



Illinois Department of Transportation

To: Paul Loete, P.E Attn: District Two
From: John Baranzelli 
Subject: Pavement Design
Date: December 12, 2013

FAI Route 80 (I-80)
Henry & Rock Island Counties
Over BN&SF RR, Barstow Road and Green River

The project, submitted to BDE by memo dated November 26, 2013, will replace the structures over the BN&SF Railroad, Barstow Road and Green River. The pavement design yielded a traffic factor = 85.79. The BDE Manual recommends using CRCP when the traffic factor exceeds 60. The District has requested to use CRCP between structures and for the bridge approaches. Outside the structures, HMA resurfacing will be placed from 0.8 miles north of IL 5/IL 92 to the Henry County Line.

BDE concurs with the proposed pavement design. The approved pavement design is as follows:

I-80 BN&SF RR, Barstow Road and Green River
(Pavement Reconstruction)

12.25 inches of CRC Pavement with PCC Shoulders
4 inches of Stabilized Sub-Base
12 inches of Aggregate Subgrade Improvement

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.



Job Number: FAI Route 80 (I-80)
 Sections: 37-1BR-1, 81-1VBR & 81-1HBR-1
 County: Henry and Rock Island
 Job Number: P-92-143-05
 Construction Number: C-92-010-13
 Contract Number: 64B78
 PTB: 152/19
 Consultant: Hutchison Engineering, Inc.
 Description: I-80: Remove and replace structures over the Green River
 Old: SN 037-0025 SN 037-0026
 New: SN 037-0179 SN 037-0180
 I-80: Remove and replace structures over the BN&SF railroad
 Old: SN 081-0014 SN 081-0015
 New: SN 081-0197 SN 081-0198
 I-80: Remove and replace structures over Barstow Road
 Old: SN 081-0016 SN 081-0017
 New: SN 081-0199 SN 081-0200
 Hot-Mix Asphalt resurfacing on I-80 from 0.8 mile north of IL 5/IL 92
 to the Henry County line.
 Letting: June 12, 2015
 Submittal: March 13, 2015

PROJECT AND TRAFFIC INPUTS				(Enter Data in Gray Shaded Cells)				
Route: FAI Route 80	Comments:							
Section: 37-1BR-1.81-1VBR & 81-1HBR-1								
County: Rock Island & Henry	Design Date: 11/20/2013	JDL	<-- BY					
Location: Green River, BarstowRd & BNSF RR	Modify Date:		<-- BY				ADT	Year
Facility Type: Interstate or Freeway	# of Lanes = 4		Current:	23,600	2013			
			Future:	42,700	2033			
Road Class: I			Structural Design Traffic					
Subgrade Support Rating (SSR): Poor			Minimum ADT	Actual ADT	Actual % of Total ADT	% of ADT in Design Lane		
Construction Year: 2015			PV = 0	19,984	57.0%	P = 32%		
Design Period (DP) = 20 years			SU = 500	1,753	5.0%	S = 45%		
			MU = 1500	13,323	38.0%	M = 45%		
			Struct. Design ADT = 35,060 (2025)					

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

C_{pv} = 0.15
 C_{su} = **132.5**
 C_{mu} = **482.53**
 TF flexible (Actual) = 59.97 (Actual ADT)
 TF flexible (Min) = 7.11 (Min ADT Fig. 54-2.C)

RIGID PAVEMENT

C_{pv} = 0.15
 C_{su} = **143.81**
 C_{mu} = **696.42**
 TF rigid (Actual) = 85.79 (Actual ADT)
 TF rigid (Min) = 10.05 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 59.97	Use TF rigid = 85.79
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 75.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 11.50 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 680 ksi (Fig. 54-5.D)	
Design HMA Strain (ε _{HMA}) = 37 (Fig. 54-5.E)	CRCP Pavement
Full Depth HMA Design Thickness = 17.25 in. (Fig. 54-5.F)	Use TF rigid = 85.79
Limiting Strain Criterion Thickness = 15.00 in. (Fig. 54-5.I)	IBR value = 3
Use Full-Depth HMA Thickness = 15.00 inches	CRCP Thickness = 12.25 in. (Fig. 54-4.M)

