Illinois Department of Transportation

To:	John Fortman	Attn: District One
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	July 11, 2012	

FAP Route 559 (IL 58)
Section 00-00078-CH
Cook County
At New Wilke Road

We have reviewed the revised pavement design for the above captioned section submitted to BDE on May 25, 2012. The life cycle cost analysis favored the rigid design by over 10%. The approved pavement design is as follows:

IL 58 at New Wilke Road [New Construction]

9.5 inches of jointed PCC pavement with tied PCC curb & gutter
12 inches of Aggregate Subgrade Improvement

EB IL 58 at the east end of improvement at Meijer Drive [Widening]

2.5 inches of HMA Surface with tied PCC curb & gutter
- 1.75 inches Polymerized HMA Surface Course Mix "F": N90
- 0.75 inches Leveling Binder [Machine Method] N70

10 inches of PCC Base Course [Match Existing]
12 inches of Aggregate Subgrade Improvement

Existing Pavement Resurfacing

2.5 inches of resurfacing
- 1.75 inches Polymerized HMA Surface Course Mix "F" N90
- 0.75 inches Leveling Binder [Machine Method] N70

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

Illinois Department of Transportation

Memorandum

To:	John D. Baranzelli, PE	Attn:	Paul R. Niedernhofer
From:	Diane O'Keefe	By:	Jose Dominguez
Subject:	Pavement Analysis*		
Date:	May 22, 2012		

*Route: FAP 0559 IL 58
Limits: at New Wilke Rd
Contract No.: 83735
Letting: 09 CY12

Section: 00-00078-CH
County: Cook
Job No.: 401-01

We are submitting the pavement analysis for the above captioned location for your review and approval. Please note that the total pavement area for reconstruction exceeds 4,750 Square Yards. The improvement involves the following scope of work:

a.) Pavement reconstruction of IL 58 at New Wilke Road for a total length of approximately 2,300 feet to accommodate three 12 foot thru lanes in either direction and turn lanes.

b.) Pavement widening and resurfacing of E.B. IL 58 at the east end of the improvement for a total length of approximately 308 feet to provide an 12 foot thru lane to Meijer Drive.

A 20 year pavement analysis was performed on the above segments. We recommend a mechanistic-rigid pavement design based on the life cycle cost analysis which favors PCC pavement by 24.3%.

a.) IL 58 at New Wilke Road

Tied PCC Curb and Gutter
Pavement Reconstruction
- 9½" PCC Pavement (Jointed) *
- 12" Aggregate Subgrade Improvement

We recommend a segmental design for the widening of IL 58 at Meijer Drive. The existing PCC thickness is believed to be 10".

b.) E.B IL 58 at the east end of the improvement at Meijer Drive.

Tied PCC Curb and Gutter
Proposed Pavement Widening
- 2 ½" HMA Surface
  - 1 ¾" Polymerized HMA Surface Course Mix "F" N90 **
  - ¾" Leveling Binder (Machine Method), N70 ***
- 10" PCC Base Course (Match Existing) ****
- 12" Aggregate Subgrade Improvement

Existing Pavement Resurfacing
- 2 ½" Resurfacing
  - 1 ¾" Polymerized HMA Surface Course Mix "F" N90 **
  - ¾" Leveling Binder (Machine Method), N70 ***

* Designer Note 1: 9 ½" PCC Pavement (Jointed) is paid in square yards as **PCC PVT 9 ½ JOINTD** (42000411). When there are 6 lanes plus turn lanes at an intersection, a dowelled construction joint should be used as shown in BD52 to avoid longitudinal cracking.

** Designer Note 2: Use pay item #40603595 **"P HMA SC "F" N90"** paid for in tons.

*** Designer Note 3: Use pay item #40600635 **"LEV BIND MM N70"** paid for in tons. ***

**** Designer Note 4: Use pay item #35300500 **"PCC BASE CSE 10"** paid for in square yards.

Designer Note 5: New Wilke Road pavement design is to be provided by the local jurisdictional.

If you have any questions or need additional information, please contact Mr. Tom Matousek at (847)705-4255.

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

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
0559	00-00078-00-CH	COOK	114	1
TED. ROAD DIST. NO.	ILLINOIS	CONTRACT NO. 83735		

PRE-FINAL SUBMITTAL
MAY 4, 2012
(FOR SEPT 2012 LETTING)

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLANS FOR PROPOSED FEDERAL AID HIGHWAY

F.A.P. 0559 IL ROUTE 58
SECTION 00-00078-00-CH
PROJECT F-0559-(007)
IL RTE 58 (GOLF ROAD) AND NEW WILKE ROAD INTERSECTION IMPROVEMENT
CITY OF ROLLING MEADOWS, COOK COUNTY
C-91-401-01

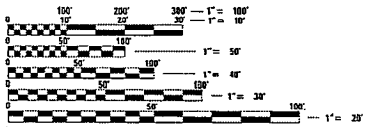
INDEX OF SHEETS LOCATED ON SHEET NO. 2

LIST OF STATE STANDARDS LOCATED ON SHEET NO. 2

DESIGN DESIGNATION
(GOLF ROAD) – 3650 (20) MAJOR ARTERIAL 20.3 (PCC-20)
DESIGN DESIGNATION
(NEW WILKE ROAD) – 350 (20) COLLECTOR 8.7 (PCC-20)

TRAFFIC DATA:
IL RTE 58
ADT = 50,000
POSTED/DESIGN SPEED = 40 MPH

NEW WILKE RD.
ADT = 30,000
POSTED/DESIGN SPEED = 30/40 MPH NORTH OF IL RTE 58
POSTED/DESIGN SPEED = 30 MPH SOUTH OF IL RTE 58

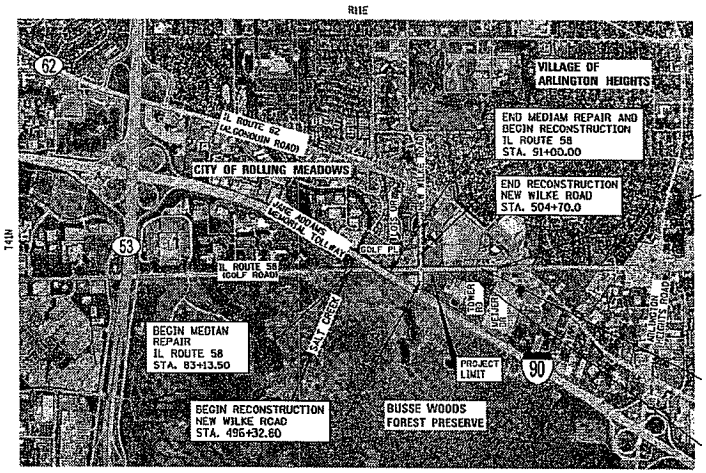


FULL SIZE PLANS HAVE BEEN PREPARED USING STANDARD ENGINEERING SCALES. REDUCED SIZED PLANS WILL NOT CONFORM TO STANDARD SCALES. IN MAKING MEASUREMENTS ON REDUCED PLANS, THE ABOVE SCALES MAY BE USED.

J.U.L.I.E.
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION
1-800-892-0123 OR 811
T41N, R11E, SECTION 8, 9, 16, 17

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AS WELL AS SUPERVISION/DIRECTION AND MEANS/METHODS OF CONSTRUCTION.

