Illinois Department of Transportation

To:	Anthony J. Quigley	Attn:	John Baczek
From:	Jack A. Elston	By:	Michael Brand MDB
Subject:	Pavement Design Approval		
Date:	March 26, 2019		

Route:	IL 171 (Archer Ave)	Job No.:	Tollway
Section:		Contract No.:	Tollway
County:	Cook	Target Letting:	11-2019
Limits:	at I-294/US 45 (La Grange Road)		

We have reviewed the pavement design for the above referenced Tollway project which was submitted on March 6, 2019. The scope of the project is to reconstruct portions of IL 171 (Archer Ave) and 79th Street, along some of their structures and ramps, to improve access to I-294.

We concur with the District's determination this is a "special design" due to the grades and volume of trucks; and as such, a life cycle cost analysis is not required. We also concur with the District's selection of full-depth HMA.

In summary, the approved pavement designs are as follows:

<u>IL 171 (Archer Ave)</u>
14" Full-Depth HMA Pavement with HMA Shoulders (some PCC C&G)
12" Aggregate Subgrade Improvement

<u>79th Street</u>
12.75" Full-Depth HMA Pavement with HMA Shoulders (some PCC C&G)
12" Aggregate Subgrade Improvement

<u>IL 171 at US 45 Rams</u>
13.75" Full-Depth HMA Pavement with HMA Shoulders
12" Aggregate Subgrade Improvement

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

Illinois Department of Transportation

Memorandum

To: Jack Elston — Attn: Michael Brand

From: Jose A. Dominguez — By: Ojas Patel

Subject: Pavement Analysis*

Date: March 6, 2019

*Route: Illinois Route 171 (Archer Avenue)
Limits: at I-294/US 45 (LaGrange Road)
Section: Unknown
Current target: 11CY19

County: Cook
Contract No.: Tollway
Job No.: Tollway

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 exceeds 4,750 Square Yards. The following is the scope of the project:

Tollway Authority project to reconstruct the IL 171 (Archer Avenue) interchange at I-294 and at US 45 (LaGrange Road).

A 20-year pavement analysis was performed for the above roadway segments. These segments including the IL 171 and the 79th Street intersection with Oak Grove Avenue are a "High Stress" location since the design lane MU ADT exceeds 200 vehicles and some approach grades are greater than 3.5%. As such, this pavement design will be classified as a "Special Design" per BDE Figure 54-1.A. A mechanistic-flexible pavement design is recommended as follows for uniformity and ease of maintenance for these segments as existing roadway network is HMA surfaced. In addition, Stone Matrix Asphalt is recommended for this high stress location.

IL 171 (Archer Avenue)
Reconstruction[5]
HMA Shoulder / Portions C&G
14" Full Depth HMA[1]
- 2" Polymerized HMA Surface Course, SMA, 9.5, N80
- 2 ¼" Polymerized HMA Binder Course, IL-19.0, N90
- 9 ¾" HMA Base Course, IL-19.0, N90

12" Aggregate Subgrade Improvement[4]

79th Street
Reconstruction[5]
HMA Shoulder / Portions C&G
12 ¾" Full Depth HMA[2]
2" Polymerized HMA Surface Course, SMA, 9.5, N80
2 ¼" Polymerized HMA Binder Course, IL-19.0, N90
8 ½" HMA Base Course, IL-19.0, N90
12" Aggregate Subgrade Improvement[4]

IL 171 at US 45 Ramps
Reconstruction[5]
HMA Shoulder
13 ¾" Full Depth HMA[3]
2" Polymerized HMA Surface Course, SMA, 9.5, N80
2 ¼" Polymerized HMA Binder Course, IL-19.0, N90
9 ½" HMA Base Course, IL-19.0, N90
12" Aggregate Subgrade Improvement[4]

[1]Designer Note 1: Use pay item **40701961, HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 14"**, paid for in square yards.

[2]Designer Note 2: Use pay item **40701936, HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 12 ¾"**, paid for in square yards.

