Illinois Department of Transportation

To:	Jeffery P. Meyers	Attn: Greg Jamerson
From:	Jack A. Elston	By: Mike Brand
Subject:	Pavement Design Approval	
Date:	October 2, 2020	

Route:	I-57	Job No.:	
Section:	(15-22HB-4)BR (15-22)R	Contract No.:	74435
County:	Coles	Target Letting:	June 2022
Limits:	IL 16 Interchange East of Mattoon		

The Pavement Selection Committee has reviewed the pavement design for the above referenced project which was most recently submitted on July 20, 2020. The project will reconstruct the I-57/IL 16 interchange and the work will include: replacement of the I-57 structures over IL 16, raising them approximately 3 feet; and reconstruction of the clover leaf interchange to a diamond interchange with roundabout intersections on IL 16.

The design for the I-57 mainline pavement compared 16” full-depth HMA and 11” JPCP. The LCCA for these pavements showed the two options to be within 10% of each other; but in lieu of alternate bidding, the committee agreed with the choice of HMA to match the surface of the adjacent mainline pavement and to better facilitate construction of the grade raise to match the new bridges.

The design for the interchange ramp pavements compared 10.5” full depth HMA and 9” JCPC. The LCCA for these pavements showed the HMA options to be 14.6% less expensive and the committee agreed with this selection due to the cost and for continuity with the HMA pavement of the I-57 mainline.

The design for the IL 16 mainline pavement compared 11.25” full-depth HMA and 9” JPCP. The LCCA for these pavements showed the HMA option to be 13.6% less expensive but the committee agreed with the selection of JPCP due to the high stress of turning vehicles at the roundabouts.

In summary, the approved pavement designs are:

I-57 Mainline	Interchange Ramps	IL 16
16” Full-Depth HMA	10.5” Full-Depth HMA	9” JPCP
12” Improved Subgrade	12” Improved Subgrade	4” Stabilized Subbase
		12” Improved Subgrade

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

Illinois Department of Transportation

To:	Jack Elston	Attn:	Michael Brand
From:	Jeffery P. Myers	By:	Kaleb Hirtzel
Subject:	Pavement Design		
Date:	July 20, 2020		

FAI-57 (I-57)
Section (15-22HB-4)BR (15-22)R
IL 16 Interchange East of Mattoon
Coles County
74435

We have completed the pavement analysis of the above referenced project. Review by BDE is required since the total pavement area exceeds 4,750 Sq Yd and the pavement costs exceed $500,000.

This project consists of the reconstruction of the I-57/IL 16 interchange located just east of Mattoon. Involved in this project is the replacement of the I-57 structures over IL 16 and raising them approximately 3 feet. As part of the reconstruction the clover leaf interchange, which does not meet current design policies, is proposed to be replaced with a diamond interchange and a raindrop roundabout on IL 16. This configuration change will require new ramps to be constructed and the IL 16 pavement to be re-aligned. For your reference a preliminary plan view of the new configuration has been attached. As a result, we are proposing new pavements for I-57, the interchange ramps and IL 16.

For this project the following pavement designs were considered:

I-57: 16” Full-Depth Hot-Mix Asphalt Pavement
11” Jointed Plain Concrete Pavement

Ramps: 10 ½” Full-Depth Hot-Mix Asphalt Pavement
9” Jointed Plain Concrete Pavement

IL 16: 11 ¼” Full-Depth Hot-Mix Asphalt Pavement
9” Jointed Plain Concrete Pavement

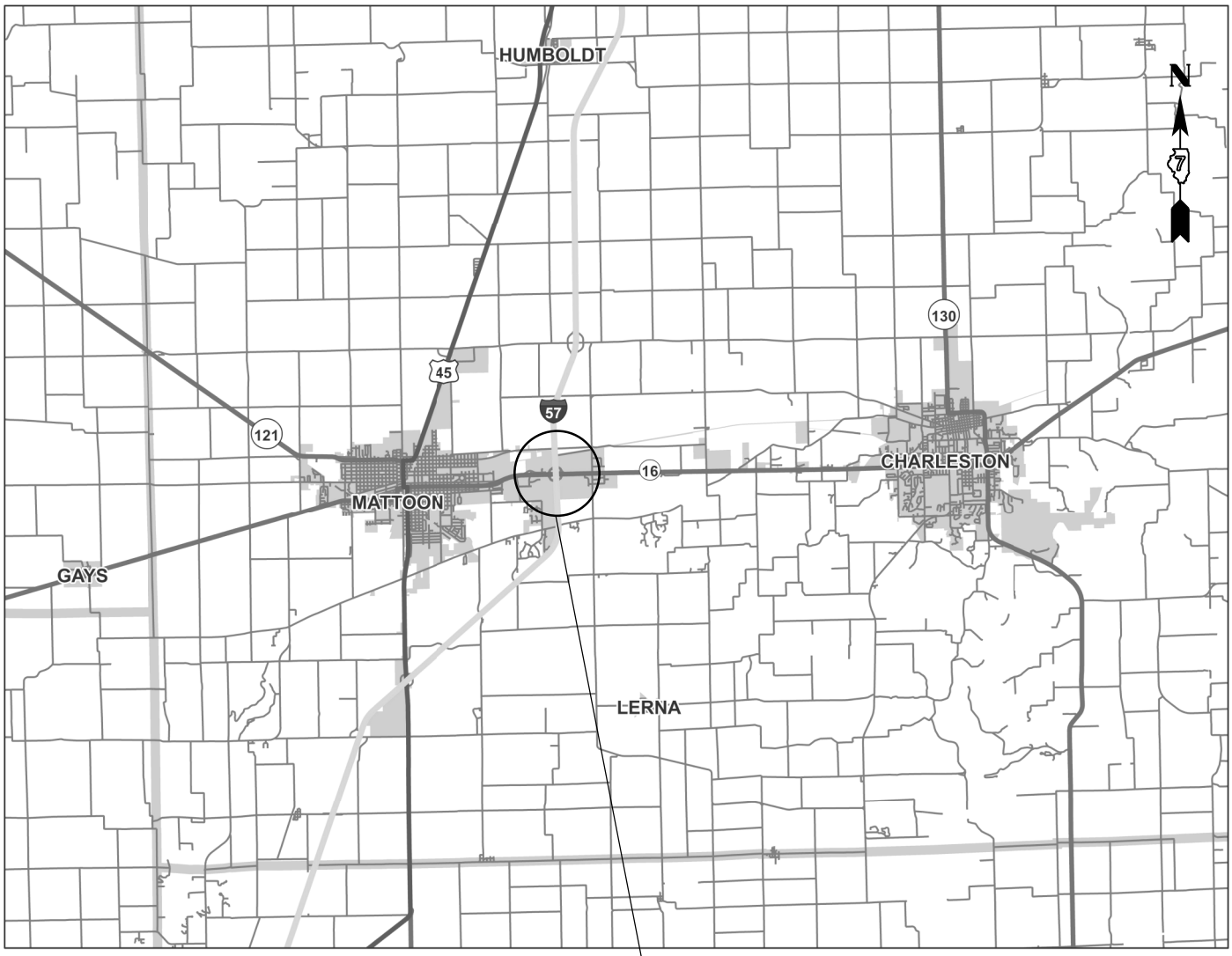
Based on the economic analysis of the different pavements we are proposing to use the following pavement designs:

The overall cost of JPC pavement for I-57 is 8% higher than the cost of HMA. The purpose of the new pavement is to raise the profile of the I-57 structures over IL 16 to meet IDOT clearances. The adjacent pavement surface on I-57 is HMA. To preserve the continuity of the pavement, we propose to use the 16" Full-Depth Hot-Mix Asphalt Pavement on I-57.

