



# Illinois Department of Transportation

## Memorandum

To: Maureen Addis Attn: Mike Brand  
From: Kevin Marchek By: Dave Broviak  
Subject: Pavement Design  
Date: January 24, 2017

A handwritten signature in cursive, appearing to read "Mike Brand".

FAP 332 (IL 1)  
Section (2SB-FAGH)BR  
Iroquois County  
Job No. P-93-014-14  
Contract 66D31

Attached is the pavement design for IL 1 at SN 038-0024, which is located 0.9 mile north of Milford. Please review the design. The district requests approval of the 10.25 inches of full depth HMA Pavement option. Construction of this project is currently programmed in FY 2019.

Full Depth HMA is the preferred pavement type based on life cycle cost in the attached analysis. The results of the mechanistic pavement design indicate that 9.0 inch JPCP or 10.25 inch full depth Hot Mix Asphalt (HMA) is required. The JPCP design has an annual life-cycle cost of \$125,047 per mile while the HMA pavement has an annual life-cycle cost of \$104,236 per mile, making the HMA pavement approximately 20% less costly.

The project involves removing SN 038-0024 which carries the CSX Railroad over IL 1 at Milford and constructing a structure to carry IL 1 over the CSX Railroad approximately 240' west of the existing structure, providing a policy vertical alignment. The pavement design is for constructing 1,971' with two 12' lanes and a 10' shoulder. The estimated quantity of new pavement is 5,256 square yards. The design period of 20 years was used with traffic based on 2029 projections. The pavement was designed using Chapter 54 of the Bureau of Design and Environment Manual, current as of September 2016.

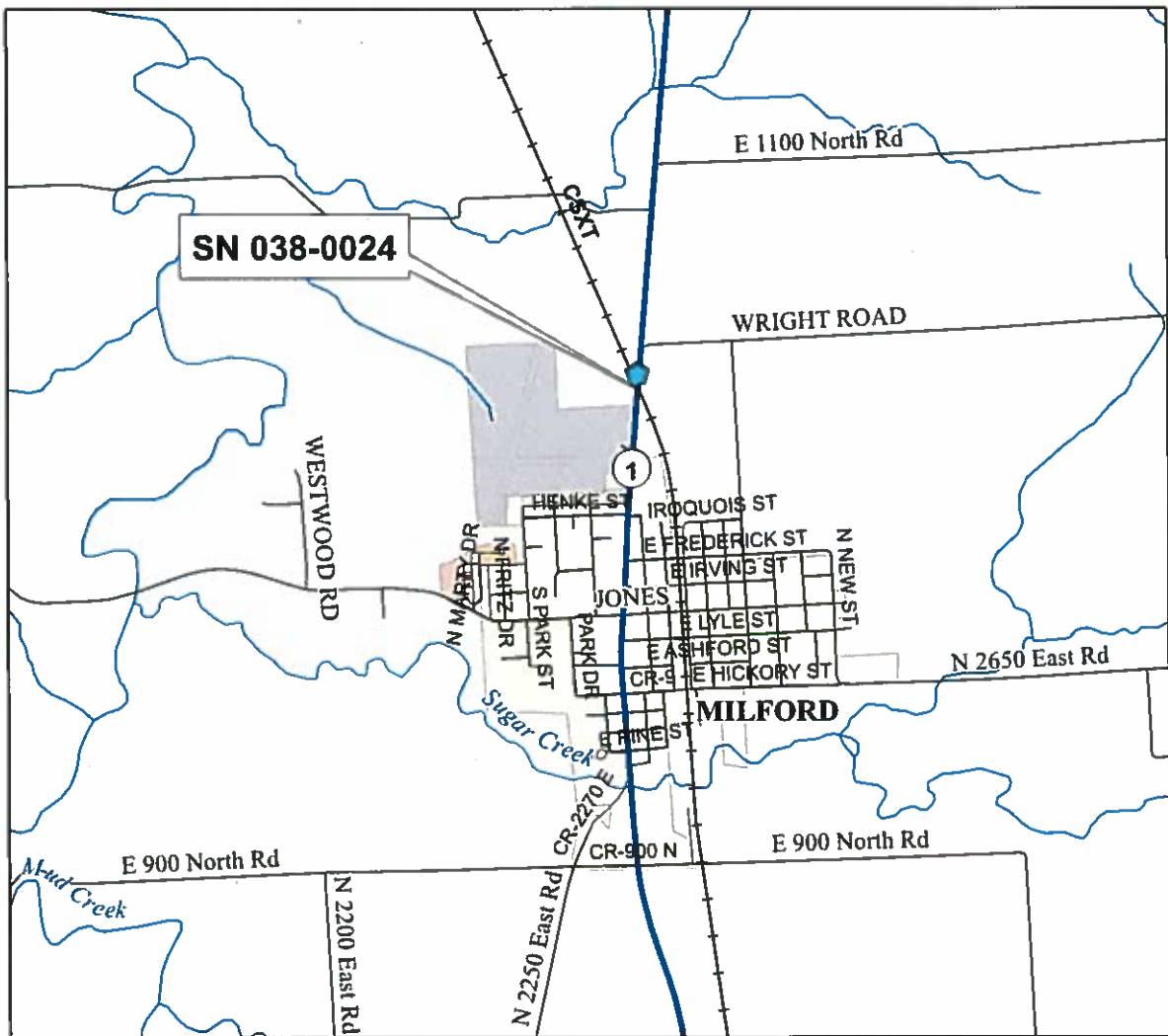
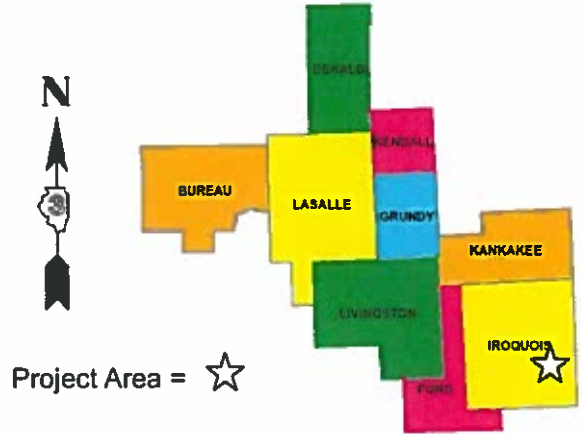
Calculations to determine pavement thicknesses and life-cycle costs are attached and electronic files have been emailed for review.