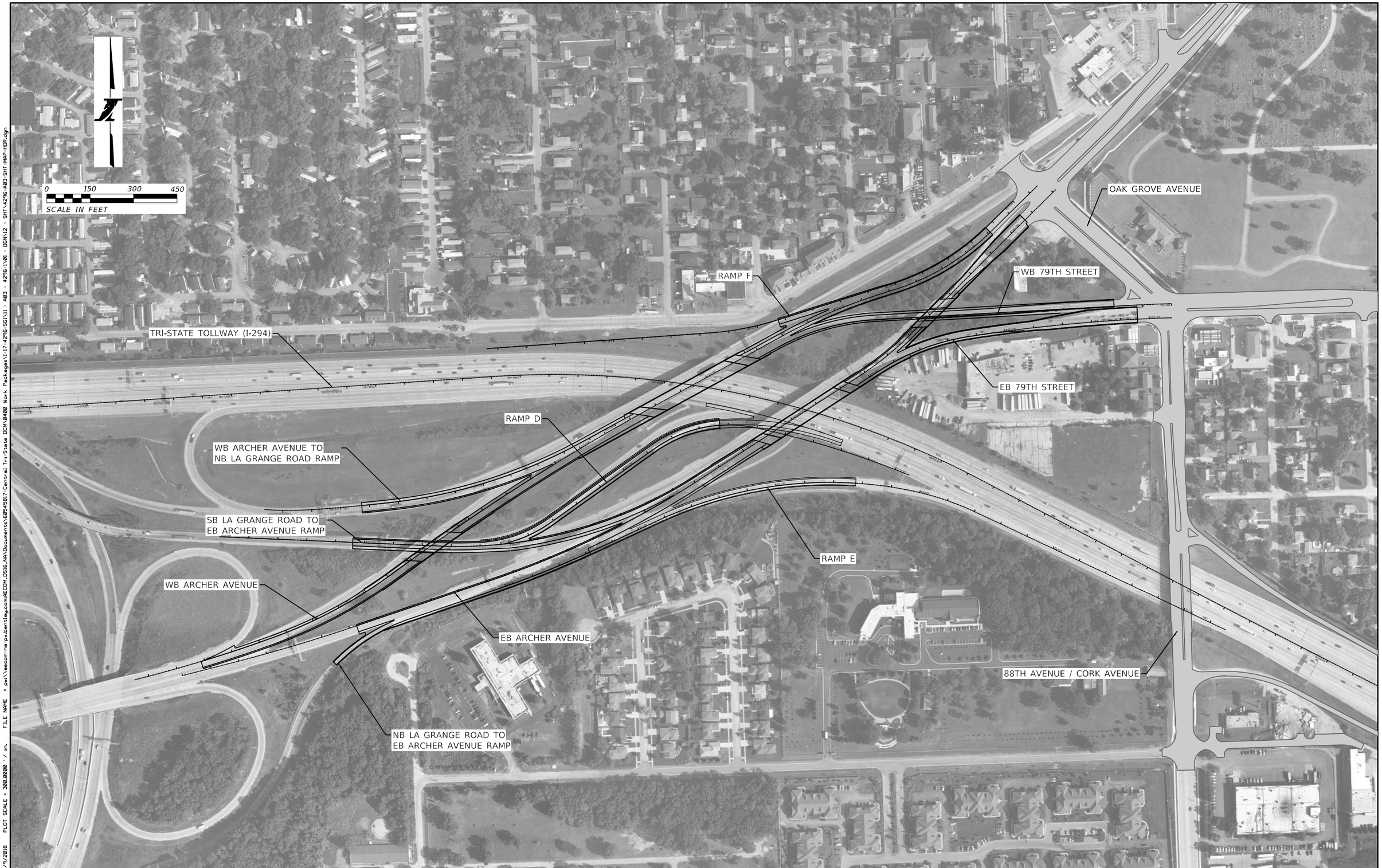
[3]Designer Note 3: Use pay item **40701956, HOT-MIX ASPHALT PAVEMENT (FULL-DEPTH), 13 ¾"**, paid for in square yards.

[4]Designer Note 4: Use pay item **30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12"**, paid in square yards.