The overall cost of JPC pavement for the ramps is 14.6% higher than the cost of HMA. Note, the traffic factor for the JPC pavement was manually adjusted to increase the design thickness from 8 ¾" to 9". This alteration was made to have the JPC thickness of the ramps match that of IL 16. The cost difference between the two thicknesses of JPC was negligible and had minimal effect on the life cycle cost. With HMA being the less expensive option, we propose utilizing the 10 ½" Full-Depth Hot-Mix Asphalt Pavement on the ramps.

The overall cost of JPC pavement on IL 16 is 13.6% higher than the cost of HMA. The new IL 16 pavement consists of multiple horizontal curves with smaller radii to help limit the vehicle speeds approaching and traversing the raindrop roundabout. The raindrop roundabout will also have left turn movements under yield control which creates the possibility of large trucks having to come to a stop. Due to these factors and past experience the District 7 Materials Engineer has concerns that shoving of the HMA pavement is highly likely. Shoving of the pavement will increase the maintenance costs beyond those shown in the life cycle cost calculations, which would make the overall cost of JPC closer to that of HMA over the life of the pavement. Therefore our recommendation is to construct the 9" Jointed Plain Concrete Pavement on IL 16.

If you have any questions, please contact Kaleb Hirtzel at 217-342-8256. Currently my office hours are limited to Tuesday and Thursday. If you need to contact me on a different day please leave a message or contact me through email at Kaleb.Hirtzel@illinois.gov.



3/10/2020
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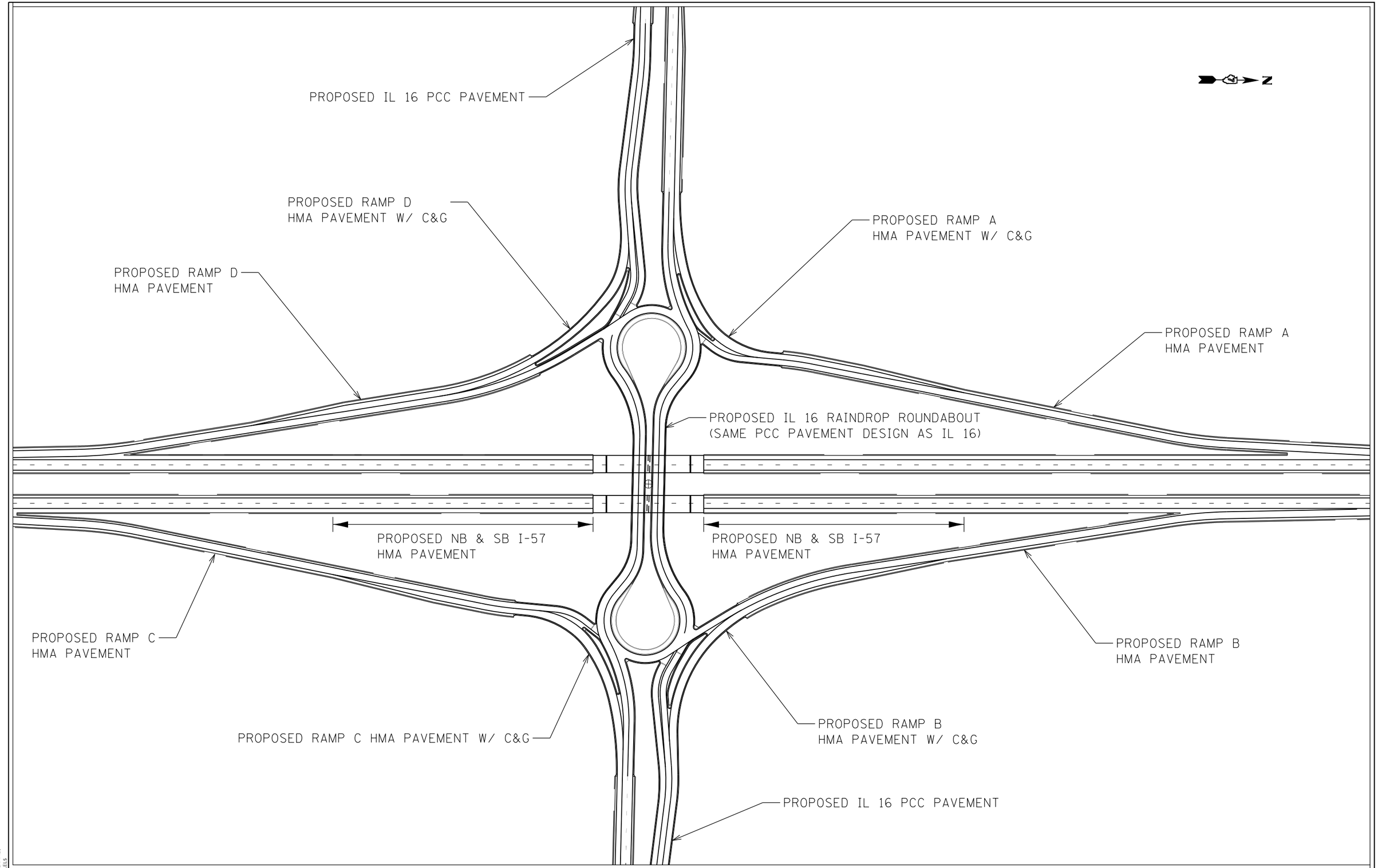

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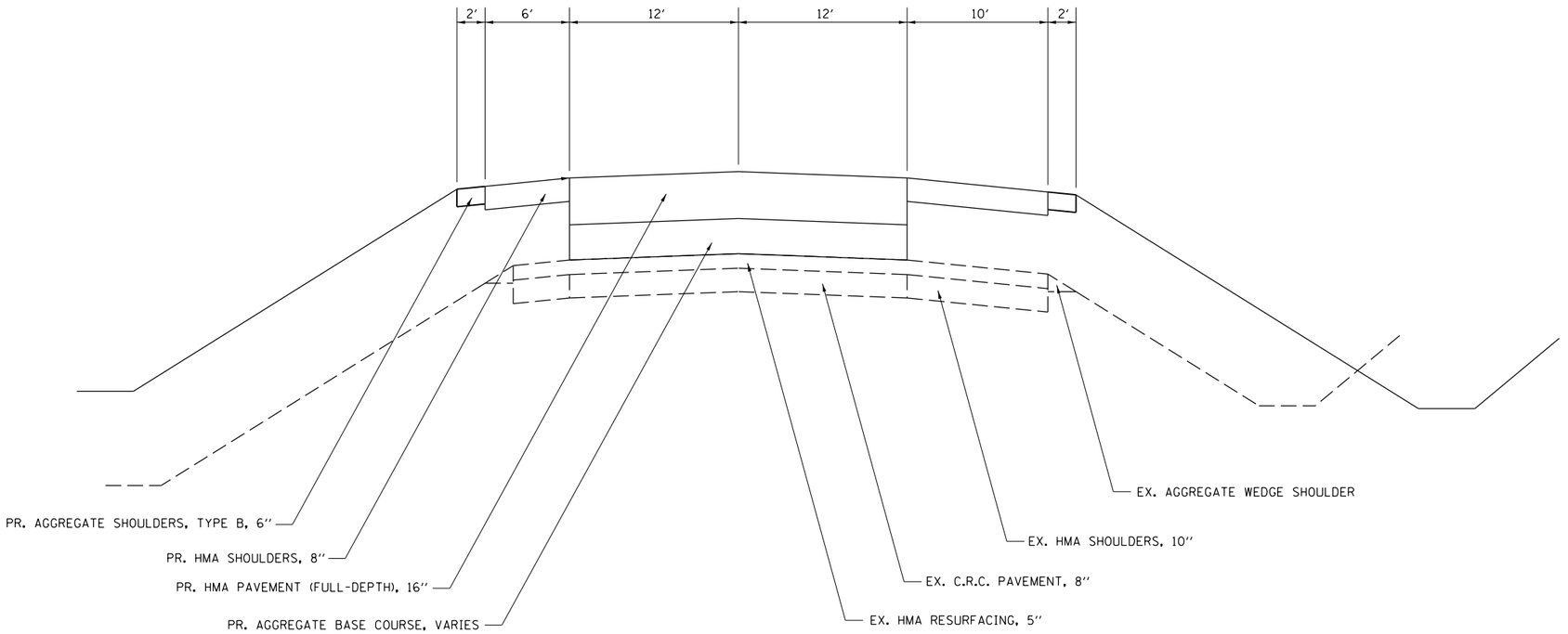
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED PAVEMENT DESIGN LOCATIONS

