES:

ALL HOT MIX ASPHALT 2.016 TONS/CU. YD.

IF ANY STAMPED STATION FALLS WITHIN THE PATCH AREA, THE NEW PATCH SHALL BE RESTAMPED. THE STATION SYMBOL STAMPS USED SHALL BE FURNISHED BY THE CONTRACTOR. THEY SHALL BE 5 1/2" TALL OF A DESIGN AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR, APPROVED BY THE ENGINEER.

THERE ARE NO AVAILABLE WASTE SITES ON THE EXISTING RIGHT OF WAY WITHIN THE PROJECT LIMITS. DISPOSAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND WASTE MUST BE DISPOSED OF IN ACCORDANCE WITH ARTICLE 202.03 OF THE STANDARD SPECIFICATIONS.

MIXTURE REQUIREMENTS

Location(s):	Hot-Mix Asphalt Surface Course
Mixture Use(s):	Polymerized Hot-Mix Asphalt Surface Course, Mix E,
AC/PG:	SBS PG76-22
Design Air Voids:	4.0 %, 90 Gyration Design
Mixture Composition: (Mixture Gradation)	IL-9.5mm
Friction Aggregate:	E Surface
Mixture Weight:	112 lbs/Sq Yd/in
Quality Management Program:	QCQA
Sublot Size:	N/A
Number of Roller Passes	N/A

COMMITMENTS

NO COMMITMENTS.

FILE NAME =	USER NAME = kirbyea	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	INDEX OF SHEETS, HIGHWAY STANDARDS, STATION EQUATIONS GENERAL NOTES, MIXTURE REQUIREMENTS, & COMMITMENTS	F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
p:\11\084EBIDINTEG.illinois.gov\PIWIDOT\Documents\DOT Offices\District 9\Projects\78585\Drawings\CAD\Sheets\PrintOrganizer.dgn		CHECKED -	REVISED -			57	D9 PATCH 2018-1	FRANKLIN	8	3
Default	PLOT SCALE = 100.0000' / in.	DATE -	REVISED -			CONTRACT NO. 78585				
	PLOT DATE = 5/12/2017					ILLINOIS FED. AID PROJECT				
				SCALE:	SHEET OF SHEETS	STA.	TO STA.			

SUMMARY OF QUANTITIES

COUNTY:	COUNTY:	Franklin
ROUTE:	ROUTE:	FAI 57
FUNDING:	FUNDING:	100% STATE ✓
LOCATION:	LOCATION:	RURAL ✓
	TOTAL QUANTITY	ROADWAY 0005 ✓

CODE NUMBER	ITEM DESCRIPTION	UNIT	TOTAL QUANTITY	ROADWAY
40600295	POLYMERIZED BITUMINOUS MATERIALS (TACK COAT)	POUND	2,163	2,163
40603570	POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, MIX "E", N90	TON	572	572
44000157	HOT-MIX ASPHALT SURFACE REMOVAL, 2"	SQ YD	4,798	4,798
44200050	WELDED WIRE REINFORCEMENT	SQ YD	263	263
44201007	CLASS B PATCHES, TYPE II, 13 INCH	SQ YD	135	135
44201011	CLASS B PATCHES, TYPE III, 13 INCH	SQ YD	20	20
44201013	CLASS B PATCHES, TYPE IV, 13 INCH	SQ YD	243	243
44201299	DOWEL BARS 1 1/2"	EACH	400	400
44213200	SAW CUTS	FOOT	1,314	1,314
44213204	TIE BARS 3/4"	EACH	88	88
67100100	MOBILIZATION	LSUM	1	1
70100420	TRAFFIC CONTROL AND PROTECTION, STANDARD 701411	EACH	12	12

12

SUMMARY OF QUANTITIES - CONT

COUNTY:	COUNTY:	Franklin
ROUTE:	ROUTE:	FAI 57
FUNDING:	FUNDING:	100% STATE
LOCATION:	LOCATION:	RURAL

CODE NUMBER	ITEM DESCRIPTION	UNIT	TOTAL QUANTITY	ROADWAY 0005
70100800	TRAFFIC CONTROL AND PROTECTION, STANDARD 701401	LSUM	1	1
70200100	NIGHTTIME WORK ZONE LIGHTING	LSUM	1	1
* 78004210	PREFORMED PLASTIC PAVEMENT MARKING, TYPE B - INLAID - LINE 4"	FOOT	4,349	4,349
* 78004230	PREFORMED PLASTIC PAVEMENT MARKING, TYPE B - INLAID - LINE 6"	FOOT	1,820	1,820
* 78100100	RAISED REFLECTIVE PAVEMENT MARKER	EACH	118	118
78300200	RAISED REFLECTIVE PAVEMENT MARKER REMOVAL	EACH	118	118
X7015005	CHANGEABLE MESSAGE SIGN	CAL DA	28	28

