

**CORRESPONDENCE/MEMORANDUM**

**State of Wisconsin**

**DATE:** June 1, 1998

**TO:** Lary Hyland  
District Soils Engineer  
Transportation District 6

**FROM:** Dennis G. Althaus  
Geologist

**SUBJECT:** Site Investigation Report  
Project I.D. 1720-08-02  
Structure B-47-128  
STH 65 over South Branch of Kinnickinnic River  
Ellsworth to River Falls  
Pierce County

Attached is the Site Investigation Report for the above project.

DGA:\  
Attachments

cc: District 6 (4)  
C.O. Bridge  
C.O. Design  
Geotechnical File

**SITE INVESTIGATION REPORT**  
**Project I.D. 1720-08-02**  
**Structure B-47-128**  
**STH 65 over South Branch of Kinnickinnic River**  
**Ellsworth to River Falls**  
**Pierce County**

**1. GENERAL**

Two borings were taken for a proposed structure to carry STH 65 over the south branch of the Kinnickinnic River at about station 16+176. The site is located about 1600 meters north of the junction of CTH "O" on STH 65 and about 3200 meters south of the junction of STH 29 & 65 at River Falls. The Proposed structure will be about 11.9 meters long by 12.9 meters wide by 3.8 meters high. The existing bridge is about 7.9 meters long by 8.7 meters wide by 3.8 meters high and appears to be in fair condition. The 1.8 meter approach fills look to be in good condition with boulders used to protect the wing walls and the abutments. The 6.7 meter wide bituminous pavement looks to be in good condition. There are 1.5 meter wide shoulders on the existing roadway. The easterly flowing river is about 6 meters wide by 0.3 meters deep with a silty muck bottom. Rolling hills with woods, open fields and homes with yards make up the surrounding terrain. There are small areas of cattails east and south west of the existing bridge. The surface soil should be silty sand.

**2. SUBSURFACE CONDITION**

Two borings conforming to AASHTO Method T-206, Standard Penetration Test, to estimate relative density, fix presumptive bearing capacity, investigate soil properties to select suitable pile types with their support values, make a cursory review of alternative foundation possibilities, and recover samples for soil textural identification and classification. Soil textures in the borings logs are field identifications made by the drillers and were later verified in the C.O. Geotechnical Lab.

Boring 1 was taken at station 16+169, 8.5 meters right of the existing centerline.

<u>Elevations</u>	<u>Soil Description</u>
287.53 to 287.20	topsoil
287.20 to 286.90	brown silty sand, trace of gravel
286.90 to 282.20	loose brown sand, seams of black silt
282.20 to 279.10	firm brown sand, with gravel
279.10 to 277.50	very dense brown sand, some gravel
277.50 to 275.60	very dense white / yellow weathered sandstone

Boring 2 was taken at station 16+182, 7.9 meters left of the existing centerline.

<u>Elevations</u>	<u>Soil Description</u>
288.06 to 287.60	topsoil
287.60 to 284.20	loose brown silty sand, some gravel & 0.1m black organic silt layer
284.20 to 282.60	loose gray organic silt, some sand
282.60 to 279.60	loose brown sand, trace of gravel
279.60 to 276.60	dense brown / yellow / white sand and gravel
276.60 to 274.50	very dense yellow / white weathered sandstone

The open water elevation was about 285.77 at the time the boring were taken. The river bed is at elevation 285.45. The topsoil varied from 0.3 meters to 0.5 meters thick.

### 3. BEARING CAPACITY

The subsurface soils within a practical footing depth have insufficient bearing capacity to support spread footings for this structure.

### 4. PILES

A cursory review indicates that the soils above very dense sand or weathered rock would not be adequate to support friction/displacement piles at practical load levels.

H-piles or oil field pipe piles however could be driven to 62 MPa load in the steel section if driven to rock at elevation 276.

### 5. ALTERNATIVE FOUNDATION TYPE

Drilled caissons could be used here but the cost would be more. Dynamic and vibratory methods could not be used effectively here.

### 6. LATERAL EARTH PRESSURE

Grade 1 granular backfill will exert an equivalent fluid pressure of 1.4 to 1.7 kPa, silty sands 2.2 kPa, silts 3.2 kPa, silty clays and clays 4.1 kPa or more.