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 59.97	Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 14.75 in. (Fig. 54-5.U)	
Limiting Strain Criterion Thickness = 11.00 in. (Fig. 54-5.V)	
Use HMA Overlay Thickness = 11.00 inches	CRCP Thickness = 11.25 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	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 One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

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

LSC Design

ROUTE SECTION COUNTY LOCATION
FAI Route 80
37-1BR-1,81-1VBR & 81-1HBR-1
Rock Island & Henry
Green River, BarstowRd & BNSF RR

FACILITY TYPE **INTERSTATE**

PROJECT LENGTH **4427 FT ==>** 0.84 Miles
 # OF CENTERLINES **2 CL**
 # OF LANES **4 LANES**
 # OF EDGES **4 EP**
 LANE WIDTH - AVERAGE **12 FT**
 SHOULDER WIDTH HMA Inside **6 FT**
 HMA Outside **10 FT**
 Total Width of Paved Shoulders **32 FT**

PAVEMENT THICKNESS (FLEXIBLE) **15.00 IN** **15.00 IN MAX**
 SHOULDER THICKNESS **8.00 IN** **HMA 2.00" LSC Design**
 POLICY OVERLAY THICKNESS **2.00 IN**

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		7.11	59.97	59.97

Read Me!

HMA	COST PER TON	UNIT PRICE
HMA SURFACE		\$95.00 / TON
HMA TOP BINDER		\$95.00 / TON
HMA LOWER BINDER		\$80.00 / TON
HMA BINDER (LEVELING)		\$85.00 / TON
HMA SHOULDER		\$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(15.00")	23,611	sq YD	\$74.32 / SQ YD	\$1,754,808 ~
HMA SURFACE COURSE	(2.00")	2,663	TONS	\$95.00 / TON	\$0
HMA TOP BINDER COURSE	(2.25")	3,040	TONS	\$95.00 / TON	\$0
HMA LOWER BINDER COURSE	(10.75")	15,164	TONS	\$80.00 / TON	\$0
HMA SHOULDER	(8.00")	7,052	TONS	\$72.00 / TON	\$507,724 ~
CURB & GUTTER		0	LIN FT	\$30.00 / LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)		4,989	TONS	\$25.00 / TON	\$124,725
IMPROVED SUBGRADE:	Modified Soil	42,794	sq YD	\$7.00 / sq YD	\$299,558
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 / UNITS	\$0
PAVEMENT REMOVAL		23,611	sq YD	\$0.00 / sq YD	\$0
SHOULDER REMOVAL		15,740	sq YD	\$0.00 / sq YD	\$0

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST \$2,686,815
 FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE \$130,697

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	\$10.71 / SQ YD
HMA OVERLAY PVMT	(2.00")	Surface Mix	\$10.71 / SQ YD
HMA SURFACE MIX	(2.00")	Surface Mix	\$10.71 / SQ YD
HMA BINDER MIX	(0.00")	Leveling Binder Mix	\$0.00 / SQ YD
HMA OVERLAY SHLD (Year 30)	(2.00")	Shoulder Mix	\$8.06 / SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	\$8.06 / SQ YD
MILLING (2.00 IN)			\$3.00 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	\$80.64 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	\$78.06 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	\$79.52 / SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	\$78.06 / 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 \$3,501,685
 FLEXIBLE TOTAL ANNUAL COST PER MILE \$170,335

