



Illinois Department of Transportation

To: John Fortmann Attn: District One *MA*
From: Maureen M. Addis
Subject: Pavement Design
Date: January 29, 2016

FAP Route 344 (IL 83)
14-A5015-03-RP
Lake/Cook Counties
At Lake-Cook Road

The project, submitted to BDE by email memo dated January 28, 2016, will reconstruct a short section of IL 83, and widen the north leg of IL 83. The project length does not qualify for alternate bid, as it is less than 2 lane-miles. The LCCA favors a rigid design by more than 10%. The widening and resurfacing of IL 25 will use a mechanistic flexible design based on first cost.

The approved pavement design is as follows:

IL 83 (Pavement Reconstruction)

9.25 inches of PCC Pavement with tied PCC Curb & Gutter
12 inches of Aggregate Subgrade Improvement

IL 83 [Sta. 1102+36 to sta. 1106+99] (Pavement Widening & Resurfacing)

10.25 inches of Full Depth HMA Pavement with PCC Curb & Gutter
1.50 inches of HMA Surface Course, Mix "D", N70
0.75 inches of Leveling Binder (Machine Method) N70
8 inches of HMA Binder Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

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



Illinois Department of Transportation

Memorandum

To: Maureen Addis

Attn: Paul Niedernhofer

From: Jose A. Dominguez

By: Melchor Mangoba / Ojas Patel

Subject: Pavement Analysis*

Date: January 28, 2016

*Route: Illinois Route 83
Limits: at Lake-Cook Road
Section: 14-A5015-03RP
Current target: Unknown

County: Cook & Lake
Contract No.: Unknown
Job No.: C-91-364&365-14

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required since the total pavement area for reconstruction and widening exceeds 4,750 Square Yards. The following is the scope of the project:

Reconstruction with widening of the north leg of the IL 83 at Lake-Cook Road intersection. A 20-year pavement analysis was performed for the above segments. We recommend a mechanistic-rigid pavement design based on the life cycle cost analysis which favors PCC pavement by 13%. Our recommendation for the widening of the north leg of IL 83 is follows based on the mechanistic pavement design procedure using a first cost analysis.

IL 83

Reconstruction
PCC Curb and Gutter (Tied)
9 ¼" PCC Pavement¹
12" Aggregate Subgrade Improvement⁵

IL 83 (Sta. 1102+36 to Sta. 1106+99)

Widening and Resurfacing
PCC Curb and Gutter
10 ¼" Full Depth HMA⁶
 1 ½" HMA Surface Course, Mix "D", N70²
 ¾" Leveling Binder (Machine Method), N70³
 8" HMA Binder Course, IL-19.0, N70⁴
12" Aggregate Subgrade Improvement⁵

Maureen Addis
January 28, 2016
Page Two

Pavement Resurfacing

Cold Milling of HMA Pavement

2 ¼" minimum (more if necessary)

1 ½" HMA Surface Course, Mix "D", N70²

¾" Leveling Binder (Machine Method), N70³

¹Designer Note 1: Use pay item 42000406, **PORTLAND CEMENT CONCRETE PAVEMENT 9 ¼" (JOINTED)**, paid for in square yards. Transverse contraction joints should be reduced to a maximum of 14 ½ foot spacing for 9 ¼" PCC pavement.

²Designer Note 2: Use pay item 40603340, **HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70** paid for in tons.

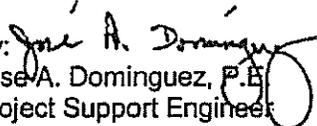
³Designer Note 3: Use pay item 40600635, **LEVELING BINDER (MACHINE METHOD), N70** paid for in tons.