Rubblization and unbonded overlay were not considered because the proposed pavement is significantly higher than the existing pavement.

If you have any questions, please contact Kelly Vlastnik at 815-434-8575.

### Project Location Map

FAP 332 / IL 1  
Section (2SB-FAGH)BR  
Iroquois County  
Structure replacement (SN 038-0024)  
Under CSX RR Bridge  
0.9 miles N of Milford  
Phase I Job No: P-93-014-14  
Contract No.66D31



D3# 1237

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: <b>FAP 332 (IL1)</b>	Comments:			
Section: <b>(2SB-FAGH)BR</b>	Design Date: <b>07/22/2016</b>	← BY		
County: <b>Iroquois</b>	Modify Date:	← BY	ADT	Year
Location: <b>Under CSX RR North of Milford</b>		Current:	<b>2,700</b>	<b>2019</b>
Facility Type: <b>Other Marked State Route</b>		Future:	<b>3,300</b>	<b>2039</b>
# of Lanes = <b>2 or 3</b>		<b>Structural Design Traffic</b>		
Part of future 4 lanes or more? <b>No</b>		Minimum ADT	Actual ADT	Actual % of Total ADT
One Way Street? <b>No</b>				% of ADT in Design Lane
Road Class: <b>II</b>		PV = <b>0</b>	<b>2,547</b>	<b>84.9%</b>
Subgrade Support Rating (SSR): <b>Poor</b>		SU = <b>250</b>	<b>189</b>	<b>6.3%</b>
Construction Year: <b>2019</b>		MU = <b>750</b>	<b>264</b>	<b>8.8%</b>
Design Period (DP) = <b>20</b> years		Struct. Design ADT = <b>3,000</b>	<b>(2029)</b>	
				P = <b>50%</b>
				S = <b>50%</b>
				M = <b>50%</b>