CONTRACT NO. 83735



LOCATION MAP
GROSS LENGTH OF PROJECT: 4083 FT (0.773 MI)
NET LENGTH OF PROJECT: 3881 FT (0.735 MI)

LOCATION OF SECTION INDICATED THUS:-

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED ..... 20 .....
CITY OF ROLLING MEADOWS ..... TITLE

PASSED ..... 20 .....
DISTRICT 1 ENGINEER OF LOCAL ROADS AND STREETS
RELEASING FOR BID BASED ON LIMITED REVIEW ..... 20 .....
DEPTUTY DIRECTOR OF HIGHWAYS, REGION 1 ENGINEER

BRYAN L. LUKE 062-054557 REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

..... 2012

BRYAN L. LUKE
ILLINOIS REGISTRATION No. 062-054557
EXPIRATION DATE: 11/30/13

PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS

CHRISTOPHER B. BURKE ENGINEERING, LTD.
9575 W. Higgins Road, Suite 600
Rosemont, Illinois 60018
(847) 823-0500

PROFESSIONAL DESIGN FIRM NO.: 184-001175
EXPIRATION DATE: APRIL 30, 2013

PROGRAM AND OFFICE ENGINEER:
CHARLES F. RIDDLE, PE
847-705-4406
SCHAUMBURG, IL

IL 58

Spreadsheet by Uehle - Rev. 11/02

MECHANISTIC PAVEMENT DESIGN

FOR TF ONLY

Date: 5/15/12

INPUT (Enter Data in Gray Shaded Cells)

Route: IL 58
Section: 00-00078-CH
County:
Location: at New Wilke

Comments: Reconstruction of IL 58

Designer: GJP

	ADT	Year
Current:	45000	2002
Future:	60000	2020

Facility Type: Other Marked State Route

# of Lanes = 6 or more

Road Class: I
Rural or Urban ?
Subgrade Support Rating (SSR): Poor
Construction Year: 2014
Design Period (DP) = 20 years

	Minimum ADT	Structural Design Traffic: Actual ADT	Actual %of Total ADT	% of ADT in Design Lane	
PV =	0	49,067	96.0%	P =	20%
SU =	250	1,022	2.0%	S =	40%
MU =	750	1,022	2.0%	M =	40%
Struct. Design ADT =		51111	(2024)		

FLEXIBLE & RIGID PAVEMENT CALCULATIONS AND ADDITIONAL INPUT

Flexible Pavement

Cpv =	0.15	
Csu =	133	
Cmu =	483	
TF flexible (Actual)=	5.06	(Actual ADT)
TF flexible (Min)=	3.16	(Min ADT Fig 54-2C)
Use TF flexible =	5.06	
AC Type =	20	
AC Mixture Tempurature =	70.6	deg. F (Figure 54-5C)
Design AC Mixture Modulus (Eac)=	550	ksi (Figure 54-5D)
Design Asphalt Concrete Microstrain =	62.6	(Figure 54-5E)
Asphalt Concrete Thickness =		in. (Figure 54-5F)

Rigid Pavement

Cpv =	0.15	
Csu =	144	
Cmu =	696	
TF rigid (Actual)=	6.90	(Actual ADT)
TF rigid (Min)=	4.47	(Min ADT Fig 54-2C)
Use TF rigid =	6.90	
	Tied	Shoulder or C. &G.
Rigid Pavt Thick =		in. (Figure 54-4D)

DESIGN TABLES FROM BD&E PAVEMENT DESIGN CH. 54 AND PAVEMENT DESIGN MANUAL

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 54-2C): PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

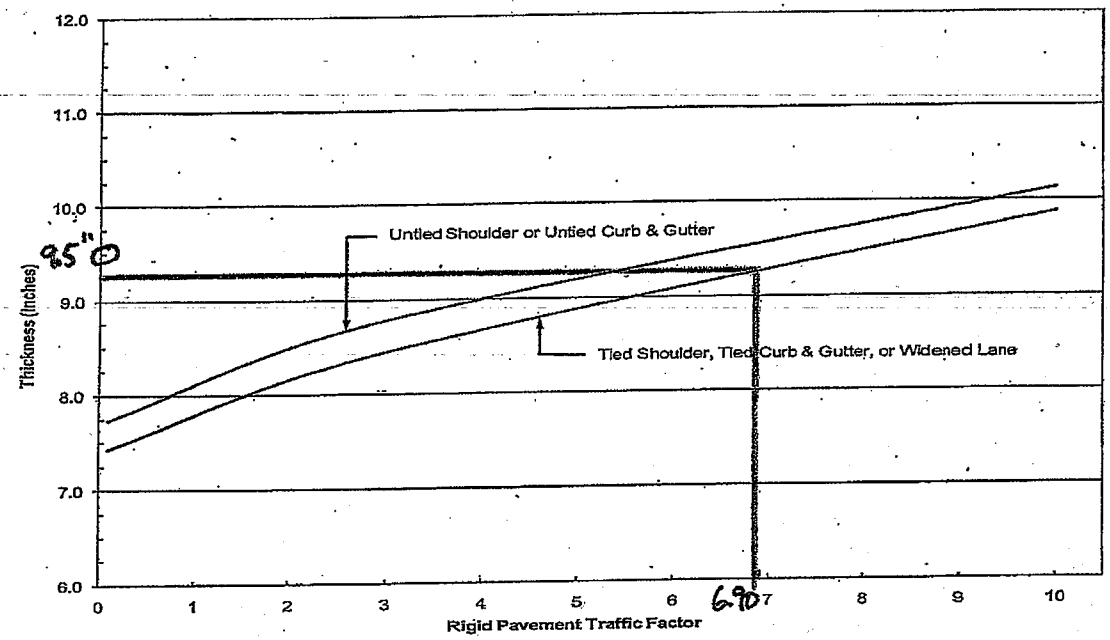
Class Table for One-Way Streets: ADT	Class
0 - 3500	II
>3501	I

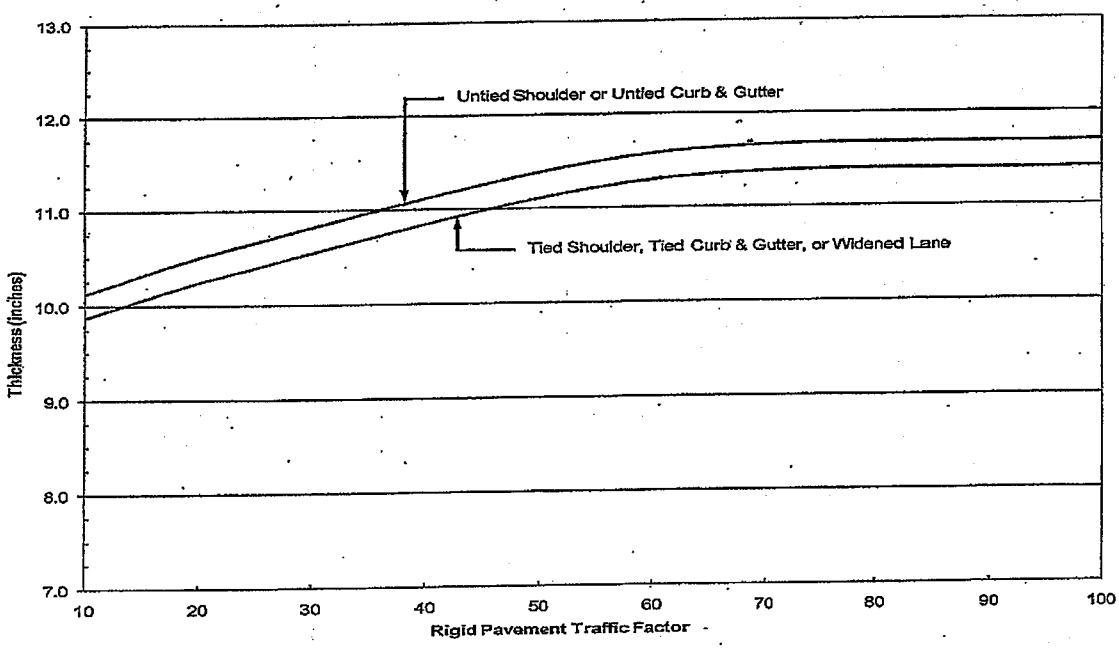
Class	Traffic Factor ESAL Coefficients: Rigid (Fig. 54-4C) Csu	Rigid Cmu	Flexible (Fig. 54-5B) Csu	Flexible Cmu
	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV(ADT>400)	127.75	555.90	109.14	384.35
IV(ADT<=400)	127.75	555.90	9.86	78.84

