



Illinois Department of Transportation

To: Jeffrey L. Keirn Attn: Kirk H. Brown
From: Jack Elston By: Michael Brand *MOB*
Subject: Pavement Design Approval
Date: June 4, 2018

Route: FAP 805 (IL 161) Job No.: D-98-024-05
Section: 7BR, 7BR-1 Contract No.: 76887
County: Clinton Target Letting: November 2018
Limits: 0.4 miles West, to 1 mile east of Shattuc Rd, near Centralia, IL

On June 1, 2018, the Pavement Selection Committee met via email to review the pavement design for the above referenced project which was submitted on May 16, 2018. The scope of the project involves replacing a bridge and a culvert, as well as raising the grade of the roadway 3 feet.

The pavement design resulted in two pavement options: 11" Full-Depth HMA and 9" PCC. The life-cycle cost analysis of those options resulted in the HMA pavement being 1.5% less expensive (\$70,301/mile compared to PCC's Cost of \$71,330/mile).

Due to the short length of the project and the complicated staging required, the District recommended the use of HMA in-lieu of PCC or alternate bidding. The Pavement Selection Committee concurred with the District's preference.

In summary, the approved pavement design is as follows:

11" Full-Depth HMA Pavement w/ 8" HMA Shoulders
12" Improved Subgrade

If you have any questions, please contact Mike Brand at (217) 782-7651.



Illinois Department of Transportation

Memorandum

To: Jack Elston Attn.: Michael Brand
From: Jeffrey L. Keirn By: Kirk H. Brown 
Subject: Pavement Design
Date: May 16, 2018

FAP 805 (IL 161)
Section 7BR, 7BR-1
Clinton County
D-98-024-05
Contract No. 76887

Bridge Replacement & Culvert Replacement and grade raise along IL 161 over Crooked Creek 8.6 mi E of IL 127 – SN 014-0025 & 8.8 mi E of IL 127 – SN 014-2426; IL 161 over Creek 1 mi W of Centralia – SN 014-2001

The subject project consists of a 3-foot grade raise of the roadway and bridge replacement along IL 161. Since the roadway will be reconstructed; Mechanistic designs of Rigid (JCPC) and Flexible (Full-Depth HMA) were performed. The two designs were evaluated using the Life-Cost Analysis. Flexible pavement cost is 1.5% less than Rigid pavement cost.

Project Information

- IL 161 is a marked State Route
- Approximately 21,200 square yards of new pavement. The length of the proposed pavement is approximately 2.8 lane-miles consisting of a Left-Turn-Lane. Since it is more than 4,750 square yards, BDE approval is required
- Lane widths vary between 24 feet and 36 feet. Shoulder widths are 6 feet (4' HMA and 2' Aggregate).
- Existing roadway will be removed in locations where the proposed subgrade is less than 3 inches above the existing surface. Areas with a difference greater than 3 inches, but less than 3 feet, will require the existing roadway to be broken. (Article 205.03(b))
- Per the Roadway Geotechnical Report, 12 inches of improved subgrade was recommended for the grade raise and side roads.
- The adjacent roadway consists of a 9"-6"-9" concrete pavement with ± 5 inches of HMA overlay.
- The road will be closed to replace a 11-span structure (SN 014-0025) with an 8-span structure (SN 014-0080).

- From the IL 161/Shattuc Road intersection to the west end of the project, a full closure of 2 weeks is proposed to make the required grade. During the closure, the District is planning to place $\pm 24"$ of aggregate and the HMA binder course, then re-opening that section of roadway for traffic. The HMA surface course and shoulders would be constructed later with the rest of the pavement. Approximately 0.9 lane-miles of pavement from the beginning of the project to just east of this intersection would be constructed. The short timeframe of the full closure would require the use of HMA. The full closure would allow Shattuc Road to remain open during the majority of construction.
- There will also be a significant grade raise on another township road (Noltings Road) that intersect IL 161. The District plans to use HMA for this roadway and Shattuc Road to either match in kind or provide similar maintenance options.

The Mechanistic design resulted in a Full Depth HMA Design Thickness of 11 inches or a Jointed Plain Concrete Pavement design thickness of 9 inches with 4 inches of stabilized subbase. Both designs require 12 inches of improved subgrade.

Chapter 54 in the BDE Manual suggests Alternate Bid Consideration with review by the Pavement Selection Committee due to the Life-Cycle Cost difference is less than 10%. However, since 1/3 of the project will be constructed using HMA pavement to maintain access to Shattuc Road, the District recommends HMA pavement for the entire project.

This project is scheduled for the November 9, 2018 letting. The PS&E submittal is August 17, 2018.

