Illinois Department of Transportation

To:	Paul Loete	Attn: District Three
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	January 28, 2015	

FAP Route 591 (US 34)
Section (13)R-2&BY
Kendall County
From Eldamain Road to Center Parkway in Yorkville

We have reviewed the pavement design for the above captioned section submitted to BDE on January 6, 2015.The project will reconstruct a portion of US 34 from the existing two-lane section to a five-lane section. The project will omit the stabilized sub-base, due to the proposal to utilize curb and gutter with storm sewer throughout the project. The life cycle cost analysis favored the rigid design by more than 10%.

The approved pavement design is as follows:

IL 178 over the Illinois River near Utica [new pavement]

10 inches of Jointed PCC Pavement with Tied PCC Curb & Gutter
12 inches of Aggregate Subgrade Improvement

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

Illinois Department of Transportation

To: John Baranzelli Attn: Paul Niedernhoffer

From: Paul Loete By: Dave Broviak

Subject: Pavement Design

Date: January 6, 2015

FAP 591 (US 34)
Section (13)R-2&BY
Kendall County
Job No. P-93-035-07
File No. 1825-100
Contract No. 66993
Reconstruction of US 34 From Eldamain Road to Center Parkway in Yorkville.

Attached for approval is the pavement design for US 34 from Eldamain Road to Center Parkway in Yorkville. Please review and approve the design which recommends 10 inches of Jointed Plain Concrete Pavement (JPCP). Construction of this project is currently anticipated in FY 2017.

JPCP is the preferred pavement type based on life cycle cost in the attached analysis. The results of the mechanistic pavement design indicate that 10 inch JPCP or 12 inch full depth Hot Mix Asphalt (HMA) is required. Construction of JPCP has an annual life cycle cost of $131,285 per mile while the HMA pavement has an annual life cycle cost of $169,622 per mile, which makes JPCP approximately 29.2 percent less costly. This project is not suitable for the alternative pavement bidding process because the life cycle cost difference is more than 10 percent.

Calculations to determine pavement thicknesses and life-cycle costs are attached and electronic files have been emailed for review. Stabilized subbase was omitted from the JPCP design, by policy, due to proposed curb and gutter and storm sewer throughout the project. An aggregate subgrade will be used to reduce the potential for pumping or erosion of fine graded soils.

The project involves replacing an existing two lane section with a five lane section from Eldamain Road to Center Parkway. The design is for five lanes with auxiliary lanes as needed and tied curb and gutter. The pavement was designed using Chapter 54 of the Bureau of Design and Environment Manual, current as of December 2014. The following facts and assumptions were used in the design:

- Jointed Plain Concrete Pavement constructed with tied B-6.24 combination concrete curb and gutter.
- Intersections throughout are considered high stress based on truck volumes.
- Design traffic was based on 2027 projections.
- Design period of 20 years.
- Poor sub-grade.
- Rubblization and unbonded overlay were not considered because the proposed pavement is significantly wider than the existing pavement.

If you have any questions, please contact Mr. Dave Alexander at 815-434-8468.

DA:jw

Illinois Department of Transportation

To:	Dave Broviak	
From:	Ted Fultz	By: Dave Alexander DSA
Subject:	Pavement Design	
Date:	December 11, 2014	

FAP Route 591 (US 34)
Section (13)R-2&BY
Kendall County
Job No. P-93-035-07
File No. 1825-100
Contract No. 66993
Reconstruction of US 34 from Eldamain Road
to Center Parkway in Yorkville

Attached is the pavement design for US 34 from Eldamain Road to Center Parkway in Yorkville. Please review the design which recommends 10 inches of Jointed Plain Concrete Pavement (JPCP). Construction of this project is currently anticipated in FY 2017. Please provide any comments to Dave Alexander.

JPCP is the preferred pavement type based on life cycle cost in the attached analysis. Construction of JPCP has a life cycle cost 29.2% less than 12 inches of full depth HMA pavement. Stabilized subbase was omitted from the JPCP design, by policy, due to proposed curb and gutter and storm sewer throughout the project. An aggregate subgrade will be used to reduce the potential for pumping or erosion of fine graded soils.