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	Figure 54-2B Percentage of ADT in Design Lane: Rural P	Rural S	Rural M	Urban P	Urban S	Urban 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%

IL 58





Note: Use of untied shoulder design requires BDE approval.

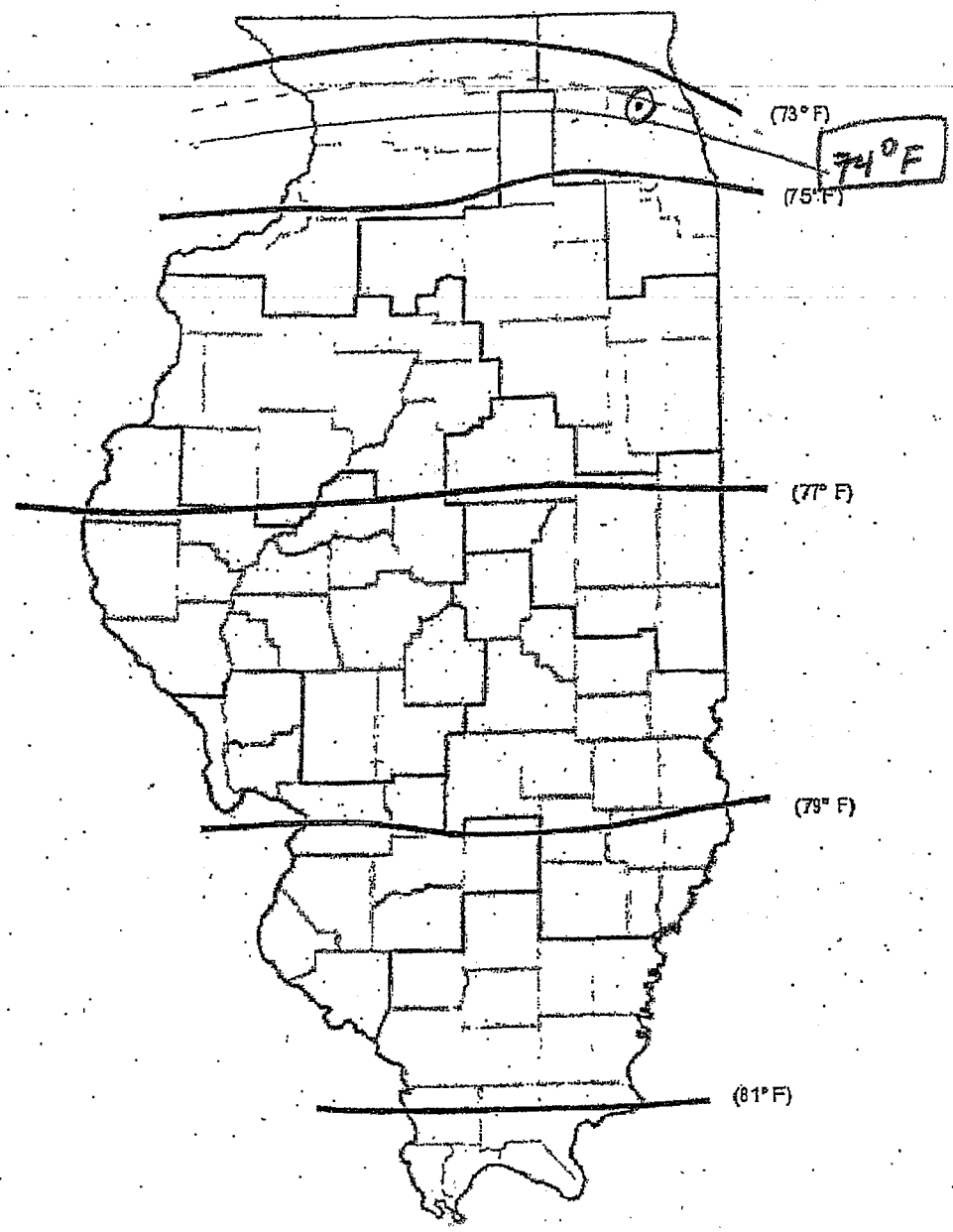
9.5" PCC

RIGID PAVEMENT DESIGN CHART
(Mechanistic Design: SSR = Poor)

Figure 54-4.E

HARD COPIES UNCONTROLLED

IL 58



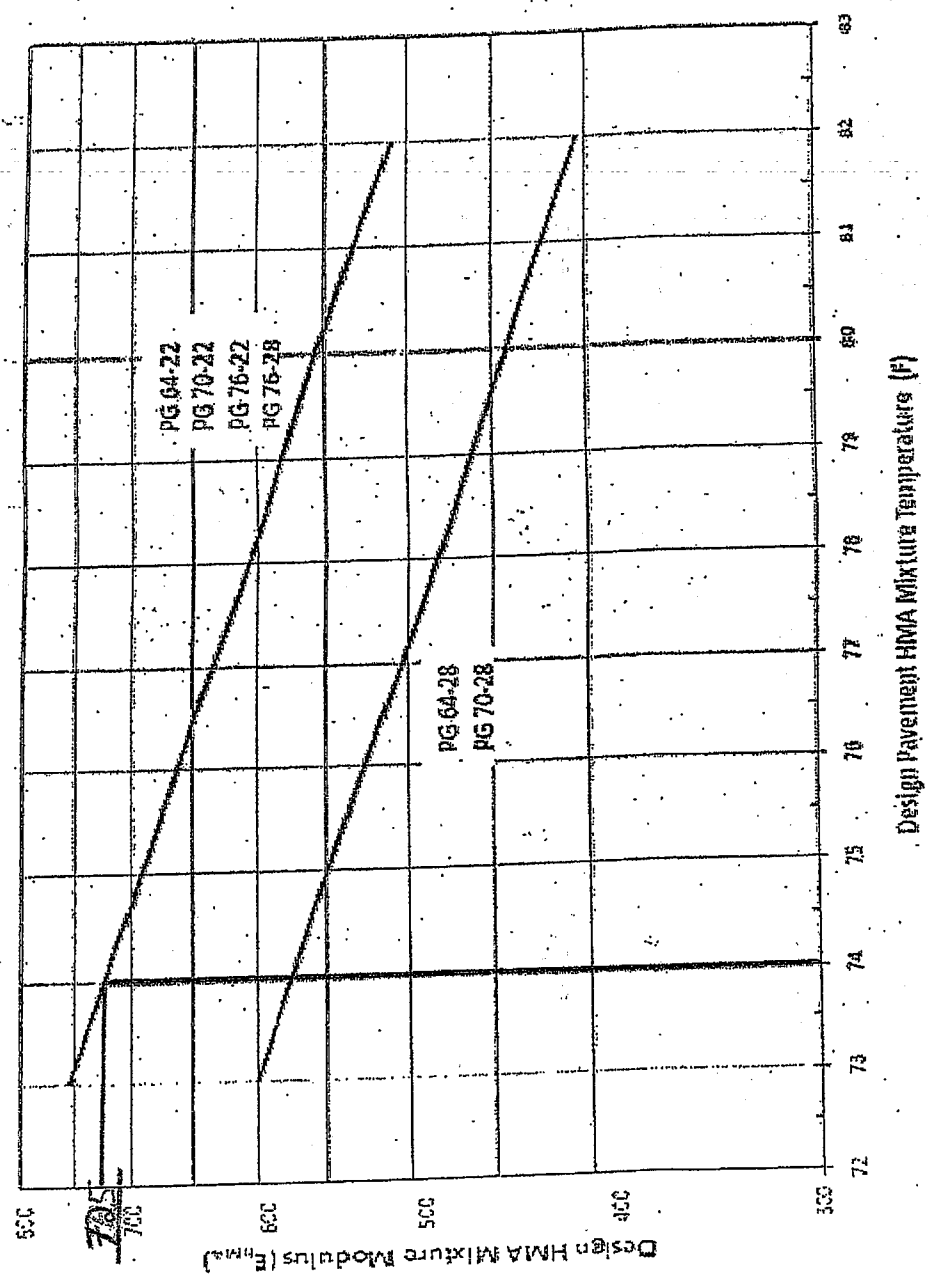
Note: The minimum design HMA mixture temperature will be 73 °F.

