



Original Report Date:	10/13/2021	Proposed SN:	050-2061	Route:	FAP 607(US 52)
Revised Date:	8/1/2022	Existing SN:	050-0059	Section:	(125)BR1-1
Geotechnical Engineer:	Jeremy Brown, P.E. (IDOT D3)			County:	LaSalle
Structural Engineer:	Benjamin A. Nebel, P.E., S.E. (Hutchison Eng.)			Contract:	66L43

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): The proposed structure is a double 12 ft by 12 ft concrete box culvert with a drop structure at the upstream end and no skew.

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): The existing structure is a single span slab bridge supported by closed abutments on untreated timber piles. Two soil borings were performed by IDOT in 2020. The soil boring logs are attached.

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: A site visit found no signs of settlement at the existing structure. The soils in the creek have not been loaded since the existing structure is a bridge. However, with the recommended plan undercut and the hard clay underlying soils, a settlement analysis 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: The fill over the top of the proposed box culvert will be approximately 3 feet high from the top of the culvert and 2 feet high from the top of the concrete headwalls and is shown to have side slopes of 3H:1V on the preliminary TS&L. The slopes will be constructed according to section 205 of the Standard Spec Book utilizing approved materials. The slopes are relatively short in height and will also be supported at the toes by the 9 inch concrete headwalls at the ends of the box culvert. Slope stability is not at concern and no further analysis is warranted.

The proposed box culvert will require little embankment construction outside of backfilling behind the new structure. Any fill placed will be used to transition the culvert wingwall grades to match into the existing side slopes. The maximum embankment height will be approximately 16 feet high with side slopes of 2H:1V according to the TS&L. The soil boring logs show stiff silty clay fill in the existing embankment which poses little slope stability concerns. A site visit showed no slope stability concerns and no further analysis is warranted.

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: Not required for closed bottom culverts.

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: Not required for closed bottom culverts.

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: Based on Figure 4.1.3.1-2 of the IDOT culvert manual, the estimated length of the wingwalls will be approximately 18.75 feet. Horizontal cantilever wingwalls are not feasible because they are limited to 16 feet in length. Two-way cantilever L-type wingwalls are feasible for the proposed wingwalls since they may be used for lengths of up to 30 feet.

Based on the invert elevations on the TS&L, the base of the proposed concrete box culvert is to be constructed on a layer of hard silty clay loam till which has adequate strength to support the structure. Differential settlement is not a concern, and construction of a cast-in-place or precast concrete box culvert is feasible. It is recommended to undercut at least 2 feet below the entire box culvert and the L-type wingwalls to an elevation of 600.50 to ensure that the existing bridge foundations are removed below the proposed structure. The horizontal limits of the bottom of the undercut shall be extended to 2 feet beyond the footprint of the proposed box culvert and wingwalls. The undercut shall be replaced with rock fill or porous granular material.