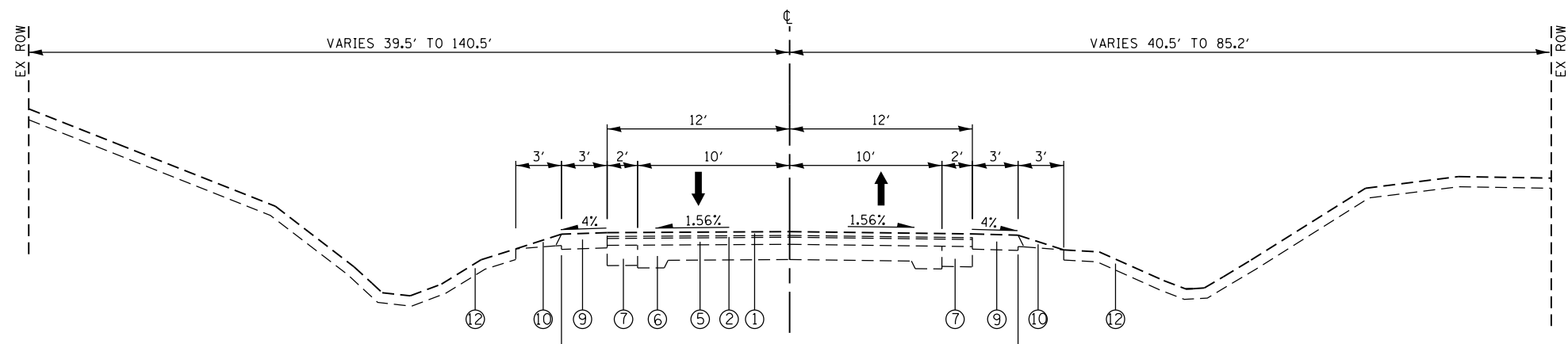
Please review the attached Report and approve or provide comments. If you have any questions, please contact Phillip Freimuth at (618) 346-3194 or Rob Harbaugh at (618) 346-3195.



Location Map

Bridge & Culvert Replacement with Grade Raise along IL 161
over Crooked Creek 8.6 mi E of IL 127 - SN 014-0025 & 8.8 mi E of IL 127 - SN 014-2426;
IL 161 over Creek 1 mi W of Centralia - SN 014-2001

FAP 805 (IL 161)
Section 7BR, 7BR-1
Clinton County
D-98-024-05
Contract No. 76887



**EXISTING TYPICAL SECTION
FAP 805 (ILLINOIS 161)**

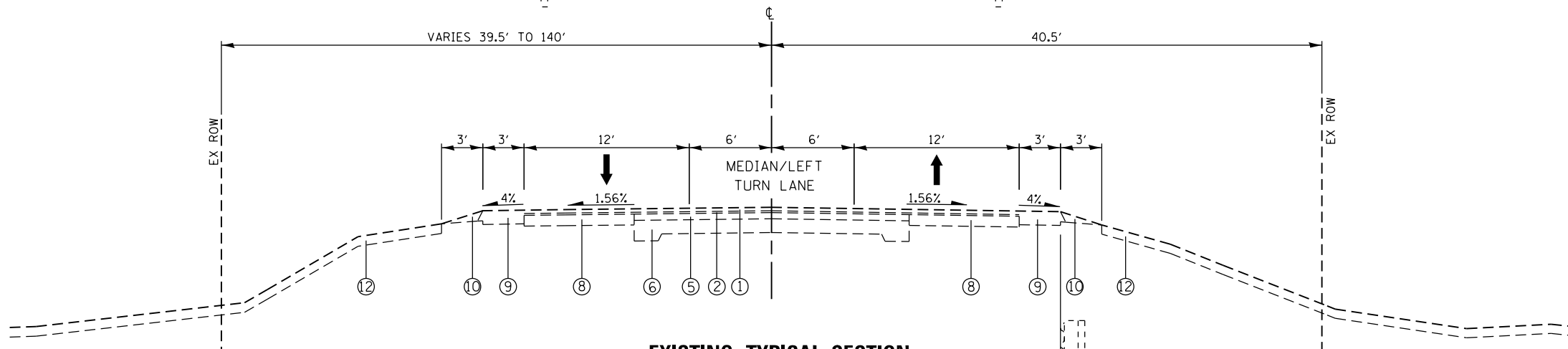
STA. 693+10.00 TO STA. 707+50.00
 STA. 718+39.00 TO STA. 727+90.00
 STA. 734+33.00 TO STA. 765+70.00
 (SEE NOTE 2)