HMA MIXTURE TEMPERATURE
(Mechanistic Design: Flexible Pavement)

Figure 54-5.C

HARD COPIES UNCONTROLLED

IL 58

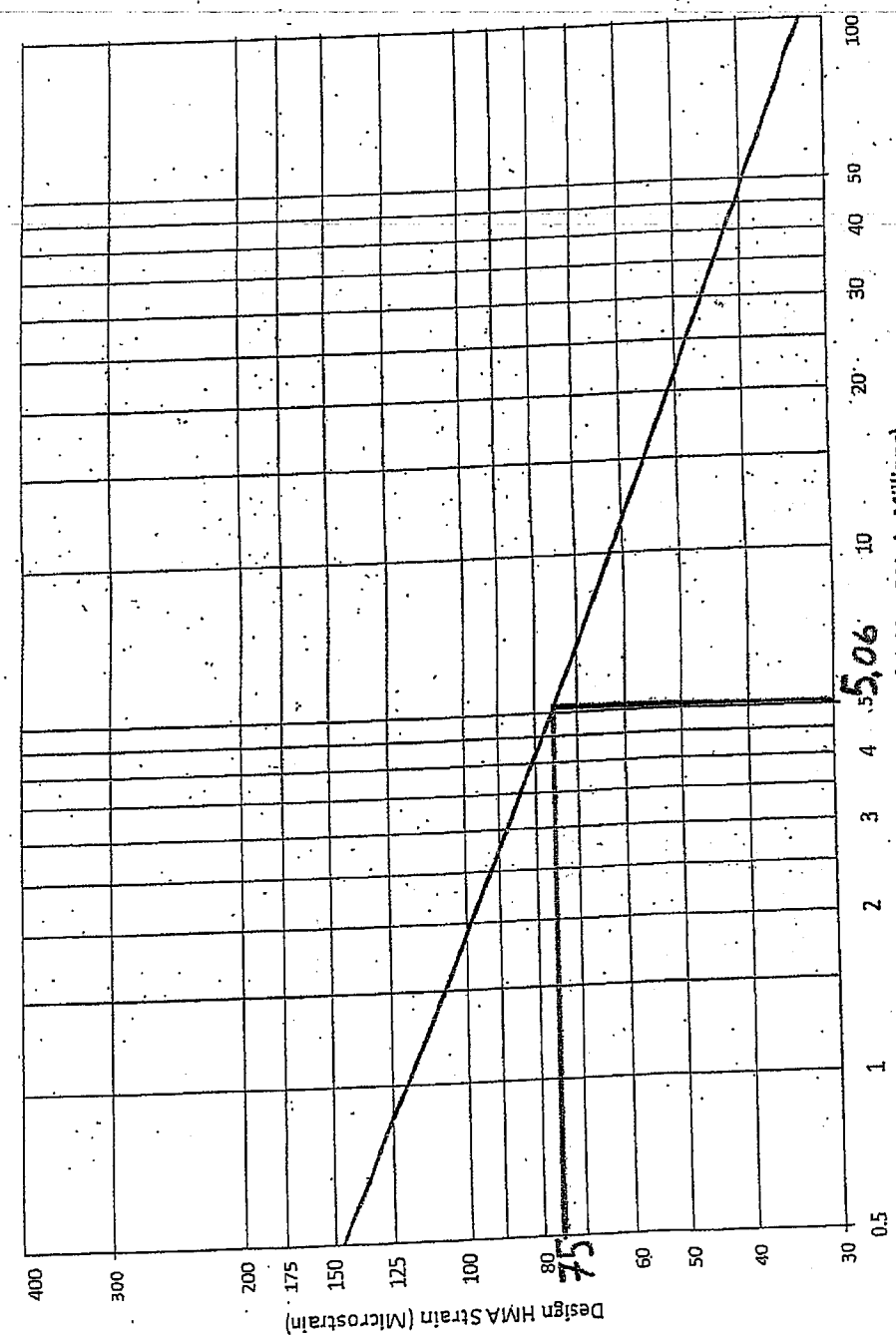


HMA MIXTURE MODULUS (E_{HMA})
(Mechanistic Design: Flexible Pavement)

Figure 54-5.D

HARD COPIES UNCONTROLLED

IL 58



DESIGN HMA STRAIN
(Mechanistic Design: Flexible Pavement)

