Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date: Jan. 15, 2019 **Proposed SN:** 019-0050 **Route:** FAP 553(IL 72)
Revised Date: June 18, 2019 **Existing SN:** 019-0021 **Section:** (125BR-1)ES
Geotechnical Engineer: IDOT District 3: Mike Short **County:** DeKalb
Structural Engineer: Chamlin & Associates Inc.: James K Clinard **Contract:** 66H52

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): The proposed structure is a single span bridge and will provide a clear width of 36.375 feet face to face of parapet, with a proposed back to back of abutments distance of 76.5 feet. PCC I-beams and integral abutments will be used. A location map and the draft TSL drawing are attached.

Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot): Two current structure borings are provided on the attachments. Both borings show similar soil stratigraphy composed of stiff to very stiff clay loam fill with potential cobbles/boulders layer beneath this layer. Auger refusal was at 27 feet at the east abutment and 21 feet at the west abutment.

Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary: The proposed profile is expected to increase by a maximum of 2 feet. Site visit was conducted on November 20, 2018 and showed no indication of significant settlement. Therefore, further investigation is not warranted.

Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary: Due to the minimal change in profile grade and additional fill, slope stability analysis is not required. In addition, a field inspection of the existing embankment slopes showed no stability problems.

Indicate at each substructure, the 100-year and 200-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations: Since the proposed structure is a single span bridge with integral abutments, the design scour elevations are set at the bottom of the abutments.

Event / Limit State	Design Scour Elevations (ft.)		Item 113
	West Abutment	East Abutment	
Q100	764.68	762.32	8
Q200	764.68	762.32	
Design	764.68	762.32	
Check	764.68	762.32	

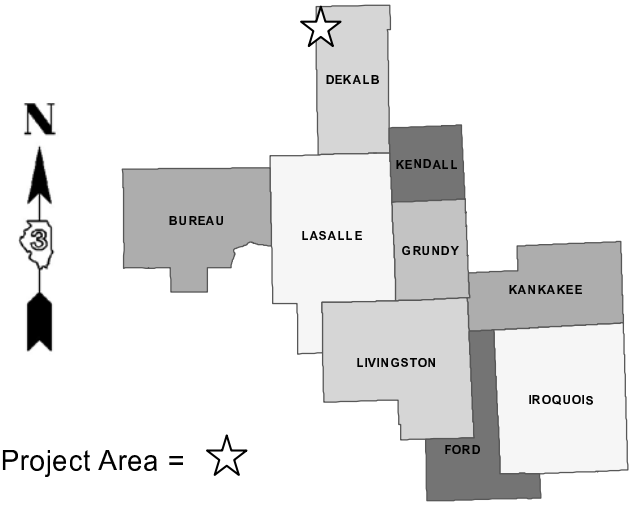
Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable: The Seismic Site Class Definition is C. The corresponding 0.2 (SDS) and 1.0 (SD1) second horizontal response spectral acceleration coefficients is 0.107g and 0.058g, respectively. The Seismic Performance Zone (SPZ) is 1; therefore, liquefaction analysis not warranted.

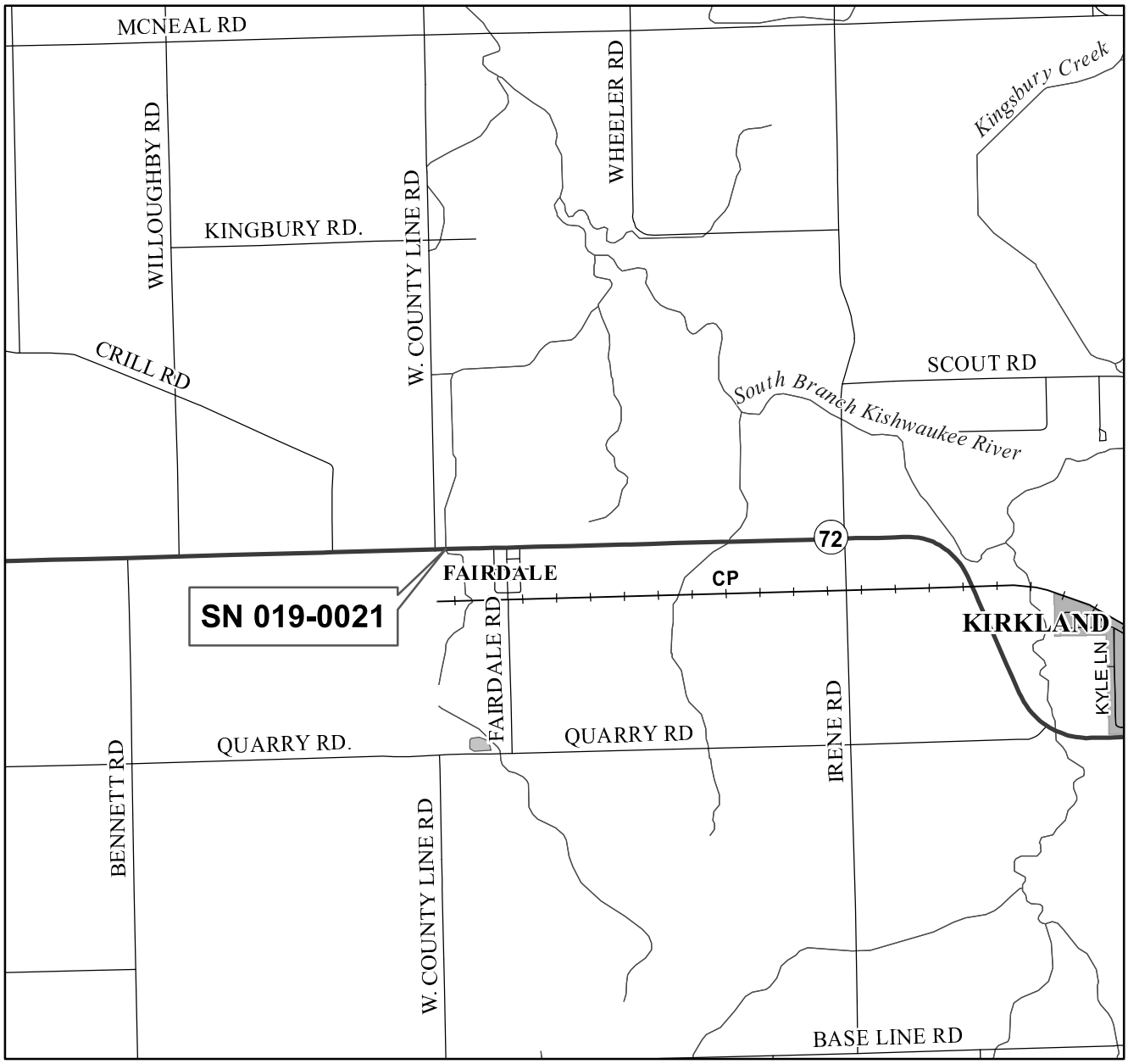
Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary factored unit side and tip resistance values shall be indicated when drilled shafts are proposed:
H-piles are the District's preferred foundation type because the piles will be driven to the top of rock and the potential for cobbles, boulders, and conflicts with the existing footing and piling elements. Pile Design Tables are attached. Pile shoes should be used because both structure borings showed potential cobbles/boulders prior to auger refusal. All piles should be driven to refusal on the bedrock. Conflicts between the existing timber piling and existing concrete footing and the proposed pile locations are expected. The existing footing should be removed either completely or only at the proposed pile locations by coring in accordance with Article 501.04 of the Standard Specifications. In the event the proposed piling conflicts with existing timber piling, the proposed piling should be able to be driven through the existing timber piling without difficulty. Since the proposed piling will be driven to refusal on the bedrock, there is no need to reduce the pile capacity for piles placed in a cored hole or driven through the existing timber piles. Test piles are recommended at each abutment location to account for the bedrock's variable and inconsistent elevation.

An integral abutment feasibility analysis was also conducted and determined that the proposed structure may be an integral by using any of the H-pile sizes provided in the Pile Design Tables. Metal shell piles should not be used due to the potential for damage during driving.
Calculate the estimated water surface elevation and determine the need for cofferdams (type 1 or 2), and seal coat: Since the proposed structure is a single span bridge, cofferdams and seal coats are not needed.
Assess the need for sheeting or soil retention or temporary construction slope and provide recommendation for other construction concerns: Temporary sheet piling is not feasible because the maximum available embedment depth is less than the required embedment depth to design the sheet piling. Therefore, a temporary soil retention system will need to be designed by the Contractor and be included in the Contract plans. The existing structure needs to be removed as per 2016 Standard Specifications for Road and Bridge Construction, Section 501.