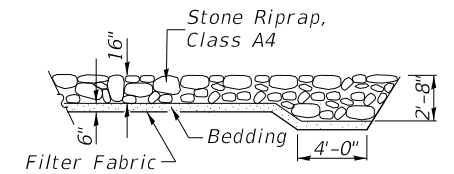
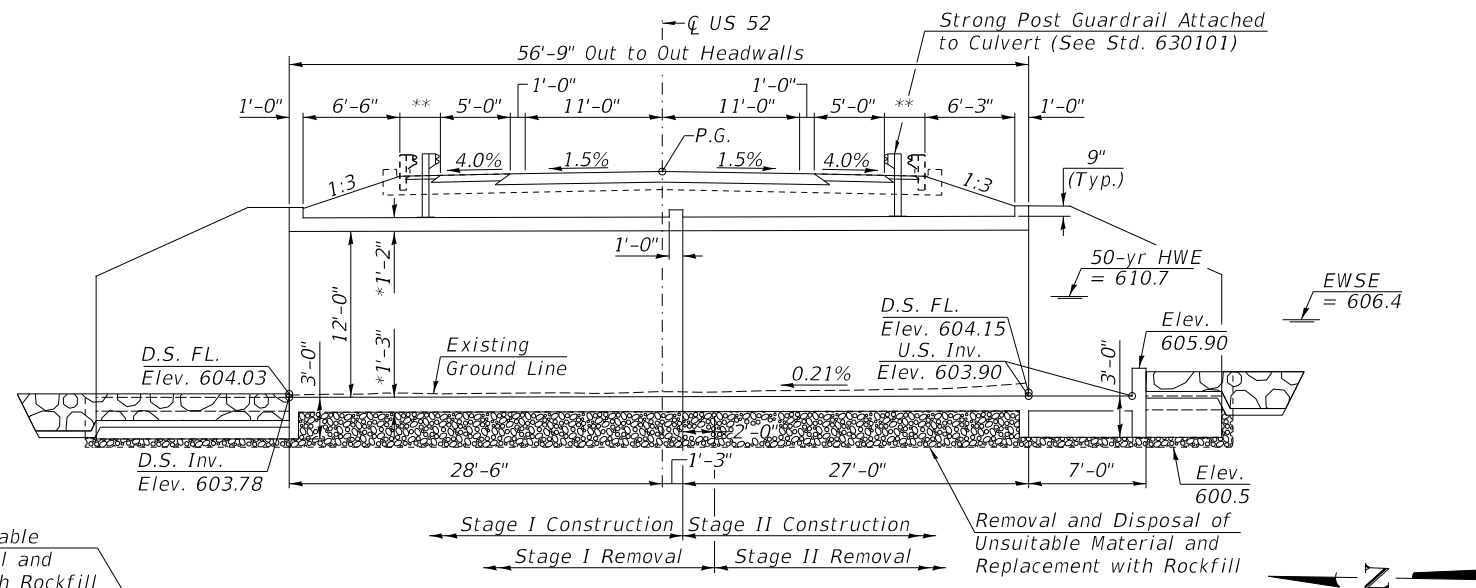
Calculate the estimated water surface elevation and determine the need for cofferdams (type 1 or 2), and seal coat: The structure can be constructed using standard methods of water diversion determined by the contractor.

Assess the need for sheeting or soil retention or temporary construction slope and provide recommendation for other construction concerns: The new structure will be constructed using staged construction. The soils show a Q_u greater than 4.5 tsf, therefore the Temporary Soil Retention System pay item should be used.

Chis. "□" on NW Wingwall
of Ex. Culvert
Sta. 440+73, 22' LT
Elev. 619.61

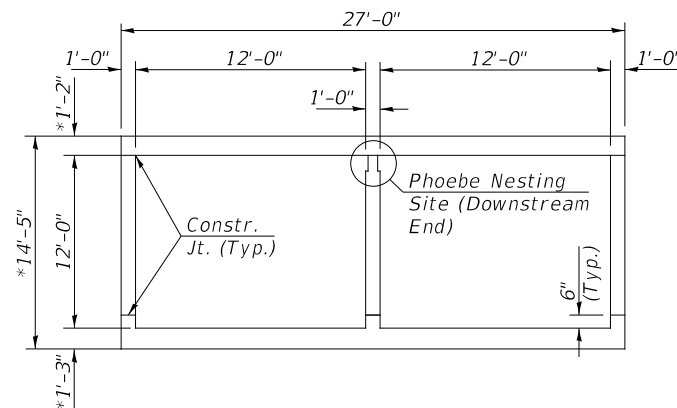
Structure No. 050-0059 was built in 1930 as S.B.I. Rte. 69, Section 125-B. The existing structure is a single span reinforced concrete slab superstructure on closed concrete abutments supported on piles. The structure is 26'-0" back to back of abutments, 42'-2" out to out deck, and is not skewed. Traffic will be maintained utilizing stage construction.

Precast alternate is not allowed.