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(15-22HB-4)BR (15-22)R	Coles		
		CONTRACT NO. 74435		
	ILLINOIS	FED. AID PROJECT		

EX. & PR. I-57
(EX. PAV'T TO BE BROKEN)



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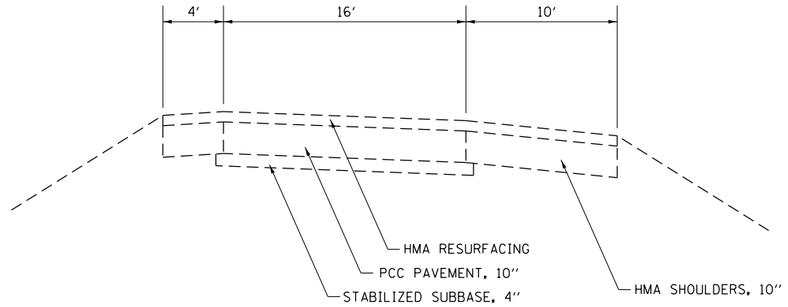
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION
I-57

SCALE: | SHEET OF SHEETS | STA. | TO STA.

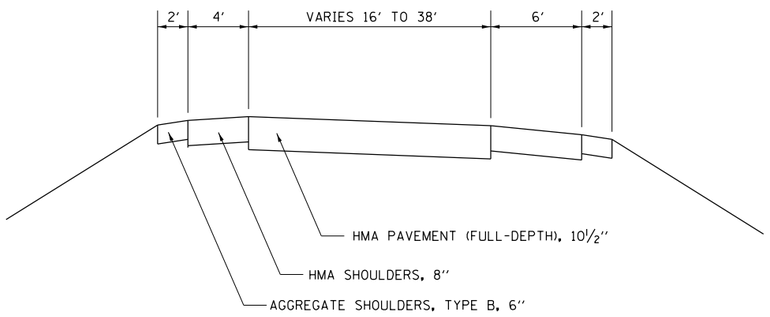
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(15-22HB-4)BR (15-22)R	Coles		
		CONTRACT NO. 74435		
	ILLINOIS FED. AID PROJECT			

EXISTING RAMPS
(TO BE REMOVED)

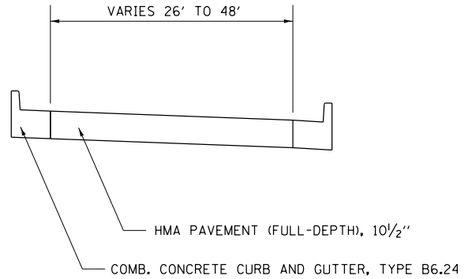


PROPOSED RAMPS

HMA SHOULDER SECTION



CURB & GUTTER SECTION



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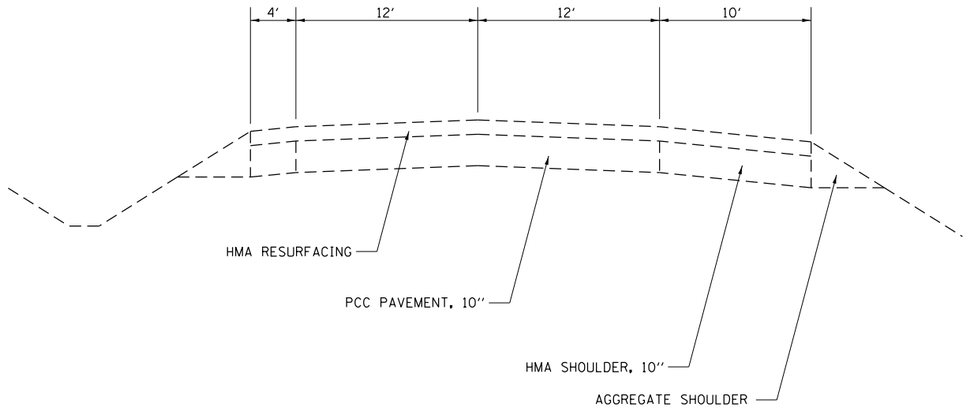
TYPICAL SECTION
RAMPS

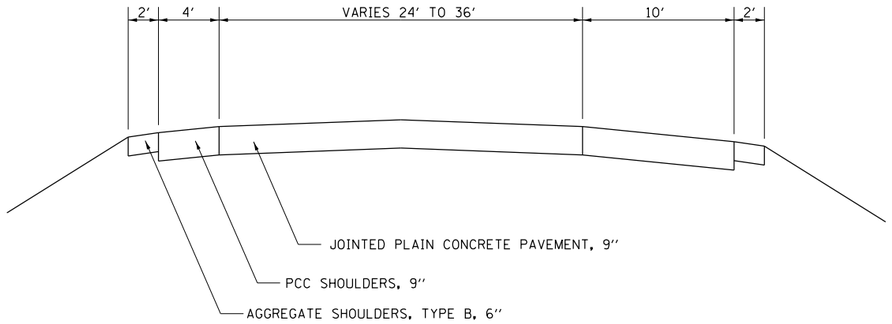
SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(15-22HB-4)BR (15-22)R	Coles		
		CONTRACT NO. 74435		
	ILLINOIS FED. AID PROJECT			

EXISTING IL 16
(TO BE REMOVED)



PROPOSED IL 16



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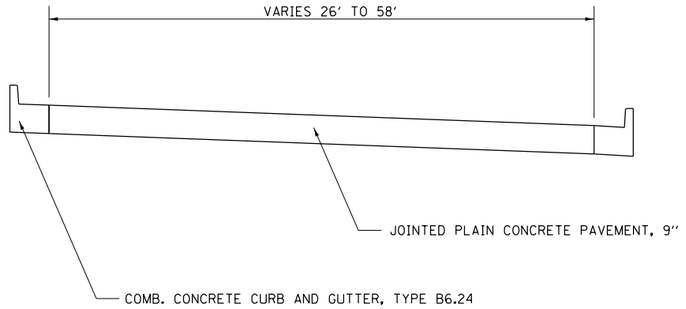
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION
IL 16

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(15-22HB-4)BR (15-22)R	Coles		
		CONTRACT NO. 74435		
	ILLINOIS FED. AID PROJECT			

PROPOSED IL 16
(INCLUDES RAINDROP ROUNDABOUT SECTION)



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TYPICAL SECTION
IL 16

SCALE: | SHEET OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(15-22HB-4)BR (15-22)R	Coles		
		CONTRACT NO. 74435		
	ILLINOIS FED. AID PROJECT			

BDE 5401 Template (Rev. 11/22/2019)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 07/08/2020

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: FAI 57
Section: (15-22HB-4)BR (15-22)R
County: COLES
Location: IL 16 Interchange East of Mattoon

Comments: I-57 Mainline Pavement
Design Date: 02/28/2020 KLH <-- BY
Modify Date: <-- BY

	ADT	Year
Current:	16,700	2025
Future:	22,700	2045

Facility Type: Interstate or Freeway
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2025
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	12,214	62.0%	P = 32%
SU =	500	1,005	5.1%	S = 45%
MU =	1500	6,481	32.9%	M = 45%
Struct. Design ADT =		19,700	(2035)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	132.5		Csu =	143.81	
Cmu =	482.53		Cmu =	696.42	
TF flexible (Actual) =	29.36	(Actual ADT)	TF rigid (Actual) =	41.94	(Actual ADT)
TF flexible (Min) =	7.11	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	10.05	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 29.36
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.O)
Goto Map
HMA Mixture Temp. = 78.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 590 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 46 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 16.00 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 16.00 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 16.00 inches