[5]Designer Note 5: 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
Jose A. Dominguez, P.E.
Project Support Engineer



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DRAWN BY	MJS	DATE	2/21/2019	HDR ENGINEERING, INC. 8550 W. BRYN MAWR AVE. CHICAGO, IL 60631	THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY 2700 OGDEN AVENUE DOWNERS GROVE, ILLINOIS 60515
CHECKED BY	TJS	DATE	2/21/2019		

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. I-17-4296-A03

PROJECT LOCATION MAP

MAP-01

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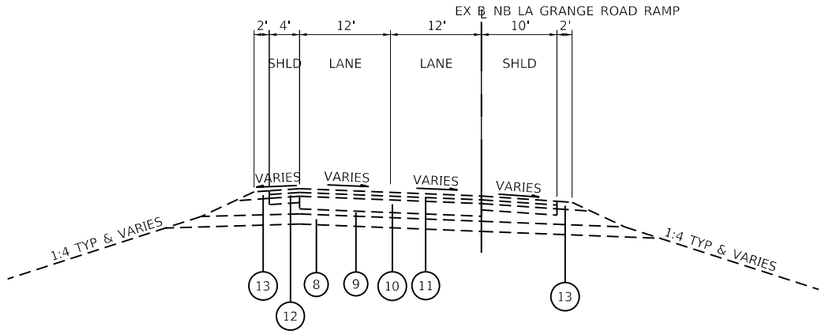
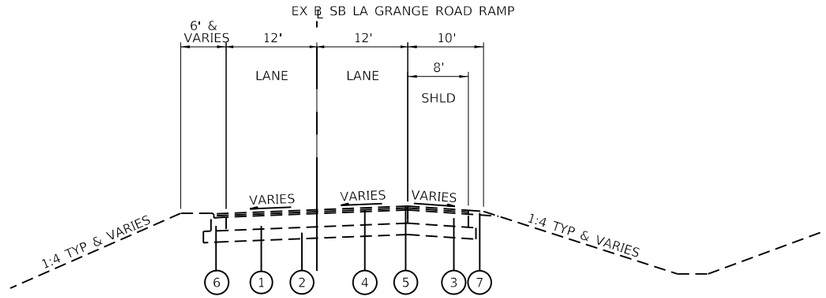
$MAP01

PLANS IN PROGRESS



NB LA GRANGE ROAD RAMP

STA. 1+06 TO 8+74



SB LA GRANGE ROAD RAMP

STA. 404+59 TO 415+76

EXISTING LEGEND

1. EXIST. P.C. CONCRETE PAVEMENT 10.5" & VARIES
2. EXIST. SUB-BASE GRANULAR MATERIAL, DEPTH VARIES
3. EXIST. HMA SHOULDER, 10.5" & VARIES
4. EXIST. HMA CONCRETE BINDER COURSE, 1.5" & VARIES
5. EXIST. HMA CONCRETE SURFACE COURSE, 1.5" & VARIES
6. EXISTING CURB & GUTTER
7. EXISTING AGGREGATE SHOULDER, 8" & VARIES
8. EXISTING SELECTED SUBGRADE, 8" & VARIES
9. EXISTING GRANULAR SUB-BASE, 4" & VARIES
10. EXISTING P.C. CONCRETE PAVEMENT, 10" & VARIES
11. EXISTING HMA CONCRETE SURFACE & BINDER, 3" & VARIES
12. EXISTING HMA SHOULDER, 6" & VARIES
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CONTRACT NO. I-17-4296-A03

EXISTING TYPICAL SECTIONS

TYP-5

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29 OF 232

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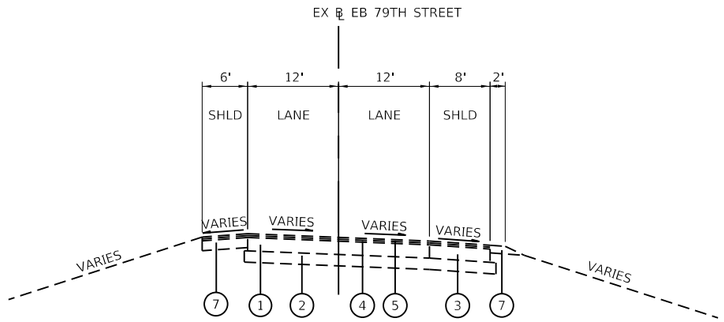
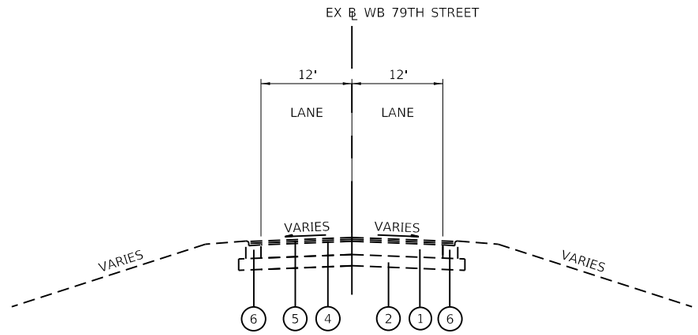