SECTION A-A

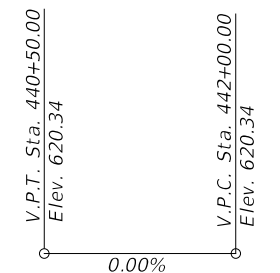
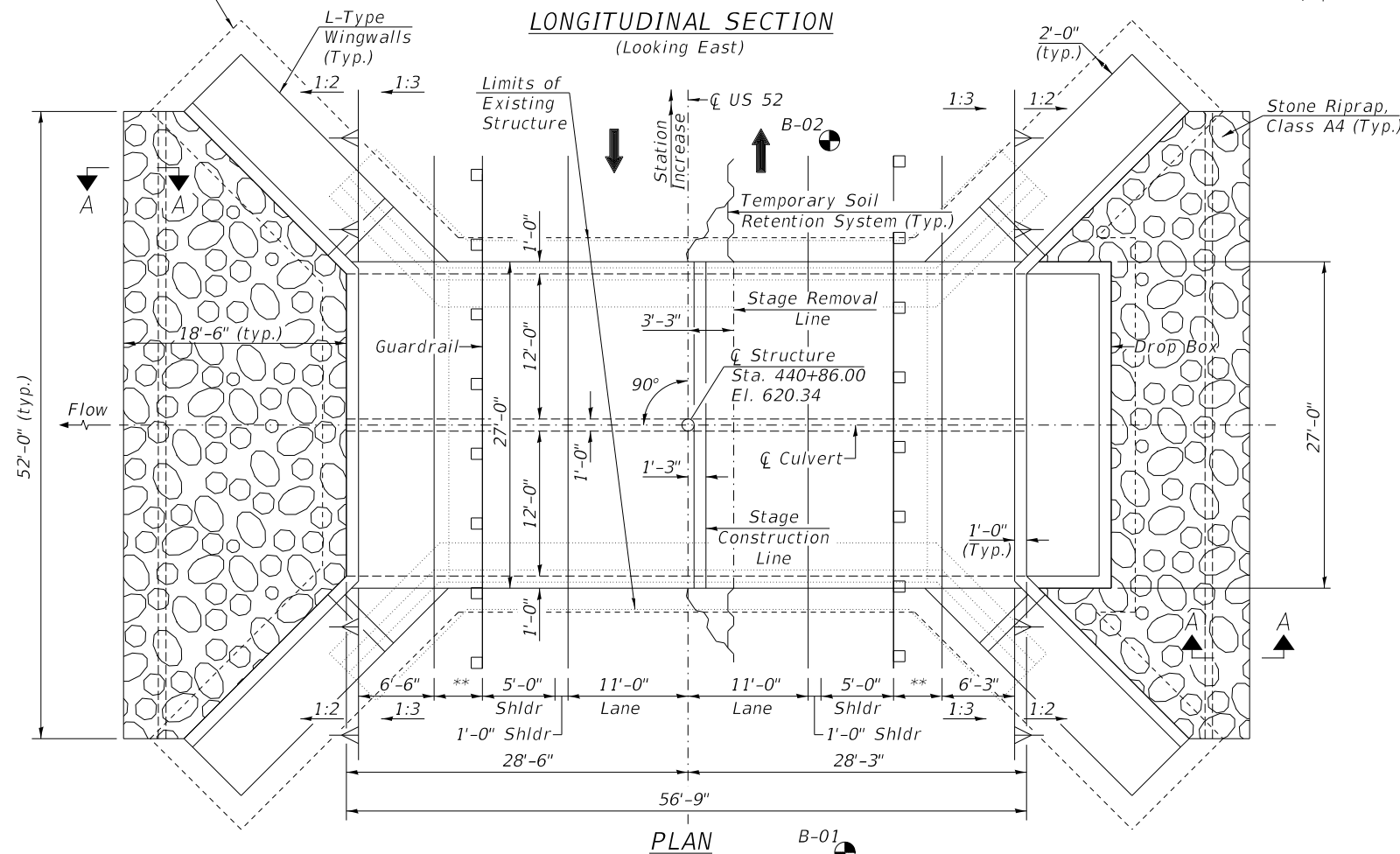
Limits of Unsuitable Material Removal and Replacement with Rockfill



SECTION THRU BARREL

JUNE 17, 2022

AS A BASIS FOR
PREPARATION OF DETAILED PLANS



PROFILE GRADE
(Along & U.S. Rte. 52)

Notes:
Excavate behind the existing abutment prior to superstructure removal.
Existing structure to be removed full depth within 2 feet of the proposed culvert barrel and wingwall footprint.