JPC Pavement

Use TF rigid = 41.94
Edge Support = Tied Shoulder or C&G

Rigid Pavt Thick. = 11.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 41.94
IBR value = 3

CRCP Thickness = 11.00 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Pavement Over Rubblized PCC

Use TF flexible = 29.36
Goto Map
HMA Overlay Design Thickness = 13.00 in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 999.00 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT RESEARCH 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)		
Facility Type	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

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	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

	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%

BDE 5401 Template (Rev. 11/22/2019) Printed: 07/08/2020
LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT LSC Design

ROUTE	FAI 57
SECTION	(15-22HB-4)BR (15-22)R
COUNTY	COLES
LOCATION	IL 16 Interchange East of Mattoon

FACILITY TYPE INTERSTATE

PROJECT LENGTH			1105	FT = = >	0.21	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)	16.00	IN	16.00	IN MAX
SHOULDER THICKNESS	8.00	IN	HMA_LSCD	LSC Design
HMA OVERLAY THICKNESS	2.00	IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	7.11	29.36	29.36

Read Me!

HMA COST PER TON	UNIT PRICE	
HMA SURFACE	$130.00	/ TON
HMA TOP BINDER	$95.00	/ TON
HMA LOWER BINDER	$80.00	/ TON
HMA BINDER (IL-9.5FG or IL-4.75)	$85.00	/ TON
HMA SHOULDER	$85.00	/ TON

INITIAL COSTS

ITEM	THICKNESS		100% QUAI	UNIT	UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(16.00")	5893	5,893	SQ YD	$83.23	/ SQ YD	$490,515	~
HMA SURFACE COURSE	(2.00")	1.0069	665	TONS	$130.00	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1.0217	759	TONS	$95.00	/ TON	$0	
HMA LOWER BINDER COURSE	(11.75")	1.0703	4,150	TONS	$80.00	/ TON	$0	
HMA SHOULDER	(8.00")	3929	1,760	TONS	$85.00	/ TON	$149,612	~
CURB & GUTTER			0	LIN FT	$30.00	/ LIN FT	$0	
SUBBASE GRAN MATL TY C (TONS)			1,477	TONS	$30.00	/ TON	$44,310	
IMPROVED SUBGRADE:	Modified Soil Width = 87.3		10,723	SQ YD	$7.00	/ SQ YD	$75,061	
Reserved For User Supplied Item			0	UNITS	$0.00	/ UNITS	$0	
Reserved For User Supplied Item			0	UNITS	$0.00	/ UNITS	$0	
PAVEMENT REMOVAL			5,893	SQ YD	$12.00	/ SQ YD	$70,716	
SHOULDER REMOVAL			3,929	SQ YD	$11.00	/ SQ YD	$43,219	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUC	$873,433
FLEXIBLE CONSTRUC	$170,217

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 M	2.00	$14.66	/ SQ YD	
HMA OVERLAY PVMT	(2.00")	1.0069		2.00	$14.66	/ SQ YD	
HMA SURFACE MIX	(2.00")	1.0069	Surface M	2.00	$14.66	/ SQ YD	
HMA BINDER MIX	(0.00")	1.0139	IL-9.5FG or I	0.00	$0.00	/ SQ YD	
HMA OVERLAY SHLD (Year 30)	(2.00")		Shoulder	2.00	$9.52	/ SQ YD	
HMA OVERLAY SHLD	(2.00")		Shoulder	2.00	$9.52	/ SQ YD	
MILLING (2.00 IN)				2.00	$4.00	/ SQ YD	
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)		Surface M	2.00	$85.56	/ SQ YD	
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)		Shoulder	2.00	$80.52	/ SQ YD	
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00 ")		Binder Mix	2.00	$80.52	/ SQ YD	
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00 ")		Shoulder	2.00	$80.52	/ 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% Reh	$2.00	/ LIN FT

FLEXIBLE TOTAL LIFE-	$1,118,069
FLEXIBLE TOTAL ANNI	$217,893

PCC PAVEMENT JPCP

ROUTE	FAI 57
SECTION	(15-22HB-4)BR (15-22)R
COUNTY	COLES
LOCATION	IL 16 Interchange East of Mattoon

FACILITY TYPE INTERSTATE

PROJECT LENGTH			1105	FT = = >	0.21 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)	JPCP	11.00	IN	TIED SHLD
SHOULDER THICKNESS		11.00	IN	

HMA OVERLAY THICKNESS 3.75 IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	10.05	41.94	41.94

Worksheet Construction Type is Reconstruction User Override Pavemen JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUA	UNIT	UNIT PRICE	COST
JPC PAVEMENT	(11.00")	5,893	SQ YD	$70.00 / SQ YD	$412,510
PAVEMENT REINFORCEMENT		0	SQ YD	$22.00 / SQ YD	$0
STABILIZED SUBBASE	(4.00")	6,630	SQ YD	$28.00 / SQ YD	$185,640
PCC SHOULDERS	(11.00" to 11.00")	3,929	SQ YD	$65.00 / SQ YD	$255,385
CURB & GUTTER		0	LIN FT	$30.00 / LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 3.48")	462	TONS	$30.00 / TON	$13,860
IMPROVED SUBGRADE:	Modified Soil Width = 82.0	10,068	SQ YD	$7.00 / SQ YD	$70,476
Reserved For User Supplied Item		0	UNITS	$0.00 / UNITS	$0
Reserved For User Supplied Item		0	UNITS	$0.00 / UNITS	$0
PAVEMENT REMOVAL		5,893	SQ YD	$12.00 / SQ YD	$70,716
SHOULDER REMOVAL		3,929	SQ YD	$11.00 / SQ YD	$43,219

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION	$1,051,806
RIGID CONSTRUCTION	$204,979

MAINTENANCE COSTS:

ITEM	THICKNESS		MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY					$0.00 / LANE-MILE / YEAR
HMA OVERLAY	(3.75")			3.75	
HMA OVERLAY PAVEMENT	(3.75")	1.0130		3.75	$23.17 / SQ YD
HMA SURFACE MIX	(1.50")	1.0052	Surface M	1.50	$10.98 / SQ YD
HMA BINDER MIX	(2.25")	1.0182	Top Binder M	2.25	$12.19 / SQ YD
HMA OVERLAY SHOULDER	(3.75")		Shoulder	3.75	$17.85 / 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 M	1.50	$81.92 / SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")			Surface M	1.50	$81.92 / 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' /		$2.00 / LIN FT

RIGID TOTAL LIFE-C	$1,207,261
RIGID TOTAL ANNUAL	$235,275

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Re ######

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT '	$1,051,806	$873,433
		ANNUAL C	$204,979	$170,217
MAINTENANCE	LIFE-CYCLE COST	PRESENT '	$155,455	$244,636
		ANNUAL C	$30,296	$47,675
TOTAL	LIFE-CYCLE COST	PRESENT '	$1,207,261	$1,118,069
		ANNUAL C	$235,275	$217,893

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=========	HMA	$217,893	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PE	JPCP	$235,275	8.0%