TRAFFIC FACTOR CALCULATION			
FLEXIBLE PAVEMENT		RIGID PAVEMENT	
Cpv = <b>0.15</b>		Cpv = <b>0.15</b>	
Csu = <b>112.06</b>		Csu = <b>135.78</b>	
Cmu = <b>385.44</b>		Cmu = <b>567.21</b>	
TF flexible (Actual) = <b>1.23</b>	(Actual ADT)	TF rigid (Actual) = <b>1.76</b>	(Actual ADT)
TF flexible (Min) = <b>3.17</b>	(Min ADT Fig. 54-2.C)	TF rigid (Min) = <b>4.59</b>	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS			
Full-Depth HMA Pavement		JPC Pavement	
Use TF flexible = <b>3.17</b>		Use TF rigid = <b>4.59</b>	
PG Grade Lower Binder Lifts = <b>PG 64-22</b>	(Fig. 53-4.R)	Edge Support = <b>Tied</b>	Shoulder or C.&G.
HMA Mixture Temp. = <b>78.5</b>	deg. F (Fig. 54-5.C)	<b>Rigid Pavt Thick. = 8.00</b>	<b>in. (Fig. 54-4.E)</b>
Design HMA Mixture Modulus (E <sub>HMA</sub> ) = <b>650</b>	ksi (Fig. 54-5.D)		
Design HMA Strain (ε <sub>HMA</sub> ) = <b>86</b>	(Fig. 54-5.E)	CRC Pavement	
Full Depth HMA Design Thickness = <b>10.25</b>	in. (Fig. 54-5.F)	Use TF rigid = <b>4.59</b>	
Limiting Strain Criterion Thickness = <b>15.25</b>	in. (Fig. 54-5.I)	IBR value = <b>3</b>	
<b>Use Full-Depth HMA Thickness = 10.25 inches</b>		<b>CRCP Thickness = 7.75</b>	<b>in. (Fig. 54-4.N)</b>

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS			
HMA Overlay of Rubblized PCC		Unbonded Concrete Overlay	
Use TF flexible = <b>3.17</b>		Review 54-4.03 for limitations and special considerations.	
HMA Overlay Design Thickness = <b>7.50</b>	in. (Fig. 54-5.U)		
Limiting Strain Criterion Thickness = <b>11.00</b>	in. (Fig. 54-5.V)	<b>JPCP Thickness = NA</b>	<b>inches</b>
<b>Use HMA Overlay Thickness = 7.50 inches</b>			

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)	
		Min. Str. Design Traffic (Fig 54-2.C)				Class Table for One-Way Streets	
Facility Type		PV	SU	MU	ADT		Class
Interstate or Freeway		0	500	1500	0 - 3500	II	
Other Marked State Route		0	250	750	>3501	I	
Unmarked State Route		No Min	No Min	No Min			
		Traffic Factor ESAL Coefficients				Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
		Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)		ADT	
Class		Csu	Cmu	Csu	Cmu	0 - 749	IV
I		143.81	696.42	132.50	482.53	750 - 2000	III
II		135.78	567.21	112.06	385.44	>2000	II
III		129.58	562.47	109.14	384.35		
IV		129.58	562.47	109.14	384.35		
Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)							
		Rural			Urban		
Number of Lanes		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 332 (IL1)**  
 SECTION **(2SB-FAGH)BR**  
 COUNTY **Iroquois**  
 LOCATION **Under CSX RR North of Milford**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **1971 FT ==> 0.37 Miles**  
 # OF CENTERLINES **1 CL**  
 # OF LANES **2 LANES**  
 # OF EDGES **2 EP**  
 LANE WIDTH - AVERAGE **12 FT**  
 SHOULDER WIDTH **10 FT**  
 HMA Left **10 FT**  
 HMA Right **10 FT**  
 Total Width of Paved Shoulders **20 FT**

PAVEMENT THICKNESS (FLEXIBLE) **10.25 IN** **15.25 IN MAX**  
 SHOULDER THICKNESS **8.00 IN** **Standard Design**  
 POLICY OVERLAY THICKNESS **2.25 IN**

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		3.17	1.23	3.17

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$84.11 / TON
HMA TOP BINDER	\$72.07 / TON
HMA LOWER BINDER	\$72.07 / TON
HMA BINDER (LEVELING)	\$81.51 / TON
HMA SHOULDER	\$85.82 / TON

Read Me!