Project Location Map

FAP 553 (IL 72)
Section (125 BR-1)ES
DeKalb County
SN 019-0021
0.1 mile east of Ogle County line
Phase I Job No: P-93-036-17
Contract No. 66H52



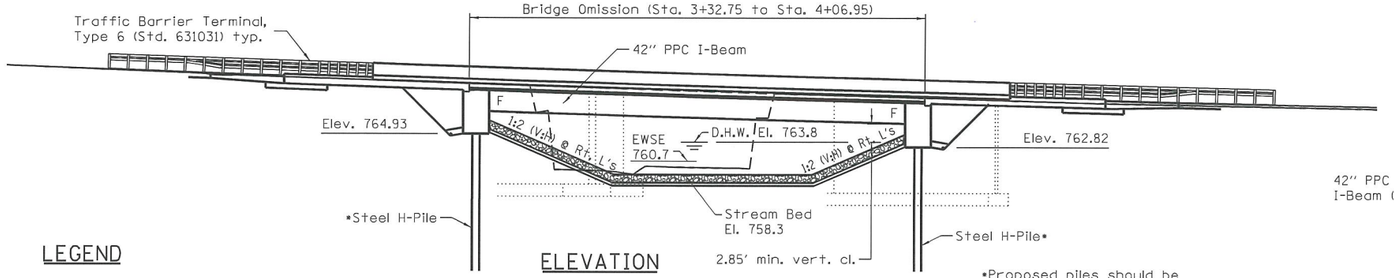


D3# 3382

Bench Mark: BM #18 Sta. 4+90.62, 40.37' LT
Railroad Spike in power pole NE Quad of S.N. 019-0021.
Elev. 764.19

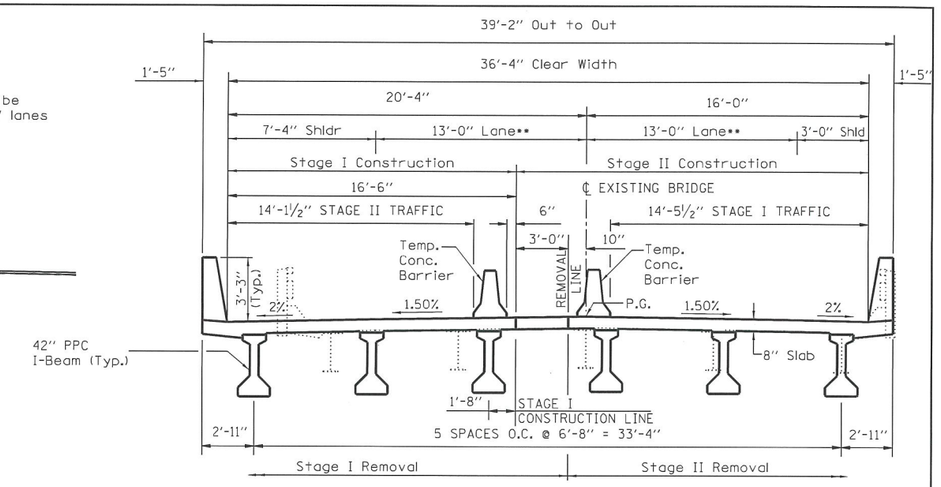
Existing Structure: SN 019-0021 built 1930 as SBI Route 72 Section 125 at Sta. 3+72.5
Re-built 1982 as FA Route 553 (IL 72). Structure consists of single span WF Beams and reinforced concrete deck supported by closed abutments on timber piles.
41'-8 3/4" Bk to Bk of Abutments.
34'-0" Out-to-Out Deck.
Structure to be removed and replaced using stage construction.

** The bridge will be striped for 12' lanes



ELEVATION

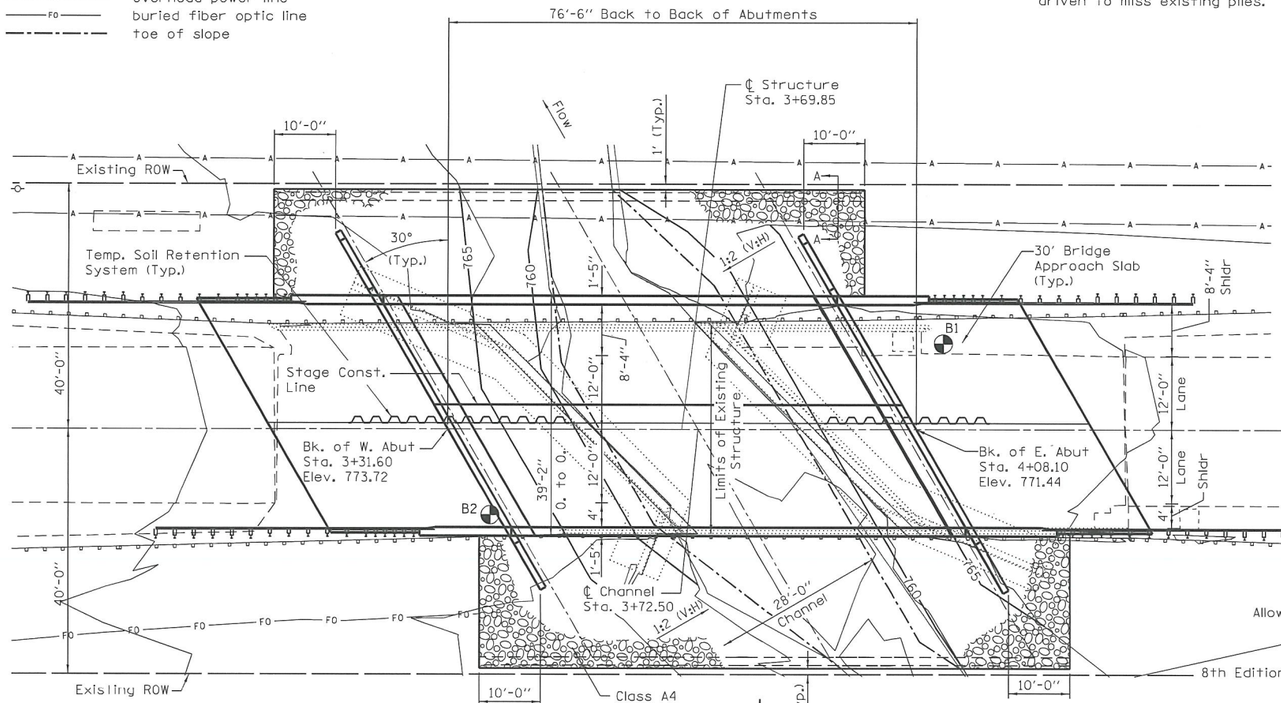
*Proposed piles should be driven to miss existing piles.



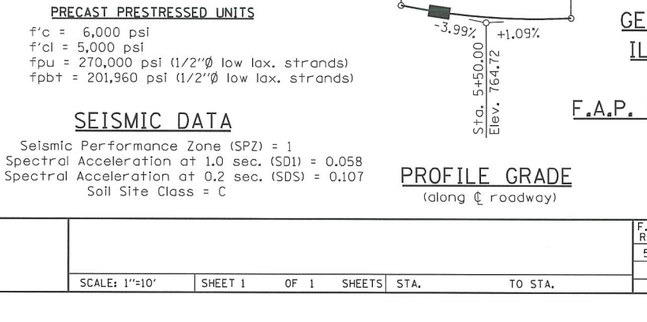
CROSS SECTION
(Looking East)

LEGEND

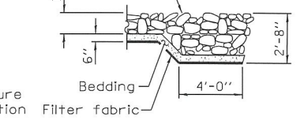
- overhead power line
- FO — buried fiber optic line
- toe of slope



PLAN



SECTION THRU INTEGRAL ABUTMENT
(Horiz. dim. @ Rt. L's)



SECTION A-A

APPROVED
APR 24 2019
AS A BASIS FOR PREPARATION OF DETAILED PLANS

WATERWAY INFORMATION

Drainage Area = 2.9 sq. mi. Low Grade Elev. = 766.8 ft

Flood	Freq. Yr.	Q C.F.S.	Opening Sq. Ft. Exist.	Opening Sq. Ft. Prop.	Nat. H.W.E.	Head - Ft. Exist	Head - Ft. Prop.	Headwater El. Exist	Headwater El. Prop.
	10	330	81	109	763.3	0.7	0.4	764.1	763.7
Hydraulic Design	50	530	91	127	763.8	1.4	0.7	765.2	764.5
Base/Scour Design	100	630	95	134	763.9	1.7	0.9	765.7	764.8
Scour Check	200	690	97	138	764	2.0	1.0	766.0	765.1
Max. Calc.	500	860	103	149	764.3	2.5	1.3	766.8	765.6
Overtopping	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DESIGN SCOUR ELEVATION TABLE

