



Illinois Department of Transportation

To: Kensil A. Garnett Attn: Karen Dvorsky
From: Jack A. Elston By: Michael Brand *Michael Brand*
Subject: Pavement Design Approval
Date: May 3, 2021

Route: IL 8 Job No.: D-94-037-08
Section: (Z-1VB)BR-2 Contract No.: 68799
County: Peoria Target Letting:
Limits: over the BSNF Railroad near Edwards, IL

We have reviewed the pavement design for the above referenced project which was submitted on April 26, 2021. The project will replace the bridge over the BSNF Railroad and 8,587 square yards of pavement near Edwards, IL.

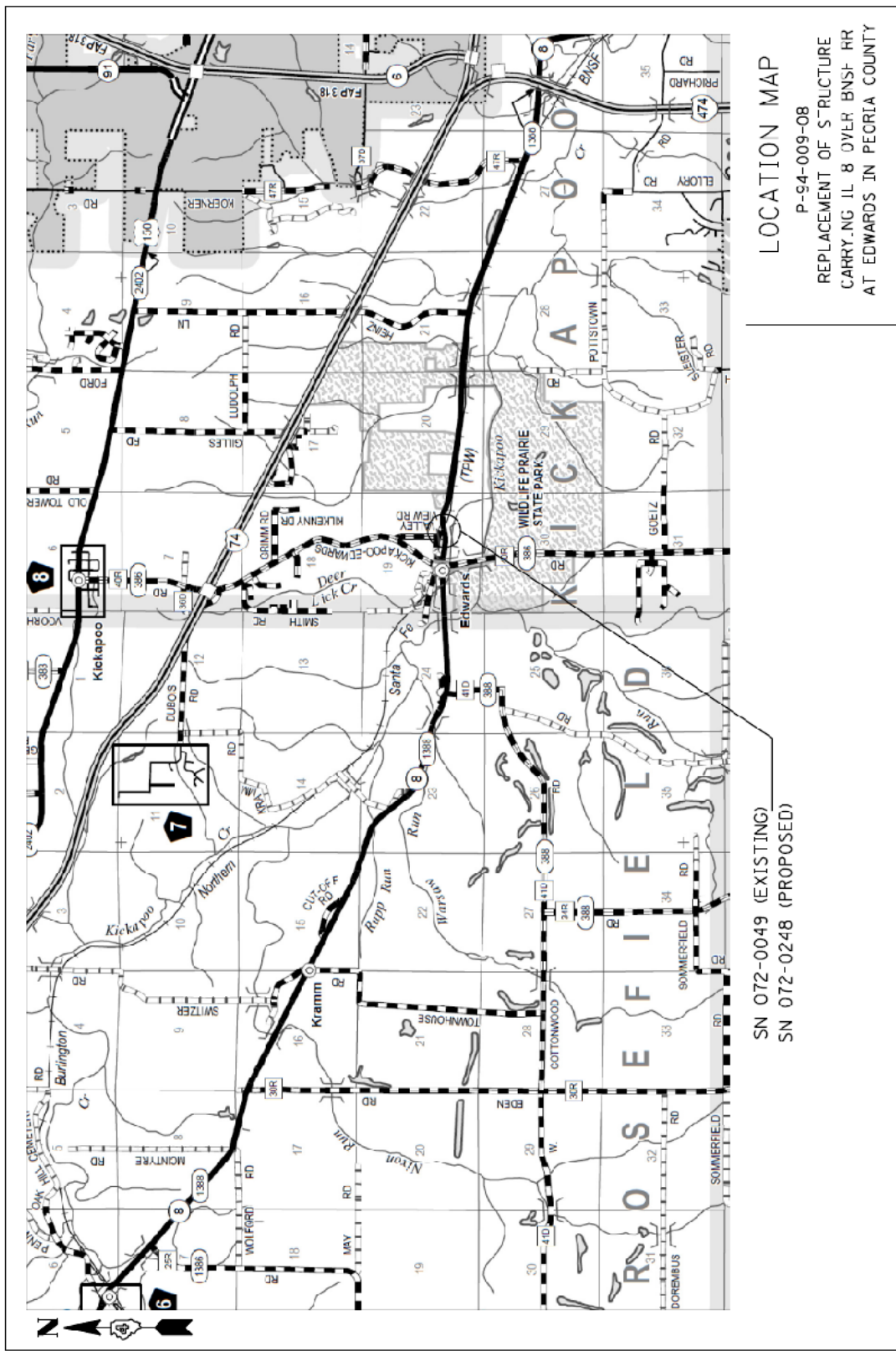
The pavement design resulted in two options: 10.25" full-depth HMA and 9" JPCP. The LCCA showed the two options to be within 10% of each other but due to the short length, alternate bidding was not considered. We concur with the District's recommendation to use HMA due to its lower cost to construct.