Figure 54-5.E

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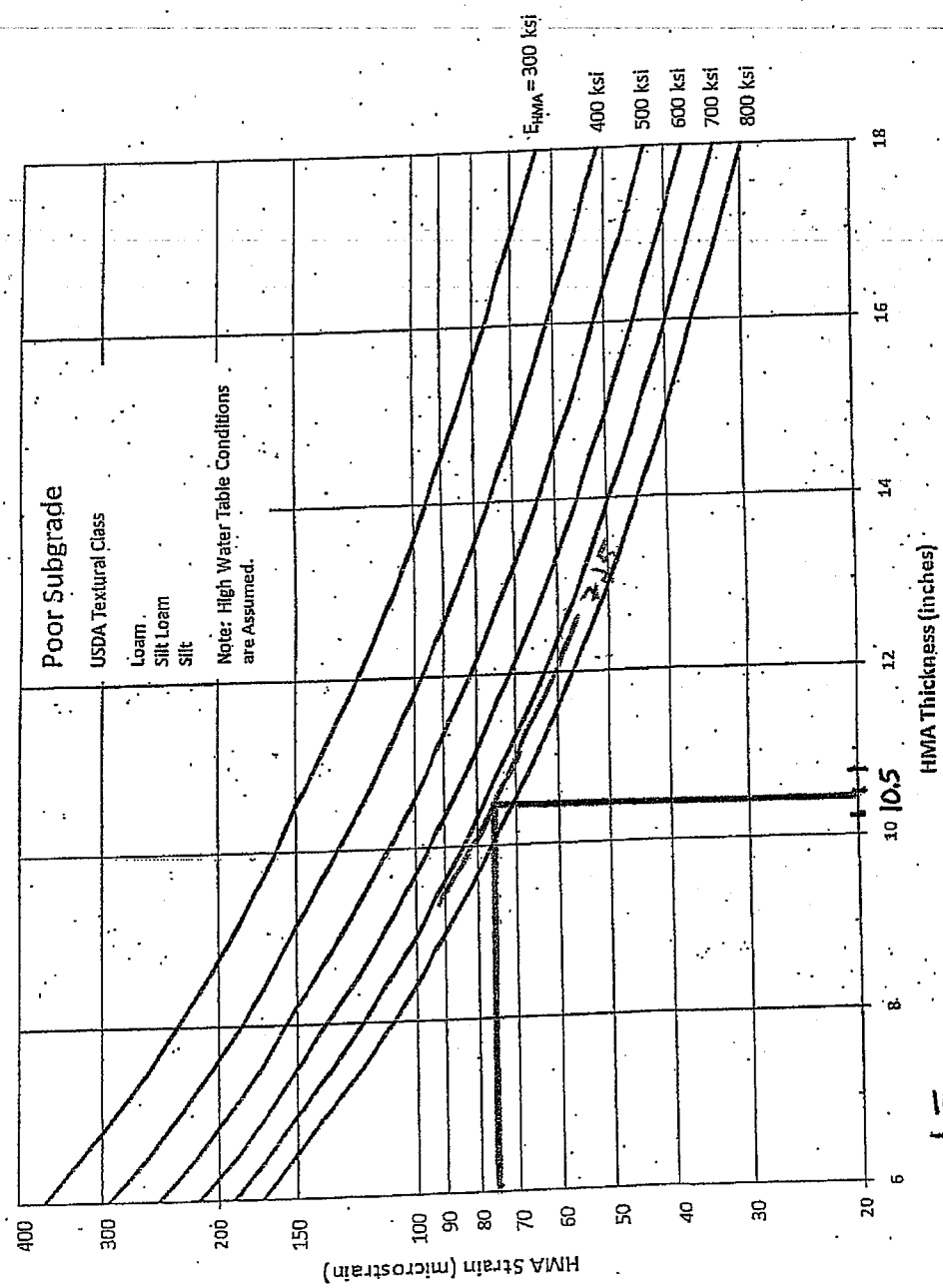
IL 58



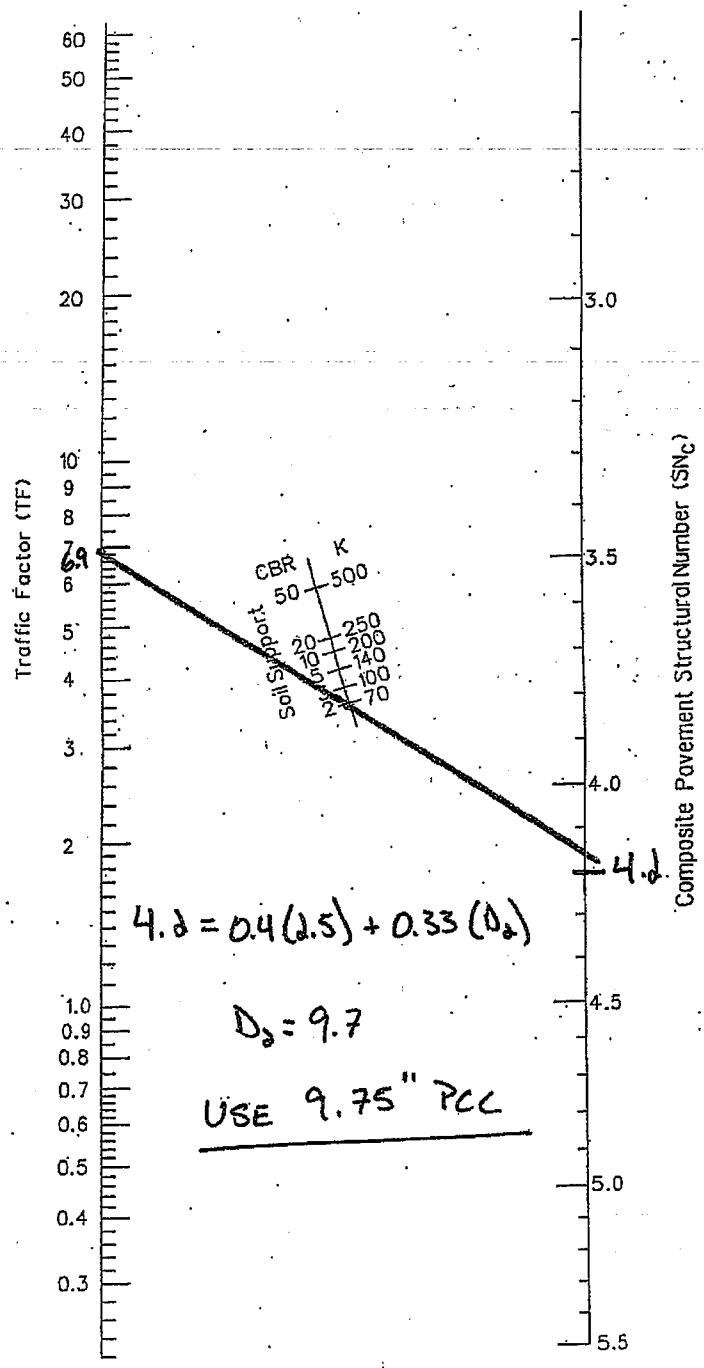
HMA THICKNESS DESIGN CHART
(Mechanistic Design: Flexible Pavement: SSR = Poor)

Figure 54-5.F

10.5" HMA FULL DEPTH
- 2" POLY SURFACE, N90
- 2¼" POLY BINDER, N90
- 6¼" BINDER, N90

HARD COPIES UNCONTROLLED

IL 58



COMPOSITE PAVEMENT DESIGN NOMOGRAPH
(Class I Facilities)

Figure 54-6.A

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MECHANISTIC PAVEMENT DESIGN

Date 17-May-12
Calcs by: SIP
Checked by:
Class I Roads and Streets
Urban X Rural
Limits of Analysis Station 91+00 to Station 114+00
Length 2300 Feet 0.44 Miles

Route IL 58 @ New Wilke
Section 00-00078-CH
Cook County
Location at New Wilke

Structural Design Traffic
PV = 49067
SU = 1022
MU = 1022

Percent of S.D.T. in Design Lane
P = 96.00%
S = 2.00%
U = 2.00%

MINIMUM SUBGRADE SUPPORT RATING - "POOR"

Flexible Pavement Design Actual TF_F = 5.06 Minimum TF_F = 3.16

Selected Design AC Type
Design AC Mixture Temp 74 °F
Design AC Microstrain 75
Design E_{AC} 725 KSI
AC Thickness 10.50 Inch

Rigid Pavement Design Actual TF_F = 6.9 Minimum TF_F = 4.47
Extended Lane 9.5 Inch
15' Panel PCC Thickness for:
Tied Shoulder 0 Inch
Untied Shoulder 0 Inch