* SPECIALTY ITEM

I-57 MILL & FILL SCHEDULE

LOCATION (APPROX)	STATION (APPROX)	LANE	LENGTH	WIDTH	DEPTH	HMA SURF REM, 2"	POLY HMA SURF CSE, MIX "E", N90	POLYMERIZED BIT MATL (TACK COAT)	PREF PVMT MARK, TY B - INLAID - LINE 4"		PREF PVMT MARK, TY B - INLAID - LINE 6"		RAISED REFLECTIVE PVMT MKR	RAISED REFLECTIVE PVMT MKR
									INSIDE WHITE	OUTSIDE YELLOW	SKIP DASH	REMOVAL		
MP	FOOT	DL/PL	FOOT	FOOT	INCHES	SO YD	TON	POUND	FOOT	FOOT	FOOT	FOOT	FOOT	FOOT
NORTHBOUND - BEGINNING AT FRANKLIN/WILLIAMSON COUNTY LINE														
FRANKLIN COUNTY														
MP 62.1	283+98	DL	50	6	2	34	4	15	50					
MP 62.1	283+98	DL	8	6	2	6	1	3			10	1	1	
MP 64.0	183+66	DL	12	12	2	16	2	8	12	12	10	1	1	
MP 64.0	183+66	DL	12	12	2	16	2	8	12		10	1	1	
MP 64.3 (EXIT 65 RAMP JOINT)	167+82	DL	20	6	2	14	2	6						
MP 64.5	162+54	DL	20	6	2	14	2	6	20					
MP 64.7	146+70	DL	40	6	2	27	3	12	40					
MP 64.9	136+14	DL	6	6	2	4	1	2	6					
MP 65.9	83+34	DL	6	6	2	4	1	2	6					
MP 66.2	67+50	DL	6	6	2	4	1	2	6					
MP 66.5	51+66	DL	30	6	2	20	3	9	30					
MP 66.5 (SN 028-0006)	51+66	CL	65	2	2	15	2	7			20	2	2	
MP 66.6 (DEPARTURE SN 028-0006)	46+22	CL	265	2	2	59	7	27			70	4	4	
MP 67.0	25+10	PL	320	12	2	427	48	192	320		80	5	5	
MP 68.0	643+06	CL	55	2	2	13	2	6			20	2	2	
MP 68.1	637+78	DL	33	6	2	22	3	10	33					
MP 68.1	637+78	CL	1328	2	2	296	34	133			340	18	18	
MP 68.1	637+78	DL	140	2	2	32	4	14	140					
MP 68.1	637+78	DL	60	6	2	40	5	18	60					
MP 68.2 (OVERPASS SN 028-0062)	632+50	DL	450	12	2	600	68	270	450		120	7	7	
MP 68.4	621+94	DL	8	12	2	11	2	5	8		10	1	1	
MP 68.5	616+66	DL	94	12	2	126	15	57	94		30	2	2	
MP 68.5	616+66	DL	8	12	2	11	2	5	8		10	1	1	
MP 68.5	616+66	DL	25	2	2	6	1	3	25					
MP 68.6	611+38	DL	135	6	2	90	11	41	135					
MP 68.6	611+38	CL	20	2	2	5	1	2			10	1	1	
MP 68.6	611+38	DL	30	6	2	20	3	9			10	1	1	
MP 68.6	611+38	DL	70	6	2	47	6	21			20	2	2	
MP 68.6	611+38	DL	73	6	2	49	6	22			20	2	2	
MP 68.7	606+10	DL	100	2	2	23	3	10	100					
MP 68.7	606+10	DL	50	2	2	12	2	5	50					
MP 68.7	606+10	DL	28	6	2	19	3	9			10	1	1	
MP 68.7	606+10	DL	20	6	2	14	2	6			10	1	1	
MP 68.7	606+10	DL	15	6	2	10	2	5			10	1	1	
MP 68.8	600+82	DL	175	2	2	39	5	18	175					
MP 69.2	579+70	DL	12	8	2	11	2	5	12					
MP 69.2	579+70	CL	150	2	2	34	4	15			40	3	3	
MP 69.2	579+70	DL	150	2	2	34	4	15	150					
NB I-57 SUBTOTAL						2224	269	1003	1954	860	58	58		

QUANTITIES AND LOCATIONS SHOWN IN THE PLANS FOR MILL & FILL ARE ESTIMATES. THE ACTUAL AMOUNT OF MILL & FILL REQUIRED AND LOCATIONS SHALL BE DETERMINED BY THE ENGINEER.