S:\PROJECTS\74435\Pavt Designs\[revised 74435 I57pavt.xlsm]PDFSheets

HMA_LSCD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 07/08/20

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

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$85.56		$513	
	PWFn =	0.8626		PW =	0.8626	X	$18,635	$16,075
YEAR 10								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$85.56		$2,481	
	PWFn =	0.7441		PW =	0.7441	X	$20,603	$15,331
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	9,822	SQ YD	$4.00		$39,288	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	59	SQ YD	$80.52		$4,751	
	HMA OVERLAY PVMT 2.00"	100.00%	5,893	SQ YD	$14.66		$86,403	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,929	SQ YD	$9.52		$37,403	
	PWFn =	0.6419		PW =	0.6419	X	$167,845	$107,733
YEAR 20								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$85.56		$513	
	PWFn =	0.5537		PW =	0.5537	X	$18,635	$10,318
YEAR 25								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$85.56		$2,481	
	PWFn =	0.4776		PW =	0.4776	X	$20,603	$9,840
	HMA_LSCD							
YEAR 30	INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	9,822	SQ YD	$4.00		$39,288	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	118	SQ YD	$80.52		$9,501	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	39	SQ YD	$80.52		$3,140	
	HMA OVERLAY PVMT 2.00"	100.00%	5,893	SQ YD	$14.66		$86,403	
	HMA OVERLAY SHLD 2.00 "	100.00%	3,929	SQ YD	$9.52		$37,403	
	PWFn =	0.4120		PW =	0.4120	X	$175,735	$72,400
YEAR 35								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.10%	6	SQ YD	$85.56		$513	
	PWFn =	0.3554		PW =	0.3554	X	$18,635	$6,623
YEAR 40								
	LONG SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CNTR LINE JOINT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RNDM / THRM CRACK R&S	50.00%	2,431	LIN FT	$2.00		$4,862	
	PD PVMT PATCH M&F SURF	0.50%	29	SQ YD	$85.56		$2,481	
	PWFn =	0.3066		PW =	0.3066	X	$20,603	$6,316
								$244,636
	ROUTINE MAINTENANCE ACTIVITY		0.84	Lane Miles	0.00		0	$0
							MAINTENANCE	$244,636
	45 YEAR LIFE CYCLE CRFn = 0.0407852						MAINTENANCE	$47,675

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

07/08/20

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

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	0.10%	6	SQ YD	$150.00		$900	
	PWFn =	0.7441		PW =	0.7441	X	$900	$670
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	12	SQ YD	$150.00		$1,800	
	PWFn =	0.6419		PW =	0.6419	X	$1,800	$1,155
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	118	SQ YD	$150.00		$17,700	
	SHOULDER PATCH CLASS C	0.50%	20	SQ YD	$145.00		$2,900	
	LONGITUDINAL SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CENTERLINE JT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	PWFn =	0.5537		PW =	0.5537	X	$33,860	$18,747
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	177	SQ YD	$150.00		$26,550	
	SHOULDER PATCH CLASS C	1.00%	39	SQ YD	$145.00		$5,655	
	PWFn =	0.4776		PW =	0.4776	X	$32,205	$15,381
YEAR 30	INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	236	SQ YD	$150.00		$35,400	
	SHOULDER PATCH CLASS C	1.50%	59	SQ YD	$145.00		$8,555	
	HMA OVERLAY 3.75" (PVMT)	100.00%	5,893	SQ YD	$23.17		$136,519	
	HMA OVERLAY 3.75" (SHLD)	100.00%	3,929	SQ YD	$17.85		$70,131	
	PWFn =	0.4120		PW =	0.4120	X	$250,605	$103,246
YEAR 35	INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CENTERLINE JT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	RANDOM CRACK R&S	50.00%	2,210	LIN FT	$2.00		$4,420	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,421	LIN FT	$2.00		$2,842	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	6	SQ YD	$81.92		$492	
	PWFn =	0.3554		PW =	0.3554	X	$21,014	$7,468
YEAR 40	INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	29	SQ YD	$150.00		$4,350	
	LONGITUDINAL SHLD JT R&S	100.00%	4,420	LIN FT	$2.00		$8,840	
	CENTERLINE JT R&S	100.00%	2,210	LIN FT	$2.00		$4,420	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	2,131	LIN FT	$2.00		$4,262	
	RANDOM CRACK R&S	50.00%	2,210	LIN FT	$2.00		$4,420	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	29	SQ YD	$81.92		$2,376	
	PWFn =	0.3066		PW =	0.3066	X	$28,668	$8,788
								$155,455
	ROUTINE MAINTENANCE ACTIVITY		0.84	Lane Miles	$0.00		$0	$0
							MAINTENANCE	$155,455
	45 YEAR LIFE CYCLE CRFn = 0.0407852						MAINTENANCE	$30,296

BDE 5401 Template (Rev. 11/22/2019) **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 07/08/2020

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

Route: FAI 57 | Comments: Ramp Pavement
Section: (15-22HB-4)BR (15-22)R
County: COLES | Design Date: 02/28/2020 KLH <-- BY
Location: IL 16 Interchange East of Mattoon | Modify Date: <-- BY

	ADT	Year
Current:	2,800	2025
Future:	3,800	2045

Facility Type: Interstate or Freeway ** Ramp Design Fig. 54-1.B **
# of Lanes = 1 Lane Ramp | Crossroad? Other Marked State Route
# of Lanes = 4

Road Class: I

Subgrade Support Rating (SSR): Poor
Construction Year: 2025
Design Period (DP) = 20 years

	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
		Structural Design Traffic		
PV =	0	2,973	90.1%	P = 100%
SU =	250	149	4.5%	S = 100%
MU =	750	178	5.4%	M = 100%
Struct. Design ADT =		3,300	(2035)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RAMP DESIGN MIN	
Cpv =	-	0.15	32%
Csu =	-	112.06	45%
Cmu =	-	385.44	45%
TF flexible (Actual) =	-	(Actual ADT)	2.85
TF flexible (Min) =	-	(Min ADT Fig. 54-2.C)	

RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv =	-	0.15	32%
Csu =	-	135.78	45%
Cmu =	-	567.21	45%
TF rigid (Actual) =	-	(Actual ADT)	4.13
TF rigid (Min) =	-	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 2.85
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.O)
Goto Map — HMA Mixture Temp. = 78.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 590 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 89 (Fig. 54-5.E)
Goto Map — Full Depth HMA Design Thickness = 10.50 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 16.00 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 10.50 inches

JPC Pavement

Use TF rigid = 4.40
Edge Support = Tied Shoulder or C&G

Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 4.40
IBR value = 3

CRCP Thickness = 7.75 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Pavement Over Rubblized PCC

Use TF flexible =
Goto Map — HMA Overlay Design Thickness = Off Chart in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)

Use HMA Overlay Thickness = 999.00 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT RESEARCH 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	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

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

Class	Traffic Factor ESAL Coefficients Rigid (Fig. 54-4.C) Csu	Cmu	Flexible (Fig. 54-5.B) 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 P	S	M	Urban 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%

BDE 5401 Template (Rev. 11/22/2019) Printed: 07/08/2020
LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT Standard Design

ROUTE	FAI 57					
SECTION	(15-22HB-4)BR (15-22)R					
COUNTY	COLES					
LOCATION	IL 16 Interchange East of Mattoon					
FACILITY TYPE		INTERSTATE				
PROJECT LENGTH			5410	FT = = >	1.02	Miles
# OF CENTERLINES			1	CL		
# OF LANES			1	LANES		
# OF EDGES			2	EP		
LANE WIDTH - AVERAGE			12	FT		
SHOULDER WIDTH	HMA	Left	6	FT		
	HMA	Right	10	FT		
	Total Width of Paved Shoulders		16	FT		
PAVEMENT THICKNESS (FLEXIBLE)			10.50	IN	16.00	IN MAX
SHOULDER THICKNESS			8.00	IN	HMA_SD	Standard Design
HMA OVERLAY THICKNESS			3.75	IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	-	-	-

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$110.00 / TON
HMA TOP BINDER	$95.00 / TON
HMA LOWER BINDER	$80.00 / TON
HMA BINDER (IL-9.5FG or IL-4.75)	$85.00 / TON
HMA SHOULDER	$85.00 / TON