EB 79TH STREET

STA. 1+92 TO 11+33



WB 79TH STREET

STA. 700+64 TO 711+90

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EXISTING TYPICAL SECTIONS

TYP-6

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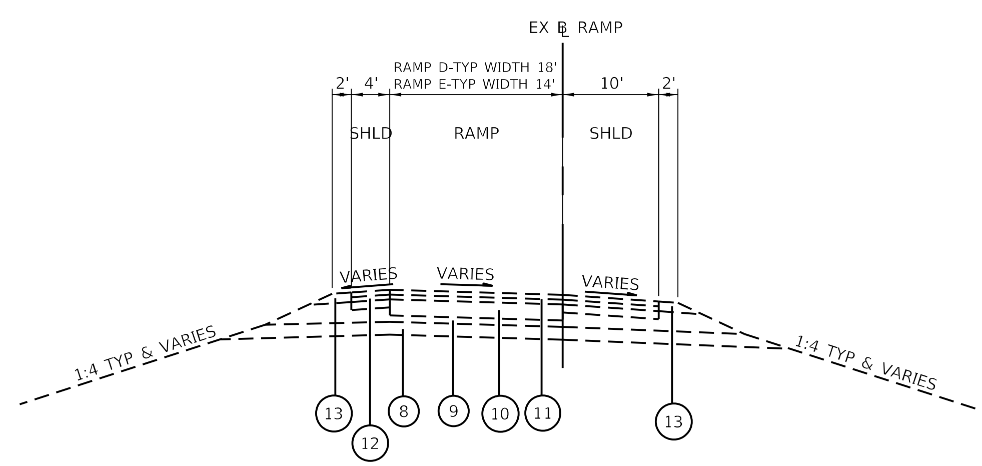

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STA. 30+00 TO 36+05 (RAMP D)
STA. 50+00 TO 57+76 (RAMP E)

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7. EXISTING AGGREGATE SHOULDER, 8" & VARIES
8. EXISTING SELECTED SUBGRADE, 8" & VARIES
9. EXISTING GRANULAR SUB-BASE, 4" & VARIES
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CONTRACT NO. I-17-4296-A03

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TYP-7

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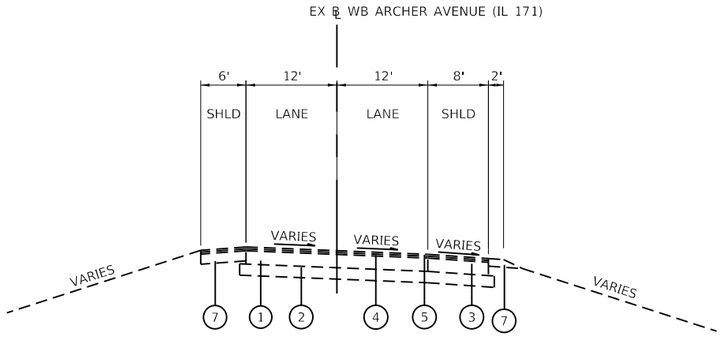

