

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

DATE: June 9, 1992

TO: George McLeod, P.E., Chief Construction & Materials Engineer
District 6

FROM: Alan J. Rommel, P.E.
Geotechnical Engineer



SUBJECT: Site Investigation Report
Project I.D. 8949-02-01
Structure B-55-122
USH 12 Over Rush River
St. Croix County

Attached are copies of the Site Investigation Report for the subject project.

AJR:a13431

Attachment

cc: Dist. 6 (Orig. + 3)
C.O. Bridge Prelim. (2)
C.O. Design
C.O. Files
SFS
Geotechnical File ✓

George McLeod, P.E.

June 9, 1992

Page 2

1. General

The existing single span bridge was built in 1927 and it is proposed to be replaced with another single span bridge. The site is rolling farmland and there is no sign of boulders, rock outcrops or marsh. Also, the existing bridge fill and foundation appear to be performing adequately.

There appears to be only nominal fill required for the project and a longer span is proposed.

2. Subsurface Conditions

A temporary Datum on the existing bridge is elevation (EL) 100. Both borings logged 4 feet of organic topsoil near the surface that would cause problems in a bridge fill. Below this is a two foot layer of silt (EL. 96-94) this should also be removed. From this point down to bedrock there is sand with small amounts of silt and gravel (EL. 94-53). Weathered limestone was encountered at nearly the same elevation in both borings (EL. 53). Competent limestone was cored at EL. 50.

The river was not flowing during drilling operations (6/1/92). however, the flow line is at EL. 91.9 and water was noted in the boreholes at EL. 90.

3. Bearing Capacity

Within practical depths, the soils are not dense enough to support pile foundations. In addition, the potential for scour exists at this site. Therefore, only a cursory review has been made.

4. Pile

This would be the most logical foundation choice at this location. Piles at this site can be driven to bearing in the limestone and will be end bearing.

5. Alternate Foundation Types

Drilled caissons would be more expensive at this site and ground improvement probably wouldn't be practical either.

SITE INVESTIGATION REPORT

June 9, 1992

Page 2

6. Lateral Earth Pressures

Native silty sand from the site would exert a pressure of 40 - 45 PSF if allowed to drain. If adequate drainage is not provided, the minimum pressure used for structures must be 63 PSF.

7. Recommendations

H-piling or steel pipes should be driven to bedrock with 9,000 PSI in the steel section. The estimated tip elevations are EL. 53 at the west abutment and EL. 50 for the east abutment. Also, the existing fill contains 5 feet of organic topsoil and loose silt which should be removed to provide a good approach fill.

AJR:a13432

USH 12 over Rush River, Hammond - Baldwin Rd., St. Croix Co.

STATE PROJECT NUMBER SHEET NO.