FILE NAME =	USER NAME = kirbyea	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	I-57 MILL & FILL SCHEDULE	F.A.I. RE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
pw:\IL\084EBIDINTEG\Illinois.gov\PIDOT\Documents\DOT Offices\District 9\Projects\7858\Drawings\CAD\Sheets\PrintOrganizer.dgn						57	D9 PATCH 2018-1	FRANKLIN	8	6
Default	PLOT SCALE = 100.0000' / in.	CHECKED -	REVISED -							
	PLOT DATE = 5/12/2017	DATE -	REVISED -		SCALE:	SHEET	OF	SHEETS	STA.	TO STA.
										ILLINOIS FED. AID PROJECT
										CONTRACT NO. 78585

I-57 MILL & FILL SCHEDULE - CONT.

LOCATION (APPROX)	STATION (APPROX)	LANE	LENGTH	WIDTH	DEPTH	HMA SURF REM, 2"	POLY HMA SURF CSE, MIX "E", N90	POLYMERIZED BIT MATL (TACK COAT)	PREF PVMT MARK, TY B - INLAID - LINE 4"		PREF PVMT MARK, TY B - INLAID - LINE 6"		RAISED REFLECTIVE PVMT MKR	RAISED REFLECTIVE PVMT MKR
									INSIDE WHITE	OUTSIDE YELLOW	SKIP DASH	REMOVAL		
MP	FOOT	DL/PL	FOOT	FOOT	INCHES	SQ YD	TON	POUND	FOOT	FOOT	FOOT	FOOT	FOOT	FOOT
NORTHBOUND - CONTINUED														
MP 69.2	579+70	CL	1250	2	2	278	32	125			320	17	17	
MP 69.5	563+86	DL	25	2	2	6	1	3	25					
MP 69.5	563+86	DL	23	2	2	6	1	3	23					
MP 69.5	563+86	DL	25	2	2	6	1	3	25					
MP 69.5	563+86	DL	3	3	2	1	1	1						
MP 69.6	558+58	DL	290	2	2	65	8	29	290					
MP 69.6	558+58	DL	50	6	2	34	4	15			20	2	2	
MP 70.2	526+90	DL	36	6	2	24	3	11						
MP 70.8	495+22	DL	45	6	2	30	4	14			20	2	2	
MP 71.0	484+66	PL	6	6	2	4	1	2			10	1	1	
MP 71.1 (RAILROAD OVERPASS SN 028-0082)	479+38	DL	90	2	2	20	3	9			30	2	2	
MP 71.1 (RAILROAD OVERPASS SN 028-0082)	479+38	DL	90	2	2	20	3	9	90					
MP 71.5 (OVERPASS SN 028-0022)	490+45	DL	170	2	2	38	5	17	170					
MP 71.9	467+74	PL	200	2	2	45	5	20	200					
MP 72.1	457+18	DL	12	6	2	8	1	4	12		10	1	1	
MP 74.5	330+46	DL	50	12	2	67	8	30	50		20	2	2	
MP 76.4	230+14	DL	65	2	2	15	2	7	65					
MP 77.3	182+62	DL	60	6	2	40	5	18	60					
MP 79.4	71+74	DL	150	12	2	200	23	90	150		40			
					NB I-57 TOTAL	907	111	410	1160		470	26	26	
SOUTHBOUND - BEGINNING AT FRANKLIN/JEFFERSON COUNTY LINE														
FRANKLIN COUNTY														
MP 80.6 (OVERPASS SN 028-0055)	9+78	DL	30	2	2	7	1	3	30					
MP 79.7	55+90	DL/CL	20	6	2	14	2	6			10	6	6	
MP 77.4	177+34	CL	13	6	2	9	1	4			10	9	9	
MP 77.3	182+62	PL	23	6	2	16	2	7		23				
MP 76.0	251+26	DL/CL	10	6	2	7	1	3			10	2	2	
MP 75.4	283+25	DL	6	12	2	8	1	4	6		10	1	1	
MP 74.3	341+02	PL	6	6	2	4	1	2		6				
MP 73.0	409+66	DL	6	12	2	8	1	4	6		10	3	3	
MP 73.0	409+66	DL	400	12	2	534	60	240	400		100	2	2	
MP 72.7	425+50	CL	600	2	2	134	15	60			150	1	1	
MP 72.3 (SN 028-0064)	446+62	DL	90	12	2	120	14	54	90		30	1	1	
MP 72.3	448+16	DL	94	2	2	21	3	10	94					
MP 72.2	451+90	DL	15	6	2	10	2	5						
MP 72.1	457+18	DL	400	12	2	534	60	240	400		100	6	6	
MP 72.0	462+46	DL	130	12	2	174	20	78	130		40	3	3	
MP 72.0	462+46	PL	50	12	2	67	8	30		50	20	2	2	
					SB I-57 TOTAL	1667	192	750	1235		490	34	34	
					I-57 TOTALS	4798	572	2163	4349		1820	118	118	