STA. 726+39.21 TO STA. 727+90.16
 STA. 734+33.62 TO STA. 736.46.28
 STA. 747+15.26 TO STA. 749+81.22

STA. 716+11.94 TO STA. 718+28.24
 STA. 725+77.13 TO STA. 727+90.09
 STA. 734+33.25 TO STA. 735+84.36
 STA. 746+88.44 TO STA. 749+54.33

EXISTING

- ① HMA SURFACE COURSE 1.5"
- ② LEVELING BINDER 0.75"
- ③ HMA BINDER COURSE 1.5"
- ④ HMA BASE COURSE 10"
- ⑤ HMA RESURFACING 2.75"
- ⑥ EX. 9"-6"-9" PAVEMENT
- ⑦ HMA BASE COURSE WIDENING 8"
- ⑧ EX. PCC BASE COURSE WIDENING 4.75"
- ⑨ HMA SHOULDERS 6"
- ⑩ AGGREGATE WEDGE SHOULDER, TYPE B
- ⑪ AGGREGATE SHOULDER, TYPE A 6"
- ⑫ EX. TOPSOIL
- ⑬ EX. GUARDRAIL



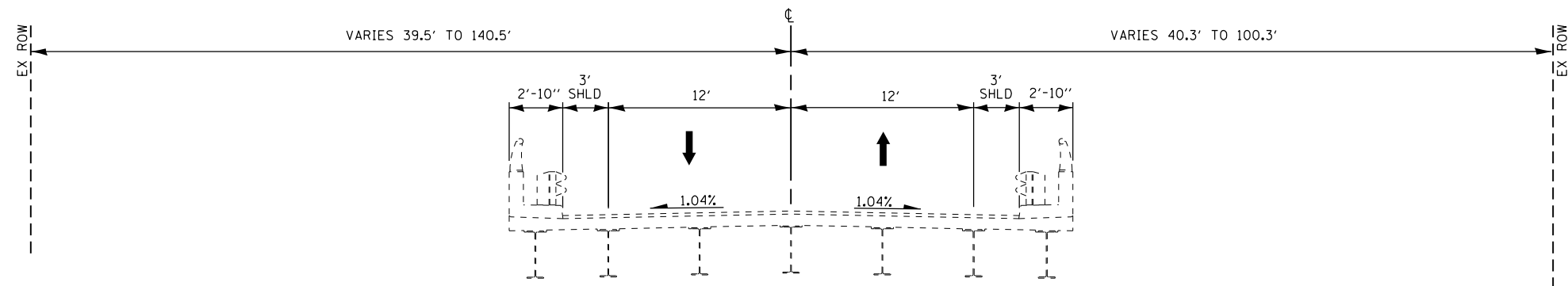
**EXISTING TYPICAL SECTION
FAP 805 (ILLINOIS 161)**

STA. 707+50.00 TO STA. 718+39.00
 (SEE NOTE 1)

STA. 716+11.94 TO STA. 718+28.24

NOTES:

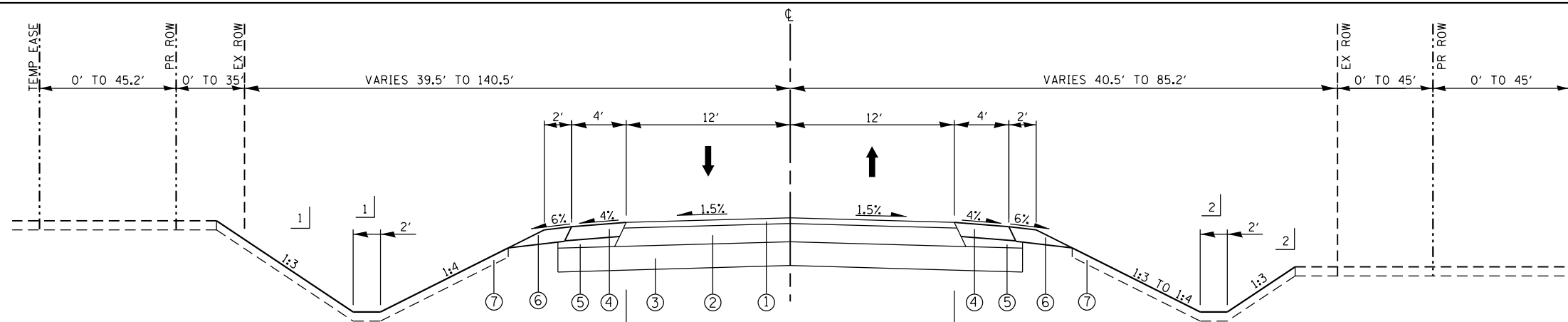
1. THE EXISTING ROADWAY TYPICAL SECTION ALSO REPRESENTS IL 161 OVER THE EXISTING STRUCTURE SN 014-2426 (CROOKED CREEK OVERFLOW STRUCTURE) AT STA. 717+20. SEE CROSS SECTION FOR DETAILS.
2. THE EXISTING ROADWAY TYPICAL SECTION ALSO REPRESENTS IL 161 OVER THE EXISTING STRUCTURE SN 014-2001 (CROOKED CREEK OVERFLOW STRUCTURE) AT STA. 748+32. SEE CROSS SECTION FOR DETAILS.