Event / Limit State	Design Scour Elevations (ft.) W. Abut.	E. Abut.	Item 113
0100	764.93	762.82	8
0200	764.93	762.82	
Design	764.93	762.82	
Check	764.93	762.82	

LOADING HL 93

Allow 50#/sq.ft. for future wearing surface

DESIGN SPECIFICATIONS

8th Edition 2017 AASHTO LRFD Bridge Design Specifications

HIGHWAY CLASSIFICATION

F.A.P. Route 553 - IL 72
Functional Class: Minor Arterial
ADT: 2258 (2020); 2688 (2040)
DHV: 248 (2020) 296 (2040)
ADTT: 684 (2020) 814 (2040)
Design Speed: 55 m.p.h.
Posted Speed: 55 m.p.h.
2-way Traffic Directional Distr. 50:50

DESIGN STRESSES

FIELD UNITS

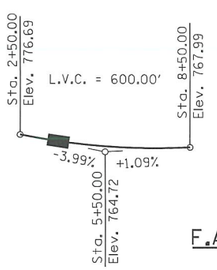
f'c = 3,500 psi
f'c = 4,000 psi (Superstructure Concrete)
fy = 60,000 psi (reinforcement)

PRECAST PRESTRESSED UNITS

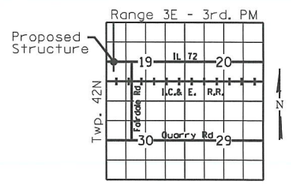
f'c = 6,000 psi
f'ci = 5,000 psi
fpu = 270,000 psi (1/2"Ø low lax. strands)
fpbt = 201,960 psi (1/2"Ø low lax. strands)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.058
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.107
Soil Site Class = C



PROFILE GRADE
(along ℄ roadway)



LOCATION SKETCH

GENERAL PLAN & ELEVATION
IL 72 OVER TRIBUTARY TO KISHWAUKEE RIVER
F.A.P. RTE. 553-SECTION (125BR-1)ES
DEKALB COUNTY
STATION 3+69.85
SN 019-0050 (PROP.)

FILE NAME = 0190050-66H52-TSL-001.dgn	USER NAME = CHAMLIN	DESIGNED - JKC	REVISED -
CHAMLIN & ASSOCIATES, INC.		DRAWN - LAG	REVISED -
	PLOT SCALE = 24.0000 ' / in.	CHECKED - JKC	REVISED -
	PLOT DATE = 4/23/2019	DATE - 1/15/19	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE: 1"=10' | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
553	(125BR-1)ES	DEKALB		
		CONTRACT NO. 66H52		
		ILLINOIS FED. AID PROJECT		

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 5/22/18

ROUTE FAP 553 (IL 72) **DESCRIPTION** IL 72 over a Stream, 0.1 miles East of Ogle County Line **LOGGED BY** Larry Myers

SECTION 125BR-1 **LOCATION** NW 1/4, **SEC.** 19, **TWP.** 42N, **RNG.** 3E, 3rd **PM**, **Latitude** 42.101483, **Longitude** -88.937779

COUNTY Dekalb **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 019-0021 (Exist.) 019-0050 (Prop.)
Station 3+72.50

BORING NO. 01 (N.E. Quad.)
Station 4+12.5
Offset 14.0 ft Lt.
Ground Surface Elev. 770.59 ft

Surface Water Elev. 759.59 ft
Stream Bed Elev. 757.55 ft

Groundwater Elev.:
First Encounter 755.6 ft ▼
Upon Completion 756.6 ft ▽
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				Augered Buff Shoulder Stone
768.09				
	3			Stiff to Very Stiff Black Silty Clay Loam and Gray & Brown Silty Clay Loam Till Fill
	4 4	2.0 P	18	
766.09				
-5				Very Stiff Black Silty Clay Loam Fill
	2			
	4 4	2.0 P	21	
	3			
	4 4	2.3 P	21	
761.09				
-10				Stiff Dark Gray Silty Clay / Silty Clay Loam with Sand Seams
	1			
	2 2	1.0 P	25	
758.09				
	3			Medium Tan Fine to Coarse Gravel in Loam Matrix - Potential Cobble / Boulder
	5 6		13	
▽				
▼-15				
	3			
	6 6		10	
753.59				
	5			Medium Gray & Brown Fine Sand to Coarse Gravel
	5 6		13	
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
	5			Medium Gray & Brown Fine Sand to Coarse Gravel *(continued)*
	4 8		11	
748.09				
	11			Hard Brown Loam Till - Very Dense
	15 19		9	
-25				
	15			
	17 17		8	
743.59				
	100/3"	No Recovery		Assumed Rock Surface - Auger Refusal / No Sample Recovery
742.84				End of Boring
-30				
-35				
-40				

SOIL BORING 019-0021.GPJ IL_DOT.GDT 1/14/19

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 5/22/18

ROUTE FAP 553 (IL 72) **DESCRIPTION** IL 72 over a Stream, 0.1 miles East of Ogle County Line **LOGGED BY** Larry Myers

SECTION 125BR-1 **LOCATION** SW 1/4, **SEC.** 19, **TWP.** 42N, **RNG.** 3E, 3rd **PM**,
Latitude 42.101412, **Longitude** -88.938054

COUNTY Dekalb **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 019-0021 (Exist.) / 019-0050 (Prop.)
Station 3+72.50

BORING NO. 02 (S.W. Quad.)
Station 3+38.5
Offset 14.0 ft Rt.
Ground Surface Elev. 772.93 ft

Surface Water Elev. 759.59 ft
Stream Bed Elev. 758.37 ft

Groundwater Elev.:
First Encounter 755.9 ft ▼
Upon Completion 755.9 ft ▽
After ____ **Hrs.** ____ ft

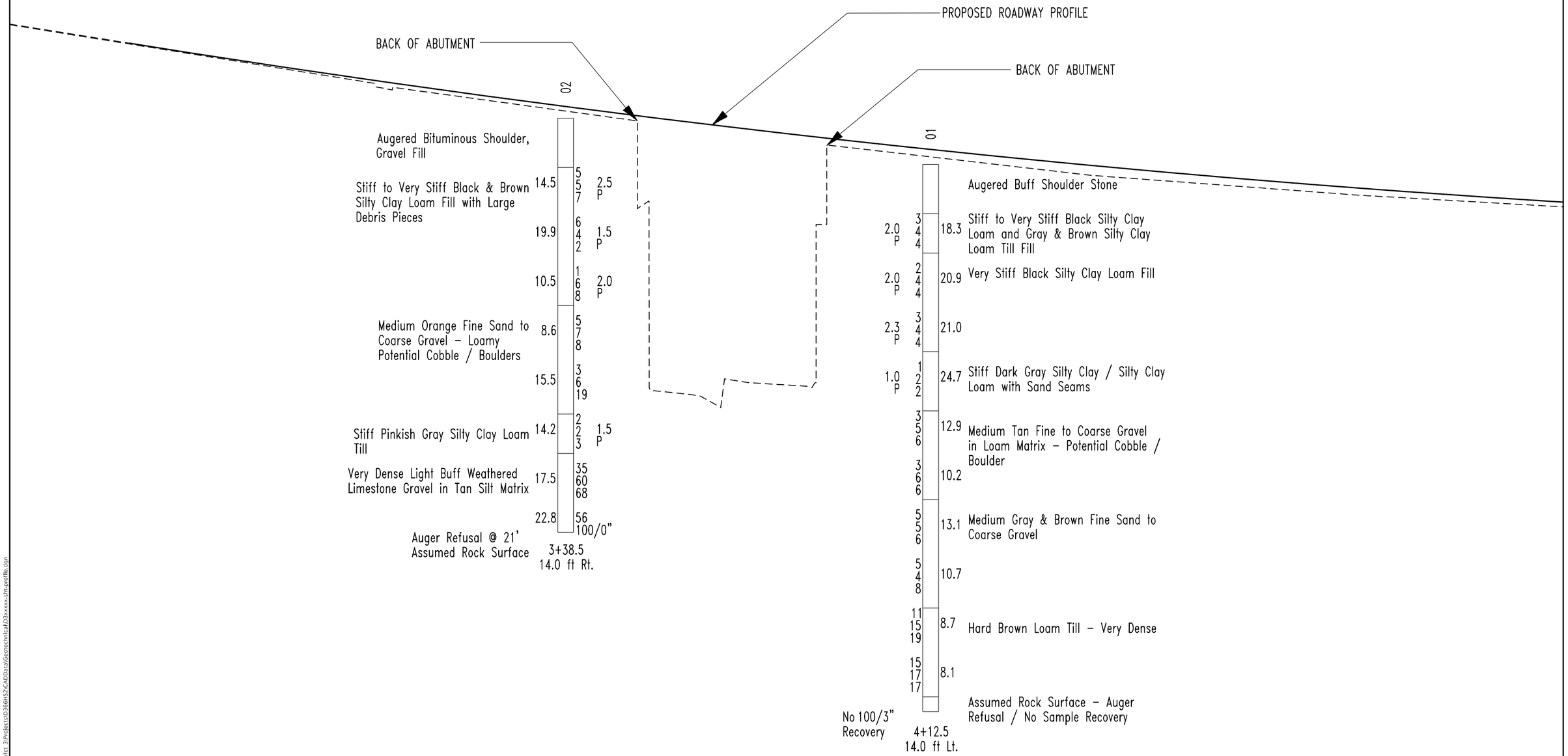
Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered Bituminous Shoulder, Gravel Fill				
770.43				
Stiff to Very Stiff Black & Brown Silty Clay Loam Fill with Large Debris Pieces		5		
		5 7	2.5 P	15
	-5	6		
		4 2	1.5 P	20
		1		
		6 8	2.0 P	11
763.43				
Medium Orange Fine Sand to Coarse Gravel - Loamy Potential Cobble / Boulders	-10	5		
		7 8		9
		3		
		6 19		16
757.93	-15			
Stiff Pinkish Gray Silty Clay Loam Till		2		
		2 3	1.5 P	14
755.93 ▼				
Very Dense Light Buff Weathered Limestone Gravel in Tan Silt Matrix		35		
		60 68		18
	-20			
	-25			
	-30			
	-35			
	-40			