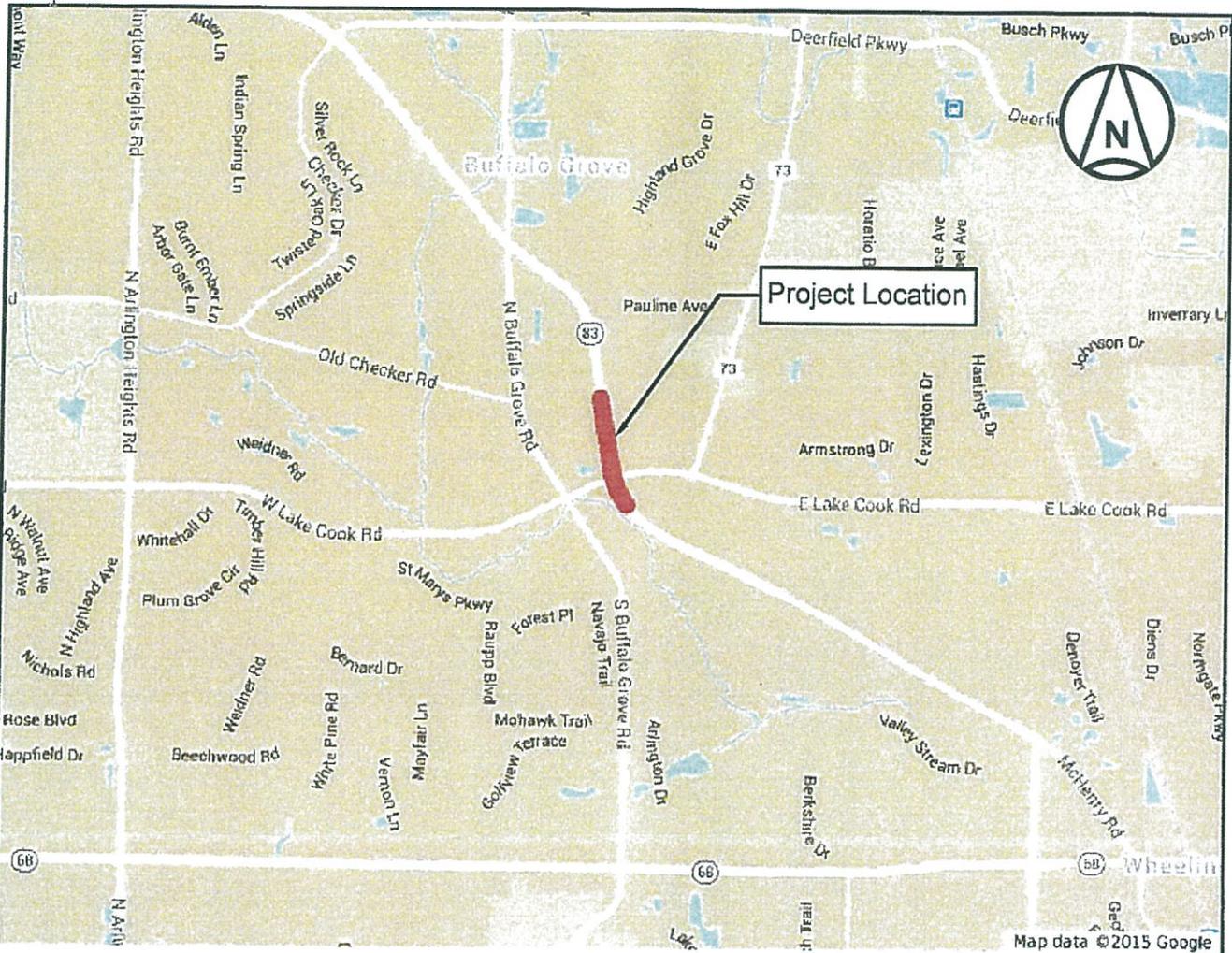
⁴Designer Note 4: For widening of six feet or less use pay item 35600708, **HOT-MIX ASPHALT BASE COURSE WIDENING, 8"**, paid for in square yards. For widening of greater than six feet use pay item 35501316, **HOT-MIX ASPHALT BASE COURSE, 8"**, paid for in square yards.

⁵Designer Note 5: Use pay item 30300112, **AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

⁶Designer Note 6: Refer to the District One, Bureau of Materials' "Hot-Mix Asphalt – Mix Selection" tables to determine the corresponding HMA mix table requirements for the plans.

If you have any questions or need additional information, please contact Ojas Patel, Pavement Design Engineer, at (847)705-4550.