**EXISTING BRIDGE TYPICAL SECTION
FAP 805 (ILLINOIS 161)**

STA. 727+90.00 TO STA. 734+33.00

FILE NAME = D876887-sht-typical.dgn	USER NAME = freimthpd	DESIGNED - TC (AMECFW)	REVISED - _____	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	ILLINOIS ROUTE 161 EXISTING TYPICAL SECTIONS	F.A.P. SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	PLOT SCALE = 10.0000' / in.	CHECKED - SLD (EFK-MOEN)	REVISED - _____			.805	CLINTON	13	1
Default	PLOT DATE = 1/29/2018	DATE - _____	REVISED - _____	SCALE: 1" = 10'		SHEET 1 OF 4 SHEETS		STA. _____ TO STA. _____	
						CONT. NO. P18157Q41			
						ILLINOIS FED. AID PROJECT			

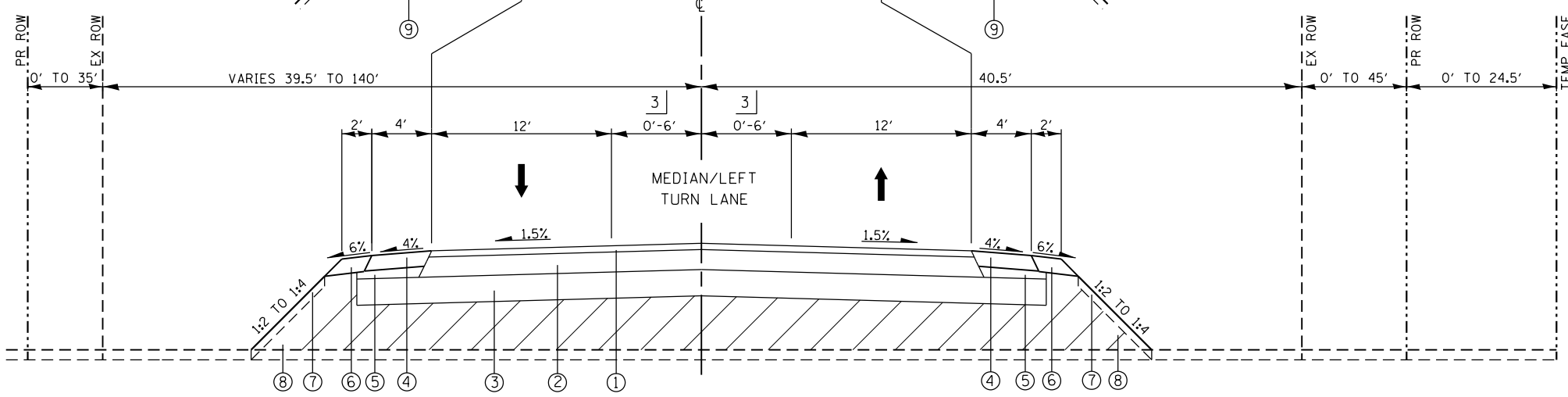


STA. 716+35.21 TO STA. 724+72.11
 STA. 735+57.51 TO STA. 742+07.46
 STA. 743+18.76 TO STA. 751+18.74

**PROPOSED TYPICAL SECTION
 FAP 805 (ILLINOIS 161)**

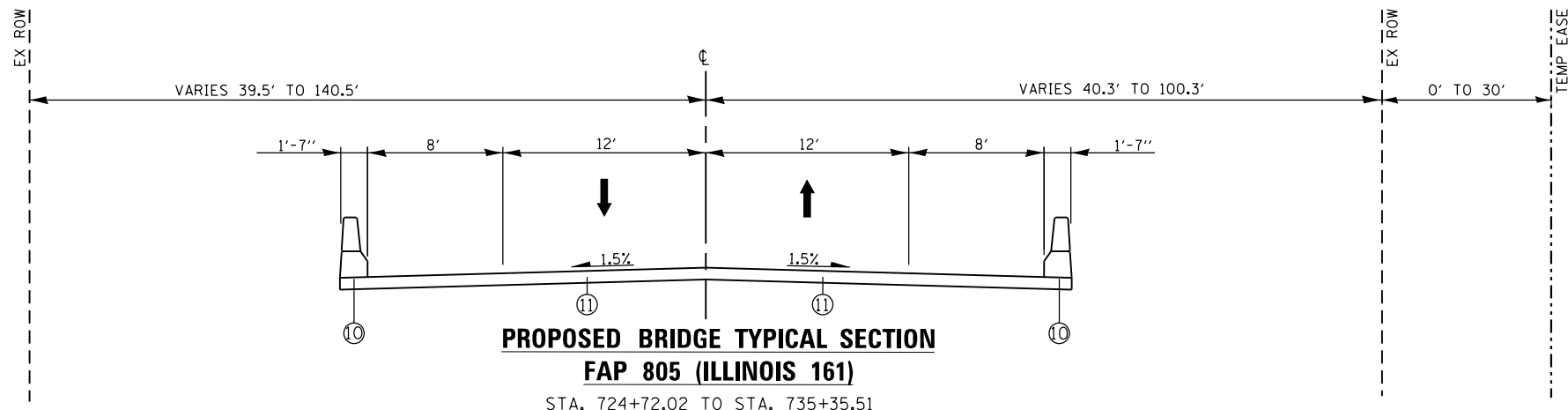
STA. 693+10.00 TO STA. 708+08.58
 STA. 719+46.61 TO STA. 724+72.02
 STA. 735+35.51 TO STA. 765+70.00
 (SEE NOTE 2)

STA. 714+51.21 TO STA. 724+50.84
 STA. 735+35.95 TO STA. 737+48.41
 STA. 737+94.57 TO STA. 741+94.55
 STA. 742+43.76 TO STA. 749+31.24



**PROPOSED TYPICAL SECTION
 FAP 805 (ILLINOIS 161)**

STA. 708+08.58 TO STA. 719+46.61
 (SEE NOTE 1)



**PROPOSED BRIDGE TYPICAL SECTION
 FAP 805 (ILLINOIS 161)**

STA. 724+72.02 TO STA. 735+35.51

- 1] STA. 693+10.00 TO STA. 705+50.00
 STA. 759+00.00 TO STA. 765+70.00
- 2] STA. 695+61.49 TO STA. 699+72.80
 STA. 707+13.29 TO STA. 708+53.57
 STA. 754+32.93 TO STA. 759+84.10