INITIAL COSTS

ITEM	THICKNESS		100% QUAI	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(10.50")	18670	18,670	SQ YD	*	$55.00	/ SQ YD	$1,026,850	~
HMA SURFACE COURSE	(2.00")	1.0139	2,149	TONS	*	$110.00	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1.0434	2,557	TONS	*	$95.00	/ TON	$0	
HMA LOWER BINDER COURSE	(6.25")	1.1024	7,873	TONS	*	$80.00	/ TON	$0	
HMA SHOULDER	(8.00")	6518	2,920	TONS	*	$85.00	/ TON	$248,200	~
CURB & GUTTER			1,929	LIN FT	*	$30.00	/ LIN FT	$57,870	
SUBBASE GRAN MATL TY C (TONS)			889	TONS	*	$30.00	/ TON	$26,670	
IMPROVED SUBGRADE:	Modified Soil	Width = 46.9	28,193	SQ YD	*	$7.00	/ SQ YD	$197,351	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL			28,186	SQ YD	*	$12.00	/ SQ YD	$338,232	
SHOULDER REMOVAL			22,970	SQ YD	*	$11.00	/ SQ YD	$252,670	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUC	$2,147,843
FLEXIBLE CONSTRUC	$85,495

MAINTENANCE COSTS:

ITEM	THICKNESS		MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	1.0139	Surface M	2.00	$12.49	/ SQ YD
HMA OVERLAY PVMT	(3.75")	1.0260		3.75	$21.74	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0104	Surface M	1.50	$9.34	/ SQ YD
HMA BINDER MIX	(2.25")	1.0365	Top Binder M	2.25	$12.41	/ SQ YD
HMA OVERLAY SHLD (Year 30)	(1.75")		Shoulder	1.75	$8.33	/ SQ YD
HMA OVERLAY SHLD	(2.00")		Shoulder	2.00	$9.52	/ SQ YD
MILLING (2.00 IN)				2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)		Surface M	2.00	$82.32	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)		Shoulder	2.00	$79.52	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00 ")		Binder Mix	2.00	$79.52	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00 ")		Shoulder	2.00	$79.52	/ 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% Reh	$2.00	/ LIN FT

FLEXIBLE TOTAL LIFE	$2,763,666
FLEXIBLE TOTAL ANN	$110,008

PCC PAVEMENT JPCP

ROUTE	FAI 57
SECTION	(15-22HB-4)BR (15-22)R
COUNTY	COLES
LOCATION	IL 16 Interchange East of Mattoon
FACILITY TYPE	INTERSTATE

PROJECT LENGTH			5410	FT = = >	1.02 Miles
# OF CENTERLINES			1	CL	
# OF LANES			1	LANES	
# OF EDGES			2	EP	
LANE WIDTH - AVERAGE			12	FT	
SHOULDER WIDTH	PCC	Left	6	FT	
	PCC	Right	10	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		3.75	IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	-	-	-

Worksheet Construction Type is Reconstruction User Override Pavemer JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUA	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(9.00")	18,670	SQ YD	*	$50.00	/ SQ YD	$933,500
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	20,473	SQ YD	*	$28.00	/ SQ YD	$573,244
PCC SHOULDERS	(9.00" to 9.00")	6,517	SQ YD	*	$60.00	/ SQ YD	$391,020
CURB & GUTTER		1,929	LIN FT	*	$30.00	/ LIN FT	$57,870
SUBBASE GRAN MATL TY C	(~ 1.74")	646	TONS	*	$30.00	/ TON	$19,380
IMPROVED SUBGRADE:	Modified Soil Width = 46.9	28,193	SQ YD	*	$7.00	/ SQ YD	$197,351
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		28,186	SQ YD	*	$12.00	/ SQ YD	$338,232
SHOULDER REMOVAL		22,970	SQ YD	*	$11.00	/ SQ YD	$252,670

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION	$2,763,267
RIGID CONSTRUCTION	$109,992

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA OVERLAY	(3.75")		3.75		
HMA OVERLAY PAVEMENT	(3.75")	1.0260	3.75	$21.74	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0104 Surface M	1.50	$9.34	/ SQ YD
HMA BINDER MIX	(2.25")	1.0365 Top Binder M	2.25	$12.41	/ SQ YD
HMA OVERLAY SHOULDER	(3.75")	Shoulder	3.75	$17.85	/ 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 M	1.50	$79.24	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")		Surface M	1.50	$79.24	/ 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' /		$2.00	/ LIN FT

RIGID TOTAL LIFE-C	$3,167,322
RIGID TOTAL ANNUAL	$126,076

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Re' ######

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT '	$2,763,267	$2,147,843
		ANNUAL C	$109,992	$85,495
MAINTENANCE	LIFE-CYCLE COST	PRESENT '	$404,055	$615,823
		ANNUAL C	$16,083	$24,513
TOTAL	LIFE-CYCLE COST	PRESENT '	$3,167,322	$2,763,666
		ANNUAL C	$126,076	$110,008

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=========	HMA	$110,008
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PE	JPCP	$126,076

14.6%

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 07/08/20

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

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$82.32		$1,564	
	PWFn =	0.8626		PW =	0.8626	X	$39,976	$34,484
YEAR 10								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.50%	93	SQ YD	$82.32		$7,656	
	PWFn =	0.7441		PW =	0.7441	X	$46,068	$34,279
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	25,188	SQ YD	$3.00		$75,564	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	187	SQ YD	$79.52		$14,870	
	HMA OVERLAY PVMT 2.00"	100.00%	18,670	SQ YD	$12.49		$233,209	
	HMA OVERLAY SHLD 2.00 "	100.00%	6,518	SQ YD	$9.52		$62,050	
	PWFn =	0.6419		PW =	0.6419	X	$385,693	$247,562
YEAR 20								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$82.32		$1,564	
	PWFn =	0.5537		PW =	0.5537	X	$39,976	$22,134
YEAR 25								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.50%	93	SQ YD	$82.32		$7,656	
	PWFn =	0.4776		PW =	0.4776	X	$46,068	$22,002
	HMA_SD							
YEAR 30	INTERSTATE							
	MILL PVMT ONLY 2.00"	100.00%	18,670	SQ YD	$3.00		$56,010	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	373	SQ YD	$79.52		$29,661	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	65	SQ YD	$79.52		$5,169	
	HMA OVERLAY PVMT 3.75 "	100.00%	18,670	SQ YD	$21.74		$405,935	
	HMA OVERLAY SHLD 1.75 "	100.00%	6,518	SQ YD	$8.33		$54,294	
	PWFn =	0.4120		PW =	0.4120	X	$551,069	$227,033
YEAR 35								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.10%	19	SQ YD	$82.32		$1,564	
	PWFn =	0.3554		PW =	0.3554	X	$39,976	$14,207
YEAR 40								
	LONG SHLD JT R&S	100.00%	10,820	LIN FT	$2.00		$21,640	
	CNTR LINE JOINT R&S	100.00%	5,410	LIN FT	$2.00		$10,820	
	RNDM / THRM CRACK R&S	50.00%	2,976	LIN FT	$2.00		$5,952	
	PD PVMT PATCH M&F SURF	0.50%	93	SQ YD	$82.32		$7,656	
	PWFn =	0.3066		PW =	0.3066	X	$46,068	$14,122
								$615,823
	ROUTINE MAINTENANCE ACTIVITY		1.02	Lane Miles	0.00		$0	$0
							MAINTENANCE	$615,823
45	YEAR LIFE CYCLE CRFn = 0.0407852						MAINTENANCE	$24,513