By: 
Jose A. Dominguez, P.E.
Project Support Engineer



Illinois Department of Transportation

IL Route 83 (McHenry Road)
Proposed Improvements

LOCATION MAP



Not To Scale

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

Route: IL 83	Comments: Local Roads Project to Reconstruct Intersection		
Section:	Includes W&RS of north leg of IL 83		
County: Lake/Cook Border	Design Date: 01/27/2016	ONP	<-- BY
Location: at Lake-Cook Road	Modify Date:	<-- BY	
		ADT	Year
		Current: 25,000	2008
		Future: 28,000	2040
Facility Type: Other Marked State Route			
# of Lanes = 4			
Road Class: I			
Subgrade Support Rating (SSR): Poor			
Construction Year: 2016			
Design Period (DP) = 20 years			

	Structural Design Traffic			% of ADT in Design Lane
	Minimum ADT	Actual ADT	Actual % of Total ADT	
PV =	0	24,899	93.3%	P = 32%
SU =	250	1,068	4.0%	S = 45%
MU =	750	721	2.7%	M = 45%
Struct. Design ADT =	26,688 (2026)			

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) =	4.43 (Actual ADT)	TF rigid (Actual) =	5.92 (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	JPC Pavement
Use TF flexible = 4.43	Use TF rigid = 5.92
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
HMA Mixture Temp. = 73.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 9.25 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 740 ksi (Fig. 54-5.D)	
Design HMA Strain (ε _{HMA}) = 79 (Fig. 54-5.E)	
Full Depth HMA Design Thickness = 10.25 in. (Fig. 54-5.F)	
Limiting Strain Criterion Thickness = 14.25 in. (Fig. 54-5.I)	
Use Full-Depth HMA Thickness = 10.25 inches	CRCP Thickness = 8.25 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 4.43	Review 54-4.03 for limitations and special considerations.
HMA Overlay Design Thickness = 7.75 in. (Fig. 54-5.U)	
Limiting Strain Criterion Thickness = in. (Fig. 54-5.V)	
Use HMA Overlay Thickness = 999.00 inches	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)

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	
>3501		I

Class Table for 2 or 3 lanes (not future 4 lane & not one-way streets)	ADT	Class
	0 - 749	
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 IL 83
 SECTION
 COUNTY Lake/Cook Border
 LOCATION at Lake-Cook Road

FACILITY TYPE NON-INTERSTATE

PROJECT LENGTH 860 FT ==> 0.16 Miles
 # OF CENTERLINES 2 CL
 # OF LANES 4 LANES
 # OF EDGES 4 EP
 LANE WIDTH - AVERAGE 12 FT
 SHOULDER WIDTH HMA Inside 0 FT
 HMA Outside 0 FT
 Total Width of Paved Shoulders 0 FT

PAVEMENT THICKNESS (FLEXIBLE) 10.25 IN 14.25 IN MAX
 SHOULDER THICKNESS 8.00 IN Standard Design
 POLICY OVERLAY THICKNESS 2.25 IN

FLEX PAVEMENT	TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
		3.56	4.43	4.43

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	\$128.27 /TON
HMA TOP BINDER	\$106.00 /TON
HMA LOWER BINDER	\$84.12 /TON
HMA BINDER (LEVELING)	\$106.00 /TON
HMA SHOULDER	\$72.00 /TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
HMA PAVEMENT (FULL-DEPTH)	(10.25")	4,533 SQ YD *	\$56.42 /SQ YD	\$255,771 ~
HMA SURFACE COURSE	(2.00")	511 TONS	\$128.27 /TON	\$0
HMA TOP BINDER COURSE	(2.25")	584 TONS	\$106.00 /TON	\$0
HMA LOWER BINDER COURSE	(6.00")	1,600 TONS	\$84.12 /TON	\$0
HMA SHOULDER	(8.00")	0 TONS	\$72.00 /TON	\$0 ~
CURB & GUTTER		3,400 LIN FT *	\$30.00 /LIN FT	\$102,000
SUBBASE GRAN MATL TY C (TONS)		20 TONS	\$25.00 /TON	\$500
IMPROVED SUBGRADE:	Aggregate 1/2" to 3/4"	5,045 SQ YD	\$7.00 /SQ YD	\$35,315
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL		4,533 SQ YD	\$15.00 /SQ YD	\$67,995
SHOULDER REMOVAL		0 SQ YD	\$0.00 /SQ YD	\$0
Note: * Denotes User Supplied Quantity			FLEXIBLE CONSTRUCTION INITIAL COST	\$461,581
			FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	\$116,941