Figure 5.05

RIGID PAVEMENT

Date: 17-May-12 Route L 58 @ New Wilk

Quantities by SJP Checked by: [redacted] Section 00-00078-CH

Unit Prices by [redacted] SJP Checked by: [redacted] Cook County

Net Length 2300 Lin. Ft. = 0.44 Miles

Number Lanes 6 Urban X Rural

ITEMIZED CONSTRUCTION COST

Quantity	Units	Item		Unit Cost	Total Cost
18400	Sq. Yds.	9.5 Inch Jointed PCC	@	$38.11	$701,224
0	Sq. Yds.	4-Inch (Stabilized/Granular Subbase)	@	$0.00	$0
0	Sq. Yds.	PCC Shoulder	@	$0.00	$0
	Lin. Ft.	Pipe Underdrains	@		
0		Subbase Gran. Mat., Type C	@	$0.00	$0
9,200	Lin. Ft.	100% Shoulder Joint Seal	@	$2.00	$18,400

Total Cost of Original Pavement Construction $719,624

ITEMIZED MAINTENANCE AND REHABILITATION ACTIVITY COST

REHABILITATION ACTIVITY 1 - YEAR 10

18 Sq. Yds.	0.1% Full Depth PCC Pavement Patching	@	$130.00	$2,340
	Total Cost of Rehabilitation Activity 1			$2,340

Figure 5.05a(1)

RIGID PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

REHABILITATION ACTIVITY 2 - YEAR 15

			Unit Cost	Total Cost
37 Sq. Yds.	0.2% Full Depth PCC Pavement Patching	@	$130.00	$4,810

Total Cost of Rehabilitation Activity 2 $4,810

REHABILITATION ACTIVITY 3 - YEAR 20

			Unit Cost	Total Cost
368 Sq. Yds.	2% Full Depth PCC Pavement Patching	@	$0.00	$47,840
0 Sq. Yds.	0.5% Full Depth PCC Pavement Patching	@	$85.00	$0
9200 Lin. Ft.	100% Longitudunal/ Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600 Lin. Ft.	100% Centerline Joint Routing & Sealing	@	$1.00	$4,600

Total Cost of Rehabilitation Activity 3 $61,640

FIGURE 5.05a(2)

RIGID PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

REHABILITATION ACTIVITY 4 - YEAR 25

			Unit Cost	Total Cost
552 Sq. Yds.	3.0% Full Depth PCC Pavement Patching	@	$130.00	$71,760
0 Sq. Yds.	1.0% Full Depth PCC Pavement Patching	@	$85.00	$0

Total Cost of Rehabilitation Activity 4 $71,760

REHABILITATION ACTIVITY 5 - YEAR 30

			Unit Cost	Total Cost
736 Sq. Yds.	3.0% Full Depth PCC Pavement Patching	@	$85.00	$0
0 Sq. Yds.	1.0% Full Depth PCC Pavement Patching	@	$9.27	$170,568
18,400 Sq. Yds.	Policy HMA Overlay - Pavement	@	$9.27	$170,568
0 Sq. Yds.	Policy HMA Overlay - Shoulder	@	$9.27	$0

Total Cost of Rehabilitation Activity 5 $266,248

REHABILITATION ACTIVITY 6 - YEAR 35

			Unit Cost	Total Cost
9,200 Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600 Lin. Ft.	100% Centerline Joint Routing & Sealing	@	$1.00	$4,600
6,900 Lin. Ft.	50% Random Crack Routing & Sealing - Assume 100ft/station	@	$1.00	$6,900
4,416 Lin. Ft.	40% Reflective Transverse Crack Routing & Sealing	@	$1.00	$4,416
18 Sq. Yds.	0.1% Partial-Depth Pavement Patching (Mill & Fill Surface-Interstates; Mill & Fill 2.5in. Non-Interstates)		$130.00	$2,340

Total Cost of Rehabilitation Activity 6 $27,456

Figure 5.05a(3)

RIGID PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

REHABILITATION ACTIVITY 7 - YEAR 40

			Unit Cost	Total Cost
92 Sq. Yds.	0.5% Full Depth PCC Pavement Patching	@	$130.00	$11,960
92 Sq. Yds.	0.5% Partial Depth Pavement Patching	@	$130.00	$11,960
	(Mill & Fill Surface-Interstates; Mill & Fill 2.5in. Non-Interstates)			
6,624 Lin. Ft.	60% Reflective Transverse Crack Routing & Sealing	@	$1.00	$6,624
6,900 Lin. Ft.	50% Random Crack Routing & Sealing - Assume 100ft/station	@	$1.00	$6,900
9,200 Lin. Ft.	100% Longitudunal/ Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4,600 Lin. Ft.	100% Centerline Joint Routing & Sealing	@	$1.00	$4,600
	Total Cost of Rehabilitation Activity 7			$51,244

RIGID PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

ANNUAL COST DETERMINATION

Present Worth Calculation:

Total Cost of Original Pavement Construction $719,624

Present Worth of Rehab Activity 1	$2,340	x 0.7441 =	$1,741
Present Worth of Rehab Activity 2	$4,810	x 0.6419 =	$3,088
Present Worth of Rehab Activity 3	$61,640	x 0.5537 =	$34,130
Present Worth of Rehab Activity 4	$71,760	x 0.4776 =	$34,273
Present Worth of Rehab Activity 5	$266,248	x 0.4120 =	$109,694
Present Worth of Rehab Activity 6	$27,456	x 0.3554 =	$9,758
Present Worth of Rehab Activity 7	$51,244	x 0.3066 =	$15,711

Total Life Cycle Cost (Present Worth) $208,395

Annual Cost Per Mile Calculation

Total PW	x CRF_n /	Length		= Annual Cost / Year-Mile
$208,395	x0.04079 /	0.44	Mi.	$86,032 per Yr.-Mi.

FLEXIBLE PAVEMENT

Date: 17-May-12 Route IL 58 @ New Wilke

Quantities by SJP Checked by: Section 00-00078-CH

Unit Prices by SJP Checked by: Cook County

Net Length 2300 Lin. Ft. = 0.44 Miles

Number Lanes 6 Urban X Rural

Single Lane Paving X Dual Lane Paving

ITEMIZED CONSTRUCTION COST

Quantity	Units	Item		Unit Cost	Total Cost
18,400	Sq. Yds.	Class I Surface Course	@	$9.27	$170,568
18,400	Sq. Yds.	Class I Binder Course	@	$24.37	$448,408
0	Sq. Yds.	Stabilized Shoulders	@	$0.00	$0
	Lin. Ft.	Pipe Underdrains	@		
0		Subbase Gran. Matl., Type C	@	$0.00	$0
18,400	Sq. Yds.	Poly Binder	@	$9.25	$170,200

Total Cost of Original Pavement Construction $789,176

ITEMIZED MAINTENANCE AND REHABILITATION ACTIVITY COST

REHABILITATION ACTIVITY 1 - YEAR 5

				Unit Cost	Total Cost
1265	Lin. Ft.	50% Random/Thermal Cracking & Sealing (Assume 110ft/station)	@	$1.00	$1,265
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	$1.00	$4,600
18	Sq. Yds.	0.1% Partial-Depth Pavement Patching Mill & Fill Surface	@	$90.00	$1,620

Total Cost of Rehabilitation Activity 1 $16,685

FIGURE 5.05b(1)

FLEXIBLE PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

REHABILITATION ACTIVITY 2 - YEAR 10

				Unit Cost	Total Cost
92	Sq. Yds.	0.5% Partial-depth HMA Pavement Patching - Mill & Fill Surface	@	$90.00	$8,280
1265	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	$1.00	$1,265
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	$1.00	$4,600