 STA. 760+42.93 TO STA. 765+50.00
- 3] STA. 708+08.58 TO STA. 711+48.71 TAPERS FROM 0' TO 6'

PROPOSED

- ① HMA SURFACE COURSE 2.5"
- ② HMA BINDER COURSE 8.5"
- ③ AGGREGATE BASE 12"
- ④ HMA SHOULDER 8"
- ⑤ SUBBASE GRANULAR MATERIAL, TYPE C
- ⑥ AGGREGATE SHOULDER, TYPE B 8"
- ⑦ TOPSOIL FURNISHED AND PLACED, 4"
- ⑧ SELECT FILL OR BORROW EXCAV.
- ⑨ STEEL PLATE BEAM GUARDRAIL, TYPE A, 6 FOOT OR 9 FOOT POSTS OR TRAFFIC BARRIER TERMINAL
- ⑩ BRIDGE PARAPET
- ⑪ BRIDGE DECK

NOTES:

- 1. THE PROPOSED ROADWAY TYPICAL SECTION ALSO REPRESENTS IL 161 OVER THE PROPOSED STRUCTURE SN 014-2454 (CROOKED CREEK OVERFLOW STRUCTURE) AT STA. 717+20. SEE CROSS SECTION FOR DETAILS.
- 2. THE PROPOSED ROADWAY TYPICAL SECTION ALSO REPRESENTS IL 161 OVER THE PROPOSED STRUCTURE SN 014-2025 (CROOKED CREEK OVERFLOW STRUCTURE) AT STA. 748+32. SEE CROSS SECTION FOR DETAILS.

PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells)

Route: **FAP 805 (IL 161)** Comments: **Bridge Replacement and Culvert Replacement with grade raise**
 Section: **7BR, 7BR-1**
 County: **Clinton** Design Date: **<-- BY**
 Location: **Over Crooked Creek 8.6 mi E of IL 127** Modify Date: **<-- BY**

	ADT	Year
Current:	6,900	2015
Future:	9,500	2038

Facility Type: **Other Marked State Route**
 # of Lanes = **2 or 3**
 Part of future 4 lanes or more? **No**
 One Way Street? **No**
 Road Class: **II**
 Subgrade Support Rating (SSR): **Poor**
 Construction Year: **2018**
 Design Period (DP) = **20** years