INITIAL COSTS	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT ( FULL-DEPTH )	( 10.25" )	5,256	SQ YD	\$44.20 / SQ YD	\$0
HMA SURFACE COURSE	( 2.00" )	589	TONS *	\$84.11 / TON	\$49,541 -
HMA TOP BINDER COURSE	( 2.25" )	662	TONS *	\$72.07 / TON	\$47,710 -
HMA LOWER BINDER COURSE	( 6.00" )	1,766	TONS *	\$72.07 / TON	\$127,276 -
HMA SHOULDER	( 8.00" )	1,963	TONS *	\$85.82 / TON	\$168,465 -
CURB & GUTTER		0	LIN FT	\$0.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		168	TONS *	\$28.00 / TON	\$4,704
IMPROVED SUBGRADE	Aggregate	9,855	SQ YD *	\$25.00 / SQ YD	\$246,375
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		0	SQ YD *	\$0.00 / SQ YD	\$0
SHOULDER REMOVAL		0	SQ YD *	\$0.00 / SQ YD	\$0

Note: \* Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$644,071  
 FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$70,369

MAINTENANCE COSTS:	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	( 2.00" )	Surface Mix	\$9.49 / SQ YD
HMA OVERLAY PVMT	( 2.25" )	Surface Mix	\$10.57 / SQ YD
HMA SURFACE MIX	( 1.50" )	Surface Mix	\$7.10 / SQ YD
HMA BINDER MIX	( 0.75" )	slng Binder Mix	\$3.47 / SQ YD
HMA OVERLAY SHLD (Year 30)	( 2.25" )	Shoulder Mix	\$10.81 / SQ YD
HMA OVERLAY SHLD	( 2.00" )	Shoulder Mix	\$9.61 / SQ YD
MILLING (2.00 IN)			\$14.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (MR & FR Surf)		Surface Mix	\$90.42 / SQ YD
PARTIAL DEPTH SHLD PATCH (MR & FR Surf)		Shoulder Mix	\$90.61 / SQ YD
PARTIAL DEPTH PVMT PATCH (MR & FR +2.00")		Leveling Binder Mix	\$90.13 / SQ YD
PARTIAL DEPTH SHLD PATCH (MR & FR +2.00")		Shoulder Mix	\$90.61 / 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 \$954,048  
 FLEXIBLE TOTAL ANNUAL COST PER MILE \$104,236

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
<b>YEAR 5</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$90.42	\$452	
		PWFn = 0.8626			PW = 0.8626 X	\$16,614	\$14,331
<b>YEAR 10</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.50%	26	SQ YD	\$90.42	\$2,351	
		PWFn = 0.7441			PW = 0.7441 X	\$18,513	\$13,775
<b>YEAR 15</b>							
	MILL PVMT & SHLD 2.00"	100.00%	9,638	SQ YD	\$14.00	\$134,932	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	53	SQ YD	\$90.13	\$4,777	
	HMA OVERLAY PVMT 2.00"	100.00%	5,256	SQ YD	\$9.49	\$49,857	
	HMA OVERLAY SHLD 2.00"	100.00%	4,382	SQ YD	\$9.61	\$42,116	
		PWFn = 0.6419			PW = 0.6419 X	\$231,682	\$148,708
<b>YEAR 20</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$90.42	\$452	
		PWFn = 0.5537			PW = 0.5537 X	\$16,614	\$9,199
<b>YEAR 25</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.50%	26	SQ YD	\$90.42	\$2,351	
		PWFn = 0.4776			PW = 0.4776 X	\$18,513	\$8,842
<b>HMA SD</b>							
<b>YEAR 30 NON-INTERSTATE</b>							
	MILL PVMT & SHLD 2.00"	100.00%	9,638	SQ YD	\$14.00	\$134,932	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	105	SQ YD	\$90.13	\$9,464	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	44	SQ YD	\$90.61	\$3,987	
	HMA OVERLAY PVMT 2.25"	100.00%	5,256	SQ YD	\$10.57	\$55,556	
	HMA OVERLAY SHLD 2.25"	100.00%	4,382	SQ YD	\$10.81	\$47,381	
		PWFn = 0.4120			PW = 0.4120 X	\$251,320	\$103,541
<b>YEAR 35</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$90.42	\$452	
		PWFn = 0.3554			PW = 0.3554 X	\$16,614	\$5,904
<b>YEAR 40</b>							
	LONG SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CNTR LINE JOINT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RNDM / THRM CRACK R&S	50.00%	2,168	LIN FT	\$2.00	\$4,336	
	PD PVMT PATCH M&F SURF	0.50%	26	SQ YD	\$90.42	\$2,351	
		PWFn = 0.3066			PW = 0.3066 X	\$18,513	\$5,675
							\$309,975
<b>ROUTINE MAINTENANCE ACTIVITY</b>				0.75 Lane Miles	0.00	\$0	\$0
				<b>MAINTENANCE LIFE-CYCLE COST</b>		\$309,975	
<b>[45] YEAR LIFE CYCLE</b>	CRFn = 0.0407852		<b>MAINTENANCE ANNUAL COST PER MILE</b>		\$33,867		