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	T	UNIT COST
ROUTINE MAINTENANCE ACTIVITY				\$0.00 LANE-MILE / YEAR
HMA OVERLAY PVMT SURF	(2.00")	Surface Mix	2.00	\$14.47 /SQ YD
HMA OVERLAY PVMT	(2.25")	Surface Mix	2.25	\$16.30 /SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix	1.50	\$10.83 /SQ YD
HMA BINDER MIX	(0.75")	Leveling Binder Mix	0.75	\$4.47 /SQ YD
HMA OVERLAY SHLD (Year 30)	(2.25")	Shoulder Mix	2.25	\$9.07 /SQ YD
HMA OVERLAY SHLD	(2.00")	Shoulder Mix	2.00	\$8.06 /SQ YD
MILLING (2.00 IN)			2.00	\$3.00 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)		Surface Mix	2.00	\$84.37 /SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix	2.00	\$78.06 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00")		Leveling Binder Mix	2.00	\$81.76 /SQ YD
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00")		Shoulder Mix	2.00	\$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 \$601,717
 FLEXIBLE TOTAL ANNUAL COST PER MILE \$152,444

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%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$84.37	\$422	
		PWFn = 0.8626			PW = 0.8626 X	\$14,362	\$12,389
YEAR 10							
	LONG SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	\$84.37	\$1,940	
		PWFn = 0.7441			PW = 0.7441 X	\$15,880	\$11,816
YEAR 15							
	MILL PVMT & SHLD 2.00"	100.00%	4,533	SQ YD	\$3.00	\$13,599	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	45	SQ YD	\$81.76	\$3,679	
	HMA OVERLAY PVMT 2.00"	100.00%	4,533	SQ YD	\$14.47	\$65,579	
	HMA OVERLAY SHLD 2.00"	100.00%	0	SQ YD	\$8.06	\$0	
		PWFn = 0.6419			PW = 0.6419 X	\$82,857	\$53,183
YEAR 20							
	LONG SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$84.37	\$422	
		PWFn = 0.5537			PW = 0.5537 X	\$14,362	\$7,952
YEAR 25							
	LONG SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	\$84.37	\$1,940	
		PWFn = 0.4776			PW = 0.4776 X	\$15,880	\$7,584
HMA SD							
YEAR 30 NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	4,533	SQ YD	\$3.00	\$13,599	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	91	SQ YD	\$81.76	\$7,440	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	0	SQ YD	\$78.06	\$0	
	HMA OVERLAY PVMT 2.25"	100.00%	4,533	SQ YD	\$15.30	\$69,352	
	HMA OVERLAY SHLD 2.25"	100.00%	0	SQ YD	\$9.07	\$0	
		PWFn = 0.4120			PW = 0.4120 X	\$90,391	\$37,240
YEAR 35							
	LONG SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.10%	5	SQ YD	\$84.37	\$422	
		PWFn = 0.3554			PW = 0.3554 X	\$14,362	\$5,104
YEAR 40							
	LONG SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CNTR LINE JOINT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RNDM / THRM CRACK R&S	50.00%	1,870	LIN FT	\$2.00	\$3,740	
	PD PVMT PATCH M&F SURF	0.50%	23	SQ YD	\$84.37	\$1,940	
		PWFn = 0.3066			PW = 0.3066 X	\$15,880	\$4,868
							\$140,136
ROUTINE MAINTENANCE ACTIVITY				0.64 Lane Miles	0.00	\$0	\$0
MAINTENANCE LIFE-CYCLE COST							\$140,136
45	YEAR LIFE CYCLE	CRFn = 0.0407852	MAINTENANCE ANNUAL COST PER MILE				\$35,503

TASK DETAIL REPORT

Date: 01/27/2016
Time: 13:27:28

Project: **LR-LAKE COOK RD AT IL 83**
Location: **LOCAL**

Project No.: **LR**
Bld Date: **01/27/2016**

Pay Item: **42000406 PORTLAND CEMENT CONCRETE PAVEMENT**
Pay Item Quantity: **8,420.000 S.Y.**

Task: **PORTLAND CEMENT CONCRETE PAVEMENT** Estimated Time: **4.00 days**
Task Quantity: **8,420.00 S.Y.** Productivity: **4.00 days**
0.063 manhours/S.Y.

