

**CORRESPONDENCE/MEMORANDUM**

**State of Wisconsin**

**DATE:** April 21, 1995

**TO:** Richard Pauser  
Construction and Materials Supervisor  
Transportation District 6

**FROM:** Dennis G. Althaus  
Geologist

**SUBJECT:** Site Investigation Report  
Project I.D. 8110-05-02  
Structure B-17-156  
STH 64 over Big Beaver Creek  
Connorsville to STH 25  
Dunn County

Attached is the Site Investigation Report for the above project.

DGA:\  
Attachments

cc: District 6 (orig. +3)  
C.O. Bridge (2)  
C.O. Files  
C.O. Design  
J.E. Haverberg  
Geotechnical File

**SITE INVESTIGATION REPORT**  
**Project I.D. 8110-05-02**  
**Structure B-17-156**  
**STH 64 over Big Beaver Creek**  
**Connersville to STH 25**  
**Dunn County**

**1. GENERAL**

Two borings were made for a proposed single span structure to replace the present 3 span steel girder bridge that carries STH 64 over Big Beaver Creek at about station 11+121. The proposed structure is about 14.38m long x 11.8m wide. The existing structure is about 20.4m long by 8.2m wide x 4.1m high. The present structure looks to be in good condition. The 2.45m approach fills look to be in good condition. The bituminous pavement has some faulting at the abutments but is in generally good condition. Boulder riprap protects the present abutment slopes and there is some erosion on the creek banks. The surrounding topography is flat to rolling hills with woods and farm fields for ground cover. Big Beaver Creek has a 3m wide x .15m to .30m deep meandering channel with a firm sandy bottom. Rock boulders and outcrops were noted. The surface soil is a sandy silt.

**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 11+118 6 meters right of the existing centerline. Boring 1 was logged as the following; elevation 304.5 to 303.7 brown/black silt with a trace of organic, 303.7 to 303.5 brown sand and gravel, 303.5 to 302.9 very loose black organic silt, 302.9 to 302.2 loose gray silt with a trace of organic, 302.2 to 294.7 firm brown sand with some gravel and a trace of silt, 294.7 to 292.9 very dense brown sandstone.

Boring 2 was taken at station 11+125.45 6 meters left of the existing centerline. Boring 2 was logged as the following; elevation 304.47 to 303.9 brown silt with a little organic, 303.9 to 303.4 loose gray sand, 303.4 to 294.7 loose to firm brown sand with a little gravel, 294.7 to 292.7 very dense brown sandstone (cored 1.5m, 8% recovery).

The water elevation at the time the borings were taken was 303.742

Rock/Weathered Rock Elevations

<u>Structure Unit</u>	<u>Station</u>	<u>Rock</u>
West Abutment Boring 1	11+118	294.7
East Abutment Boring 2	11+125.45	294.7

**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 rock/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 634 kg/square cm load in the steel section if driven into rock at about elevation 293.7.

**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 14.7 to 17.1 g/square cm, silty sands 22 g/square cm, silts 31.8 g/square cm, silty clays and clays 41.6 g/square cm or more.

## **7. CONSTRUCTION PROBLEMS**

The black silts with some organic material will cause settlement problems for any new fills that are to be placed over it as well as differential settlement between existing and newly filled areas needed for the proposed approach fills. If not taken into account this settlement could cause cracking in the newly placed pavement.

## **8. RECOMMENDATIONS**

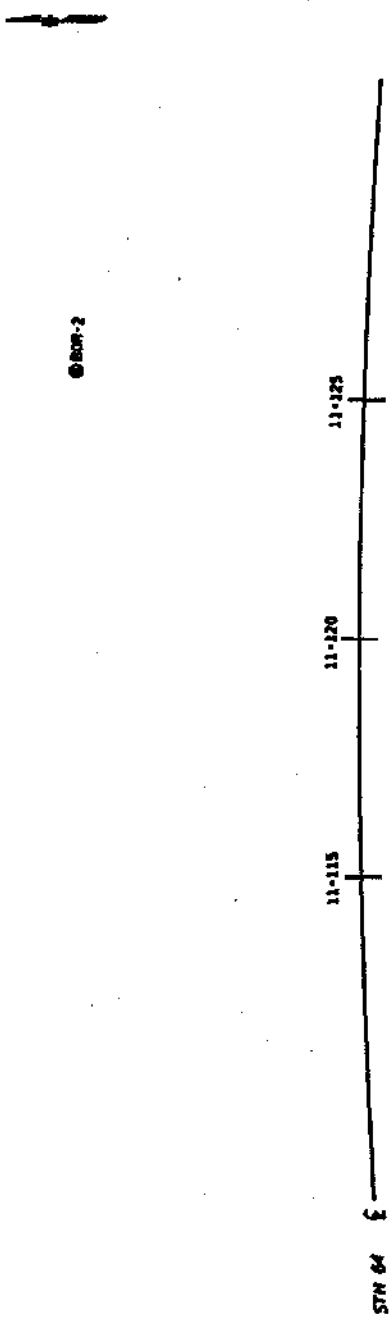
A) Remove the black silts with some organic material before placing any fill widening or lengthening. Let the proposed fills set for 2 to 3 months after they are constructed before paving over them begins to eliminate most of the settlement caused problems.

B) Use H-piles or oil field pipe piles driven into rock/weathered rock at 634kg/square cm load in the steel section at about elevation 293.7.