WATERWAY INFORMATION

Drainage Area =		Existing Overtopping Elev. = 620.11 @ Sta. 441+00.00							
2.5 Sq. Mi.		Proposed Overtopping Elev. = 620.34 @ Sta. 440+86.00							
Flood	Freq. Yr.	Discharge C.F.S.	Opening Sq. ft.		Nat. H.W.E. ft.	Head - ft.		Headwater Elev. - ft.	
			Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	
Ten-Year	10	368	60	139	609.7	0.7	0.0	610.4	609.7
Design	50	612	85	163	610.7	0.8	0.1	611.5	610.8
Base	100	728	95	174	611.1	0.9	0.1	612.0	611.2
Scour Check	200	848	104	183	611.5	1.0	0.0	612.5	611.5
Max. Calc.	500	1,020	118	197	612.1	1.1	0.0	613.2	612.1

10-Year Velocity through Existing Structure = 6.0 ft/s
10-Year Velocity through Proposed Structure = 3.3 ft/s

HIGHWAY CLASSIFICATION

F.A.P. Rte. 607 – U.S. Rte. 52
Functional Class: Minor Arterial (Non-Urban)
ADT: 1,785 (2024); 2,125 (2044)
ADTT: 105 (2024); 125 (2044)
DHV: 214 (2024); 255 (2044)
Design Speed: 55 mph
Posted Speed: 55 mph

DESIGN SPECIFICATIONS

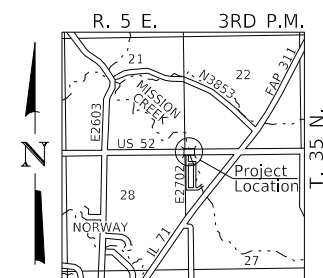
2020 AASHTO LRFD Bridge Design Specifications, 9th Edition

DESIGN STRESSES

(FIELD UNITS)
 $f'_c = 3,500$ p.s.i.
 $f_y = 60,000$ p.s.i. (Rein.)

LOADING HL-93

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



LOCATION SKETCH

GENERAL PLAN
U.S. ROUTE 52 OVER
MISSION CREEK
F.A.P. RTE. 607 - SEC. (125)BR1-1
LASALLE COUNTY
STATION 440+86.00
STRUCTURE NO. 050-2061

USER NAME = BNeibel	DESIGNED - ZL	REVISED - _____
	DRAWN - JCW	REVISED - _____
PLOT SCALE = 20.0000 ' / in.	CHECKED - MMO/BAN	REVISED - _____
PLOT DATE = 5/10/2022	DATE - 03/02/2022	REVISED - _____

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GENERAL PLAN
US 52 OVER MISSION CREEK

SCALE:	SHEET NO. 1 OF 2 SHEETS	STA.	TO STA.
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F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
607	(125)BR-1	LASALLE	2	1
S.N. 050-2061		CONTRACT NO. 66L43		
FED. ROAD DIST. NO. 7 ILLINOIS		FED. AID PROJ. NO.		

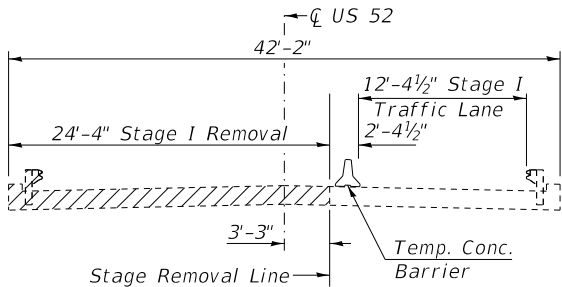
PLAN	SURVEYED	DATE
NOTE BOOK	PLOTTED	BY
NO.	ALIGNMENT CHECKED	
	STRUCTURE NOTATION CHNG	
	CADD FILE NAME	