**PCC PAVEMENT**

**JPCP**

ROUTE **FAP 332 (IL1)**  
 SECTION **(28B-FAGH)BR**  
 COUNTY **Iroquois**  
 LOCATION **Under CSX RR North of Milford**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **1971 FT = >** 0.37 Miles  
 # OF CENTERLINES **1 CL**  
 # OF LANES **2 LANES**  
 # OF EDGES **2 EP**  
 LANE WIDTH - AVERAGE **12 FT**  
 SHOULDER WIDTH **10 FT**  
     PCC Left **10 FT**  
     PCC Right **10 FT**  
 Total Width of Paved Shoulders **20 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
	<b>4.59</b>	<b>1.76</b>	<b>4.59</b>
Worksheet Construction Type Is <b>New Construction</b>		The Pavement Type Is	<b>JPCP</b>

INITIAL COSTS	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	( 9.00" )	5,256	SQ YD	\$49.39 /SQ YD	\$259,594
PAVEMENT REINFORCEMENT		0	SQ YD	\$0.00 /SQ YD	\$0
STABILIZED SUBBASE	( 4.00" )	5,913	SQ YD	\$25.00 /SQ YD	\$147,825
PCC SHOULDERS		4,380	SQ YD	\$56.00 /SQ YD	\$245,280
CURB & GUTTER		0	LIN FT	\$0.00 /LIN FT	\$0
SUBBASE GRAN MATL TY C	( - 1.65" )	5,913	TONS *	\$24.00 /TON	\$141,912
IMPROVED SUBGRADE:	Aggregate	9,855	SQ YD	\$25.00 /SQ YD	\$246,375
Reserved For User Supplied Item		0	UNITS	\$0.00 /UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL		0	SQ YD *	\$0.00 /SQ YD	\$0
SHOULDER REMOVAL		0	SQ YD *	\$0.00 /SQ YD	\$0

Note: \* Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	<b>\$1,040,986</b>
RIGID CONSTRUCTION ANNUAL COST PER MILE	<b>\$113,735</b>

**MAINTENANCE COSTS:**

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			<b>\$0.00 /LANE-MILE /YEAR</b>
HMA POLICY OVERLAY	( 2.50" )		\$11.73 /SQ YD
HMA POLICY OVERLAY PVMT	( 2.50" )	Surface Mix	\$7.10 /SQ YD
HMA SURFACE MIX	( 1.50" )	Surface Mix	\$4.63 /SQ YD
HMA BINDER MIX	( 1.00" )	Binder Mix	\$12.01 /SQ YD
HMA POLICY OVERLAY SHLD	( 2.50" )	Shoulder Mix	\$170.00 /SQ YD
CLASS A PAVEMENT PATCHING			\$125.00 /SQ YD
CLASS B PAVEMENT PATCHING			\$110.00 /SQ YD
CLASS C SHOULDER PATCHING			
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$89.07 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	\$92.78 /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	<b>\$1,144,517</b>
RIGID TOTAL ANNUAL COST PER MILE	<b>\$125,047</b>