LABOR

description	number	days	base rate	loaded rate	S.T. cost	Overtime	total cost	unit cost
cement finisher	6.0	4.00	344.80	738.66	12,661.04	0.00	17,727.92	2.11
cement finisher foreman	1.0	4.00	360.80	783.12	2,208.08	0.00	3,052.48	0.36
laborer	6.0	4.00	304.00	660.32	11,162.88	0.00	15,847.68	1.88
laborer foreman	1.0	4.00	310.00	669.50	1,897.20	0.00	2,678.00	0.32
operating engineer crane	1.0	4.00	362.40	810.88	2,217.92	0.00	3,243.52	0.39
operating engineer oiler	1.0	4.00	320.80	747.24	1,963.28	0.00	2,988.96	0.35
traffic safety worker	1.0	1.00	262.00	508.88	400.88	0.00	508.88	0.06
traffic safety worker foreman	1.0	1.00	274.80	528.48	420.48	0.00	528.48	0.06
	18.0	66.00			32,931.76	0.00	46,575.92	5.53

EQUIPMENT

description	number	days	Rate/day	ownership	repair part			total cost	unit cost
					repair labor	rental equip	operation		
compressor - gas 175 cfm 90hp	1.0	4.00	257.90	195.84	0.00	0.00	835.76	1,031.60	0.12
generator,small diesel 6.5kw 13hp	1.0	4.00	61.28	129.92	0.00	0.00	115.20	245.12	0.03
paver slipform gomaco ghp 2800	1.0	4.00	2,247.36	7,003.84	0.00	0.00	1,985.60	8,989.44	1.07
truck - stakebody	1.0	4.00	259.76	390.08	0.00	0.00	548.96	1,039.04	0.12
truck hd service/mechanical	1.0	4.00	505.60	1,024.00	0.00	0.00	998.40	2,022.40	0.24
truck pickup 3/4 ton 4x2 diesel	3.0	4.00	144.49	780.48	0.00	0.00	953.44	1,733.92	0.21
walking saw 65hp 36"blade	1.0	4.00	289.32	458.00	0.00	0.00	741.28	1,197.28	0.14
work bridge 20hp 40'	1.0	4.00	103.84	228.16	0.00	0.00	187.20	415.36	0.05
(Fuel: 4,973.8 gallons)	10.0	40.00		10,208.32	0.00	0.00	6,485.84	16,674.16	1.98

MATERIAL/SUPPLIES

description	quant+waste	units	unit price	sub-total	waste	sales tax	total cost	unit cost
Class X 3500 PSI Concrete	2,184.630	C.Y.	98.00	211,974.00	1.00%	0.00%	214,093.74	25.43
Curing Compound	307.040	GAL	6.00	1,824.00	1.00%	0.00%	1,842.24	0.22
Curing Supplies	1.000	L.S.	2,000.00	2,000.00	0.00%	0.00%	2,000.00	0.24
Diamond Saw Blade	3.000	EACH	2,000.00	6,000.00	0.00%	0.00%	6,000.00	0.71
Dowels	8,504.200	S.Y.	6.00	50,520.00	1.00%	0.00%	51,025.20	6.06
Misc Supplies Slip Form	858.500	L.F.	2.00	1,700.00	1.00%	0.00%	1,717.00	0.20
PCG Joint and Crack Sealer	7,134.640	L.F.	4.50	31,788.00	1.00%	0.00%	32,105.88	3.81
				305,806.00	2,978.06	0.00	308,784.06	36.67

	total cost	unit cost
TOTAL TASK COST:	372,034.14	44.18
Overhead:	27,083.18	3.22
Profit:	38,244.32	4.54
Other Mark-Up:	21,868.08	2.60
TOTAL COST PLUS MARK-UP:	459,229.72	54.54