Structural Design Traffic				
	Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane
PV =	0	7,491	89.5%	P = 50%
SU =	250	552	6.6%	S = 50%
MU =	750	326	3.9%	M = 50%
Struct. Design ADT =	8,370		(2028)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv = 0.15
 Csu = **112.06**
 Cmu = **385.44**
 TF flexible (Actual) = 1.89 (Actual ADT)
 TF flexible (Min) = 3.17 (Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv = 0.15
 Csu = **135.78**
 Cmu = **567.21**
 TF rigid (Actual) = 2.61 (Actual ADT)
 TF rigid (Min) = 4.59 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Goto Map

Use TF flexible = 3.17
 PG Grade Lower Binder Lifts = **PG 64-22** (Fig. 53-4.R)
 HMA Mixture Temp. = **79.5** deg. F (Fig. 54-5.C)
 Design HMA Mixture Modulus (E_{HMA}) = 570 ksi (Fig. 54-5.D)
 Design HMA Strain (ε_{HMA}) = 86 (Fig. 54-5.E)
 Full Depth HMA Design Thickness = 11.00 in. (Fig. 54-5.F)
 Limiting Strain Criterion Thickness = **16.50** in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness = 11.00 inches

JPC Pavement

Use TF rigid = 4.59
 Edge Support = **Tied** Shoulder or C.&G.
Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRCP Pavement

Use TF rigid = 4.59
 IBR value = 3
CRCP Thickness = 7.75 in. (Fig. 54-4.N)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Goto Map

Use TF flexible = 3.17
 HMA Overlay Design Thickness = 7.75 in. (Fig. 54-5.U)
 Limiting Strain Criterion Thickness = **11.75** in. (Fig. 54-5.V)
Use HMA Overlay Thickness = 7.75 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU	MU
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE **FAP 805 (IL 161)**
 SECTION **7BR, 7BR-1**
 COUNTY **Clinton**
 LOCATION **Over Crooked Creek 8.6 mi E of IL 127**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **7260 FT == > 1.38 Miles**
 # OF CENTERLINES **1 CL**
 # OF LANES **2 LANES**
 # OF EDGES **2 EP**
 LANE WIDTH - AVERAGE **12 FT**
 SHOULDER WIDTH HMA Left **4 FT**
 HMA Right **4 FT**
 Total Width of Paved Shoulders **8 FT**

PAVEMENT THICKNESS (FLEXIBLE) **11.00 IN 16.50 IN MAX**
 SHOULDER THICKNESS **8.00 IN HMA_SD Standard Design**
 POLICY OVERLAY THICKNESS **2.25 IN**

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		3.17	1.89	3.17

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$95.00 /TON
HMA TOP BINDER	\$92.00 /TON
HMA LOWER BINDER	\$90.50 /TON
HMA BINDER (LEVELING)	\$85.00 /TON
HMA SHOULDER	\$86.50 /TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(11.00")	19360	19,360 SQ YD	\$58.58 /SQ YD	\$1,134,067 ~
HMA SURFACE COURSE	(2.00")	1.0069	2,183 TONS	\$95.00 /TON	\$0
HMA TOP BINDER COURSE	(2.25")	1.0217	2,492 TONS	\$92.00 /TON	\$0
HMA LOWER BINDER COURSE	(6.75")	1.0530	7,706 TONS	\$90.50 /TON	\$0
HMA SHOULDER	(8.00")	6453	2,891 TONS	\$86.50 /TON	\$250,080 ~
CURB & GUTTER			0 LIN FT	\$0.00 /LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)			837 TONS	\$26.50 /TON	\$22,181
IMPROVED SUBGRADE:	Aggregate Width = 34.8'		28,099 SQ YD	\$12.50 /SQ YD	\$351,238
SUBBASE GRANULAR MATERIAL, TYPE B 12"			0 SQ YD	\$0.00 /SQ YD	\$0
Reserved For User Supplied Item			0 UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL			19,360 SQ YD	\$10.25 /SQ YD	\$0
SHOULDER REMOVAL			6,453 SQ YD	\$9.50 /SQ YD	\$0
Note: * Denotes User Supplied Quantity				FLEXIBLE CONSTRUCTION INITIAL COST	\$1,757,566
				FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	\$52,133