The project involves replacing an existing two lane section with a five lane section from Eldamain Road to Center Parkway. The design is for five lanes with auxiliary lanes as needed and tied curb and gutter. The pavement was designed using Chapter 54 of the Bureau of Design and Environment Manual, current as of December 2014. The following facts and assumptions were used in the design:

- Jointed Plain Concrete Pavement constructed with tied B-6.24 combination concrete curb and gutter.
- Intersections throughout are considered high stress based on truck volumes.
- Design Traffic was based on 2027 projections
- Design Period of 20 years
- Poor Sub-grade
- Rubblization and unbonded overlay were not considered because the proposed pavement is significantly wider than the existing pavement.

Joe Kammel
QA/QC Review

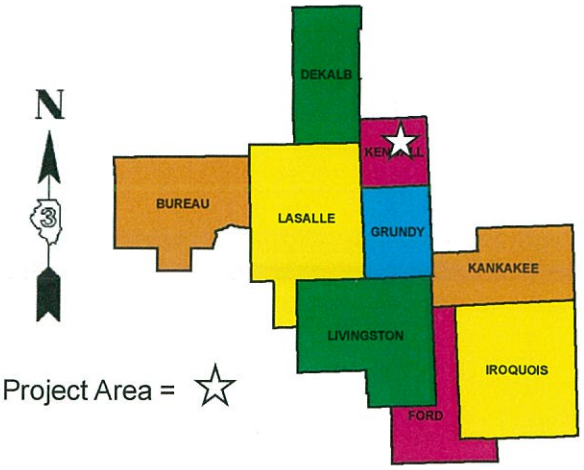
12/29/14
Date

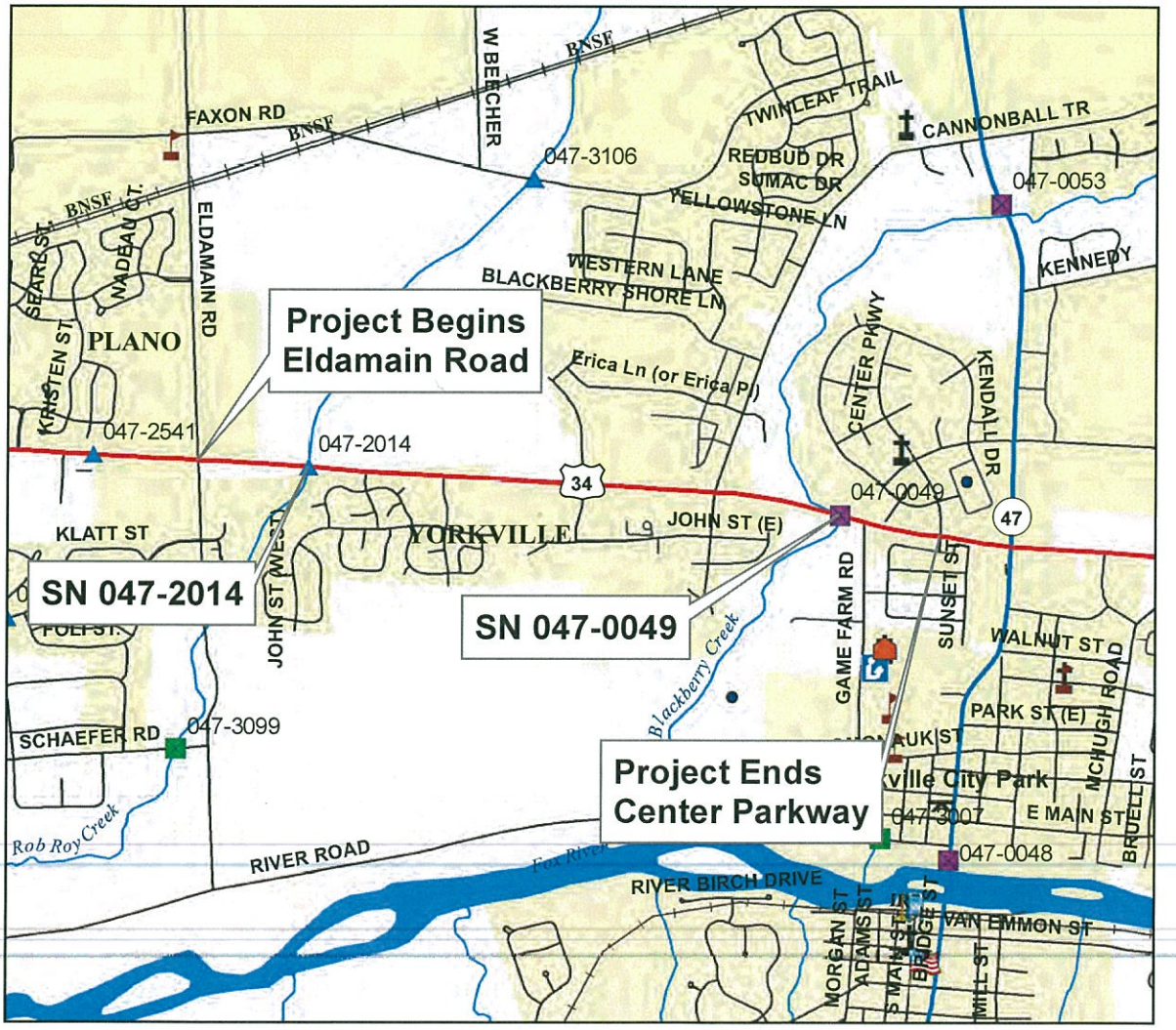
Studies & Plans Engineer

12/30/14
Date

Project Location Map

FAP Route 591 (US 34)
Section (13)R-2 & BY
Kendall County
Add Lanes, Bridge Replacement (SN 047-0049)
P-93-035-07
Contract No. 66993





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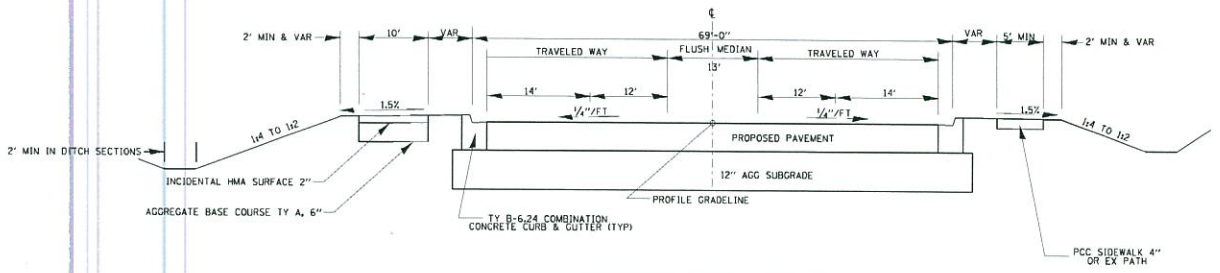
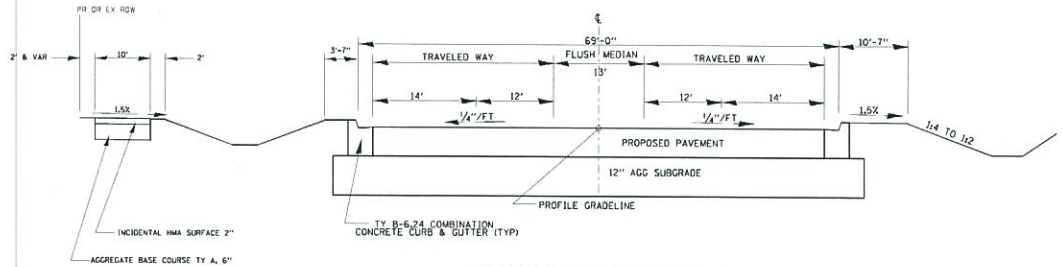
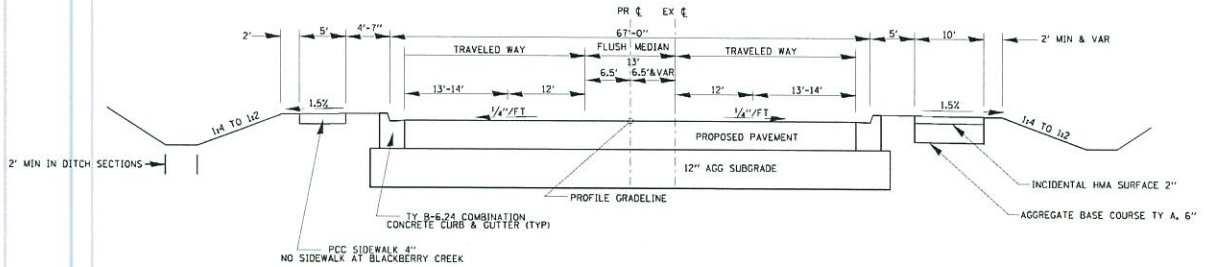


PROPOSED TYPICAL SECTION
ELDAMAIN RD. TO BEECHER RD. (LOOKING EAST)