PCC PAVEMENT

JPCP

ROUTE IL 83
SECTION 0
COUNTY Lake/Cook Border
LOCATION at Lake-Cook Road

FACILITY TYPE NON-INTERSTATE

PROJECT LENGTH 850 FT ==> 0.16 Miles
OF CENTERLINES 2 CL
OF LANES 4 LANES
OF EDGES 4 EP
LANE WIDTH - AVERAGE 12 FT
SHOULDER WIDTH PCC Inside 0 FT
PCC Outside 0 FT
Total Width of Paved Shoulders 0 FT

PAVEMENT THICKNESS (RIGID) JPCP 9.25 IN TIED SHLD
SHOULDER THICKNESS 9.25 IN

POLICY OVERLAY THICKNESS 2.50 IN

RIGID PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
Worksheet Construction Type Is Reconstruction	5.02	5.92	JPCP
The Pavement Type is			JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY UNIT	UNIT PRICE	COST
JPC PAVEMENT	(9.25")	4,533 SQ YD	\$54.54 /SQ YD	\$247,230
PAVEMENT REINFORCEMENT		0 SQ YD	\$22.00 /SQ YD	\$0
STABILIZED SUBBASE	(4.00")	0 SQ YD	\$19.00 /SQ YD	\$0
PCC SHOULDERS	(9.25" to 9.25")	0 SQ YD	\$40.00 /SQ YD	\$0
CURB & GUTTER		3,400 LIN FT	\$30.00 /LIN FT	\$102,000
SUBBASE GRAN MATL TY C	(~ 0.00")	0 TONS	\$25.00 /TON	\$0
IMPROVED SUBGRADE: Aggregate Width = 50.0'		4,722 SQ YD	\$7.00 /SQ YD	\$33,054
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
Reserved For User Supplied Item		0 UNITS	\$0.00 /UNITS	\$0
PAVEMENT REMOVAL		4,533 SQ YD	\$15.00 /SQ YD	\$67,995
SHOULDER REMOVAL		0 SQ YD	\$0.00 /SQ YD	\$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST \$450,279
RIGID CONSTRUCTION ANNUAL COST PER MILE \$114,077

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")	1.0087 Surface Mix	\$16.79 /SQ YD
HMA SURFACE MIX	(1.50")	1.0052 Surface Mix	\$10.83 /SQ YD
HMA BINDER MIX	(1.00")	1.0139 eling Binder Mix	\$5.96 /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			\$150.00 /SQ YD
CLASS C SHOULDER PATCHING			\$145.00 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix	\$80.77 /SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix	\$87.96 /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 \$529,821
RIGID TOTAL ANNUAL COST PER MILE \$134,229

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

01/28/16

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

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10							
	PAVEMENT PATCH CLASS B	0.10%	5	SQ YD	\$150.00	\$750	
		PWFn = 0.7441			PW = 0.7441 X	\$750	\$558
YEAR 15							
	PAVEMENT PATCH CLASS B	0.20%	9	SQ YD	\$150.00	\$1,350	
		PWFn = 0.6419			PW = 0.6419 X	\$1,350	\$867
YEAR 20							
	PAVEMENT PATCH CLASS B	2.00%	91	SQ YD	\$150.00	\$13,650	
	SHOULDER PATCH CLASS C	0.50%	0	SQ YD	\$145.00	\$0	
	LONGITUDINAL SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CENTERLINE JT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
		PWFn = 0.5537			PW = 0.5537 X	\$23,850	\$13,205
YEAR 25							
	PAVEMENT PATCH CLASS B	3.00%	136	SQ YD	\$150.00	\$20,400	
	SHOULDER PATCH CLASS C	1.00%	0	SQ YD	\$145.00	\$0	
		PWFn = 0.4776			PW = 0.4776 X	\$20,400	\$9,743
YEAR 30 NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	181	SQ YD	\$150.00	\$27,150	
	SHOULDER PATCH CLASS C	1.50%	0	SQ YD	\$145.00	\$0	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	4,533	SQ YD	\$16.79	\$76,126	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	0	SQ YD	\$10.08	\$0	
		PWFn = 0.4120			PW = 0.4120 X	\$103,276	\$42,548
YEAR 35 NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CENTERLINE JT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	RANDOM CRACK R&S	50.00%	1,700	LIN FT	\$2.00	\$3,400	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	1,094	LIN FT	\$2.00	\$2,188	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	5	SQ YD	\$87.96	\$440	
		PWFn = 0.3554			PW = 0.3554 X	\$16,228	\$5,767
YEAR 40 NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	23	SQ YD	\$150.00	\$3,450	
	LONGITUDINAL SHLD JT R&S	100.00%	3,400	LIN FT	\$2.00	\$6,800	
	CENTERLINE JT R&S	100.00%	1,700	LIN FT	\$2.00	\$3,400	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	1,642	LIN FT	\$2.00	\$3,284	
	RANDOM CRACK R&S	50.00%	1,700	LIN FT	\$2.00	\$3,400	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	23	SQ YD	\$87.96	\$2,023	
		PWFn = 0.3066			PW = 0.3066 X	\$22,357	\$6,854
							\$79,542
	ROUTINE MAINTENANCE ACTIVITY		0.64 Lane Miles		\$0.00	\$0	\$0
							MAINTENANCE LIFE-CYCLE COST \$79,542
45	YEAR LIFE CYCLE	CRFn = 0.0407852					MAINTENANCE ANNUAL COST PER MILE \$20,152