In summary, the approved pavement design is:

IL 8 - Pavement Replacement

10.25" Full-Depth HMA w/HMA Shoulders
12" Agg. Subgrade Improvement

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

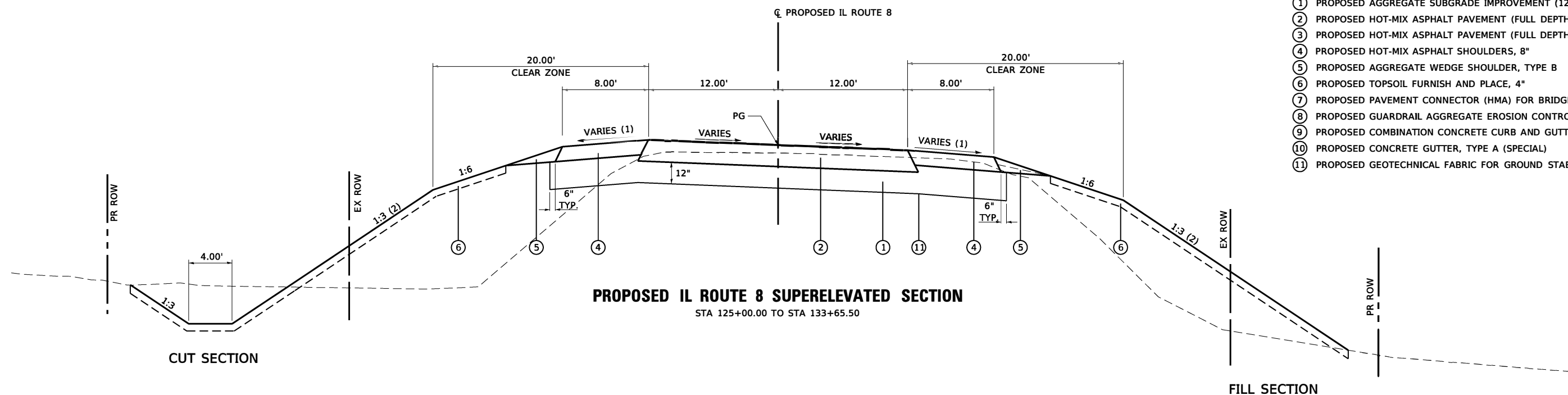


Results and Recommendations

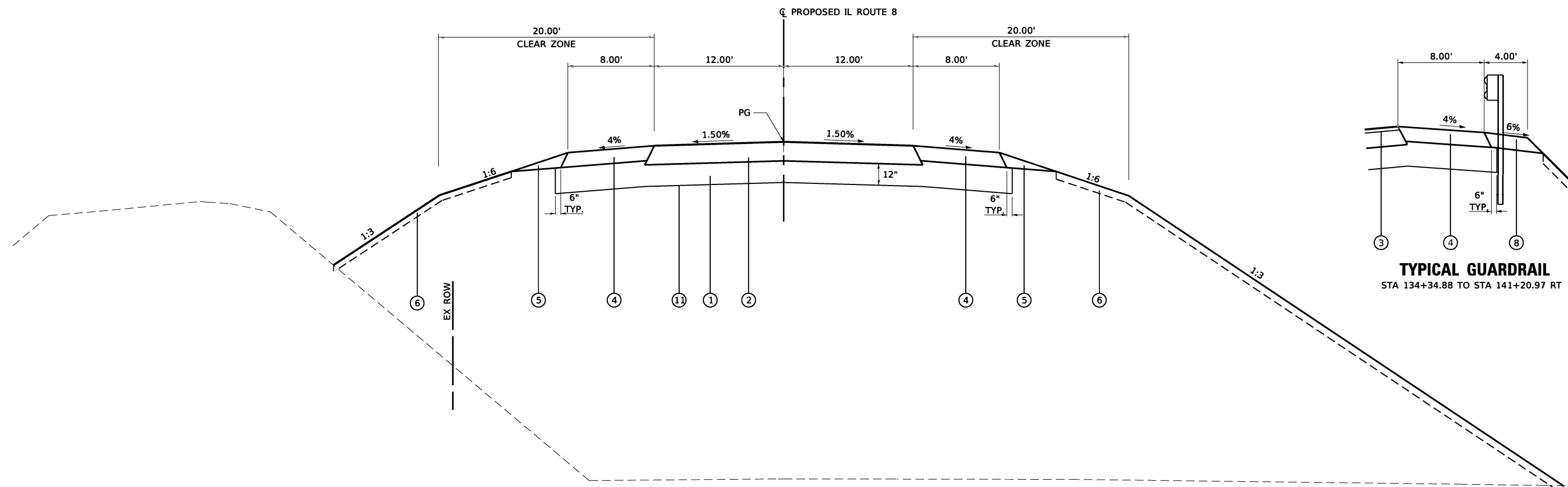
The proposed improvement consists of the replacement of structure carrying IL8 over BNSF RR with road reconstruction prior and after the structure. The project is 3,220 feet long and includes approximately 8,587 square yards of new pavement from station 125+00 to 160+70. Results from the life cycle cost analysis indicate that the annual cost per mile for 9" Jointed PCC Pavement is \$89,624 and \$81,440 for 10.25" Full Depth HMA Pavement. The difference between the two comes out to 10.0%. Considering both the annual cost per mile and the estimated initial construction costs, the District recommends using 10.25" Full Depth HMA Pavement: 2 inches of POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, MIX "E", N50, 2 inches of POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-9.5, N50, 6.25 inches of HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N50 and AGGREGATE SUBGRADE IMPROVEMENT 12". The project is less than 2 lane-miles and is not subject to alternate bidding.