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
		56		23
751.93		100/0"		
Auger Refusal @ 21' Assumed Rock Surface End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

SOIL BORING 019-0021.GPJ IL_DOT.GDT 1/14/19



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USER NAME = GrunstadAJ	DESIGNED - _____	REVISED - _____	**STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION**
	DRAWN - _____	REVISED - _____	
PLOT SCALE = 20.0000 ' / in.	CHECKED - _____	REVISED - _____	
PLOT DATE = 4/5/2019	DATE - _____	REVISED - _____	

STRUCT. NO. 019-0021 (EXIST.)
019-0050(PROP.)

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

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
___	125BR-1	DEKALB	1	1
		CONTRACT NO. 66H52		
	ILLINOIS	FED. AID PROJECT		

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====019-0050: IL 72 over Trib to So Branch Kishwaukee River

Substructure 1

Base of Substruct. Elev. (or ground surf for bents	764.68	ft.
Pile or Shaft Dia.	12	inches
Boring Number	B-02	
Top of Boring Elev.	772.93	ft.
Approximate Fixity Elev.	758.68	ft.

Individual Site Class Definition:

N (bar): 71 (Blows/ft.) Soil Site Class C
N_{ch} (bar): 98 (Blows/ft.) Soil Site Class C
s_u (bar): 4.77 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	770.4	2.50	0	0.25	B
	767.9	2.50	12	2.50	
	765.4	2.50	6	1.50	
	763.4	2.00	14	2.00	B
	760.9	2.50	15	0.00	
0.8	757.9	3.00	25	0.00	B
2.8	755.9	2.00	5	1.50	B
6.8	751.9	4.00	128	0.00	B
100.0	658.7	93.20	100	10.00	R

Substructure 2

Base of Substruct. Elev. (or ground surf for bents	762.32	ft.
Pile or Shaft Dia.	12	inches
Boring Number	B-01	
Top of Boring Elev.	770.59	ft.
Approximate Fixity Elev.	756.32	ft.

Individual Site Class Definition:

N (bar): 59 (Blows/ft.) Soil Site Class C <----Controls
N_{ch} (bar): 59 (Blows/ft.) Soil Site Class C
s_u (bar): (ksf) NA, H < 0.1*H (Soil)

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	768.1	2.50	0	0.25	B
	766.1	2.00	8	2.00	B
	763.6	2.50	8	2.00	
	761.1	2.50	8	2.30	B
	758.1	3.00	4	1.00	B
0.7	755.6	2.50	11	0.00	
2.7	753.6	2.00	12	0.00	B
5.2	751.1	2.50	11	0.00	
8.2	748.1	3.00	12	0.00	B
10.7	745.6	2.50	34	0.00	
12.7	743.6	2.00	34	0.00	B
100.0	656.3	87.30	100	10.00	R

Substructure 3

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Substructure 4

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Global Site Class Definition: Substructures 1 through 2

N (bar): 65 (Blows/ft.) Soil Site Class C
N_{ch} (bar): 78 (Blows/ft.) Soil Site Class C <----Controls
s_u (bar): 4.88 (ksf) Soil Site Class C

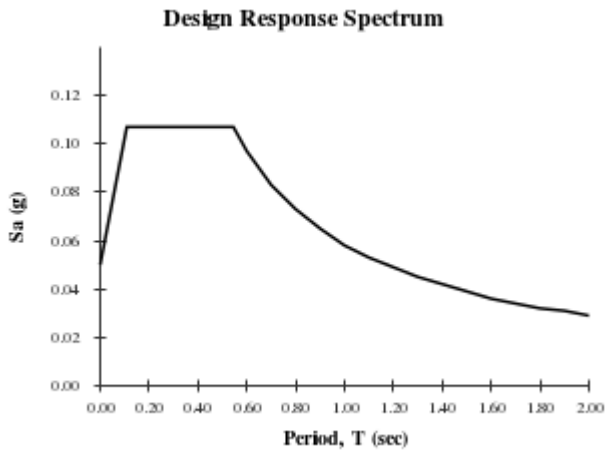
USGS Design Maps Summary Report

User–Specified Input

Report Title	Design Spectral Acceleration Wed December 5, 2018 14:36:29 UTC
Building Code Reference Document	2009 AASHTO Guide Specifications for LRFD Seismic Bridge Design (which utilizes USGS hazard data available in 2002)
Site Coordinates	42.10144°N, 88.9379°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"

USGS–Provided Output

PGA =	0.042 g	**A_s =**	0.050 g
S_s =	0.089 g	**S_{DS} =**	0.107 g
S_1 =	0.034 g	**S_{D1} =**	0.058 g



Illinois Department of Transportation

INTEGRAL ABUTMENT FEASIBILITY ANALYSIS

Modified 10/30/17

GENERAL DATA

STRUCTURE NUMBER==========	SN 019-0050		TOTAL STRUCTURE LENGTH==========	76.50	FT
STRUCTURE TYPE ==========	SIMPLE-SPAN				
STRUCTURE SKEW==========	30	DEGREES			
SUPER. DATA IN REFERENCE TO SUB. DATA ====	ABUT 1				

SUPERSTRUCTURE DATA (END OR MAIN SPAN)			SUPERSTRUCTURE DATA (ADJACENT SPAN)		
BEAM TYPE ==========	CONCRETE BEAM				
CONCRETE BEAM ==========	42" PPC I-BEAM				
BEAM F'C ==========	6	KSI			KSI
BEAM SPACING PERP. TO CL ==========	7.00	FT	BEAM SPACING PERP. TO CL ==========		FT
SLAB THICKNESS ==========	8.00	IN			
SLAB F'C ==========	4.00	KSI			

ABUTMENT #1 DATA			ABUTMENT #2 DATA		
ABUTMENT NAME ==========	East		ABUTMENT NAME ==========	West	
ABUTMENT REFERENCE BORING ==========	B-01		ABUTMENT REFERENCE BORING==========	B-02	
BOTTOM OF ABUTMENT ELEVATION ==========	762.32	FT	BOTTOM OF ABUTMENT ELEVATION==========	764.68	FT
ESTIMATED NUMBER OF PILES AT ABUT. =======	6		ESTIMATED NUMBER OF PILES AT ABUT.=======	6	
PILE SPACING PERP. TO CL ==========	5.75	FT	PILE SPACING PERP. TO CL ==========	5.75	FT

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #1

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
761.09	1.23	2.3		
758.09	3.00	1.0		
755.84	2.25		11	2.5
753.59	2.25		12	2.6
752.32	1.27		11	2.5