PROPOSED TYPICAL SECTION
BEECHER ROAD TO CANNONBALL TRAIL (LOOKING EAST)



PROPOSED TYPICAL SECTION
CANNONBALL TRAIL TO CENTER PARKWAY (LOOKING EAST)

FILE NAME =	USER NAME = alexanderds	DESIGNED -	REVISED -	**STATE OF ILLINOIS**	**PROPOSED TYPICAL SECTIONS**
s:\pw_work\pwidot\alexanderds\d0712361\R03587-details.dgn		DRAWN -	REVISED -	**DEPARTMENT OF TRANSPORTATION**	**US 34 MAINLINE**
	PLOT SCALE = 100.0000 ' / in.	CHECKED -	REVISED -		
$MODELNAME$	PLOT DATE = 9/8/2014	DATE -	REVISED -	SCALE:	SHEET OF SHEETS STA. TO STA.

F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
591	(13)R-2 & BY	KENDALL		
		CONTRACT NO. 66993		
		ILLINOIS FED. AID PROJECT		

BDE 5401 Template (Rev. 09/05/2013)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 02/09/2015

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route:	FAP 591 (US 34)	Comments:			
Section:	(13)R-2&BY				
County:	Kendall	Design Date:	09/05/2014	DSA	<-- BY
Location:	Eldamin Rd. to Center Parkway	Modify Date:			<-- BY

	ADT	Year
Current:	23,000	2013
Future:	37,000	2040

Facility Type: Other Marked State Route

# of Lanes = 4

Road Class: I

Subgrade Support Rating (SSR): Poor

Construction Year: 2017

Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	27,233	90.0%	P = 32%
SU =	250	1,513	5.0%	S = 45%
MU =	750	1,513	5.0%	M = 45%

Struct. Design ADT = 30,259 (2027)

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) =	8.40	(Actual ADT)	TF rigid (Actual) =	11.47	(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 =	8.40	
	PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
Goto Map	HMA Mixture Temp. =	75.5	deg. F (Fig. 54-5.C)
	Design HMA Mixture Modulus (E_{HMA}) =	680	ksi (Fig. 54-5.D)
	Design HMA Strain (ε_{HMA}) =	65	(Fig. 54-5.E)
	Full Depth HMA Design Thickness =	12.00	in. (Fig. 54-5.F)
Goto Map	Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
	Use Full-Depth HMA Thickness =	**12.00**	**inches**

JPC Pavement

Use TF rigid =	11.47	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	**10.00**	**in. (Fig. 54-4.E)**

CRC Pavement

Use TF rigid =	11.47	
IBR value =	3	
CRCP Thickness =	**9.00**	**in. (Fig. 54-4.M)**

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

	Use TF flexible =	8.40	
	HMA Overlay Design Thickness =	9.25	in. (Fig. 54-5.U)
Goto Map	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 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)		
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. 09/05/2013) Printed: 02/09/2015

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	FAP 591 (US 34)
SECTION	(13)R-2&BY
COUNTY	Kendall
LOCATION	Eldamin Rd. to Center Parkway
FACILITY TYPE	NON-INTERSTATE

PROJECT LENGTH			11000	FT = = >	2.08 Miles
# OF CENTERLINES			2	CL	
# OF LANES			5	LANES	
# OF EDGES			4.2545	EP	
LANE WIDTH - AVERAGE			13.5291	FT	
SHOULDER WIDTH	HMA	Inside	0	FT	
	HMA	Outside	0	FT	
	Total Width of Paved Shoulders		0	FT	

PAVEMENT THICKNESS (FLEXIBLE)	12.00	IN	14.75 IN MAX
SHOULDER THICKNESS	8.00	IN	Standard Design
POLICY OVERLAY THICKNESS	2.25	IN	

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.56	7.82	7.82

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$100.52 / TON
HMA TOP BINDER	$93.30 / TON
HMA LOWER BINDER	$73.89 / 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)	(12.00")	82,678	SQ YD		$56.70	/ SQ YD	$0	
HMA SURFACE COURSE	(2.00")	9,260	TONS	*	$100.52	/ TON	$930,815	~
HMA TOP BINDER COURSE	(2.25")	10,420	TONS	*	$93.30	/ TON	$972,186	~
HMA LOWER BINDER COURSE	(7.75")	36,820	TONS	*	$73.89	/ TON	$2,720,630	~
HMA SHOULDER	(8.00")	0	TONS		$72.00	/ TON	$0	~
CURB & GUTTER		22,000	LIN FT	*	$20.00	/ LIN FT	$440,000	
SUBBASE GRAN MATL TY C (TONS)		0	TONS	*	$25.00	/ TON	$0	
IMPROVED SUBGRADE:	Aggregate	90,011	SQ YD	*	$13.00	/ SQ YD	$1,170,143	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0	
PAVEMENT REMOVAL		82,678	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	$6,233,774
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$122,038