LEGEND

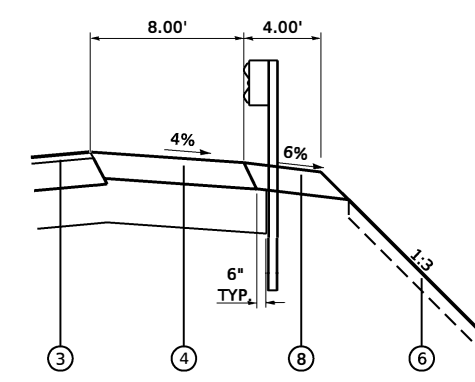
- ① PROPOSED AGGREGATE SUBGRADE IMPROVEMENT (12" AND VARIES)
- ② PROPOSED HOT-MIX ASPHALT PAVEMENT (FULL DEPTH), 10 1/4"
- ③ PROPOSED HOT-MIX ASPHALT PAVEMENT (FULL DEPTH), 6"
- ④ PROPOSED HOT-MIX ASPHALT SHOULDERS, 8"
- ⑤ PROPOSED AGGREGATE WEDGE SHOULDER, TYPE B
- ⑥ PROPOSED TOPSOIL FURNISH AND PLACE, 4"
- ⑦ PROPOSED PAVEMENT CONNECTOR (HMA) FOR BRIDGE APPROACH SLAB
- ⑧ PROPOSED GUARDRAIL AGGREGATE EROSION CONTROL
- ⑨ PROPOSED COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- ⑩ PROPOSED CONCRETE GUTTER, TYPE A (SPECIAL)
- ⑪ PROPOSED GEOTECHNICAL FABRIC FOR GROUND STABILIZATION



PROPOSED IL ROUTE 8 SUPERELEVATED SECTION
STA 125+00.00 TO STA 133+65.50



PROPOSED IL ROUTE 8 TANGENT SECTION
STA 133+65.50 TO STA 134+98.46



TYPICAL GUARDRAIL
STA 134+34.88 TO STA 141+20.97 RT

- (1) IF SUPER ELEVATION SLOPE EXCEEDS 4% THEN THE SHOULDER SLOPE SHALL BE ADJUSTED AS FOLLOWS:
HIGH SIDE: VARY THE SHOULDER SLOPE TO MAINTAIN A MAXIMUM 8% SLOPE BREAKOVER.
LOW SIDE: SHOULDER SLOPE SHALL MATCH SUPERELEVATION SLOPE.
- (2) SEE PLAN AND PROFILE SHEETS FOR DITCH PROFILE.
- (3) CLEAR ZONE ON OUTSIDE OF CURVE IS 30'.
- (4) SEE CROSS SECTIONS FOR DITCH WIDTH.