10.00 FT = TOTAL DEPTH ENTERED

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #2

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
763.43	1.25	2.0		
760.93	2.50		15	2.7
757.93	3.00		25	3.1
755.93	2.00	1.50		
754.68	1.25		100	4.2

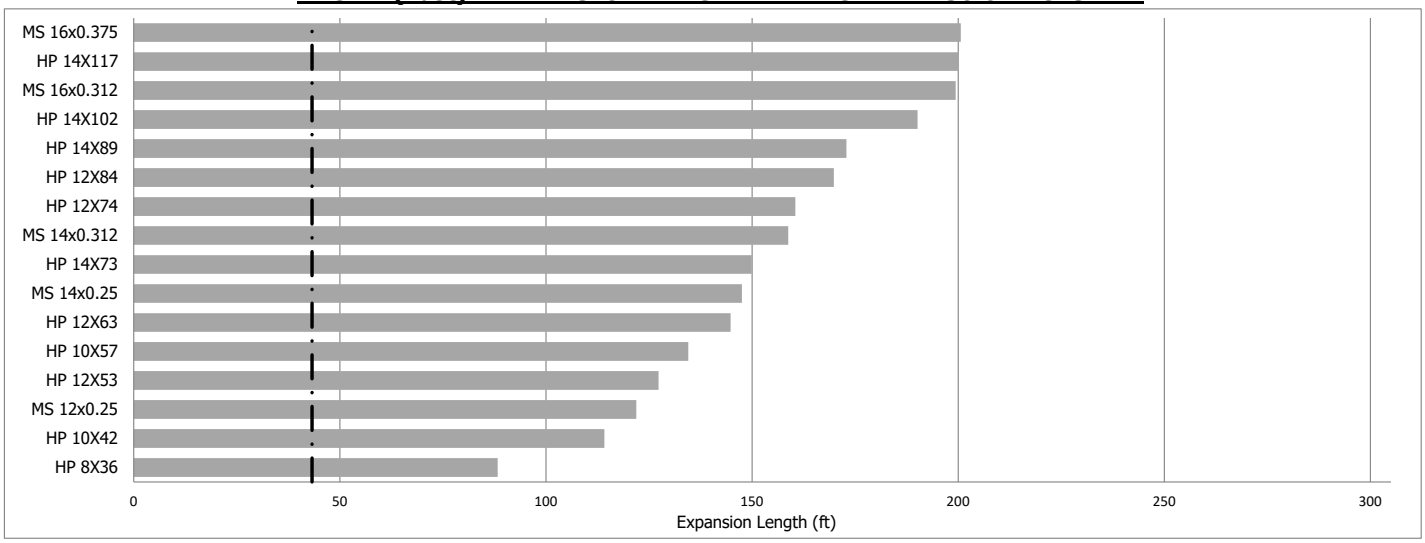
10.00 FT = TOTAL DEPTH ENTERED

WEIGHTED AVERAGE Qu FOR ABUTMENT #1=======	2.04	TSF	WEIGHTED AVERAGE Qu FOR ABUTMENT #2=======	2.69	TSF
PILE STIFFNESS MODIFIER FOR ABUTMENT #1 = 1/(1.45-[0.3*2.04])==========	1.19		PILE STIFFNESS MODIFIER FOR ABUTMENT #2 = 1/(1.45-[0.3*2.69])==========	1.55	

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #1 = [1.19*6*0+1.55*6*76.5]/[1.19*6+1.55*6]========== 43.26 FT

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #2 = [1.55*6*0+1.19*6*76.5]/[1.55*6+1.19*6]========== 33.24 FT

ABUT 1 (East) - EXPANSION LENGTH LIMIT CHART - 30.0 DEG. SKEW

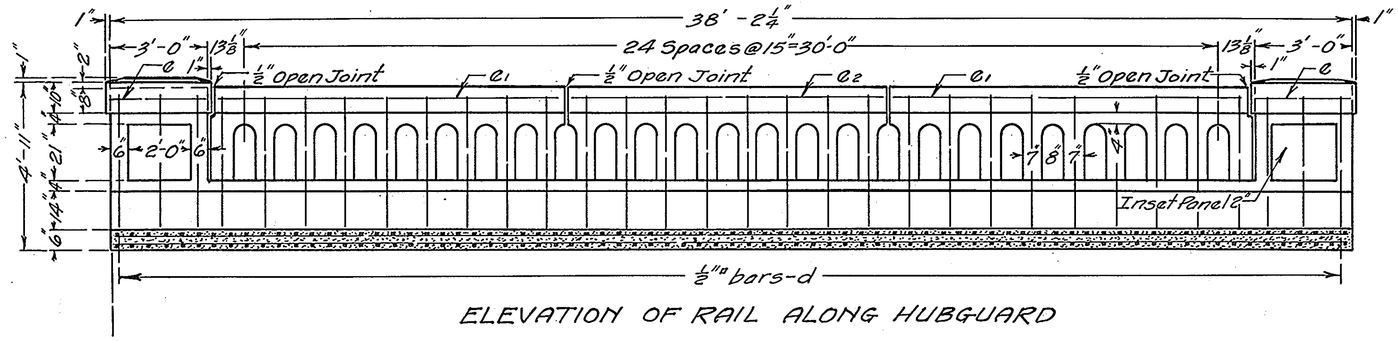


= *Estimated expansion length for the indicated abutment. Piles with an expansion length greater than this are suitable for consideration.*
(Note: The same size pile should be used at both abutments.)

BOND ISSUE ROUTE NO.	SEC.	COUNTY	TOTAL SHEETS	SHEET NO.
72	125	DeKalb	61	56
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

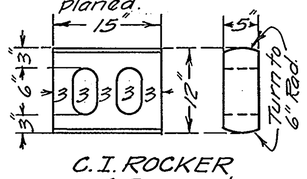
SHEET NO. 1
2 SHEETS

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS

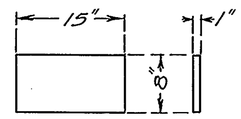


ELEVATION OF RAIL ALONG HUBGUARD

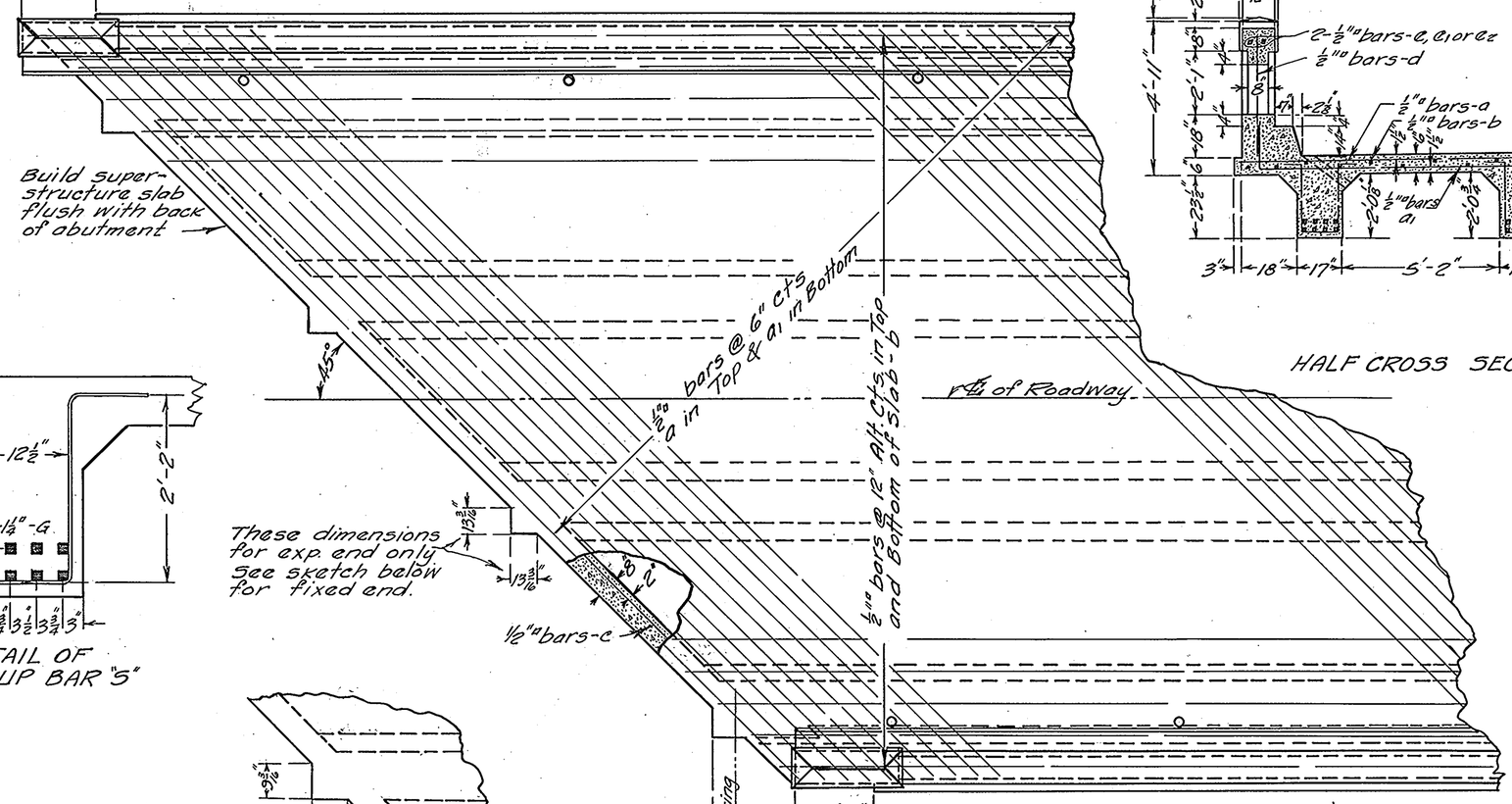
Rockers and Plates shall be given one coat of sublimed blue lead paint and two coats of white lead paint.
Surface of Plate adjacent to Rocker shall be planed.