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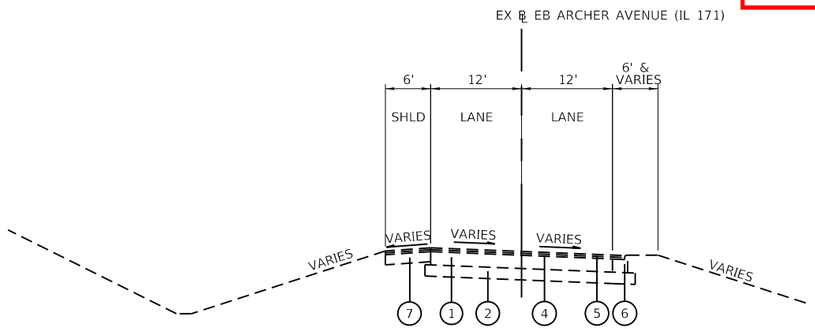
STA. 7+68 TO 16+50
STA. 23+51 TO 38+70



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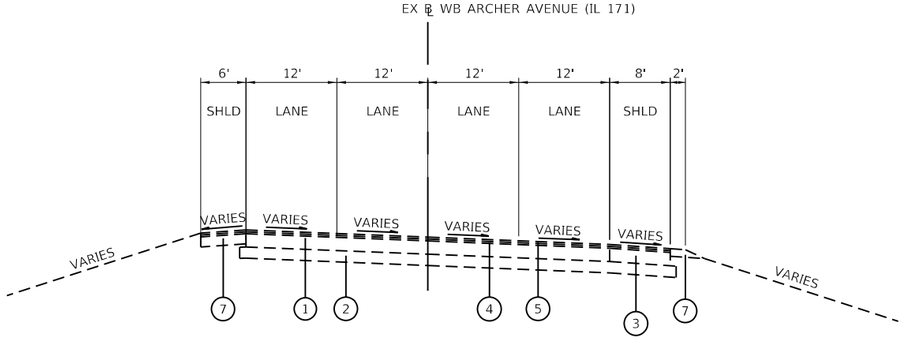
STA. 128+80 TO 135+87



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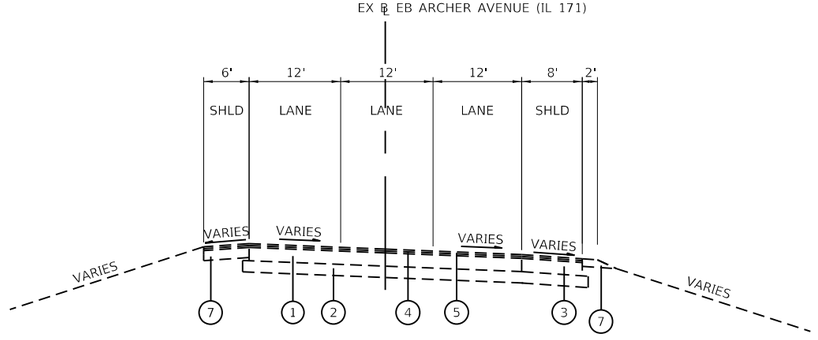

EB ARCHER AVENUE

STA. 111+06 TO 128+80

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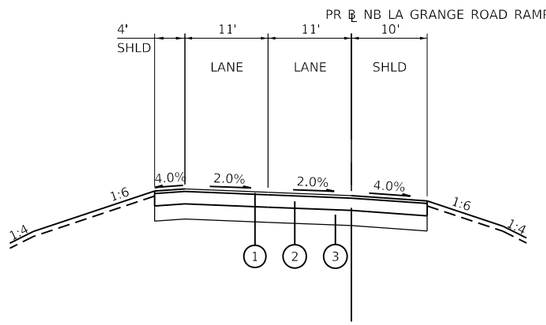
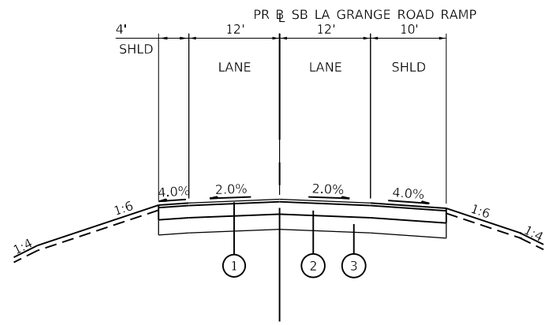