FILE NAME: S:\Projects\488-0024-1BD_IL_8_over_BNSF_Phase_1\Drawings\CADD_Sheets\0468799-ah-typical.dgn



USER NAME	+ Betsy
MODEL NAME	+ Typ 01
PLOT SCALE	+ 10.0000' / in.
PLOT DATE	+ 8/22/2019

DESIGNED	- JLS
DRAWN	- PDB
CHECKED	- ESW
DATE	-

REVISED	-
REVISED	-
REVISED	-
REVISED	-

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

PROPOSED TYPICAL SECTIONS IL ROUTE 8	
SCALE: 1"-5"	SHEET 1 OF 5 SHEETS

F.A.S. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1388	(Z-1VB)BR-2	PEORIA	235	19
CONTRACT NO. 68799				
ILLINOIS FED. AID PROJECT				

Pavement Design and Selection

Route: FAS 1388 (IL 8)
Section: (Z-1VB)BR-2
County: Peoria
Catalog No.: 03381-00D
Job No.: D-94-037-08

DESIGN DATA:

- Class II Road (Major Collector/Other Marked State Route)
- 2 Lanes – New Construction (Rural)
- Design Period = 20 years
- Estimated Construction Year = 2022
- Design Year = 2032
- Traffic Growth factor is 1.0% Annually

2019 TRAFFIC	2032 TRAFFIC Actual Structural Design Traffic
ADT = 2,050	ADT = 2,351
PV = 1,961	PV = 2,257
SU = 70	SU = 71
MU = 19	MU = 24

- Analysis of Mechanistic Full-Depth HMA vs. Hinge Jointed P.C. Pavement.
- Selection based on estimated life – cycle costs.

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: **FAS 1388 (IL 8)**
 Section: **(Z-1VB)BR-2**
 County: **Peoria**
 Location: **IL 8 over BNSF at Edwards**

Comments: **Contract Number: 68799**
D-94-037-08

Design Date: **02/19/2021** **AAD**
 Modify Date:

<-- BY	ADT	Year
Current:	2,050	2019
Future:	2,629	2044

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: **2022**
 Design Period (DP) = **20** years

	Structural Design Traffic			% of ADT in Design Lane
	Minimum ADT	Actual ADT	Actual % of Total ADT	
PV =	0	2,257	96.0%	P = 50%
SU =	250	71	3.0%	S = 50%
MU =	750	24	1.0%	M = 50%
Struct. Design ADT =	2,351	(2032)		

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RIGID PAVEMENT	
Cpv =	0.15	Cpv =	0.15
Csu =	112.06	Csu =	135.78
Cmu =	385.44	Cmu =	567.21
TF flexible (Actual) =	0.17 (Actual ADT)	TF rigid (Actual) =	0.23 (Actual ADT)
TF flexible (Min) =	3.17 (Min ADT Fig. 54-2.C)	TF rigid (Min) =	4.59 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement		JPC Pavement	
Use TF flexible =	3.17	Use TF rigid =	4.59
PG Grade Lower Binder Lifts =	PG 64-22 (Fig. 53-4.O)	Edge Support =	Tied Shoulder or C&G
HMA Mixture Temp. =	76.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. =	9.00 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) =	650 ksi (Fig. 54-5.D)	CRC Pavement	
Design HMA Strain (ε _{HMA}) =	86 (Fig. 54-5.E)	Use TF rigid =	4.59
Full Depth HMA Design Thickness =	10.25 in. (Fig. 54-5.F)	IBR value =	3
Limiting Strain Criterion Thickness =	15.25 in. (Fig. 54-5.I)	CRCP Thickness =	7.75 in. (Fig. 54-4.N)
Use Full-Depth HMA Thickness =	10.25 inches	TF MUST BE > 60 FOR CRCP	