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 07/08/20
-

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

MAINTENANC	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%	37	SQ YD	$150.00	$5,550	
	PWFn =	0.6419		PW =	0.6419 X	$5,550	$3,562
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	373	SQ YD	$150.00	$55,950	
	SHOULDER PATCH CLASS C	0.50%	33	SQ YD	$145.00	$4,785	
	LONGITUDINAL SHLD JT R&S	100.00%	10,820	LIN FT	$2.00	$21,640	
	CENTERLINE JT R&S	100.00%	5,410	LIN FT	$2.00	$10,820	
	PWFn =	0.5537		PW =	0.5537 X	$93,195	$51,600
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	560	SQ YD	$150.00	$84,000	
	SHOULDER PATCH CLASS C	1.00%	65	SQ YD	$145.00	$9,425	
	PWFn =	0.4776		PW =	0.4776 X	$93,425	$44,620
YEAR 30	INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	747	SQ YD	$150.00	$112,050	
	SHOULDER PATCH CLASS C	1.50%	98	SQ YD	$145.00	$14,210	
	HMA OVERLAY 3.75" (PVMT)	100.00%	18,670	SQ YD	$21.74	$405,935	
	HMA OVERLAY 3.75" (SHLD)	100.00%	6,518	SQ YD	$17.85	$116,344	
	PWFn =	0.4120		PW =	0.4120 X	$648,539	$267,189
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	10,820	LIN FT	$2.00	$21,640	
	CENTERLINE JT R&S	100.00%	5,410	LIN FT	$2.00	$10,820	
	RANDOM CRACK R&S	50.00%	2,705	LIN FT	$2.00	$5,410	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,733	LIN FT	$2.00	$3,466	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	19	SQ YD	$79.24	$1,506	
	PWFn =	0.3554		PW =	0.3554 X	$42,842	$15,225
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	93	SQ YD	$150.00	$13,950	
	LONGITUDINAL SHLD JT R&S	100.00%	10,820	LIN FT	$2.00	$21,640	
	CENTERLINE JT R&S	100.00%	5,410	LIN FT	$2.00	$10,820	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	2,599	LIN FT	$2.00	$5,198	
	RANDOM CRACK R&S	50.00%	2,705	LIN FT	$2.00	$5,410	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	93	SQ YD	$79.24	$7,369	
	PWFn =	0.3066		PW =	0.3066 X	$64,387	$19,738
							$404,055
	ROUTINE MAINTENANCE ACTIVITY		1.02	Lane Miles	$0.00	$0	$0
						MAINTENANCE	$404,055
	45 YEAR LIFE CYCLE CRFn = 0.0407852					MAINTENANCE	$16,083

BDE 5401 Template (Rev. 11/22/2019) **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 07/08/2020

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

Route: FAI 57 | Comments: IL 16 Pavement
Section: (15-22HB-4)BR (15-22)R
County: COLES | Design Date: 02/28/2020 KLH <-- BY
Location: IL 16 Interchange East of Mattoon | Modify Date: <-- BY

	ADT	Year
Current:	18,100	2025
Future:	22,800	2045

Facility Type: Other Marked State Route
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2025
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	18,753	91.7%	P = 32%
SU =	250	1,125	5.5%	S = 45%
MU =	750	573	2.8%	M = 45%
Struct. Design ADT =		20,450	(2035)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	132.5		Csu =	143.81	
Cmu =	482.53		Cmu =	696.42	
TF flexible (Actual) =	3.85	(Actual ADT)	TF rigid (Actual) =	5.06	(Actual ADT)
TF flexible (Min) =	3.56	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	5.02	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 3.85
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.O)
Goto Map
HMA Mixture Temp. = 78.5 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 590 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 82 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 11.25 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 16.00 in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness = 11.25 inches

JPC Pavement

Use TF rigid = 5.06
Edge Support = Tied Shoulder or C&G
Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 5.06
IBR value = 3
CRCP Thickness = 8.00 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Pavement Over Rubblized PCC

Use TF flexible = 3.85
Goto Map
HMA Overlay Design Thickness = 8.00 in. (Fig. 54-5.U)
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)
Use HMA Overlay Thickness = 999.00 inches

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT RESEARCH 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) Csu	Cmu	Flexible (Fig. 54-5.B) 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 P	S	M	Urban 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%

BDE 5401 Template (Rev. 11/22/2019) Printed: 07/08/2020
LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT Standard Design

ROUTE	FAI 57						
SECTION	(15-22HB-4)BR (15-22)R						
COUNTY	COLES						
LOCATION	IL 16 Interchange East of Mattoon						
FACILITY TYPE			NON-INTERSTATE				
PROJECT LENGTH			4077	FT	= = >	0.77	Miles
# OF CENTERLINES			2	CL			
# OF LANES			4	LANES			
# OF EDGES			4	EP			
LANE WIDTH - AVERAGE			12	FT			
SHOULDER WIDTH	HMA	Inside	4	FT			
	HMA	Outside	10	FT			
	Total Width of Paved Shoulders		28	FT			
PAVEMENT THICKNESS (FLEXIBLE)			11.25	IN		16.00	IN MAX
SHOULDER THICKNESS			8.00	IN	HMA_SD	Standard Design	
HMA OVERLAY THICKNESS			2.00	IN			

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.56	3.85	3.85

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$110.00 / TON
HMA TOP BINDER	$95.00 / TON
HMA LOWER BINDER	$80.00 / TON
HMA BINDER (IL-9.5FG or IL-4.75)	$85.00 / TON
HMA SHOULDER	$85.00 / TON

INITIAL COSTS

ITEM	THICKNESS		100% QUAI	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(11.25")	27310	27,310	SQ YD	*	$60.00	/ SQ YD	$1,638,606	~
HMA SURFACE COURSE	(2.00")	1.0069	3,144	TONS	*	$110.00	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1.0217	3,740	TONS	*	$95.00	/ TON	$0	
HMA LOWER BINDER COURSE	(7.00")	1.0538	12,899	TONS	*	$80.00	/ TON	$0	
HMA SHOULDER	(8.00")	5669	2,540	TONS	*	$85.00	/ TON	$215,892	~
CURB & GUTTER			7,489	LIN FT	*	$30.00	/ LIN FT	$224,670	
SUBBASE GRAN MATL TY C (TONS)			1,015	TONS	*	$30.00	/ TON	$30,447	
IMPROVED SUBGRADE:	Modified Soil Width = 77.8		35,244	SQ YD	*	$7.00	/ SQ YD	$246,711	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item			0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL			27,310	SQ YD	*	$12.00	/ SQ YD	$327,721	
SHOULDER REMOVAL			5,669	SQ YD	*	$11.00	/ SQ YD	$62,362	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUC	$2,746,409
FLEXIBLE CONSTRUC	$145,064

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 M	2.00	$12.41	/ SQ YD
HMA OVERLAY PVMT	(2.00")	1.0069		2.00	$12.41	/ SQ YD
HMA SURFACE MIX	(2.00")	1.0069	Surface M	2.00	$12.41	/ SQ YD
HMA BINDER MIX	(0.00")	1.0139	IL-9.5FG or I	0.00	$0.00	/ SQ YD
HMA OVERLAY SHLD (Year 30)	(2.00")		Shoulder	2.00	$9.52	/ SQ YD
HMA OVERLAY SHLD	(2.00")		Shoulder	2.00	$9.52	/ SQ YD
MILLING (2.00 IN)				2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill Surf)		Surface M	2.00	$82.32	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill Surf)		Shoulder	2.00	$79.52	/ SQ YD
PARTIAL DEPTH PVMT PATCH	(Mill & Fill +2.00 ")		Binder Mix	2.00	$79.52	/ SQ YD
PARTIAL DEPTH SHLD PATCH	(Mill & Fill +2.00 ")		Shoulder	2.00	$79.52	/ 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% Rel	$2.00	/ LIN FT

FLEXIBLE TOTAL LIFE	$3,540,099
FLEXIBLE TOTAL ANN	$186,987

PCC PAVEMENT JPCP

ROUTE			FAI 57			
SECTION			(15-22HB-4)BR (15-22)R			
COUNTY			COLES			
LOCATION			IL 16 Interchange East of Mattoon			
FACILITY TYPE			NON-INTERSTATE			
PROJECT LENGTH			4077	FT = = >	0.77	Miles
# OF CENTERLINES			2	CL		
# OF LANES			4	LANES		
# OF EDGES			4	EP		
LANE WIDTH - AVERAGE			12	FT		
SHOULDER WIDTH	PCC	Inside	4	FT		
	PCC	Outside	10	FT		
	Total Width of Paved Shoulders		28	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
	5.02	5.06	5.06