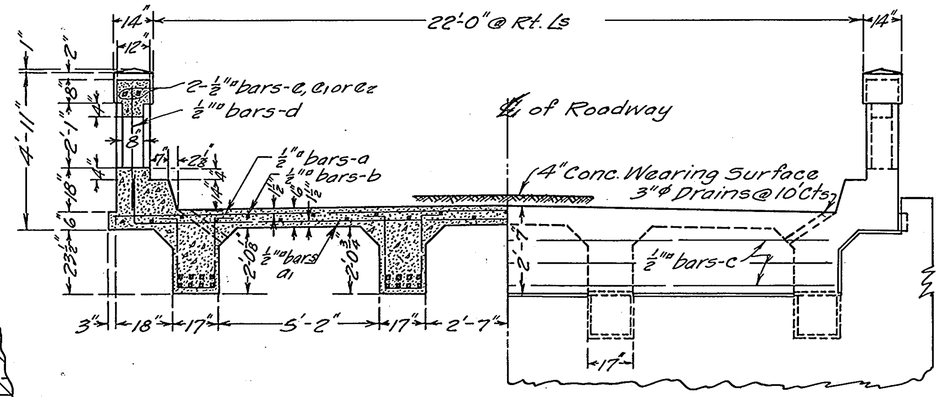
C.I. ROCKER
4 Required



STEEL PLATE
8 Required



PART PLAN



HALF CROSS SECTION

HALF END ELEVATION

DETAIL OF STIRRUP BAR "S"

END OF GIRDER AT FIXED END

BILL OF MATERIAL

Bar	No.	Size	Length
a	54	½" ▫	34'-6"
a1	54	½" ▫	36'-0"
b	46	½" ▫	20'-0"
c	6	½" ▫	29'-6"
d	64	½" ▫	4'-0"
e	8	½" ▫	2'-9"
e1	8	½" ▫	10'-9"
e2	4	½" ▫	9'-6"
G	32	1¼" ▫	37'-3"
s	188	½" ▫	7'-6"
Class X Concrete Cu. Yds. 41.8			
Class X Conc. (Rail) Cu. Yds. 5.8			
Reinforcing Steel - Lbs. 12040			
4 C.I. Rockers - Lbs. 744			
8 Steel Plates - Lbs. 270			

Class X concrete shall be used throughout.
All reinforcing steel shall be wired securely in place before concrete is poured.

STANDARD	COMPUTED —	E. M. Rommie
	CHECKED —	M. Humphreys Jr.
	DRAWN —	E. M. Rommie
	CHECKED —	M. H. Jr.
SPECIAL	ASSEMBLED —	
	CHECKED —	

EXAMINED July 30 1930
D. F. Burch BRIDGE ENGINEER
PASSED ENGINEER OF DESIGN
APPROVED Frank T. Sheets CHIEF HIGHWAY ENGINEER

S.B.I. ROUTE 72 SECTION 125
DEKALB COUNTY
STATION 3+72.5

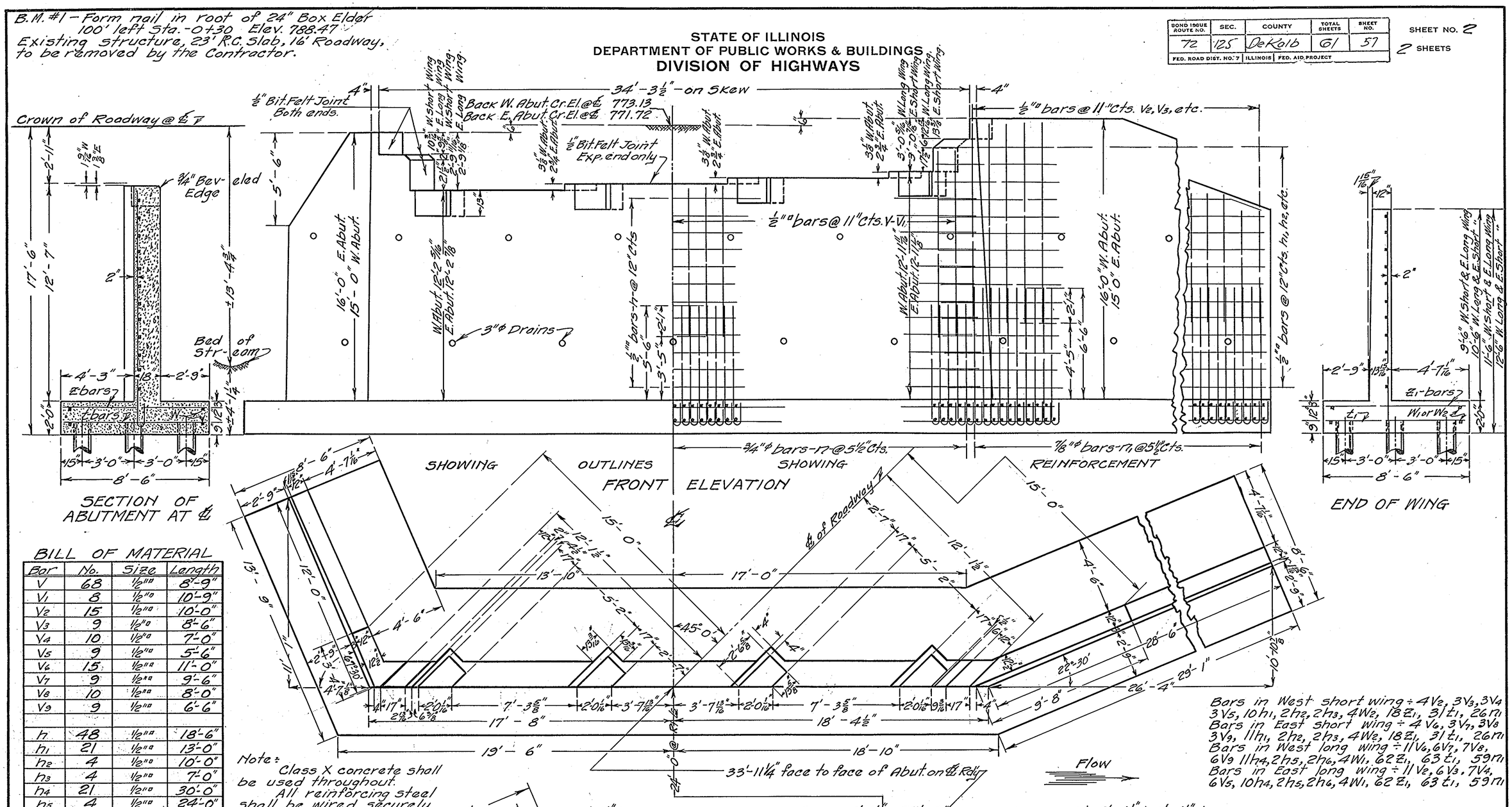
PRINTED ON PERMANENT TRACING CLOTH K & E CO., N.Y.

B.M. #1 – Form nail in root of 24" Box Elder 100' left Sta. -0+30 Elev. 788.47
Existing structure, 23' R.C. Slab, 16' Roadway, to be removed by the Contractor.