FULL-DEPTH HMA PAVEMENT
 HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
 Figure 54-7.C
 LIMITING STRAIN CRITERION DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.10%	24	SQ YD	\$80.64	\$1,935	
	PWFn = 0.8626		PW = 0.8626 X			\$74,537	\$64,296
YEAR 10							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.50%	118	SQ YD	\$80.64	\$9,516	
	PWFn = 0.7441		PW = 0.7441 X			\$82,118	\$61,104
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	39,351	SQ YD	\$3.00	\$118,053	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	236	SQ YD	\$79.52	\$18,767	
	HMA OVERLAY PVMT 2.00"	100.00%	23,611	SQ YD	\$10.71	\$252,962	
	HMA OVERLAY SHLD 2.00"	100.00%	15,740	SQ YD	\$8.06	\$126,931	
	PWFn = 0.6419		PW = 0.6419 X			\$516,713	\$331,658
YEAR 20							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.10%	24	SQ YD	\$80.64	\$1,935	
	PWFn = 0.5537		PW = 0.5537 X			\$74,537	\$41,269
YEAR 25							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.50%	118	SQ YD	\$80.64	\$9,516	
	PWFn = 0.4776		PW = 0.4776 X			\$82,118	\$39,220
HMA_LSCD INTERSTATE							
YEAR 30							
	MILL PVMT & SHLD 2.00"	100.00%	39,351	SQ YD	\$3.00	\$118,053	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	472	SQ YD	\$79.52	\$37,533	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	157	SQ YD	\$78.06	\$12,256	
	HMA OVERLAY PVMT 2.00"	100.00%	23,611	SQ YD	\$10.71	\$252,962	
	HMA OVERLAY SHLD 2.00"	100.00%	15,740	SQ YD	\$8.06	\$126,931	
	PWFn = 0.4120		PW = 0.4120 X			\$547,735	\$225,660
YEAR 35							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.10%	24	SQ YD	\$80.64	\$1,935	
	PWFn = 0.3554		PW = 0.3554 X			\$74,537	\$26,489
YEAR 40							
	LONG SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CNTR LINE JOINT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RNDM / THRM CRACK R&S	50.00%	9,739	LIN FT	\$2.00	\$19,478	
	PD PVMT PATCH M&F SURF	0.50%	118	SQ YD	\$80.64	\$9,516	
	PWFn = 0.3066		PW = 0.3066 X			\$82,118	\$25,174
							\$814,870
ROUTINE MAINTENANCE ACTIVITY			3.35 Lane Miles	0.00	0	\$0	
							MAINTENANCE LIFE-CYCLE COST \$814,870
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE			\$39,638	

PCC PAVEMENT

CRCP

ROUTE **FAI Route 80**
 SECTION **37-1BR-1,81-1VBR & 81-1HBR-1**
 COUNTY **Rock Island & Henry**
 LOCATION **Green River, BarstowRd & BNSF RR**

FACILITY TYPE **INTERSTATE**

PROJECT LENGTH **4427 FT ==> 0.84 Miles**
 # OF CENTERLINES **2 CL**
 # OF LANES **4 LANES**
 # OF EDGES **4 EP**
 LANE WIDTH - AVERAGE **12 FT**
 SHOULDER WIDTH **PCC Inside 6 FT**
 PCC Outside 10 FT
 Total Width of Paved Shoulders **32 FT**

PAVEMENT THICKNESS (RIGID) **CRCP 12.25 IN TIED SHLD**
 SHOULDER THICKNESS **12.25 IN**

POLICY OVERLAY THICKNESS **3.75 IN**

RIGID PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		10.05	85.79	85.79
Worksheet Construction Type is	Reconstruction		The Pavement Type is	CRCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
CRC PAVEMENT	(12.25")	23,611	SQ YD	\$50.00 /SQ YD	\$1,180,550
PAVEMENT REINFORCEMENT		23,611	SQ YD	\$22.00 /SQ YD	\$519,442
STABILIZED SUBBASE	(4.00")	26,562	SQ YD	\$19.00 /SQ YD	\$504,678
PCC SHOULDERS	(12.25" to 12.25")	15,740	SQ YD	\$40.00 /SQ YD	\$629,600
CURB & GUTTER		0	LIN FT	\$30.00 /LIN FT	\$0
SUBBASE GRAN MATL TY C	(~ 3.48")	1,852	TONS	\$25.00 /TON	\$46,300
IMPROVED SUBGRADE:	Modified Soil (Width = 22.0')	40,335	SQ YD	\$7.00 /SQ YD	\$282,345
Reserved For User Supplied Item		0	UNITS	\$0.00 /UNITS	\$0
Reserved For User Supplied Item		0	UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL		23,611	SQ YD	\$0.00 /SQ YD	\$0
SHOULDER REMOVAL		15,740	SQ YD	\$0.00 /SQ YD	\$0

Note: * Denotes User Supplied Quantity
 RIGID CONSTRUCTION INITIAL COST **\$3,162,915**
 RIGID CONSTRUCTION ANNUAL COST PER MILE **\$153,856**