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 1/27/16 1:42 PM

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$450,279	\$461,581
		ANNUAL COST PER MILE	\$114,077	\$116,941
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$79,542	\$140,136
		ANNUAL COST PER MILE	\$20,152	\$35,503
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$529,821	\$601,717
		ANNUAL COST PER MILE	\$134,229	\$152,444

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	----->	JPCP	\$134,229	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$152,444	13.6%

First Cost Analysis of Widening Project

Date: 1/27/2016
 Quantities by: LR
 Unit prices by:

Checked by:
 Checked by:
 Net Length 1300 ft

Route IL 83
 Section
 County Lake/Cook
 Project LR-Lake Cook Rd at IL 83
 Contract

Mechanistic Flexible							
Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA Surface Course, MIX "D" N50	@		\$0.00	40603335
400	2	45	HMA Surface Course, MIX "D" N70	@	\$210	\$9,408.00	40603340
		0	Poly HMA Surface Course, MIX "F" N90	@		\$0.00	40603595
		0	Poly HMA Surface Course, SMA N80	@		\$0.00	40603153
		0	HMA Binder course, IL-19, N50	@		\$0.00	40603080
400	8.25	185	HMA Binder course, IL-19, N70	@	\$125	\$23,100.00	40603085
		0	HMA Binder course, IL-19, N90	@		\$0.00	40603090
		0	Poly HMA Binder course, IL-19, N90	@		\$0.00	40603240
		0	HMA Binder course, SMA, N80	@		\$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		\$0.00	30300112
Total						\$32,508.00	

Modified AASHTO							
Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA Surface Course, MIX "D" N50	@		\$0.00	40603335
400	2	45	HMA Surface Course, MIX "D" N70	@	\$210	\$9,408.00	40603340
		0	Poly HMA Surface Course, MIX "F" N90	@		\$0.00	40603595
		0	Poly HMA Surface Course, SMA N80	@		\$0.00	40603153
		0	HMA Binder course, IL-19, N50	@		\$0.00	40603080
400	11.25	252	HMA Binder course, IL-19, N70	@	\$125	\$31,500.00	40603085
		0	HMA Binder course, IL-19, N90	@		\$0.00	40603090
		0	Poly HMA Binder course, IL-19, N90	@		\$0.00	40603240
		0	HMA Binder course, SMA, N80	@		\$0.00	40603148
	NA	NA	12" Aggregate Subgrade	@		\$0.00	30300112
Total						\$40,908.00	

Composite							
Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA Surface Course, MIX "D" N50	@		\$0.00	40603335
400	2	45	HMA Surface Course, MIX "D" N70	@	\$210	\$9,408.00	40603340
		0	Poly HMA Surface Course, MIX "F" N90	@		\$0.00	40603595
		0	Poly HMA Surface Course, SMA N80	@		\$0.00	40603153
400	10	NA	PCC Base Course	@	\$59	\$23,600.00	35300410
	NA	NA	12" Aggregate Subgrade	@		\$0.00	30300112
Total						\$33,008.00	