NB LA GRANGE ROAD RAMP

STA. 502+57.18 TO 509+27.10



SB LA GRANGE ROAD RAMP

STA. 404+59.45 TO 415+89.95

LEGEND

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2. PROPOSED HMA BINDER COURSE (TO BE DETERMINED BY IDOT)
3. PROPOSED SUBGRADE AGGREGATE (TO BE DETERMINED BY IDOT)
4. PROPOSED SINGLE FACE BARRIER
5. PROPOSED CURB & GUTTER, TYPE B-6.24
6. PROPOSED AGGREGATE SHOULDER

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DOWNERS GROVE,
ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. I-17-4296-A03

PROPOSED TYPICAL SECTIONS

TYP-1

DRAWING NO.
25 OF 232

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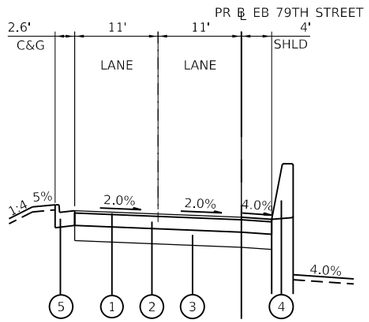
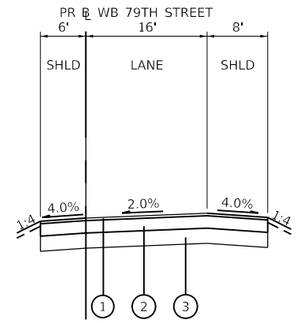


EB 79TH STREET

STA. 801+19 TO 809+60.16



WB 79TH STREET

STA. 701+98.87 TO 713+21.58

LEGEND

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2. PROPOSED HMA BINDER COURSE (TO BE DETERMINED BY IDOT)
3. PROPOSED SUBGRADE AGGREGATE (TO BE DETERMINED BY IDOT)
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5. PROPOSED CURB & GUTTER, TYPE B-6.24
6. PROPOSED AGGREGATE SHOULDER

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2700 OGDEN AVENUE
DOWNERS GROVE,
ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

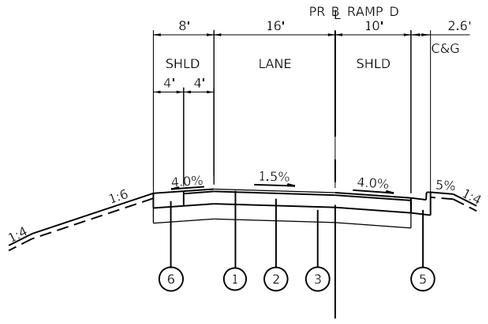
CONTRACT NO. I-17-4296-A03

PROPOSED TYPICAL SECTIONS

TYP-2

DRAWING NO.
26 OF 232

PLANS IN PROGRESS



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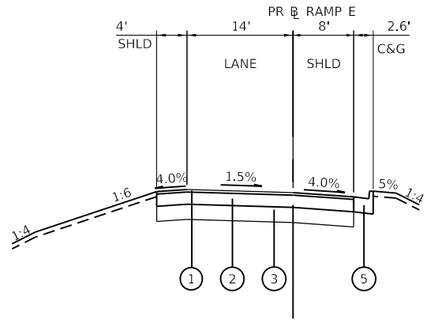
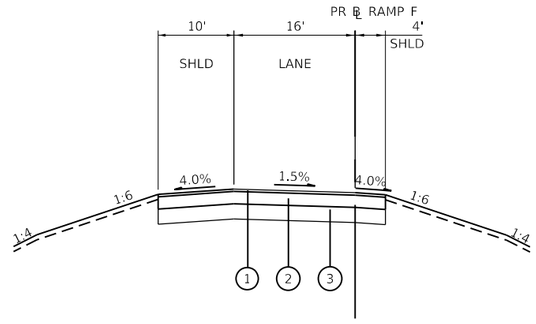
STA. 300+00.00 TO 308+70.97



ARCHER AVENUE RAMP E

STA. 48+13.37 TO 57+76.03



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STA. 607+49.76 TO 609+26.39

LEGEND

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2. PROPOSED HMA BINDER COURSE (TO BE DETERMINED BY IDOT)
3. PROPOSED SUBGRADE AGGREGATE (TO BE DETERMINED BY IDOT)
4. PROPOSED SINGLE FACE BARRIER
5. PROPOSED CURB & GUTTER, TYPE B-6.24
6. PROPOSED AGGREGATE SHOULDER