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix	$11.32	/ SQ YD
HMA OVERLAY PVMT		(2.25")		$12.08	/ SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix	$8.48	/ SQ YD
HMA BINDER MIX		(0.75")	eling Binder Mix	$3.61	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")	Shoulder Mix	$9.07	/ SQ YD
HMA OVERLAY SHLD		(2.00")	Shoulder Mix	$8.06	/ SQ YD
MILLING (2.00 IN)				$3.19	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	Surface Mix	$81.45	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	Shoulder Mix	$78.25	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	Leveling Binder Mix	$79.71	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	Shoulder Mix	$78.25	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$3.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL				$3.00	/ LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL			(100% Rehab = 110.00' / Station / Lane)	$3.00	/ LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	$8,664,422
FLEXIBLE TOTAL ANNUAL COST PER MILE	$169,622

HMA_SD

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

02/09/15

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

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.10%	83	SQ YD	$81.45		$6,760	
	PWFn =	0.8626		PW =	0.8626	X	$303,910	$262,155
YEAR 10								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.50%	413	SQ YD	$81.45		$33,638	
	PWFn =	0.7441		PW =	0.7441	X	$330,788	$246,137
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	82,678	SQ YD	$3.19		$263,743	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	827	SQ YD	$79.71		$65,920	
	HMA OVERLAY PVMT 2.00"	100.00%	82,678	SQ YD	$11.32		$935,685	
	HMA OVERLAY SHLD 2.00 "	100.00%	0	SQ YD	$8.06		$0	
	PWFn =	0.6419		PW =	0.6419	X	$1,265,348	$812,179
YEAR 20								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.10%	83	SQ YD	$81.45		$6,760	
	PWFn =	0.5537		PW =	0.5537	X	$303,910	$168,268
YEAR 25								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.50%	413	SQ YD	$81.45		$33,638	
	PWFn =	0.4776		PW =	0.4776	X	$330,788	$157,986
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	82,678	SQ YD	$3.19		$263,743	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	1,654	SQ YD	$79.71		$131,840	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	0	SQ YD	$78.25		$0	
	HMA OVERLAY PVMT 2.25 "	100.00%	82,678	SQ YD	$12.08		$998,910	
	HMA OVERLAY SHLD 2.25 "	100.00%	0	SQ YD	$9.07		$0	
	PWFn =	0.4120		PW =	0.4120	X	$1,394,493	$574,513
YEAR 35								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.10%	83	SQ YD	$81.45		$6,760	
	PWFn =	0.3554		PW =	0.3554	X	$303,910	$108,005
YEAR 40								
	LONG SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CNTR LINE JOINT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RNDM / THRM CRACK R&S	50.00%	30,250	LIN FT	$3.00		$90,750	
	PD PVMT PATCH M&F SURF	0.50%	413	SQ YD	$81.45		$33,638	
	PWFn =	0.3066		PW =	0.3066	X	$330,788	$101,405
								$2,430,648
	ROUTINE MAINTENANCE ACTIVITY		10.42	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$2,430,648
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$47,585

PCC PAVEMENT

JPCP

ROUTE			FAP 591 (US 34)		
SECTION			(13)R-2&BY		
COUNTY			Kendall		
LOCATION			Eldamin Rd. to Center Parkway		
FACILITY TYPE			NON-INTERSTATE		
PROJECT LENGTH			11000 FT	= = >	2.08 Miles
# OF CENTERLINES			2 CL		
# OF LANES			5 LANES		
# OF EDGES			4.2545 EP		
LANE WIDTH - AVERAGE			13.5291 FT		
SHOULDER WIDTH	PCC	Inside	0 FT		
	PCC	Outside	0 FT		
	Total Width of Paved Shoulders		0 FT		
PAVEMENT THICKNESS (RIGID)		JPCP	10.00 IN	TIED SHLD	
SHOULDER THICKNESS			10.00 IN		
POLICY OVERLAY THICKNESS			2.50 IN		