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Pavement Over Rubblized PCC		Unbonded Concrete Overlay	
Use TF flexible =	3.17	Review 54-4.03 for limitations and special considerations.	
HMA Overlay Design Thickness =	7.50 in. (Fig. 54-5.U)	JPCP Thickness =	NA inches
Limiting Strain Criterion Thickness =	11.00 in. (Fig. 54-5.V)	CONTACT RESEARCH FOR ASSISTANCE	
Use HMA Overlay Thickness =	7.50 inches		

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 **FAS 1388 (IL 8)**
 SECTION **(Z-1VB)BR-2**
 COUNTY **Peoria**
 LOCATION **IL 8 over BNSF at Edwards**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **3220** FT == > 0.61 Miles
 # OF CENTERLINES **1** CL
 # OF LANES **2** LANES
 # OF EDGES **2** EP
 LANE WIDTH - AVERAGE **12** FT
 SHOULDER WIDTH HMA Left **8** FT
 HMA Right **8** FT
 Total Width of Paved Shoulders **16** FT

PAVEMENT THICKNESS (FLEXIBLE) **10.25** IN **15.25** IN MAX
 SHOULDER THICKNESS **8.00** IN HMA_SD **Standard Design**
 HMA OVERLAY THICKNESS **2.00** IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		3.17	0.17	3.17

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HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$101.70 / TON
HMA TOP BINDER	\$99.40 / TON
HMA LOWER BINDER	\$83.00 / TON
HMA BINDER (IL-9.5FG or IL-4.75)	/ TON
HMA SHOULDER	\$35.75 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(10.25")	8587	8,587 SQ YD	\$53.56 / SQ YD	\$0
HMA SURFACE COURSE	(2.00")	1.0069	968 TONS	\$101.70 / TON	\$98,485 ~
HMA TOP BINDER COURSE	(2.25")	1.0217	1,105 TONS	\$99.40 / TON	\$109,877 ~
HMA LOWER BINDER COURSE	(6.00")	1.0503	3,030 TONS	\$83.00 / TON	\$251,521 ~
HMA SHOULDER	(8.00")	5724	5,724 SQ YD *	\$35.75 / SQ YD	\$204,649 ~
CURB & GUTTER			0 LIN FT	/ LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)			238 TONS	\$22.00 / TON	\$5,236
IMPROVED SUBGRADE: Modified Soil Width = 42.7'			15,280 SQ YD	\$17.70 / SQ YD	\$270,456
Reserved For User Supplied Item			0 UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item			0 UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL			8,587 SQ YD	\$0.00 / SQ YD	\$0
SHOULDER REMOVAL			5,724 SQ YD	\$0.00 / SQ YD	\$0

Note: * Denotes User Supplied Quantity
 FLEXIBLE CONSTRUCTION INITIAL COST \$940,224
 FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$62,880

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	\$11.47 / SQ YD
HMA OVERLAY PVMT	(2.00")	1.0069 Surface Mix	2.00	\$11.47 / SQ YD
HMA SURFACE MIX	(2.00")	1.0069 Surface Mix	2.00	\$11.47 / SQ YD
HMA BINDER MIX	(0.00")	1.0139 4.75 Binder Mix	0.00	\$0.00 / SQ YD
HMA OVERLAY SHLD (Year 30)	(2.00")	Shoulder Mix	2.00	\$4.00 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	2.00	\$4.00 / SQ YD
MILLING (2.00 IN)			2.00	\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	2.00	\$81.39 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	2.00	\$74.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00 ")		Binder Mix	2.00	\$70.00 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00 ")		Shoulder Mix	2.00	\$74.00 / 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 \$1,217,753
 FLEXIBLE TOTAL ANNUAL COST PER MILE \$81,440