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%	5	SQ YD	\$125.00	\$625	
		PWF <sub>n</sub> = 0.7441			PW = 0.7441 X	\$625	\$465
YEAR 15	PAVEMENT PATCH CLASS B	0.20%	11	SQ YD	\$125.00	\$1,375	
		PWF <sub>n</sub> = 0.6419			PW = 0.6419 X	\$1,375	\$883
YEAR 20	PAVEMENT PATCH CLASS B	2.00%	105	SQ YD	\$125.00	\$13,125	
	SHOULDER PATCH CLASS C	0.50%	22	SQ YD	\$110.00	\$2,420	
	LONGITUDINAL SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CENTERLINE JT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
		PWF <sub>n</sub> = 0.5537			PW = 0.5537 X	\$27,371	\$15,155
YEAR 25	PAVEMENT PATCH CLASS B	3.00%	158	SQ YD	\$125.00	\$19,750	
	SHOULDER PATCH CLASS C	1.00%	44	SQ YD	\$110.00	\$4,840	
		PWF <sub>n</sub> = 0.4776			PW = 0.4776 X	\$24,590	\$11,744
YEAR 30	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	210	SQ YD	\$125.00	\$26,250	
	SHOULDER PATCH CLASS C	1.50%	66	SQ YD	\$110.00	\$7,260	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	5,256	SQ YD	\$11.73	\$61,653	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	4,382	SQ YD	\$12.01	\$52,645	
		PWF <sub>n</sub> = 0.4120			PW = 0.4120 X	\$147,808	\$60,895
YEAR 35	NON-INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CENTERLINE JT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	RANDOM CRACK R&S	50.00%	1,971	LIN FT	\$2.00	\$3,942	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,258	LIN FT	\$2.00	\$2,516	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	5	SQ YD	\$92.78	\$464	
		PWF <sub>n</sub> = 0.3554			PW = 0.3554 X	\$18,748	\$6,663
YEAR 40	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	26	SQ YD	\$125.00	\$3,250	
	LONGITUDINAL SHLD JT R&S	100.00%	3,942	LIN FT	\$2.00	\$7,884	
	CENTERLINE JT R&S	100.00%	1,971	LIN FT	\$2.00	\$3,942	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	1,888	LIN FT	\$2.00	\$3,772	
	RANDOM CRACK R&S	50.00%	1,971	LIN FT	\$2.00	\$3,942	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	26	SQ YD	\$92.78	\$2,412	
		PWF <sub>n</sub> = 0.3066			PW = 0.3066 X	\$25,202	\$7,726
							\$103,531
	ROUTINE MAINTENANCE ACTIVITY		0.75 Lane Miles		\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$103,531
45	YEAR LIFE CYCLE	CRF <sub>n</sub> = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$11,311

## LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 10/21/16 8:57 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,040,986	\$844,071
		ANNUAL COST PER MILE	\$113,735	\$70,369
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$103,531	\$309,975
		ANNUAL COST PER MILE	\$11,311	\$33,857
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,144,517	\$954,046
		ANNUAL COST PER MILE	\$125,047	\$104,236

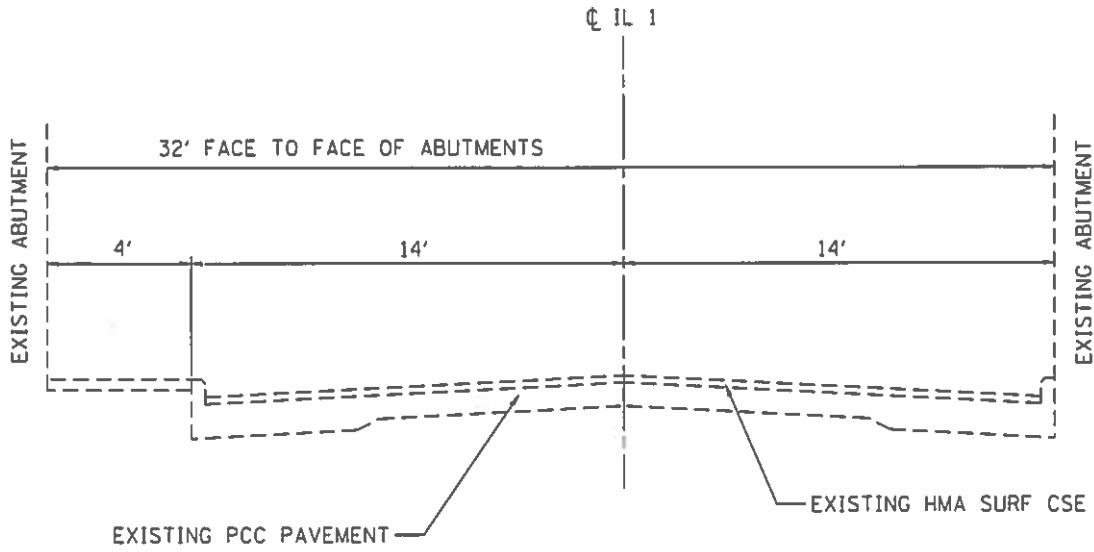
## LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	—————>	HMA	\$104,236	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$125,047	20.0%