BOND ISSUE ROUTE NO.	SEC.	COUNTY	TOTAL SHEETS	SHEET NO.
72	125	DeKalb	61	57
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

SHEET NO. 2
2 SHEETS

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS

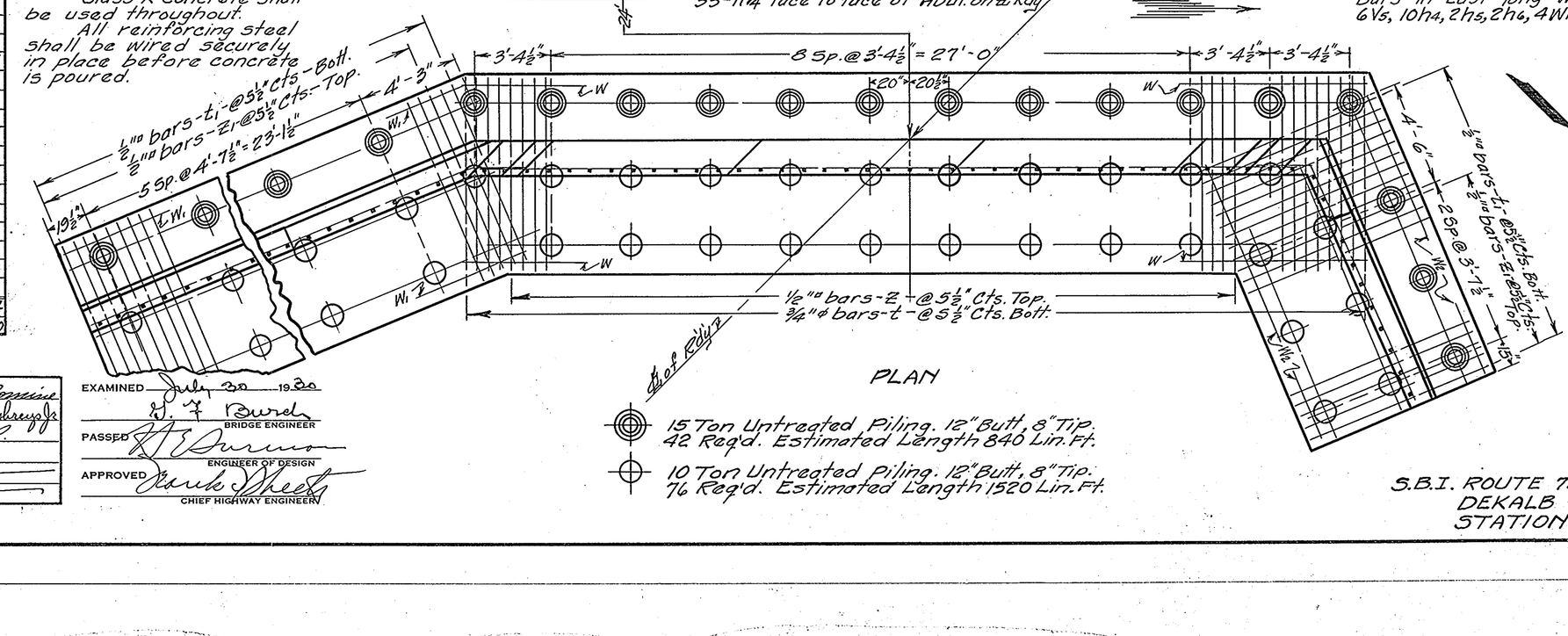


BILL OF MATERIAL

Bar	No.	Size	Length
V	68	½"ø	8'-9"
V1	8	½"ø	10'-9"
V2	15	½"ø	10'-0"
V3	9	½"ø	8'-6"
V4	10	½"ø	7'-0"
V5	9	½"ø	5'-6"
V6	15	½"ø	11'-0"
V7	9	½"ø	9'-6"
V8	10	½"ø	8'-0"
V9	9	½"ø	6'-6"
h	48	½"ø	18'-6"
h1	21	½"ø	13'-0"
h2	4	½"ø	10'-0"
h3	4	½"ø	7'-0"
h4	21	½"ø	30'-0"
h5	4	½"ø	24'-0"
h6	4	½"ø	18'-0"
n	152	¾"ø	8'-6"
n1	170	⅞"ø	10'-0"
t	166	¾"ø	8'-3"
t1	188	½"ø	8'-3"
Z	134	½"ø	8'-3"
Z1	160	½"ø	8'-3"
W	16	½"ø	20'-0"
W1	8	½"ø	29'-0"
W2	8	½"ø	13'-6"

Class X Concrete-Cu. Yds.-1884
Reinforcing Steel-Lbs.-14330

Note:
Class X concrete shall be used throughout.
All reinforcing steel shall be wired securely in place before concrete is poured.



PLAN

Bars in West short wing ÷ 4 V2, 3 V3, 3 V4, 3 V5, 10 h1, 2 h2, 2 h3, 4 W2, 18 Z1, 3 t1, 26 n1
Bars in East short wing ÷ 4 V4, 3 V7, 3 V8, 3 V9, 11 h1, 2 h2, 2 h3, 4 W2, 18 Z1, 3 t1, 26 n1
Bars in West long wing ÷ 11 V2, 6 V7, 7 V8, 6 V9, 11 h4, 2 h5, 2 h6, 4 W1, 62 Z1, 63 t1, 59 n1
Bars in East long wing ÷ 11 V2, 6 V3, 7 V4, 6 V5, 10 h4, 2 h5, 2 h6, 4 W1, 62 Z1, 63 t1, 59 n1

STANDARD	COMPUTED —	Zm Romine
	CHECKED —	M Humphreys Jr
	DRAWN —	[illegible]
	CHECKED —	MH.
SPECIAL	ASSEMBLED —	
	CHECKED —	

EXAMINED July 30 1930
PASSED
APPROVED

15 Ton Untreated Piling. 12" Butt, 8" Tip.
42 Req'd. Estimated Length 840 Lin. Ft.

10 Ton Untreated Piling. 12" Butt, 8" Tip.
76 Req'd. Estimated Length 1520 Lin. Ft.

S.B.I. ROUTE 72 – SECTION 125
DEKALB COUNTY
STATION 3+72.5

IL 72 over South Branch of Kishwaukee River (SN 019-0050(P))
Information for SGR Consultant

By: JKC Ck'd By: AJD

	Kips
Dead Load of West Abutment w/ Bottom Elev. = 764.68*	225.70
Dead Load of East Abutment w/ bottom Elev. = 762.32*	227.50

* - Does not include weight of dog ear wingwalls

Approach Slab Dead Load Reaction at Abutments	
West	103.10
East	103.10
Approach Slab Wearing Surface Reaction at Abutments	
West	23.70
East	23.70

Beam Dead Load Reactions (One Beam):	Abutment
Non-composite (DC1)	42.52
Composite (DC2)	5.42
Wearing Surface	10.95
One Beam Total	58.89
# of Beams	6.00
Six Beam Total	**353.34**

	W/o Impact
Single Lane Load Reaction at Abutment	99.30

Calculate Total Load on Abutment - Single Lane Load							
Load Combination	DC		DW		LL		Total Load on Abutment
	FACTOR	LOAD	FACTOR	LOAD	FACTOR	LOAD	LOAD
Strength I	1.25	618.1	1.5	89.4	1.75	99.3	1080.5
Strength II	1.25	618.1	1.5	89.4	1.35	99.3	1040.78
Strength IV	1.5	618.1	1.5	89.4	0	99.3	1061.25
Service I	1	618.1	1	89.4	1	99.3	806.8

Calculate Total Load on Abutment - Two Lanes Loaded							
Load Combination	DC		DW		LL		Total Load on Abutment
	FACTOR	LOAD	FACTOR	LOAD	FACTOR	LOAD	LOAD
Strength I	1.25	618.1	1.5	89.4	1.75	198.6	1254.275
Strength II	1.25	618.1	1.5	89.4	1.35	198.6	1174.835
Strength IV	1.5	618.1	1.5	89.4	0	198.6	1061.25
Service I	1	618.1	1	89.4	1	198.6	906.1

Calculate Total Load on Abutment - Three Lanes Loaded							
Load Combination	DC		DW		LL		Total Load on Abutment
	FACTOR	LOAD	FACTOR	LOAD	FACTOR	LOAD	LOAD
Strength I	1.25	618.1	1.5	89.4	1.75	238.3	1323.75
Strength II	1.25	618.1	1.5	89.4	1.35	238.3	1228.43
Strength IV	1.5	618.1	1.5	89.4	0	238.3	1061.25
Service I	1	618.1	1	89.4	1	238.3	945.8

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 019-0050 EAST ABUTMENT
REFERENCE BORING ========== 1
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 764.57 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 762.57 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ====== None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1324 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 42.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 252.19 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 94.57 KIPS

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
929 KIPS	**917** KIPS	**504** KIPS	**25** FT.