FULL-DEPTH HMA PAVEMENT
 HMA PAVEMENT OVER 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%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.10%	9	SQ YD	\$81.39	\$733		
	PWFn =	0.8626		PW =	0.8626 X	\$27,137	\$23,409	
YEAR 10								
	LONG SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.50%	43	SQ YD	\$81.39	\$3,500		
	PWFn =	0.7441		PW =	0.7441 X	\$29,904	\$22,251	
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	14,311	SQ YD	\$3.00	\$42,933		
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	86	SQ YD	\$70.00	\$6,020		
	HMA OVERLAY PVMT 2.00"	100.00%	8,587	SQ YD	\$11.47	\$98,485		
	HMA OVERLAY SHLD 2.00 "	100.00%	5,724	SQ YD	\$4.00	\$22,921		
	PWFn =	0.6419		PW =	0.6419 X	\$170,359	\$109,347	
YEAR 20								
	LONG SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.10%	9	SQ YD	\$81.39	\$733		
	PWFn =	0.5537		PW =	0.5537 X	\$27,137	\$15,025	
YEAR 25								
	LONG SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.50%	43	SQ YD	\$81.39	\$3,500		
	PWFn =	0.4776		PW =	0.4776 X	\$29,904	\$14,282	
HMA SD								
YEAR 30 NON-INTERSTATE								
	MILL PVMT & SHLD 2.00"	100.00%	14,311	SQ YD	\$3.00	\$42,933		
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	172	SQ YD	\$70.00	\$12,040		
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	57	SQ YD	\$74.00	\$4,218		
	HMA OVERLAY PVMT 2.00 "	100.00%	8,587	SQ YD	\$11.47	\$98,485		
	HMA OVERLAY SHLD 2.00 "	100.00%	5,724	SQ YD	\$4.00	\$22,921		
	PWFn =	0.4120		PW =	0.4120 X	\$180,597	\$74,404	
YEAR 35								
	LONG SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.10%	9	SQ YD	\$81.39	\$733		
	PWFn =	0.3554		PW =	0.3554 X	\$27,137	\$9,644	
YEAR 40								
	LONG SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880		
	CNTR LINE JOINT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440		
	RNDM / THRM CRACK R&S	50.00%	3,542	LIN FT	\$2.00	\$7,084		
	PD PVMT PATCH M&F SURF	0.50%	43	SQ YD	\$81.39	\$3,500		
	PWFn =	0.3066		PW =	0.3066 X	\$29,904	\$9,167	
							\$277,529	
ROUTINE MAINTENANCE ACTIVITY				1.22 Lane Miles	0.00	\$0	\$0	
							MAINTENANCE LIFE-CYCLE COST	\$277,529
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE				\$18,560	

PCC PAVEMENT

JPCP

ROUTE **FAS 1388 (IL 8)**
 SECTION **(Z-1VB)BR-2**
 COUNTY **Peoria**
 LOCATION **IL 8 over BNSF at Edwards**

FACILITY TYPE **NON-INTERSTATE**

PROJECT LENGTH **3220 FT ==>** 0.61 Miles
 # OF CENTERLINES **1 CL**
 # OF LANES **2 LANES**
 # OF EDGES **2 EP**
 LANE WIDTH - AVERAGE **12 FT**
 SHOULDER WIDTH PCC Left **8 FT**
 PCC Right **8 FT**
 Total Width of Paved Shoulders **16 FT**

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

HMA OVERLAY THICKNESS **2.75 IN**

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		4.59	0.23	4.59
Worksheet Construction Type is	Reconstruction	The Pavement Type is		JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(9.00")	8,587	SQ YD	\$58.40 / SQ YD	\$501,481
PAVEMENT REINFORCEMENT		0	SQ YD	/ SQ YD	\$0
STABILIZED SUBBASE	(4.00")	9,660	SQ YD	\$18.65 / SQ YD	\$180,159
PCC SHOULDERS		5,724	SQ YD	\$40.40 / SQ YD	\$231,250
CURB & GUTTER		0	LIN FT	/ LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 1.80")	698	TONS	\$18.50 / TON	\$12,913
IMPROVED SUBGRADE:	Modified Soil Width = 41.0'	14,669	SQ YD	\$18.30 / SQ YD	\$268,443
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		8,587	SQ YD	\$0.00 / SQ YD	\$0
SHOULDER REMOVAL		5,724	SQ YD	\$0.00 / SQ YD	\$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	\$1,194,246
RIGID CONSTRUCTION ANNUAL COST PER MILE	\$79,868