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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
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DOWNERS GROVE,
ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

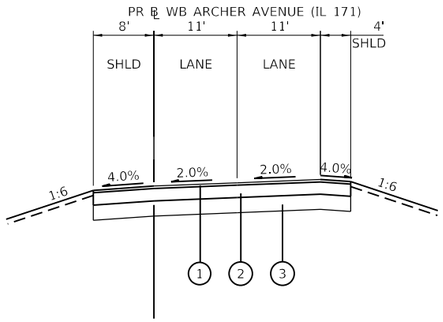
CONTRACT NO. I-17-4296-A03

PROPOSED TYPICAL SECTIONS

TYP-3

DRAWING NO.
27 OF 232

PLANS IN PROGRESS



WB ARCHER AVENUE

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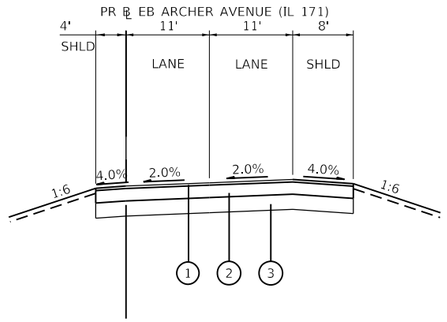
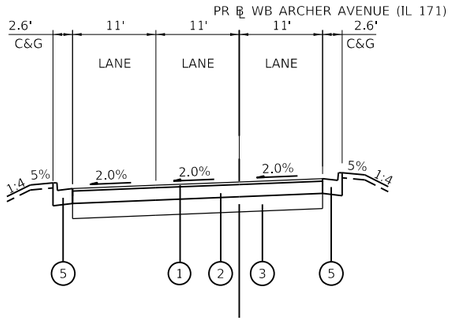
STA. 222+64 TO 225+27



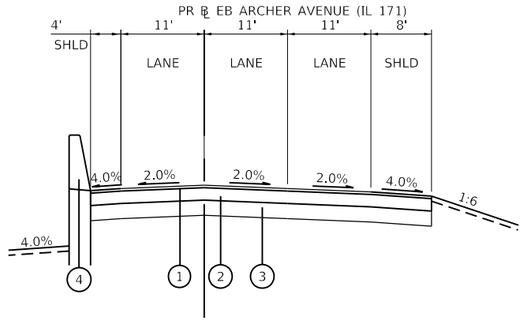
EB ARCHER AVENUE

STA. 108+25 TO 110+07
STA. 116+67 TO 121+20
STA. 129+12 TO 135+64



WB ARCHER AVENUE

STA. 214+24 TO 222+64
STA. 225+27 TO 231+08



EB ARCHER AVENUE

STA. 110+07 TO 116+67
STA. 121+20 TO 129+12

LEGEND

1. PROPOSED HMA SURFACE COURSE (TO BE DETERMINED BY IDOT)
2. PROPOSED HMA BINDER COURSE (TO BE DETERMINED BY IDOT)
3. PROPOSED SUBGRADE AGGREGATE (TO BE DETERMINED BY IDOT)
4. PROPOSED SINGLE FACE BARRIER
5. PROPOSED CURB & GUTTER, TYPE B-6.24
6. PROPOSED AGGREGATE SHOULDER

PLOT TIME = 9:45:24 AM
PLOT DATE = 11/9/2018
PLOT SCALE = 20.0000 ' / in.
FILE NAME = pw:\\aecom-na.pwbentleycom#ECOM.0516.NA\Documents\68545817-Central Tri-State DCM\8400 Work Packages\I-17-4296-SG\11 - A03 - 4296-1\01 - DGN\12 - SHT\4296-A03-SHT-TYP08-HDR.dgn

DRAWN BY	CD	DATE	2/21/2019	HDR ENGINEERING, INC. 8550 W. BRYN MAWR AVE. CHICAGO, IL 60631	THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY 2700 OGDEN AVENUE DOWNERS GROVE, ILLINOIS 60515
CHECKED BY	EN	DATE	2/21/2019		

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. I-17-4296-A03

PROPOSED TYPICAL SECTIONS

TYP-4

DRAWING NO.
28 OF 232

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

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 03/26/2019

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: 79th Street
Section:
County: Cook
Location: at US 45 and at I-294