## **7. CONSTRUCTION PROBLEMS**

No unique or especially difficult construction problems are foreseen.

## **8. RECOMMENDATIONS**

A) Remove any topsoil before the placing of any fill.

B) Use H-piles or oil field pipe piles driven to 62 MPa load in the steel section. The piles should drive to about elevation 276.

C) The use of a grade 2 granular material or better as fill material at this site is recommended so it is equivalent to the existing fill.

If you have any questions, please contact the Geotechnical Unit.

STH 65 OVER S BRANCH KINNICKINNIC RIVER  
ELLSWORTH TO RIVER FALLS ROAD, PIERCE COUNTY

STATE PROJECT NUMBER

SHEET NO.

8

ABBREVIATIONS  
F—Fine M—Medium C—Coarse  
W—Weathered S—Sound

MATERIAL SYMBOLS  
Topsoil Silt Sandstone  
Sand Peat Limestone  
Gravel Clay Igneous Rock

LEGEND OF PROBING  
Probing No. Sta.  
Elevation  
95/152-95 Blows for  
152mm Penetration  
Probing taken with a  
155kg Wt.  
Falling 457mm on a  
51mm O.D. Point.  
Refusal 95/152

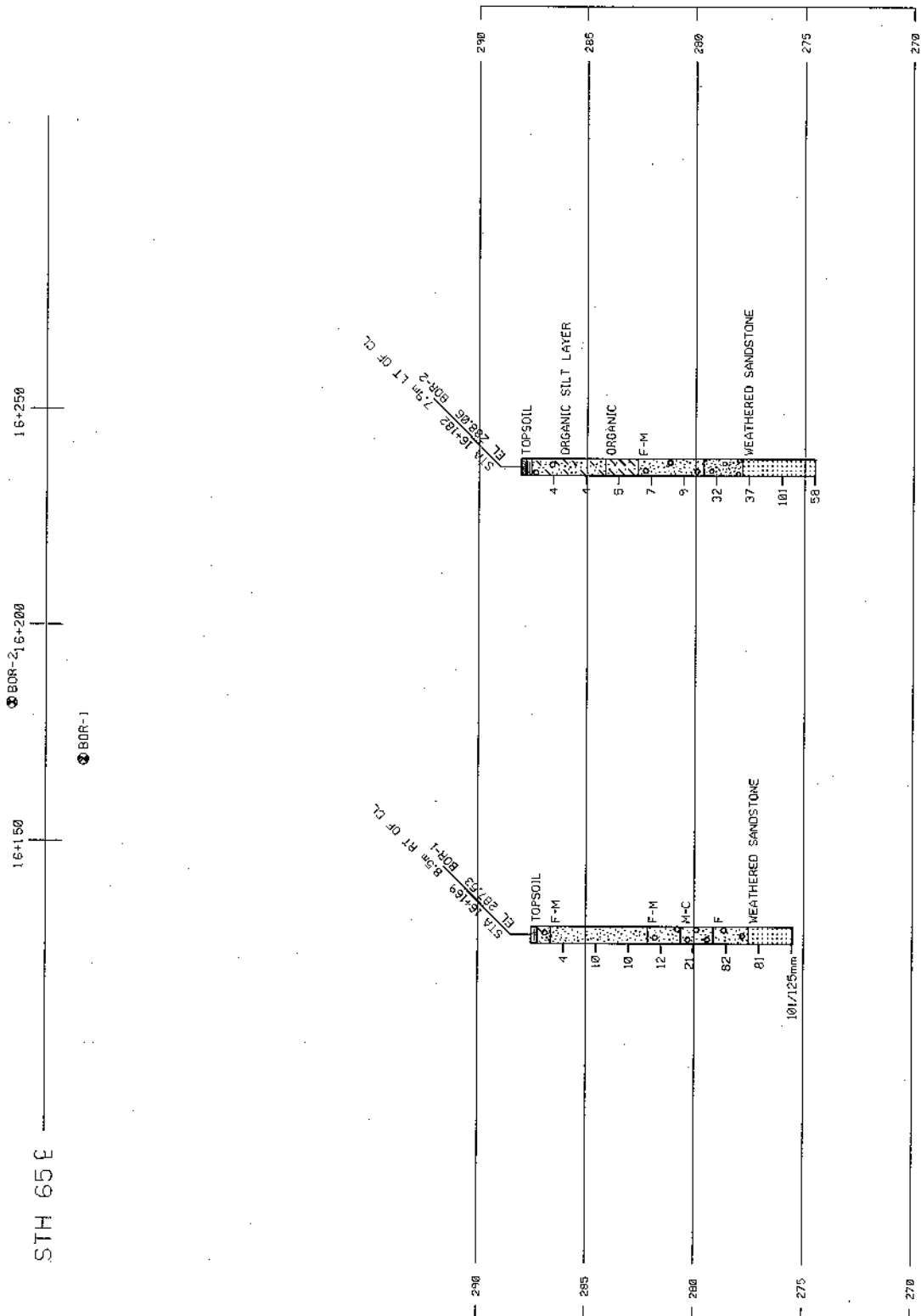
LEGEND OF BORING  
Boring No. Sta.  
Elev.  
Unconfined  
Strength  
KPa  
Blows Per 300mm  
Using 63 Kg Wt.  
Falling 760mm  
Wash Sample  
Shelby Tube—S.T.  
Ground Water  
Elevation  
No Ground Water  
Observed Above  
This Elevation  
Silty Clay  
Limestone  
Sandy Gravel  
Boulders or  
Cobbles  
Sand