Worksheet Construction Type is Reconstruction The Pavement Type is JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUA	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(9.00")	27,310	SQ YD	*	$55.00	/ SQ YD	$1,502,056
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	28,669	SQ YD	*	$28.00	/ SQ YD	$802,735
PCC SHOULDERS	(9.00" to 9.00")	5,669	SQ YD	*	$60.00	/ SQ YD	$340,158
CURB & GUTTER		7,489	LIN FT	*	$30.00	/ LIN FT	$224,670
SUBBASE GRAN MATL TY C	(~ 3.37")	1,088	TONS	*	$30.00	/ TON	$32,640
IMPROVED SUBGRADE:	Modified Soil Width = 77.8	35,244	SQ YD	*	$7.00	/ SQ YD	$246,711
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		27,310	SQ YD	*	$12.00	/ SQ YD	$327,721
SHOULDER REMOVAL		5,669	SQ YD	*	$11.00	/ SQ YD	$62,362
						RIGID CONSTRUCTION	$3,539,053
						RIGID CONSTRUCTION	$186,932

Note: * Denotes User Supplied Quantity

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	$15.33	/ SQ YD
HMA SURFACE MIX	(1.50")	1.0052 Surface M	1.50	$9.29	/ SQ YD
HMA BINDER MIX	(1.25")	1.0148 IL-9.5FG or I	1.25	$6.04	/ SQ YD
HMA OVERLAY SHOULDER	(2.75")	Shoulder	2.75	$13.09	/ 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 M	1.50	$79.24	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.75")		Surface M	2.75	$86.94	/ 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' /		$2.00	/ LIN FT

RIGID TOTAL LIFE-C	$4,022,719
RIGID TOTAL ANNUAL	$212,479

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Re' ######

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT '	$3,539,053	$2,746,409
		ANNUAL C	$186,932	$145,064
MAINTENANCE	LIFE-CYCLE COST	PRESENT '	$483,666	$793,690
		ANNUAL C	$25,547	$41,922
TOTAL	LIFE-CYCLE COST	PRESENT '	$4,022,719	$3,540,099
		ANNUAL C	$212,479	$186,987

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	=========	HMA	$186,987	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PE	JPCP	$212,479	13.6%

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

07/08/20

-

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

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.10%	27	SQ YD	$82.32		$2,223	
	PWFn =	0.8626		PW =	0.8626	X	$69,085	$59,593
YEAR 10								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.50%	137	SQ YD	$82.32		$11,278	
	PWFn =	0.7441		PW =	0.7441	X	$78,140	$58,143
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	32,980	SQ YD	$3.00		$98,940	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	273	SQ YD	$79.52		$21,709	
	HMA OVERLAY PVMT 2.00"	100.00%	27,310	SQ YD	$12.41		$338,797	
	HMA OVERLAY SHLD 2.00 "	100.00%	5,669	SQ YD	$9.52		$53,973	
	PWFn =	0.6419		PW =	0.6419	X	$513,419	$329,544
YEAR 20								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.10%	27	SQ YD	$82.32		$2,223	
	PWFn =	0.5537		PW =	0.5537	X	$69,085	$38,251
YEAR 25								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.50%	137	SQ YD	$82.32		$11,278	
	PWFn =	0.4776		PW =	0.4776	X	$78,140	$37,320
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	32,980	SQ YD	$3.00		$98,940	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	546	SQ YD	$79.52		$43,418	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	57	SQ YD	$79.52		$4,533	
	HMA OVERLAY PVMT 2.00 "	100.00%	27,310	SQ YD	$12.41		$338,797	
	HMA OVERLAY SHLD 2.00 "	100.00%	5,669	SQ YD	$9.52		$53,973	
	PWFn =	0.4120		PW =	0.4120	X	$539,661	$222,333
YEAR 35								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.10%	27	SQ YD	$82.32		$2,223	
	PWFn =	0.3554		PW =	0.3554	X	$69,085	$24,552
YEAR 40								
	LONG SHLD JT R&S	100.00%	16,308	LIN FT	$2.00		$32,616	
	CNTR LINE JOINT R&S	100.00%	8,154	LIN FT	$2.00		$16,308	
	RNDM / THRM CRACK R&S	50.00%	8,969	LIN FT	$2.00		$17,938	
	PD PVMT PATCH M&F SURF	0.50%	137	SQ YD	$82.32		$11,278	
	PWFn =	0.3066		PW =	0.3066	X	$78,140	$23,954
								$793,690
	ROUTINE MAINTENANCE ACTIVITY		3.09	Lane Miles	0.00		$0	$0
							MAINTENANCE	$793,690
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE	$41,922

JPCP

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 07/08/20
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JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANC	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10							
	PAVEMENT PATCH CLASS B	0.10%	27	SQ YD	$150.00	$4,050	
	PWFn =	0.7441		PW =	0.7441 X	$4,050	$3,014
YEAR 15							
	PAVEMENT PATCH CLASS B	0.20%	55	SQ YD	$150.00	$8,250	
	PWFn =	0.6419		PW =	0.6419 X	$8,250	$5,295
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	546	SQ YD	$150.00	$81,900	
	SHOULDER PATCH CLASS C	0.50%	28	SQ YD	$145.00	$4,060	
	LONGITUDINAL SHLD JT R&S	100.00%	16,308	LIN FT	$2.00	$32,616	
	CENTERLINE JT R&S	100.00%	8,154	LIN FT	$2.00	$16,308	
	PWFn =	0.5537		PW =	0.5537 X	$134,884	$74,682
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	819	SQ YD	$150.00	$122,850	
	SHOULDER PATCH CLASS C	1.00%	57	SQ YD	$145.00	$8,265	
	PWFn =	0.4776		PW =	0.4776 X	$131,115	$62,621
YEAR 30	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	4.00%	1,092	SQ YD	$150.00	$163,800	
	SHOULDER PATCH CLASS C	1.50%	85	SQ YD	$145.00	$12,325	
	HMA OVERLAY 2.75" (PVMT)	100.00%	27,310	SQ YD	$15.33	$418,553	
	HMA OVERLAY 2.75" (SHLD)	100.00%	5,669	SQ YD	$13.09	$74,213	
	PWFn =	0.4120		PW =	0.4120 X	$668,891	$275,574
YEAR 35	NON-INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	16,308	LIN FT	$2.00	$32,616	
	CENTERLINE JT R&S	100.00%	8,154	LIN FT	$2.00	$16,308	
	RANDOM CRACK R&S	50.00%	8,154	LIN FT	$2.00	$16,308	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	5,222	LIN FT	$2.00	$10,444	
	PD PVMT PATCH M&F HMA 2.75"	0.10%	27	SQ YD	$86.94	$2,347	
	PWFn =	0.3554		PW =	0.3554 X	$78,023	$27,728
YEAR 40	NON-INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	137	SQ YD	$150.00	$20,550	
	LONGITUDINAL SHLD JT R&S	100.00%	16,308	LIN FT	$2.00	$32,616	
	CENTERLINE JT R&S	100.00%	8,154	LIN FT	$2.00	$16,308	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	7,834	LIN FT	$2.00	$15,668	
	RANDOM CRACK R&S	50.00%	8,154	LIN FT	$2.00	$16,308	
	PD PVMT PATCH M&F HMA 2.75"	0.50%	137	SQ YD	$86.94	$11,911	
	PWFn =	0.3066		PW =	0.3066 X	$113,361	$34,752
							$483,666
	ROUTINE MAINTENANCE ACTIVITY		3.09	Lane Miles	$0.00	$0	$0
						MAINTENANCE	$483,666
	45 YEAR LIFE CYCLE CRFn = 0.0407852					MAINTENANCE	$25,547