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 / LANE-MILE / YEAR
HMA OVERLAY	(2.75")		2.75	
HMA OVERLAY PAVEMENT	(2.75")	1.0095	2.75	\$8.59 / SQ YD
HMA SURFACE MIX	(1.50")	1.0052	Surface Mix 1.50	\$8.59 / SQ YD
HMA BINDER MIX	(1.25")	1.0148	4.75 Binder Mix 1.25	\$0.00 / SQ YD
HMA OVERLAY SHOULDER	(2.75")		Shoulder Mix 2.75	\$5.51 / 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 PVM T PATCH (Mill & Fill HMA Surf)		Surface Mix	1.50	\$78.54 / SQ YD
PARTIAL DEPTH PVM T PATCH (Mill & Fill HMA 2.75")		Surface Mix	2.75	\$85.66 / 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	\$1,340,123
RIGID TOTAL ANNUAL COST PER MILE	\$89,624

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%	9	SQ YD	\$150.00	\$1,350	
		PWFn = 0.7441			PW = 0.7441 X	\$1,350	\$1,005
YEAR 15							
	PAVEMENT PATCH CLASS B	0.20%	17	SQ YD	\$150.00	\$2,550	
		PWFn = 0.6419			PW = 0.6419 X	\$2,550	\$1,637
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	172	SQ YD	\$150.00	\$25,800	
	SHOULDER PATCH CLASS C	0.50%	29	SQ YD	\$145.00	\$4,205	
	LONGITUDINAL SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880	
	CENTERLINE JT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440	
		PWFn = 0.5537			PW = 0.5537 X	\$49,325	\$27,310
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	258	SQ YD	\$150.00	\$38,700	
	SHOULDER PATCH CLASS C	1.00%	57	SQ YD	\$145.00	\$8,265	
		PWFn = 0.4776			PW = 0.4776 X	\$46,965	\$22,431
YEAR 30 NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	343	SQ YD	\$150.00	\$51,450	
	SHOULDER PATCH CLASS C	1.50%	86	SQ YD	\$145.00	\$12,470	
	HMA OVERLAY 2.75" (PVMT)	100.00%	8,587	SQ YD	\$8.59	\$73,736	
	HMA OVERLAY 2.75" (SHLD)	100.00%	5,724	SQ YD	\$5.51	\$31,516	
		PWFn = 0.4120			PW = 0.4120 X	\$169,172	\$69,697
YEAR 35 NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880	
	CENTERLINE JT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440	
	RANDOM CRACK R&S	50.00%	3,220	LIN FT	\$2.00	\$6,440	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	2,064	LIN FT	\$2.00	\$4,128	
	PD PVMT PATCH M&F HMA 2.75"	0.10%	9	SQ YD	\$85.66	\$771	
		PWFn = 0.3554			PW = 0.3554 X	\$30,659	\$10,896
YEAR 40 NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	43	SQ YD	\$150.00	\$6,450	
	LONGITUDINAL SHLD JT R&S	100.00%	6,440	LIN FT	\$2.00	\$12,880	
	CENTERLINE JT R&S	100.00%	3,220	LIN FT	\$2.00	\$6,440	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	3,096	LIN FT	\$2.00	\$6,192	
	RANDOM CRACK R&S	50.00%	3,220	LIN FT	\$2.00	\$6,440	
	PD PVMT PATCH M&F HMA 2.75"	0.50%	43	SQ YD	\$85.66	\$3,683	
		PWFn = 0.3066			PW = 0.3066 X	\$42,085	\$12,901
							\$145,877
	ROUTINE MAINTENANCE ACTIVITY		1.22	Lane Miles	\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$145,877
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$9,756

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 2/19/21 12:35 PM

				JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH		\$1,194,246	\$940,224
		ANNUAL COST PER MILE		\$79,868	\$62,880
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH		\$145,877	\$277,529
		ANNUAL COST PER MILE		\$9,756	\$18,560
TOTAL	LIFE-CYCLE COST	PRESENT WORTH		\$1,340,123	\$1,217,753
		ANNUAL COST PER MILE		\$89,624	\$81,440

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	HMA	\$81,440	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	JPCP	\$89,624	10.0%