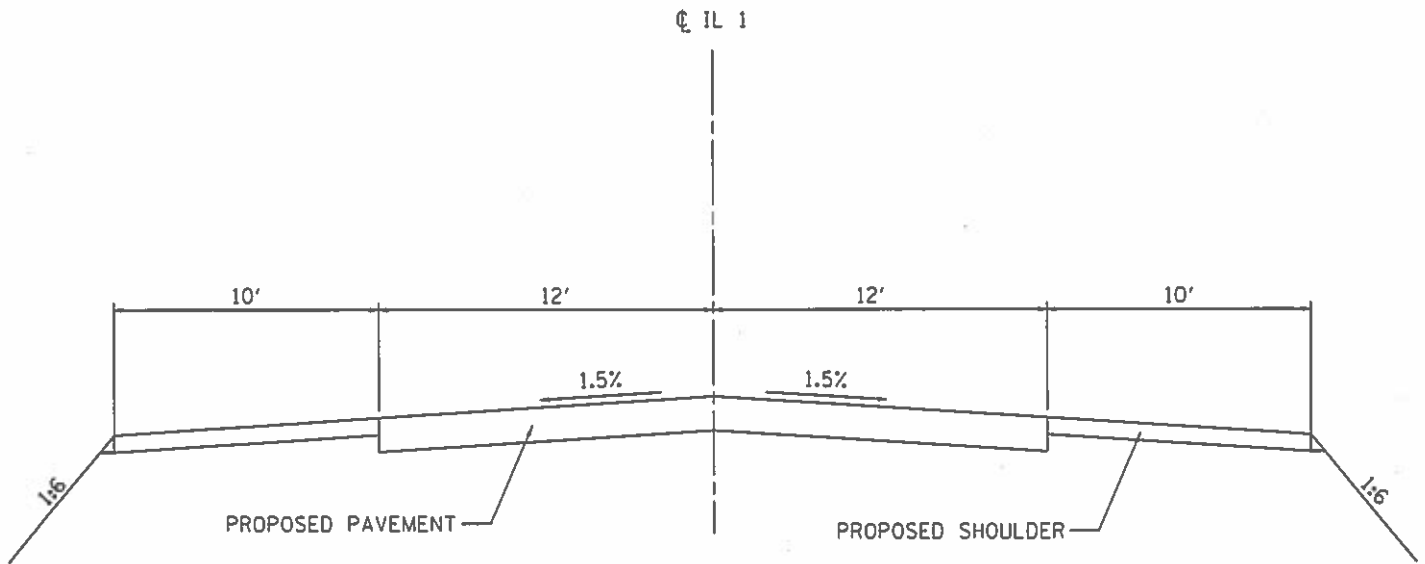
S:\STUDIES\Writers\Wastnik\038-0024 IL 1 CSX\Work\Pavement Design\COPY of IDOT Mechanistic Pavement Design with LCCA 090513.xlsm\LifeCycleCost



F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
332	12SB-FAGHBR	ILLINOIS		
STA.	TO STA.			
FED. ROAD DIST. NO. 3		ILLINOIS	FED. AID PROJECT	



EXISTING ROADWAY TYPICAL SECTION  
(LOOKING SOUTH)



PROPOSED ROADWAY TYPICAL SECTION