ABBREVIATIONS
F—Fine No—Medium C—Coarse
M—Medium S—Sand

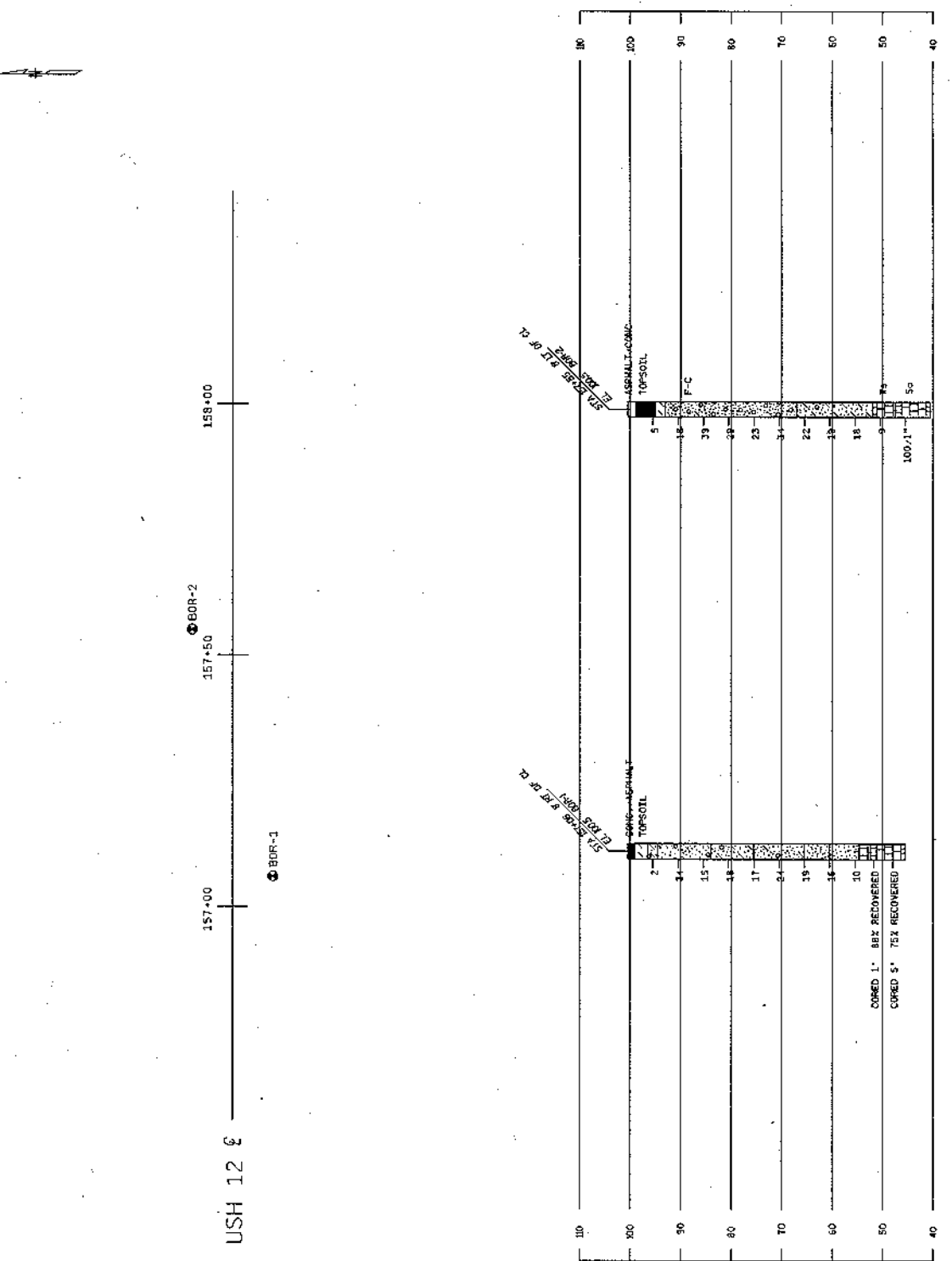
MATERIAL SYMBOLS
Topsoil Sand Gravel Post Clay Igneous Rock

LEGEND OF PROBING
95/6/95 Blow for 6"
Penetration
Probing taken with a
358-lb.
Falling 18" on a 2"
O.D. Point.
Refusal 95/6

LEGEND OF BORING
Elev.
Boring No.
Sta.
Unconfined
Strength
Blow for 6"
Using 140-lb. Wt.
Falling 36"
Wash Sample
Shelby Tube—ST.
Ground Water
Elevation
No Ground Water
Observed Above
This Elevation
Unless otherwise specified, the blow per foot at the
locations indicated are based on driving a 60-lb. 4"
I.D. split spoon sampler with a 140-lb. hammer having a
free fall of 36". The blow count is taken in undisturbed soil
immediately below a cased or open hole eliminating side
friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION
DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of
material in and upon which the foundation might be built
borings and/or soundings were made at points approximately
as indicated on this drawing. The data presented herein
represents the findings of the subsurface exploration only.
However, because the depths investigated are limited and
the area of the borings and/or soundings is very small in
relation to the entire area, the Division of Highways does not
warrant decisions below the depths investigated or that the
classification of material encountered in these investigations
is necessarily typical of the entire area.