PILE TYPE AND SIZE ========== Steel HP 14 X 117
Pile Perimeter========== 4.850 FT. Unplugged Pile Perimeter========== 7.117 FT.
Pile End Bearing Area========== 1.469 SQFT. Unplugged Pile End Bearing Area========= 0.239 SQFT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)	NOMINAL UNPLUG'D SIDE RESIST. (KIPS)	NOMINAL UNPLUG'D END BRG. RESIST. (KIPS)	NOMINAL UNPLUG'D TOTAL RESIST. (KIPS)	NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
761.09	1.48	2.30	8		9.1		29.7	13.4		***16.8***	17	0	0	9	3
758.09	3.00	1.00	4		10.3	20.6	43.6	15.2	3.3	***32.5***	33	0	0	18	6
755.59	2.50		11	Sandy Gravel	3.1	24.1	56.4	4.6	3.9	***38.7***	39	0	0	21	9
753.59	2.00		12	Sandy Gravel	2.7	33.8	64.9	4.0	5.5	***43.6***	44	0	0	24	11
751.09	2.50		11	Sandy Gravel	3.1	39.6	72.4	4.6	6.4	***48.9***	49	0	0	27	13
748.09	3.00		12	Sandy Gravel	4.1	43.9	125.9	6.0	7.1	***62.9***	63	0	0	35	16
747.09	1.00		34	Hard Till	1.8	93.3	127.7	2.7	15.2	***65.5***	66	0	0	36	17
746.09	1.00		34	Hard Till	1.8	93.3	129.5	2.7	15.2	***68.2***	68	0	0	38	18
745.59	0.50		34	Hard Till	0.9	93.3	130.4	1.3	15.2	***69.5***	70	0	0	38	19
744.59	1.00		34	Hard Till	1.8	93.3	132.2	2.7	15.2	***72.2***	72	0	0	40	20
743.59	1.00		34	Hard Till	1.8	93.3	406.7	2.7	15.2	***119.2***	119	0	0	66	21
742.59	1.00			Limestone	120.8	366.1	527.6	177.3	59.5	***296.5***	296	0	0	163	22
741.59	1.00			Limestone	120.8	366.1	648.4	177.3	59.5	***473.8***	474	0	0	261	23
740.59	1.00			Limestone	120.8	366.1	769.2	177.3	59.5	***651.1***	651	0	0	358	24
739.59	1.00			Limestone	120.8	366.1	890.1	177.3	59.5	***828.4***	828	0	0	456	25
739.09	0.50			Limestone	60.4	366.1	950.5	88.7	59.5	***917.1***	917	0	0	504	25.5
738.59	0.50			Limestone	60.4	366.1	1010.9	88.7	59.5	***1005.7***	~~1006~~	~~0~~	~~0~~	~~553~~	~~26~~
738.09	0.50			Limestone		366.1			59.5						

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 019-0050 WEST ABUTMENT
REFERENCE BORING ========== 2
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 766.93 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 764.93 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ====== None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1324 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 42.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 252.19 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 94.57 KIPS

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
929 KIPS	**903** KIPS	**496** KIPS	**16** FT.

PILE TYPE AND SIZE ========== Steel HP 14 X 117
Pile Perimeter========== 4.850 FT. Unplugged Pile Perimeter========== 7.117 FT.
Pile End Bearing Area========== 1.469 SQFT. Unplugged Pile End Bearing Area========= 0.239 SQFT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)	NOMINAL UNPLUG'D SIDE RESIST. (KIPS)	NOMINAL UNPLUG'D END BRG. RESIST. (KIPS)	NOMINAL UNPLUG'D TOTAL RESIST. (KIPS)	NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
763.43	1.50	2.00	14		8.5		27.3	12.4		***15.5***	15	0	0	9	4
760.93	2.50		15	Sandy Gravel	4.2	18.8	67.6	6.2	3.1	***27.6***	28	0	0	15	6
757.93	3.00		25	Sandy Gravel	8.8	54.9	52.4	12.9	8.9	***36.5***	37	0	0	20	9
755.93	2.00	1.50	5		9.3	30.9	396.9	13.7	5.0	***104.7***	105	0	0	58	11
754.93	1.00			Limestone	120.8	366.1	517.7	177.3	59.5	***282.0***	282	0	0	155	12
753.93	1.00			Limestone	120.8	366.1	638.5	177.3	59.5	***459.3***	459	0	0	253	13
752.93	1.00			Limestone	120.8	366.1	759.4	177.3	59.5	***636.6***	637	0	0	350	14
751.93	1.00			Limestone	120.8	366.1	880.2	177.3	59.5	***813.9***	814	0	0	448	15
751.43	0.50			Limestone	60.4	366.1	940.6	88.7	59.5	***902.6***	903	0	0	496	15.5
750.93	0.50			Limestone	60.4	366.1	1001.0	88.7	59.5	***991.3***	~~991~~	~~0~~	~~0~~	~~545~~	~~16~~
750.43	0.50			Limestone	60.4	366.1	***1061.5***	88.7	59.5	1079.9	~~1061~~	~~0~~	~~0~~	~~584~~	~~16.5~~
749.93	0.50			Limestone		366.1			59.5						

SN 019-0050		DEKALB COUNTY	
IL 72 OVER TRIBUTARY TO SOUTH BRANCH OF KISHWAUKEE RIVER			
PILE LENGTH TABLE: EAST ABUTMENT USING BORING #1			
ALL PILES SHOULD BE DRIVEN TO REFUSAL ON THE BEDROCK SURFACE			
PILE CUTOFF ELEVATION 764.57			
PILE TYPE AND SIZE	**NOMINAL REQUIRED BEARING**	**FACTORED RESISTANCE AVAILABLE**	**ESTIMATED PILE LENGTH**
	KIPS	KIPS	FEET
Steel HP 8 X 36	245	135	23
Steel HP 8 X 36	286	157	23
Steel HP 10 X 42	304	167	23
Steel HP 10 X 42	335	184	23
Steel HP 10 X 57	435	239	24
Steel HP 10 X 57	454	250	24
Steel HP 12 X 53	364	200	23
Steel HP 12 X 53	419	230	23
Steel HP 12 X 63	374	206	23
Steel HP 12 X 63	497	273	24
Steel HP 12 X 74	529	291	24
Steel HP 12 X 74	589	324	24
Steel HP 12 X 84	536	295	24
Steel HP 12 X 84	664	365	25
Steel HP 14 X 73	443	244	23
Steel HP 14 X 73	578	318	24
Steel HP 14 X 89	630	346	24
Steel HP 14 X 89	705	388	24
Steel HP 14 X 102	639	351	24
Steel HP 14 X 102	810	446	25
Steel HP 14 X 117	917	504	25
Steel HP 14 X 117	929	511	26

SN 019-0050		DEKALB COUNTY	
IL 72 OVER TRIBUTARY TO SOUTH BRANCH OF KISHWAUKEE RIVER			
PILE LENGTH TABLE: WEST ABUTMENT USING BORING #2			
ALL PILES SHOULD BE DRIVEN TO REFUSAL ON THE BEDROCK SURFACE			
PILE CUTOFF ELEVATION 766.93			
PILE TYPE AND SIZE	**NOMINAL REQUIRED BEARING**	**FACTORED RESISTANCE AVAILABLE**	**ESTIMATED PILE LENGTH**
	KIPS	KIPS	FEET
Steel HP 8 X 36	237	130	13
Steel HP 8 X 36	286	157	13
Steel HP 10 X 42	294	162	13
Steel HP 10 X 42	335	184	13
Steel HP 10 X 57	425	234	14
Steel HP 10 X 57	454	250	14
Steel HP 12 X 53	353	194	13
Steel HP 12 X 53	419	230	13
Steel HP 12 X 63	362	199	13
Steel HP 12 X 63	497	273	14
Steel HP 12 X 74	517	284	14
Steel HP 12 X 74	589	324	14
Steel HP 12 X 84	524	288	14
Steel HP 12 X 84	664	365	15
Steel HP 14 X 73	429	236	13
Steel HP 14 X 73	578	318	14
Steel HP 14 X 89	616	339	14
Steel HP 14 X 89	705	388	15
Steel HP 14 X 102	800	440	15
Steel HP 14 X 102	810	446	15
Steel HP 14 X 117	903	496	16
Steel HP 14 X 117	929	511	16