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	5.02	10.68	10.68
Worksheet Construction Type is New Construction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(10.00")	82,678	SQ YD		$45.36	/ SQ YD	$3,750,274
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	0	SQ YD	*	$13.00	/ SQ YD	$0
PCC SHOULDERS	(10.00" to 10.00")	0	SQ YD		$40.00	/ SQ YD	$0
CURB & GUTTER		22,000	LIN FT	*	$20.00	/ LIN FT	$440,000
SUBBASE GRAN MATL TY C	(~ 0.00")	0	TONS		$25.00	/ TON	$0
IMPROVED SUBGRADE:	Aggregate	90,011	SQ YD	*	$13.00	/ SQ YD	$1,170,143
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
Reserved For User Supplied Item		0	UNITS		$0.00	/ UNITS	$0
PAVEMENT REMOVAL		82,678	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	$5,360,417
RIGID CONSTRUCTION ANNUAL COST PER MILE	$104,940

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")				
HMA POLICY OVERLAY PVMT	(2.50")			$13.29	/ SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix		$8.48	/ SQ YD
HMA BINDER MIX	(1.00")	eling Binder Mix		$4.81	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")	Shoulder Mix		$10.08	/ SQ YD
CLASS A PAVEMENT PATCHING				$195.00	/ SQ YD
CLASS B PAVEMENT PATCHING				$140.00	/ SQ YD
CLASS C SHOULDER PATCHING				$130.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix		$78.63	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix		$84.26	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$3.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL				$3.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL				$3.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)			$3.00	/ LIN FT

RIGID TOTAL LIFE-CYCLE COST	$6,706,141
RIGID TOTAL ANNUAL COST PER MILE	$131,285

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 02/09/15

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%	83	SQ YD	$140.00		$11,620	
	PWFn =	0.7441		PW =	0.7441	X	$11,620	$8,646
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	165	SQ YD	$140.00		$23,100	
	PWFn =	0.6419		PW =	0.6419	X	$23,100	$14,827
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	1,654	SQ YD	$140.00		$231,560	
	SHOULDER PATCH CLASS C	0.50%	0	SQ YD	$130.00		$0	
	LONGITUDINAL SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CENTERLINE JT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	PWFn =	0.5537		PW =	0.5537	X	$437,960	$242,488
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	2,480	SQ YD	$140.00		$347,200	
	SHOULDER PATCH CLASS C	1.00%	0	SQ YD	$130.00		$0	
	PWFn =	0.4776		PW =	0.4776	X	$347,200	$165,825
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	3,307	SQ YD	$140.00		$462,980	
	SHOULDER PATCH CLASS C	1.50%	0	SQ YD	$130.00		$0	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	82,678	SQ YD	$13.29		$1,098,521	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	0	SQ YD	$10.08		$0	
	PWFn =	0.4120		PW =	0.4120	X	$1,561,501	$643,318
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CENTERLINE JT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	RANDOM CRACK R&S	50.00%	27,500	LIN FT	$3.00		$82,500	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	19,834	LIN FT	$3.00		$59,502	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	83	SQ YD	$84.26		$6,994	
	PWFn =	0.3554		PW =	0.3554	X	$355,396	$126,302
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	413	SQ YD	$140.00		$57,820	
	LONGITUDINAL SHLD JT R&S	100.00%	46,800	LIN FT	$3.00		$140,400	
	CENTERLINE JT R&S	100.00%	22,000	LIN FT	$3.00		$66,000	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	29,750	LIN FT	$3.00		$89,250	
	RANDOM CRACK R&S	50.00%	27,500	LIN FT	$3.00		$82,500	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	413	SQ YD	$84.26		$34,801	
	PWFn =	0.3066		PW =	0.3066	X	$470,771	$144,318
								$1,345,724
	ROUTINE MAINTENANCE ACTIVITY		10.42	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$1,345,724
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$26,345

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 9/5/14 9:20 AM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$5,360,417	$6,233,774
		ANNUAL COST PER MILE	$104,940	$122,038
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$1,345,724	$2,430,648
		ANNUAL COST PER MILE	$26,345	$47,585
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$6,706,141	$8,664,422
		ANNUAL COST PER MILE	$131,285	$169,622

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**JPCP**	**$131,285**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**HMA**	**$169,622**	**29.2%**

P:\Pavement Design Stuff\D-3\US 34 from Eldamain Road to Center Parkway\[US 34 from Eldamain Road to Center Parkway IDOT Mechanistic Pavement Design w