Comments: Tollway Project to reconfigure the interchange
BDE Coordination Required
Design Date: 02/04/2019 ONP
Modify Date:

	ADT	Year
<-- BY		
<-- BY		
Current:	27,400	2014
Future:	30,000	2040

Facility Type: Other Marked State Route
# of Lanes = 4
Road Class: I
Subgrade Support Rating (SSR): Poor
Construction Year: 2019
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	25,085	86.8%	P = 32%
SU =	250	1,156	4.0%	S = 45%
MU =	750	2,659	9.2%	M = 45%
Struct. Design ADT =		28,900	(2029)	

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) =	12.95	(Actual ADT)	TF rigid (Actual) =	18.19	(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 = 12.95
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map
HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 690 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 58 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 12.75 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 12.75 inches

JPC Pavement

Use TF rigid = 18.19
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 10.25 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 18.19
IBR value = 3

CRCP Thickness = 9.75 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 = 12.95
HMA Overlay Design Thickness = 10.25 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) **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 03/26/2019

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

Route: IL 171 at US 45 Ramps
Section:
County: Cook
Location: at US 45 and at I-294

Comments: Tollway Project to reconfigure the interchange
WB IL 171 to NB US 45 Controls - BDE Coordination Required
Design Date: 02/06/2019 ONP <-- BY
Modify Date: <-- BY

	ADT	Year
Current:	15,500	2015
Future:	15,500	2040

Facility Type: Other Marked State Route
** 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: 2019
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	12,168	78.5%	P = 100%
SU =	250	1,907	12.3%	S = 100%
MU =	750	1,426	9.2%	M = 100%
Struct. Design ADT =		15,500	(2029)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	32%
Csu =	132.5	112.06	45%
Cmu =	482.53	385.44	45%
TF flexible (Actual) =	18.85	(Actual ADT)	2.85
TF flexible (Min) =	2.85	(Min ADT Fig. 54-2.C)	

RIGID PAVEMENT		RAMP DESIGN MIN	
Cpv =	0.15	0.15	32%
Csu =	143.81	135.78	45%
Cmu =	696.42	567.21	45%
TF rigid (Actual) =	25.38	(Actual ADT)	4.13
TF rigid (Min) =	4.13	(Min ADT Fig. 54-2.C)	

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 18.85
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map
HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 690 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 52 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 13.75 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 13.75 inches

JPC Pavement

Use TF rigid = 25.38
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 10.50 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 25.38
IBR value = 3

CRCP Thickness = 10.25 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 = 18.85
HMA Overlay Design Thickness = 11.25 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	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

	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) **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 03/26/2019

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

Route:	IL 171 (Archer Avenue)	Comments:	Tollway Project to reconfigure the interchange			
Section:			BDE Coordination Required			
County:	Cook	Design Date:	02/04/2019	ONP	<-- BY	
Location:	at US 45 and at I-294	Modify Date:			<-- BY	

	ADT	Year
Current:	43,200	2015
Future:	45,100	2040

Facility Type: Other Marked State Route

# of Lanes = 4

Road Class: I

Subgrade Support Rating (SSR): Poor

Construction Year: 2019

Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	36,474	82.4%	P = 32%
SU =	250	4,471	10.1%	S = 45%
MU =	750	3,320	7.5%	M = 45%
Struct. Design ADT =		44,264	(2029)	

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) =	19.78	(Actual ADT)	TF rigid (Actual) =	26.63	(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 = 19.78

Goto Map

PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)

HMA Mixture Temp. = 75.0 deg. F (Fig. 54-5.C)

Design HMA Mixture Modulus (E_{HMA}) = 690 ksi (Fig. 54-5.D)

Design HMA Strain (ε_{HMA}) = 51 (Fig. 54-5.E)

Goto Map

Full Depth HMA Design Thickness = 14.00 in. (Fig. 54-5.F)

Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 14.00 inches

JPC Pavement

Use TF rigid = 26.63

Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 10.50 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 26.63

IBR value = 3

CRCP Thickness = 10.25 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 = 19.78

Goto Map

HMA Overlay Design Thickness = 11.25 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 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%