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	1.0069 Surface Mix	2.00	\$10.71 /SQ YD
HMA OVERLAY PVMT	(2.25")	1.0078 Surface Mix	2.25	\$11.64 /SQ YD
HMA SURFACE MIX	(1.50")	1.0052 Surface Mix	1.50	\$8.02 /SQ YD
HMA BINDER MIX	(0.75")	1.0130 Leveling Binder Mix	0.75	\$3.62 /SQ YD
HMA OVERLAY SHLD (Year 30)	(2.25")	Shoulder Mix	2.25	\$10.90 /SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	2.00	\$9.69 /SQ YD
MILLING (2.00 IN)			2.00	\$3.00 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	2.00	\$80.64 /SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	2.00	\$79.69 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	2.00	\$79.52 /SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	2.00	\$79.69 /SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				\$2.00 /LIN FT
CENTERLINE JOINT ROUT & SEAL				\$2.00 /LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL (100% Rehab = 110.00' / Station / Lane)				\$2.00 /LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST **\$2,370,077**
 FLEXIBLE TOTAL ANNUAL COST PER MILE **\$70,301**

FULL-DEPTH HMA PAVEMENT
 HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
 Figure 54-7.C
 STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	\$80.64	\$1,532	
		PWF _n = 0.8626			PW = 0.8626 X	\$61,064	\$52,674
YEAR 10							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.50%	97	SQ YD	\$80.64	\$7,822	
		PWF _n = 0.7441			PW = 0.7441 X	\$67,354	\$50,118
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	25,813	SQ YD	\$3.00	\$77,439	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	194	SQ YD	\$79.52	\$15,427	
	HMA OVERLAY PVMT 2.00"	100.00%	19,360	SQ YD	\$10.71	\$207,421	
	HMA OVERLAY SHLD 2.00 "	100.00%	6,453	SQ YD	\$9.69	\$62,520	
		PWF _n = 0.6419			PW = 0.6419 X	\$362,807	\$232,872
YEAR 20							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	\$80.64	\$1,532	
		PWF _n = 0.5537			PW = 0.5537 X	\$61,064	\$33,810
YEAR 25							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.50%	97	SQ YD	\$80.64	\$7,822	
		PWF _n = 0.4776			PW = 0.4776 X	\$67,354	\$32,169
YEAR 30							
	HMA SD NON-INTERSTATE						
	MILL PVMT & SHLD 2.00"	100.00%	25,813	SQ YD	\$3.00	\$77,439	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	387	SQ YD	\$79.52	\$30,774	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	65	SQ YD	\$79.69	\$5,180	
	HMA OVERLAY PVMT 2.25 "	100.00%	19,360	SQ YD	\$11.64	\$225,313	
	HMA OVERLAY SHLD 2.25 "	100.00%	6,453	SQ YD	\$10.90	\$70,335	
		PWF _n = 0.4120			PW = 0.4120 X	\$409,041	\$168,519
YEAR 35							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	\$80.64	\$1,532	
		PWF _n = 0.3554			PW = 0.3554 X	\$61,064	\$21,701
YEAR 40							
	LONG SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CNTR LINE JOINT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RNDM / THRM CRACK R&S	50.00%	7,986	LIN FT	\$2.00	\$15,972	
	PD PVMT PATCH M&F SURF	0.50%	97	SQ YD	\$80.64	\$7,822	
		PWF _n = 0.3066			PW = 0.3066 X	\$67,354	\$20,648
							\$612,511
	ROUTINE MAINTENANCE ACTIVITY						
			2.75	Lane Miles	0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$612,511
45	YEAR LIFE CYCLE	CRF _n = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$18,168

PCC PAVEMENT

JPCP

ROUTE **FAP 805 (IL 161)**
 SECTION **7BR, 7BR-1**
 COUNTY **Clinton**
 LOCATION **Over Crooked Creek 8.6 mi E of IL 127**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **7260 FT ==> 1.38 Miles**
 # OF CENTERLINES **1 CL**
 # OF LANES **2 LANES**
 # OF EDGES **2 EP**
 LANE WIDTH - AVERAGE **12 FT**
 SHOULDER WIDTH **PCC Left 4 FT**
 PCC Right 4 FT
 Total Width of Paved Shoulders 8 FT

PAVEMENT THICKNESS (RIGID) **JPCP 9.00 IN TIED SHLD**
 SHOULDER THICKNESS **9.00 IN**

POLICY OVERLAY THICKNESS **2.50 IN**

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		4.59	2.61	4.59
Worksheet Construction Type is New Construction				The Pavement Type is JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(9.00")	19,360	SQ YD	\$52.50 / SQ YD	\$1,016,400
PAVEMENT REINFORCEMENT		0	SQ YD	\$0.00 / SQ YD	\$0
STABILIZED SUBBASE	(4.00")	21,780	SQ YD	\$17.50 / SQ YD	\$381,150
PCC SHOULDERS		6,453	SQ YD	\$46.50 / SQ YD	\$300,065
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.72")	870	TONS	\$25.00 / TON	\$21,750
IMPROVED SUBGRADE:	Aggregate Width = 33.0'	26,620	SQ YD	\$12.50 / SQ YD	\$332,750
SUBBASE GRANULAR MATERIAL, TYPE B 12"		0	SQ YD	\$0.00 / SQ YD	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		19,360	SQ YD	\$10.25 / SQ YD	\$0
SHOULDER REMOVAL		6,453	SQ YD	\$9.50 / SQ YD	\$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$2,052,115
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$60,870