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	UNIT COST
ROUTINE MAINTENANCE ACTIVITY			\$0.00 /LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")		\$195.00 /SQ YD
HMA POLICY OVERLAY PVMT	(3.75")		\$150.00 /SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	\$8.02 /SQ YD
HMA BINDER MIX	(2.25")	Top Binder Mix	\$12.19 /SQ YD
HMA POLICY OVERLAY SHLD	(3.75")	Shoulder Mix	\$15.12 /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	\$77.98 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface Mix	\$77.98 /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 **\$3,654,712**
 RIGID TOTAL ANNUAL COST PER MILE **\$177,779**

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
 UNBONDED CONTINUOUSLY REINFORCED CONCRETE OVERLAY
 Figure 54-7.B

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10							
	PAVEMENT PATCH CLASS A	0.10%	24	SQ YD	\$195.00	\$4,680	
		PWF _n = 0.7441			PW = 0.7441 X	\$4,680	\$3,482
YEAR 15							
	PAVEMENT PATCH CLASS A	0.20%	47	SQ YD	\$195.00	\$9,165	
		PWF _n = 0.6419			PW = 0.6419 X	\$9,165	\$5,883
YEAR 20							
	PAVEMENT PATCH CLASS A	0.50%	118	SQ YD	\$195.00	\$23,010	
	LONGITUDINAL SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CENTERLINE JT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
		PWF _n = 0.5537			PW = 0.5537 X	\$76,134	\$42,154
YEAR 25							
	PAVEMENT PATCH CLASS A	0.75%	177	SQ YD	\$195.00	\$34,515	
	SHOULDER PATCH CLASS C	0.50%	79	SQ YD	\$145.00	\$11,455	
		PWF _n = 0.4776			PW = 0.4776 X	\$45,970	\$21,956
YEAR 30 INTERSTATE							
	PAVEMENT PATCH CLASS A	3.00%	708	SQ YD	\$195.00	\$138,060	
	SHOULDER PATCH CLASS C	1.00%	157	SQ YD	\$145.00	\$22,765	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%	23,611	SQ YD	\$20.21	\$477,166	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	15,740	SQ YD	\$15.12	\$237,995	
		PWF _n = 0.4120			PW = 0.4120 X	\$875,986	\$360,895
YEAR 35							
	LONGITUDINAL SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CENTERLINE JT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RANDOM CRACK R&S	50.00%	8,854	LIN FT	\$2.00	\$17,708	
	PD PVMT PATCH M&F HMA SURF	0.10%	24	SQ YD	\$77.98	\$1,872	
		PWF _n = 0.3554			PW = 0.3554 X	\$72,704	\$25,838
YEAR 40							
	LONGITUDINAL SHLD JT R&S	100.00%	17,708	LIN FT	\$2.00	\$35,416	
	CENTERLINE JT R&S	100.00%	8,854	LIN FT	\$2.00	\$17,708	
	RANDOM CRACK R&S	50.00%	8,854	LIN FT	\$2.00	\$17,708	
	PAVEMENT PATCH CLASS A	0.50%	118	SQ YD	\$195.00	\$23,010	
	PD PVMT PATCH M&F HMA SURF	0.50%	118	SQ YD	\$77.98	\$9,202	
		PWF _n = 0.3066			PW = 0.3066 X	\$103,044	\$31,589
							\$491,797
	ROUTINE MAINTENANCE ACTIVITY		3.35 Lane Miles		\$0.00	\$0	\$0
							MAINTANANCE LIFE-CYCLE COST \$491,797
45	YEAR LIFE CYCLE	CRF _n = 0.0407852					MAINTANANCE ANNUAL COST PER MILE \$23,923

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 11/20/13 1:58 PM

			CRCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$3,162,915	\$2,686,815
		ANNUAL COST PER MILE	\$153,856	\$130,697
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$491,797	\$814,870
		ANNUAL COST PER MILE	\$23,923	\$39,638
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$3,654,712	\$3,501,685
		ANNUAL COST PER MILE	\$177,779	\$170,335

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=====>	HMA	\$170,335	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	CRCP	\$177,779	4.4%