Unless otherwise specified, blows per 300mm at the locations indicated are based on driving a 51mm O.D. x 33mm I.D. split spoon sampler with a 63kg hammer having a free fall of 760mm. 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 explorations made. 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 conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

IND.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS			
STRUCTURE B-47-128			
CONSTR. SPEC.	1956	LEARN SWY	DATA
SUBSURFACE EXPLORATION			SHEET 1 OF 1



FIELD BORING LOG  
12 Meter Log

Boring No. 1 Structure B-47-128 County Pierce Sheet 1 of 1  
 Project 1720-08-02 Road STH 65  
 Station 16 x x 69 Offset 0.5 m x 0.5 m Surface Elevation 287.53

## GROUND WATER OBSERVATIONS

Streambed Elev. 287 Time After Drilling 1 one Day  
 Water Elev. 287  
 Top of Well Elev. 287 Depth to Water CAVE in 120 cm moist

## MOISTURE

D = Damp  
 M = Moist  
 W = Wet

A = Auger  
 C = Coring  
 CA = Casing Advancer  
 WA = Wash Ahead  
 HS = Hollowstem

## DRILLING METHOD

DM = Drilling Mud  
 RB = Rockbit  
 SS = Splitspoon  
 ST = Shelby Tube  
 E = Easy  
 NW = Casing, 76.2mm I.D. (3")  
 HW = Casing, 101.6mm I.D. (4")  
 BV = Corebarrel, 36.5mm Core Dia. (1 7/16")  
 NV = Corebarrel, 47.6mm Core Dia. (1 7/8")  
 M = Medium  
 H = Hard

Start 5-14-98 Pit 1Finish 5-18-98 Chief STAVEN

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0-15	15-30							
						Top Soil				
						30 cm				
						60 cm BR Silty SAND TR GRAVEL				
						90 cm				
1	mw	2	2	4	4	Loose BR Fine to Med SAND				
						120 cm				
						1.5 m				
						180 cm (Seems Black MOF Silty)				
						210 cm				
						240 cm				
2	W	2	2	10	10	Loose BR Fine to Med SAND				
						270 cm				
						3 m				
						330 cm				
						360 cm				
						390 cm				
3	W	4	5	10	10	No recovery				
						420 cm				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
4	W	6	6	12	12	Firm BR Fine to Med SAND				
						570 cm TR GRAVEL				
						6 m				
						630 cm				
						660 cm (get harder)				
5	W	11	5	21	21	Firm BR Med to Coarse SAND				
						690 cm				
						720 cm Lots GRAVEL				
						7.5 m				
						780 cm				
						810 cm				
6		12	82	82	82	Very Dense BR SAND with Some GRAVEL				
		31	51			(in layers) SAND & GRAVEL				
						9 m				
						930 cm				
						960 cm				
						990 cm				
7		16	81	81	81	Weather SANDstone white & yellow				
		35	46			Very Dense				
						1020 cm				
						10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
						1170 cm				
						12 m				
						EOB #40' Hole Filled Cutting & Chips				