PROFILE	SURVEYED	DATE
NOTE BOOK	PLOTTED	BY
NO.	GRADES CHECKED	
	STRUCTURE NOTATION CHNG	
	CADD FILE NAME	

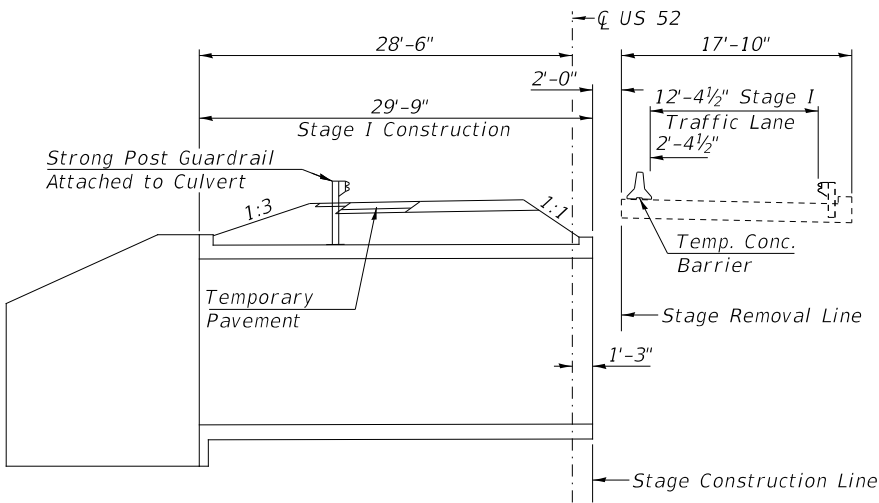
APPROVED

JUNE 17, 2022

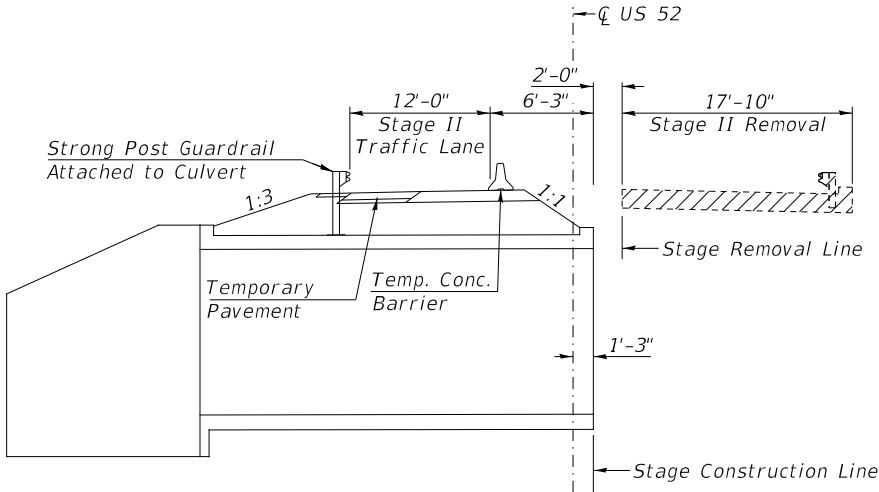
AS A BASIS FOR
PREPARATION OF DETAILED PLANS



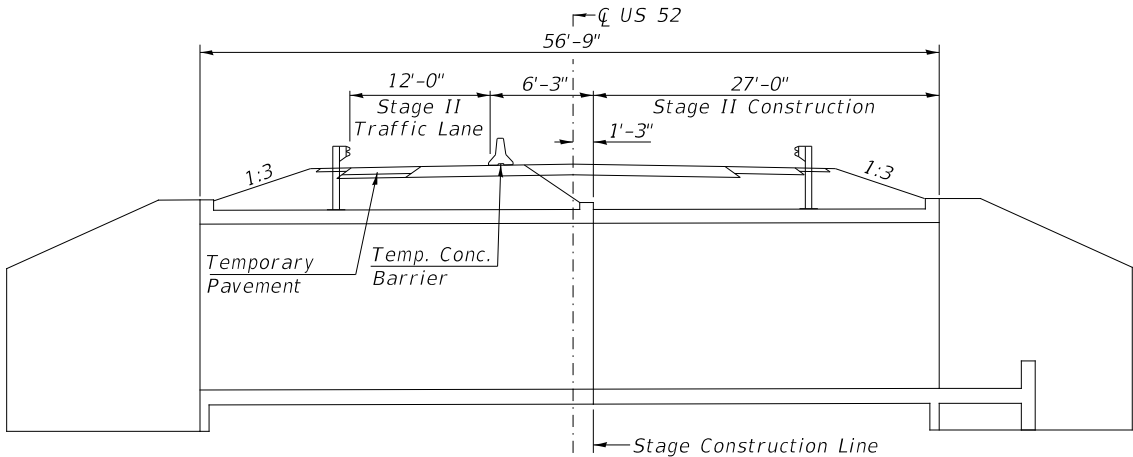
STAGE I REMOVAL



STAGE I CONSTRUCTION



STAGE II REMOVAL



STAGE II CONSTRUCTION

Note:
The staging details are based on 2020 inspection data and the staging details should be re-evaluated during the design phase based on the most recent inspection data available. If the existing deck continues to deteriorate, a temporary support or structural slab may be needed.