Total Cost of Rehabilitation Activity 2 $23,345

REHABILITATION ACTIVITY 3 - YEAR 15

				Unit Cost	Total Cost
18,400	Sq. Yds.	2.00in. Milling - Pavement & Shoulder	@	$1.75	$32,200
184	Sq. Yds.	1.0% Partial-depth Pavement Patching (Mill & Fill Addition 2.00in.)	@	$90.00	$16,560
2,061	Sq. Yds.	2.00in. HMA Overlay Pavement & Shoulder	@	$82.77	$170,585

Total Cost of Rehabilitation Activity 3 $219,345

FIGURE 5.05b(2)

FLEXIBLE PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

				Unit Cost	Total Cost
REHABILITATION ACTIVITY 4 - YEAR 20					
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	$1.00	$4,600
1265	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	$1.00	$1,265
18	Sq. Yds.	0.1% Partial-Depth HMA Pavement Patching (Mill & Fill Surface)	@	$90.00	$1,620
		Total Cost of Rehabilitation Activity 4			$16,685
				Unit Cost	Total Cost
REHABILITATION ACTIVITY 5 - YEAR 25					
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	$1.00	$4,600
1265	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	$1.00	$1,265
92	Sq. Yds.	0.5% Partial-Depth Pavement Patching (Mill & Fill Surface)	@	$90.00	$8,280
		Total Cost of Rehabilitation Activity 5			$23,345
				Unit Cost	Total Cost
REHABILITATION ACTIVITY 6 - YEAR 30					
18,400	Sq. Yds.	2.00in. Milling (Pavement only-Std Design Pavement & Shoulder-Limiting Strain Criteria Design)	@	$1.75	$32,200
368	Sq. Yds.	2.0% Partial-Depth HMA Pavement Patching (Mill & Fill Additional 2.00in. All Designs)	@	$90.00	$33,120
0	Sq. Yds.	1.0% Full-Depth HMA Shoulder Patching (Mill & Fill Surface-Standard Design Mill & Fill Additional 2.00in.-Limiting Strain Criteria Design)	@	$90.00	$0
3,864	Tons	HMA Overlay Pvmt (3.75in. - Std Design 2.00in.-Limiting Strain Criterion Design)	@	$82.77	$319,815
0	Tons	HMA Overlay Shoulder (1.75in. - Standard Design; 2.00in.-Limiting Strain Criterion Design)	@	$82.77	$0
		Total Cost of Rehabilitation Activity 6			$385,135

FIGURE 5.05b(3)

FLEXIBLE PAVEMENT (Cont.)

Route IL 58 @ New Wilke

Section 00-00078-CH

Cook County

REHABILITATION ACTIVITY 7 - YEAR 35

				Unit Cost	Total Cost
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	$1.00	$4,600
1265	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	$1.00	$1,265
18	Sq. Yds.	0.1% Partial-Depth HMA Pavement Patching (Mill & Fill Surface)	@	$90.00	$1,620
		Total Cost of Rehabilitation Activity 7			$16,685

REHABILITATION ACTIVITY 8 - YEAR 40

				Unit Cost	Total Cost
9200	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	$1.00	$9,200
4600	Lin. Ft.	100% Centerline Joint Rounting & Sealing (Single Lane and Dual Lane Paving)	@	$1.00	$4,600
1265	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	$1.00	$1,265
92	Sq. Yds.	0.5% Partial-Depth Pavement Patching (Mill & Fill Surface)	@	$90.00	$8,280
		Total Cost of Rehabilitation Activity 8			$23,345

Figure 5.05b(4) - continued

FLEXIBLE PAVEMENT (Cont.)
Route IL 58 @ New Wilke
Section 00-00078-CH
Cook County

ANNUAL COST DETERMINATION

Present Worth Calculation:

Total Cost of Original Pavement Construction $789,176

Present Worth of Rehab Activity 1	$16,685	x 0.7441 =	$14,392
Present Worth of Rehab Activity 2	$23,345	x 0.6419 =	$17,371
Present Worth of Rehab Activity 3	$219,345	x 0.5537 =	$140,798
Present Worth of Rehab Activity 4	$16,685	x 0.4776 =	$9,238
Present Worth of Rehab Activity 5	$23,345	x 0.4120 =	$11,150
Present Worth of Rehab Activity 6	$385,135	x 0.3554 =	$158,676
Present Worth of Rehab Activity 7	$16,685	x 0.3066 =	$5,930
Present Worth of Rehab Activity 8	$23,345	x 0.3066 =	$7,158

Total Life Cycle Cost (Present Worth) $364,713

Annual Cost Per Mile Calculation

Total PW	x CRF_n /	Length		= Annual Cost / Year-Mile
$364,713	x0.04079 /	0.44	Mi.	$106,971 per Yr.-Mi.

MATERIAL TYPE/PERCENTAGE	PCC	24.3%

PLAIN JOINTED PCC PAVEMENT

FILENAME-	1L55 @ New Wil	17-May-12	
ROUTE-	1L55	8:42 AM	
SECTION-	00-00078-CC		
COUNTY-	Cook		
LOCATION-	at New Wilke		
DATE-	17-May-12		
PROJECT LENGTH (FT)	2300	0.44	MILES
AVERAGE LANE WIDTH (FT)	12		
NUMBER OF LANES	6		
# OF EDGES	14		
INSIDE SHLDER WIDTH (FT)			
OUTSIDE SHLDER WIDTH (FT)			
# OF CENTERLINES	2		
RIGID THICKNESS-	9.5		
TRAFFIC FACTORS	MINIMUM	ACTUAL	
RIGID-	1.47	6.9	

TRAFFIC		Percentages
PV-	49067	96.00%
SU-	1022	2.00%
MU-	1022	2.00%

INITIAL COSTS

ITEM	QUANTITY	UNIT PRICE	COST
PAVEMENT (SQ YDS)	18,400	$38.11	$701,224
STAB SUBBASE (SQ YDS)	0		$0
SHOULDERS (SQ YDS)	0		$0
SHOULDER SEAL (LN FT)	9,200	$2.00	$18,400
SUBBASE GRAN MATL TY C (TONS)	0		$0

CONSTRUCTION INITIAL COST (PW)	$719,624
TOTAL REHABILITATION COST (PW)	$208,395
TOTAL LIFE CYCLE COST (PW)	$928,019
ANNUAL COST PER MILE	$66,032

MAINTENANCE COSTS:

ITEM		UNIT COST
PAVEMENT PATCHING (SQ YDS)	(Use Class A pricing for CRC)	$130.00
SHOULDER PATCHING (SQ YDS)		$85.00
SHLDR JT ROUT & SEAL (LF)		$1.00
CENTERLINE JT ROUT & SEAL (LF)		$1.00
POLICY HMA OVERLAY PVMT (SQ YDS)		$9.27
POLICY HMA OVERLAY SHLDR (SQ YDS)		$9.27
RANDOM CRACK ROUT & SEAL (LF)		$1.00
REFL TRANS CRACK ROUT & SEAL (LF)		$1.00
PARTIAL PVMT PATCH (SQ YDS)		$130.00

MAINTENANCE COSTS:

	ITEM	QUANTITY	UNIT PRICE	COST	PW
Activity 1					
YEAR 10					
	PAVEMENT PATCHING 0.1% (SQ YDS)	18	$130.00	$2,340	
				$2,340	$1,741
Activity 2					
YEAR 15					
	PAVEMENT PATCHING 0.2% (SQ YDS)	37	$130.00	$4,810	
				$4,810	$3,088
Activity 3					
YEAR 20					
	PAVEMENT PATCHING 2.0% (SQ YDS)	368	$130.00	$47,840	
	SHOULDER PATCHING 0.5% (SQ YDS)	0	$85.00	$0	
	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
				$61,640	$34,130
Activity 4					
YEAR 25					
	PAVEMENT PATCHING 3.0% (SQ YDS)	552	$130.00	$71,760	
	SHOULDER PATCHING 1.0% (SQ YDS)	0	$85.00	$0	
				$71,760	$34,273
Activity 5					
YEAR 30					
	PAVEMENT PATCHING 4.0% (SQ YDS)	736	$130.00	$95,680	
	SHOULDER PATCHING 1.5% (SQ YDS)	0	$85.00	$0	
	POLICY HMS OVERLAY OVMT (SQ YDS)	18,400	$9.27	$170,568	
	POLICY HMA OVERLAY SHLDR (SQ YDS)	0	$9.27	$0	
				$266,248	$109,894
Activity 6					
YEARS 35					
	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	RANDOM CRACK ROUT & SEAL 50% (LF)	6,900	$1.00	$6,900	
	REFL TRANS CRACK ROUT & SEAL 40%	4,416	$1.00	$4,416	
	PARTIAL PVMT PATCH 0.1% (SQ YDS)	18	$130.00	$2,340	
				$27,456	$9,758
Activity 7					
YEAR 40					
	PAVEMENT PATCHING 0.5% (SQ YDS)	92	$130.00	$11,960	
	SHOULDER PATCHING 0.5% (SQ YDS)	92	$130.00	$11,960	
	REFL TRANS CRACK ROUT & SEAL 60%	6,624	$1.00	$6,624	
	RANDOM CRACK ROUT & SEAL 50% (LF)	6,900	$1.00	$6,900	
	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
				$51,244	$15,711
			Total Rehabilitation Cost (Present Worth)		$208,395

FULL-DEPTH FLEXIBLE
TRAFFIC FACTOR LESS THAN 15.0 (RURAL)
TRAFFIC FACTOR LESS THAN 10.0 (URBAN)

FULL DEOTH FLEXIBLE PAVEMENT

ROUTE-	IL 58	17-May-12
SECTION-	00-00078-CH	8:42 AM
COUNTY-	Cook	
LOCATION-	at New Wilke	

PROJECT LENGTH (FT)	2300	
AVERAGE LANE WIDTH (FT)	12	
NUMBER OF LANES	6	
# OF EDGES	4	
INSIDE SHLDER WIDTH (FT)	0	
OUTSIDE SHLDER WIDTH (FT)	0	
# OF CENTERLINES	2	
PROJECT TYPE	2	1=RURAL, 2=URBAN
PAVING WIDTH	1	1=SINGLE LANE, 2=DUAL LANE
INTERSTATE / OTHER ROUTE	OTHER ROUTE	
FLEXIBLE THICKNESS-	10.5	

TRAFFIC FACTORS

	MINIMUM	ACTUAL
FLEXIBLE	2.10	6.06

TRAFFIC

PV-	49087	0.98
SU-	1022	0.02
MU-	1022	0.02

PAVEMENT OVERLAY THICKNESS	3.75
SHOULDER OVERLAY THICKNESS	1.75

INITIAL COSTS

ITEM	QUANTITY	UNIT PRICE	COST
SURFACE (SQ YDS)	18,400	$9.27	$170,568
POLY BINDER (SQ YDS)	18,400	$9.25	$170,200
BINDER (SQ YDS)	18,400	$24.37	$448,408
SHOULDERS (SQ YDS)	0		$0
SUBBASE GRAN MATL TY C (TONS)	0		$0

CONSTRUCTION INITIAL COST (PW)	$789,176
TOTAL REHABILITATION COST (PW)	$364,713
TOTAL LIFE CYCLE COST (PW)	$1,153,889
ANNUAL COST PER MILE	$106,871

MAINTENANCE COSTS:

ITEM		UNIT COST
RAND/THERM CRACK ROUT & SEAL (LF)		$1.00
SHLDR JT ROUT & SEAL (LF)		$1.00
CENTERLINE JT ROUT & SEAL (LF)		$1.00
PARTIAL PVMT PATCH (SQ YDS)		$90.00
2" MILL PVMT & SHLDR (SQ YDS)	(Use $3.00 for small quantity)	$1.75
2" OVERLAY PVMT & SHLDR (TONS)		$82.77
2" MILL PVMT ONLY (SQ YDS)	(Use $3.00 for small quantity)	$1.75
HMA SHOULDER PATCHING (SQ YDS)		$90.00
POLICY HMA OVERLAY PVMT (TONS)		$82.77
POLICY HMA OVERLAY SHLDR (TONS)		$82.77

MATERIAL TYPE/PERCENTAGE PCC 24.3%

MAINTENANCE COSTS

	ITEM	QUANTITY	UNIT PRICE	COST	PW
Activity 1					
YEAR 5	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	PARTIAL PVMT PATCH 0.1% (SQ YDS)	18	$90.00	$1,620	
				$16,685	$14,392
Activity 2					
YEAR 10	PARTIAL PVMT PATCH 0.5% (SQ YDS)	92	$90.00	$8,280	
	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
				$23,345	$17,371
Activity 3					
YEAR 15	2" MILL PVMT & SHLDR 100% (SQ YDS)	18,400	$1.75	$32,200	
	PARTIAL PVMT PATCH 1.0% (SQ YDS)	184	$90.00	$16,560	
	2" OVERLAY PVMT & SHLDR 100% (TONS)	2,061	$82.77	$170,585	
				$219,345	$140,798
Activity 4					
YEAR 20	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	PARTIAL PVMT PATCH 0.1% (SQ YDS)	18	$90.00	$1,620	
				$16,685	$9,238
Activity 5					
YEAR 25	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	PARTIAL PVMT PATCH 0.5% (SQ YDS)	92	$90.00	$8,280	
				$23,345	$11,150
Activity 6					
YEAR 30	2" MILL PVMT & SHLDR 100% (SQ YDS)	18,400	$1.75	$32,200	
	PARTIAL PVMT PATCH 2.0% (SQ YDS)	368	$90.00	$33,120	
	HMA SHLDR PATCHING 1.0% (SQ YDS)	0	$90.00	$0	
	POLICY HMA OVERLAY PVMT (TONS)	3,864	$82.77	$319,815	
	POLICY HMA OVERLAY SHLDR (TONS)	0	$82.77	$0	
				$385,135	$158,676
Activity 7					
YEAR 35	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	PARTIAL PVMT PATCH 0.1% (SQ YDS)	18	$90.00	$1,620	
				$16,685	$5,930
Activity 8					
YEAR 40	SHLDR JT ROUT & SEAL 100% (LF)	9,200	$1.00	$9,200	
	CENTERLINE JT ROUT & SEAL 100% (LF)	4,600	$1.00	$4,600	
	RAND/THERM CRACK ROUT & SEAL 50% (LF)	1,265	$1.00	$1,265	
	PARTIAL PVMT PATCH 0.5% (SQ YDS)	92	$90.00	$8,280	
				$23,345	$7,158

Total Rehabilitation Cost (Present Worth) $364,713