QUANTITIES AND LOCATIONS SHOWN IN THE PLANS FOR MILL & FILL ARE ESTIMATES. THE ACTUAL AMOUNT OF MILL & FILL REQUIRED AND LOCATIONS SHALL BE DETERMINED BY THE ENGINEER.

I-57 PATCHING SCHEDULE

CLASS B PATCHING													
LOCATION (APPROX)	STATION (APPROX)	LANE	LENGTH	WIDTH	AREA	CLASS B PATCH, TY II, 13 1/4 IN	CLASS B PATCH, TY III, 13 1/4 IN	CLASS B PATCH, TY IV, 13 1/4 IN	WELDED WIRE	DOWEL BARS	SAW CUTS	TIE BARS	
MP	FOOT	DL/PL	FOOT	FOOT	SQ YD	SQ YD	SQ YD	SQ YD	SQ YD	EACH	FOOT	EACH	
NORTHBOUND - BEGINNING AT FRANKLIN/WILLIAMSON COUNTY LINE													
FRANKLIN COUNTY													
MP 63.0 (OVERPASS SN 028-0058)	239+00	DL	6	12	8.0	8.0				20	48		
MP 63.4 (APPROACH SN 028-0001)	213+29	DL	6	12	8.0	8.0				20	48		
MP 63.4 (DEPARTURE SN 028-0001)	211+65	DL	6	12	8.0	8.0				20	48		
MP 64.5 (UNDER SN 0028-0039)	157+26	DL	8	12	10.7	10.7				20	52		
MP 66.5 (SN 028-0006)	51+66	DL	65	12	86.7			86.7	86.7	20	166	32	
MP 71.1 (RAILROAD OVERPASS SN 028-0082)	479+38	PL	6	12	8.0	8.0				20	48		
MP 71.1 (RAILROAD OVERPASS SN 028-0082)	479+38	PL	8	12	10.7	10.7				20	52		
MP 72.3 (OVERPASS SN 028-0064)	446+62	DL	6	12	8.0	8.0				20	48		
MP 75 (DEPARTURE SN 028-0011)	303+50	DL	30	12	40.0			40.0	40.0	20	96	14	
MP 80.6 (OVERPASS SN 028-0055)	9+78	DL	8	12	10.7	10.7				20	52		
					NB I-57 TOTAL						200	658	46
SOUTHBOUND - BEGINNING AT FRANKLIN/JEFFERSON COUNTY LINE													
FRANKLIN COUNTY													
MP 80.6 (OVERPASS SN 028-0055)	9+78	DL	23	12	30.7			30.7	30.7	20	82	11	
MP 77.4 (SN 028-0059)	177+34	PL	6	12	8.0	8.0				20	48		
MP 76.4 (SN 028-0056)	229+75	PL	6	12	8.0	8.0				20	48		
MP 75.4 (SN 028-0053)	283+25	PL	6	12	8.0	8.0				20	48		
MP 75.0 (SN 028-0011)	303+00	DL	6	12	8.0	8.0				20	48		
MP 75.0 (SN 028-0011)	303+00	DL	6	12	8.0	8.0				20	48		
MP 75.0 (SN 028-0011)	303+00	DL	6	12	8.0	8.0				20	48		
MP 75.0 (SN 028-0011)	305+00	DL	15	12	20.0		20.0		20.0	20	66		
MP 72.3 (OVERPASS SN 028-0064)	447+52	DL	64	12	85.3			85.3	85.3	20	164	31	
MP 63.0 (OVERPASS SN 028-0058)	239+00	DL	10	12	13.3	13.3				20	56		
					SB I-57 TOTAL						200	656	42
					I-57 TOTALS						400	1314	88

QUANTITIES AND LOCATIONS SHOWN IN THE PLANS FOR PATCHING ARE ESTIMATES. THE ACTUAL AMOUNT OF PATCHING REQUIRED AND LOCATIONS SHALL BE DETERMINED BY THE ENGINEER.