C) Use a grade 1 or 2 granular material as fill and backfill material. If a grade 1 or 2 granular backfill is not used a drainage system will have to be put behind any earth retaining system and a longer settlement time will be needed for the approach fills before paving should take place.

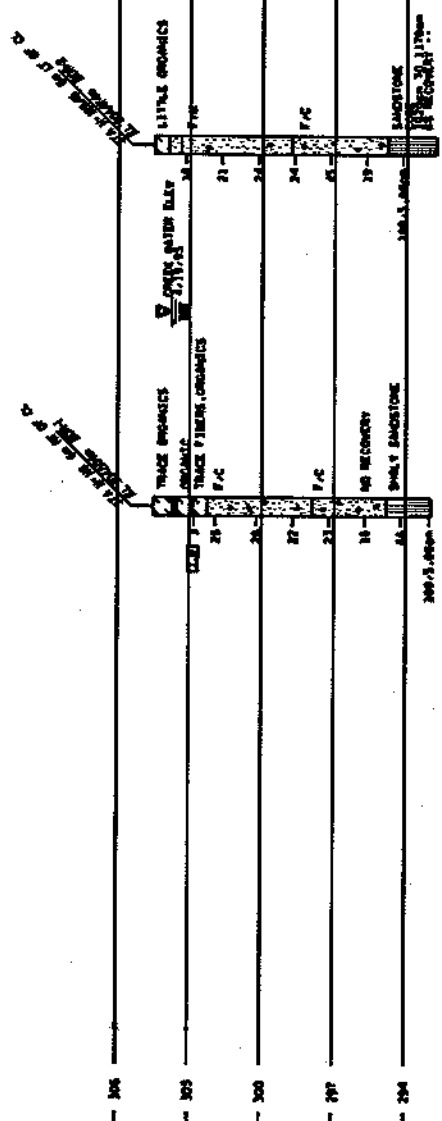
D) Since the bank of the creek shows signs of erosion and the present toe of the approach fills is riprapped it is suggested that the toes of the proposed approach fills be riprapped.

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



● BOR-2

● BOR-3



**LEGEND OF MATERIALS**

Material	Symbol	Notes
Gravel	□	Gravel
Clay	▨	Clay
Concrete	▩	Concrete
Asphalt	▧	Asphalt
Subgrade	▦	Subgrade
Fill	▤	Fill
Base	▥	Base
Subbase	▦	Subbase
Shoulder	▧	Shoulder
Drainage	▨	Drainage
Foundation	▩	Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

**LEGEND OF BORINGS**

Gravel  
Clay  
Concrete  
Asphalt  
Subgrade  
Fill  
Base  
Subbase  
Shoulder  
Drainage  
Foundation

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Subbase  
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Gravel  
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FIELD BORING LOG  
12 Meter Log

Boring No. 1 Structure B-17-156 County Dunn Sheet 1 of 1  
Project 8/10-05-02 Road STH 64 Big Bear  
Station 11+118 Offset 6m Right 4 Surface Elevation 304.504

## GROUND WATER OBSERVATIONS

Streambed Elev. \_\_\_\_\_ Time After Drilling \_\_\_\_\_  
Water Elev. 303.742  
Top of Well Elev. \_\_\_\_\_ Depth to Water \_\_\_\_\_

## 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 4-19-95 Unit 1Finish 11 Chief Kowald

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				
						120 cm				
1	W	0	1			1.5 m				
		2				180 cm	1.0			
						210 cm				
2	W	10	14			240 cm				
		12				270 cm				
						3 m				
						330 cm				
						360 cm				
						390 cm				
3	W	1	10			420 cm				
		18	15			4.5 m				
						480 cm				
						510 cm				
						540 cm				
4	W	12	7			570 cm				
			10			6 m				
						630 cm				
						660 cm				
						690 cm				
5	W	12	8			720 cm				
			11			7.5 m				
						780 cm				
						810 cm				
						840 cm				
						870 cm				
						9 m				
						930 cm				
						960 cm				
						990 cm				
6	W	28	19			1020 cm				
		38	38			10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
7						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. 1

FIELD BORING LOG  
12 Meter Log

Boring No. 2 Structure B-17-156 County Dunn Sheet 1 of 1  
 Project 8110-05-02 Road STN 64  
 Station 11+125.45 Offset 6 m Left of C Surface Elevation 304.474

## GROUND WATER OBSERVATIONS

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

## MOISTURE

D = Damp  
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 NV = Corebarrel, 47.6mm Core Dia. (1 7/8")  
 M = Medium  
 H = Hard

Start 4-20-95 Unit 1Finish 11 Chief KOWALOP

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				
1	W	4	6			120 cm				
						1.5 m				
						180 cm				
						210 cm				
						240 cm				
2	W	9	12			270 cm				
						3 m				
						330 cm				
						360 cm				
						390 cm				
3	W	13	11			420 cm				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
4	W	11	13			570 cm				
						6 m				
						630 cm				
						660 cm				
						690 cm				
5	W	20	25			720 cm				
						7.5 m				
						780 cm				
						810 cm				
						840 cm				
6	W	10	9			870 cm				
						9 m				
						930 cm				
						960 cm				
						990 cm				
						1020 cm				
7	W					10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
						1170 cm				
						12 m				

Checked by

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Boring No.

2