STAGE CONSTRUCTION DETAILS
(Looking East)

STAGE CONSTRUCTION DETAILS
U.S. ROUTE 52 OVER
MISSION CREEK
F.A.P. RTE. 607 - SEC. (125)BR1-1
LASALLE COUNTY
STATION 440+86.00
STRUCTURE NO. 050-2061

MODEL \$MODELNAME\$
FILE NAME: V:\4845.03 - US 52 over Mission Creek - PTB 194-23 (DOT D-3)\CADD\CADD Sheets\4845.03 TSC.dgn

Hutchison Engineering, Inc.
JACKSONVILLE-SHOREWOOD
PEORIA-QUAD CITIES-CARBONDALE
2021 JOB#4845.03

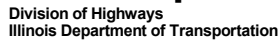
USER NAME = BNebe1	DESIGNED - ZL	REVISED - _____
DRAWN - JCW	REVISED - _____	
PLOT SCALE = 20.0000 ' / in.	CHECKED - MMO/BAN	REVISED - _____
PLOT DATE = 5/10/2022	DATE - 03/02/2022	REVISED - _____

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STAGE CONSTRUCTION DETAILS
US 52 OVER MISSION CREEK

SCALE: SHEET NO. 2 OF 2 SHEETS STA. TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
607	(125)BR1-1	LASALLE	2	2
S.N. 050-2061		CONTRACT NO. 66L43		
FED. ROAD DIST. NO. 7		ILLINOIS FED. AID PROJ. NO.		



BBS, form 137 (Rev. 8-99)

US 52 over Mission Creek, 0.3 miles West of IL
71

ROUTE	SBI-69 (US 52)	DESCRIPTION	71	LOGGED BY	Larry Myers
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SECTION 125-B **LOCATION** NW 1/4, SEC. 27, TWP. 35N, RNG. 5E, 3rd PM,
Latitude 41.48577, Longitude -88.65432

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

STRUCT. NO.	050-2061 (Pro.)
Station	050-0059 (Exist.)
	440+86

BORING NO.	<u>02 (S.E. Quad.)</u>
Station	<u>441+10</u>
Offset	<u>15.0 ft Rt.</u>
Ground Surface Elev.	<u>619.77</u>

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev.	_____	ft
Stream Bed Elev.	_____	ft
Groundwater Elev.:		
First Encounter	_____ 599.8	ft ▼
Upon Completion	_____ 599.8	ft ▼
After Hrs.	_____	ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Augered Shoulder Stone, Brown Silty Clay Loam Fill				Loose to Medium Brown Very Fine Sand with Free Water	WH		
					2		24
					2		
617.27							
Very Stiff to Stiff Brown & Gray Silty Clay Loam Till Fill with Cobbles & Rocks		2			2		
		2	2.5	21	2		25
		3	P		2		
	-5						
		2			-25	1	
		5	1.5	24		2	23
		2	P			3	
612.27							
Stiff Black Silty Clay		2				3	
		2	1.5	35		3	20
		3	P			3	
609.77	-10				-30		
Very Stiff Gray Silty Clay Loam Till		2				1	
		5	2.5	19		2	22
		7	P			3	
607.77							
Hard Brown Silty Clay Loam Till		7					
		8	5.4	20			
		11	S				
605.27							
Hard Gray Clay Loam Till	-15				-35		
		5				4	
		8	6.1	18		4	20
		12	S			6	
				583.27			
				End of Boring			
		4					
		6	4.4	10			
		6	S				
599.77	-20				-40		

SOIL BORING 050-0059.GPJ IL DOT.GDT 10/1/21

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)