NO. DATE REVISION BY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE
SUBSURFACE
EXPLORATION
SHEET 1 OF 1
X



FIELD BORING LOG

EL3(S) 385

State of Wisconsin Department of Transportation

Boring No. 1 Structure B-55-122 County St Croix Sheet of 2Project 8949-02-01 Road USH 12Station 1574 ~~23~~ 06 Offset 8' R to E Surface Elevation 100.5

GROUND WATER OBSERVATIONS

Dry Run Bed.
91.9

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave in _____ Water Notes _____

MOISTURE D = Damp M = Moist W = Wet	HS = Hollowstem WA = Washhead RB = Rockbit	ST = Shelby tube SS = Split spoon DM = Drilling mud	A = Auger C = Coring W = Wash	E = Easy M = Medium H = Hard	Start <u>5-26-92</u> Unit <u>4</u> Finish <u>5-28-92</u> Chief <u>Hors Leman</u>
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Sample No.	Moisture	Blows on Sampler		Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on			Drilling Method
		D/S	4/12					Casing Size	Probe Size	Drilling Method	
					5" Asphalt						
					7" 4- Concrete						A
					4" Air Void						
					Silty Br. Topsoil						
					V. Loose Br. SILT to sand & gravel						
1	M	1	1								28
		1	1		V. loose Br. SAND little gravel to silt						35
											46
											48
											45
2	W	12	14								WA
		20	19		Dense						RB
											revert
3	W	13	6		4" layer Br. SILT						
		9	9		Firm Br. silty SAND, to gravel						
4	W	9	9								
		9	10								
5	W	6	7		Firm Br. SAND little silt to gravel						
		10	8								
6	W	9	12		Probe rock down						
		12	13								
7	W	7	9		Firm Br. SAND to silt, + fine gravel						
		10	12								
8	W	6	8		Firm Br. med SAND little silt						
		8	9								

Checked by _____

Final

Boring No. 1

FIELD BORING LOG

Boring No. 1 Structure B-55-122 EL(S) 385 State of Wisconsin/Department of Transportation
 Project 8949-02-01 Road USH 12 County 52 Croix Sheet 2 of 2
 Station 757+06 Offset 8' R2E Surface Elevation 100.5

White drilling _____ Time after drilling _____
 Before casing removal _____ Depth to water _____
 After Boring Completed _____ Depth to cave-in _____
 Cave In _____ Water Notes _____

MOISTURE
 O = Damp
 M = Moist
 W = Wet

DRILLING METHOD
 HS = Hollowstem
 WA = Washhead
 RB = Rockbit
 ST = Shelby tube
 SS = Split spoon
 DM = Drilling mud
 A = Auger
 C = Coring
 W = Wash
 E = Easy
 M = Medium
 H = Hard

Start 5-26-92 Unit 4
 Finish 5-28-92 Chief Horsman

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unclassified Strength	Boulders	Blows on			Drilling Method
		0/8	5/12					Casing Size	Probe Size	Drilling Method	
8	W	6	8	40	Firm Br. med SAND little silt	40					WA
		8	9								RB
9	W	6	6	45		45					
		4	100		SS refusal						
					Start core run #1 - 1' 88% rec.						
					Start core run #2 5' 75% rec.	50					
					NV Barrel						
					End Core run #2						
				55	E.O. B.	55					
				60		60					
				65		65					
				70		70					
				75		75					
				80		80					

Checked by _____ Boring No. _____

FIELD BORING LOG

Boring No. 2 Structure B-55-122 E.L.S(S) 385 State of Wisconsin/Department of Transportation
 Project 8949-02-01 Road USH 12 County St. Croix Sheet 2 of 2
 Station 157+55 Offset 8' L E Surface Elevation 100.5

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____
 Before casing removal _____ Depth to water _____ Dry H₂O - 5' 8"
 After Boring Completed _____ Depth to cave-in _____ 71.4'
 Cave In _____ Water Notes _____

MOISTURE: D = Damp, M = Moist, W = Wet
 DRILLING METHOD: HS = Hollowstem, WA = Washhead, RB = Rockbit, ST = Shelby tube, SS = Split spoon, DM = Drilling mud, A = Auger, C = Casing, V = Wash, E = Easy, M = Medium, H = Hard
 Start 5/1/92 Unit SV Finish _____ Chief Meyer S

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on		Drilling Method
		0/8	6/12					Casing Size	Probe Size	
8	W	6	11	40'	Firm Br. Silty SAND Fr. Gravel.					R.B.
		10								Ahead Revert
9	W	7	11	40'						
		15								
10	W	1	1	50'	Loose weathered Limestone	5 ₁₀				
		8								
11		100/1		5 ₁₅	SS. Refuse. Roller. Ahead. Drilled V. Hard Limestone	5 ₁₅				
				60'	EP. 60'					
				25		25				
				30		30				
				35		35				
				40		40				

Checked by _____ Final _____ Boring No. 2