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 / LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")		2.50	
HMA POLICY OVERLAY PVMT	(2.50")	1.0087	2.50	\$12.85 / SQ YD
HMA SURFACE MIX	(1.50")	1.0052	Surface Mix 1.50	\$8.02 / SQ YD
HMA BINDER MIX	(1.00")	1.0139	elting Binder Mix 1.00	\$4.83 / SQ YD
HMA POLICY OVERLAY SHLD	(2.50")		Shoulder Mix 2.50	\$12.11 / SQ YD
CLASS A PAVEMENT PATCHING				\$195.00 / SQ YD
CLASS B PAVEMENT PATCHING				\$150.00 / SQ YD
CLASS C SHOULDER PATCHING				\$145.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	1.50	\$77.98 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	2.50	\$83.30 / SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				\$2.00 / LIN FT
CENTERLINE JOINT ROUT & SEAL				\$2.00 / LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL				\$2.00 / LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)			\$2.00 / LIN FT

RIGID TOTAL LIFE-CYCLE COST	\$2,404,762
RIGID TOTAL ANNUAL COST PER MILE	\$71,330

JOINTED PLAIN CONCRETE PAVEMENT
 UNBONDED JOINTED PLAIN CONCRETE OVERLAY
 Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10							
	PAVEMENT PATCH CLASS B	0.10%	19	SQ YD	\$150.00	\$2,850	
		PWFn = 0.7441			PW = 0.7441 X	\$2,850	\$2,121
YEAR 15							
	PAVEMENT PATCH CLASS B	0.20%	39	SQ YD	\$150.00	\$5,850	
		PWFn = 0.6419			PW = 0.6419 X	\$5,850	\$3,755
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	387	SQ YD	\$150.00	\$58,050	
	SHOULDER PATCH CLASS C	0.50%	32	SQ YD	\$145.00	\$4,640	
	LONGITUDINAL SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CENTERLINE JT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
		PWFn = 0.5537			PW = 0.5537 X	\$106,250	\$58,828
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	581	SQ YD	\$150.00	\$87,150	
	SHOULDER PATCH CLASS C	1.00%	65	SQ YD	\$145.00	\$9,425	
		PWFn = 0.4776			PW = 0.4776 X	\$96,575	\$46,125
YEAR 30	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	774	SQ YD	\$150.00	\$116,100	
	SHOULDER PATCH CLASS C	1.50%	97	SQ YD	\$145.00	\$14,065	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	19,360	SQ YD	\$12.85	\$248,731	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	6,453	SQ YD	\$12.11	\$78,150	
		PWFn = 0.4120			PW = 0.4120 X	\$457,046	\$188,297
YEAR 35	NON-INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CENTERLINE JT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	RANDOM CRACK R&S	50.00%	7,260	LIN FT	\$2.00	\$14,520	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	4,646	LIN FT	\$2.00	\$9,292	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	19	SQ YD	\$83.30	\$1,583	
		PWFn = 0.3554			PW = 0.3554 X	\$68,955	\$24,505
YEAR 40	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	97	SQ YD	\$150.00	\$14,550	
	LONGITUDINAL SHLD JT R&S	100.00%	14,520	LIN FT	\$2.00	\$29,040	
	CENTERLINE JT R&S	100.00%	7,260	LIN FT	\$2.00	\$14,520	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	6,970	LIN FT	\$2.00	\$13,940	
	RANDOM CRACK R&S	50.00%	7,260	LIN FT	\$2.00	\$14,520	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	97	SQ YD	\$83.30	\$8,080	
		PWFn = 0.3066			PW = 0.3066 X	\$94,650	\$29,016
							\$352,647
	ROUTINE MAINTENANCE ACTIVITY		2.75	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$352,647
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$10,460

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 1/29/18 2:50 PM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$2,052,115	\$1,757,566
		ANNUAL COST PER MILE	\$60,870	\$52,133
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$352,647	\$612,511
		ANNUAL COST PER MILE	\$10,460	\$18,168
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$2,404,762	\$2,370,077
		ANNUAL COST PER MILE	\$71,330	\$70,301

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	HMA	\$70,301	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$71,330	1.5%