Checked by

## METRIC CONVERSION FACTORS

1 cm = 0.3937 inches  
 1 m = 3.281 feet  
 1 inch = 2.54 cm  
 1 foot = 30.48 cm, 0.3048 m

Boring No. 1

FIELD BORING LOG  
12 Meter Log

Boring No. 2 Structure B-47-128 County Pierce Sheet 1 of 2  
 Project 1720-08-02 Road SH 65  
 Station 16+182 Offset 7.9m Left of CL Surface Elevation 288.06

## GROUND WATER OBSERVATIONS

Streambed Elev. \_\_\_\_\_ Time After Drilling \_\_\_\_\_  
 Water Elev. \_\_\_\_\_  
 Top of Well Elev. \_\_\_\_\_ Depth to Water \_\_\_\_\_

## MOISTURE

D = Damp  
 M = Moist  
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A = Auger  
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 CA = Casing Advancer  
 WA = Wash Ahead  
 HS = Hollowstem

## DRILLING METHOD

DM = Drilling Mud NW = Casing, 76.2mm I.D. (3")  
 RB = Rockbit HW = Casing, 101.6mm I.D. (4")  
 SS = Splitspoon BV = Corebarrel, 36.5mm Core Dia. (1 7/16")  
 ST = Shelby Tube NV = Corebarrel, 47.6mm Core Dia. (1 7/8")  
 E = Easy M = Medium H = Hard

Start 5-19-98 Unit 1Finish 5-19-98 Chief STAVEN

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0-15	15-30							
						Top Soil				
						30 cm				
						60 cm				
1	D	2	2	2	4	Loose BR Silty SAND some GRAVEL				
						90 cm				
						120 cm				
						1.5 m				
						180 cm				
						210 cm ORGANIC (BLACK SILT Layer)				
2	M	2	2	2	6	Loose BLACK & BR Silty SAND			RB	
						240 cm			WFA	
						270 cm			SS	
						3 m				
						330 cm				
						360 cm				
						390 cm				
3	W	2	3	2	5	Loose GRAY ORGANIC silt some SAND				
						420 cm				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
4	W	3	4	2	7	Loose BR Fine to med SAND TR GRAVEL				
						570 cm				
						6 m				
						630 cm				
						660 cm				
						690 cm				
5	M	4	5	3	9					
						720 cm				
						7.5 m				
						780 cm				
						810 cm				
						840 cm				
6		16	20	12	32	Dense BR SAND & GRAVEL				
						870 cm				
						9 m				
						930 cm				
						960 cm				
						990 cm				
7		12	17	20	37	Dense yellow & white weathered SANDstone got harder				
						1020 cm				
						1045 m				
						1080 cm				
						1110 cm				
						1140 cm				
8		25	41	60	101	Very DENSE yellow SANDstone				
						1170 cm				
						12 m				

Checked by \_\_\_\_\_

## METRIC CONVERSION FACTORS

1 cm = 0.3937 inches  
 1 m = 3.281 feet  
 1 inch = 2.54 cm  
 1 foot = 30.48 cm, 0.3048 m

Boring No. 2

FIELD BORING LOG  
12 Meter Log

Boring No. 2 Structure B47-128 County Pierce Sheet 2 of 2  
Project 1720-08-02 Road 5TH BS over kninick South Fork  
Station 16+182 Offset 7.9m LEFT OF CL Surface Elevation \_\_\_\_\_

## GROUND WATER OBSERVATIONS

Streambed Elev. \_\_\_\_\_ Time After Drilling \_\_\_\_\_  
Water Elev. \_\_\_\_\_  
Top of Well Elev. \_\_\_\_\_ Depth to Water \_\_\_\_\_

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Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0-15	15-30							
						30 cm				
						60 cm				
						90 cm				
9		23	20		58	120 cm			RB	
						1.5 m			WH	
						180 cm			SS	
						210 cm				
						240 cm				
						270 cm				
						3 m				
						330 cm				
						360 cm				
						390 cm				
						420 cm				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
						570 cm				
						6 m				
						630 cm				
						660 cm				
						690 cm				
						720 cm				
						7.5 m				
						780 cm				
						810 cm				
						840 cm				
						870 cm				
						9 m				
						930 cm				
						960 cm				
						990 cm				
						1020 cm				
						10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
						1170 cm				
						12 m				

Checked by \_\_\_\_\_

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