

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: May 9, 1995

TO: Richard Pauser
Construction and Materials Supervisor
Transportation District 6

FROM: Dennis G. Althaus *DGA*
Geologist

SUBJECT: Site Investigation Report
Project I.D. 8110-05-02
Structure B-17-157
STH 64 over Little Beaver Creek
Connersville 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-17-157
STH 64 over Little Beaver Creek
Connersville to STH 25
Dunn county

1. GENERAL

Two borings were made for a proposed single span structure to replace the existing single span steel girder structure to carry STH 64 over Little Beaver Creek at about station 15+716. The new structure will be located about .1 mile west of the intersection of STH 64 and CTH "F" and about 6.7 miles east of Connersville. The existing structure appears to be in fair condition. The bituminous pavement is patched, cracked and rutted and in generally fair condition. The 1.5 meter approach fills appear to be in good condition. Little Beaver Creek's meandering channel is 3 meter wide. The creek flows south. Rolling hills with farm fields and woods for ground cover make up the surrounding terrain. Rock boulders and outcrops were noted.

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 15+721.5 6 meters right of the existing centerline. Boring 1 was logged as the following; elevation 298.19 to 297.3 black to brown silt with a trace of organic, 297.3 to 296.1 loose brown / green sand with a trace of organic, 296.1 to 285.3 loose to firm brown sand, 285.3 to 282.3 Firm gray / brown sand with a trace of gravel, 282.3 to 281.2 loose brown silt with seams of sand, 281.2 to 279.9 firm brown sand, 279.9 to 278.9 boulder and gravel, 278.9 to 277.8 firm brown sand with a little silt, 277.8 to 275.7 very dense brown weathered sandstone.

Boring 2 was taken at station 15+710 6 meters left of the existing centerline. Boring 2 was logged as the following; elevation 300.26 to 296.1 loose brown sand with a little silt and gravel (fill), 296.1 to 295.8 very loose black peat, 295.8 to 284.7 firm brown sand with a trace of gravel, 284.7 to 282.9 firm gray sand with a trace of silt and gravel, 282.9 to 281.8 loose brown / gray silt with layers of sand, 281.8 to 277.2 firm to dense brown sand with a little gravel and a trace of silt, 277.2 to 275.1 very dense brown weathered sandstone.

The stream elevation at the time the borings were made was 298.767. The stream bed elevation was 297.15. The topsoil was .9 meters at boring 1.

Weathered Rock Elevations

<u>Structure Unit</u>	<u>Station</u>	<u>Rock</u>
West Abutment Boring 2	15+710	277.2
East Abutment Boring 1	15+721.5	277.8

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 277.

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

No unique problems in construction are foreseen

8. RECOMMENDATIONS

A) Remove the topsoil where necessary before placing any new fill.

B) Use a grade 1 or 2 sand as fill and backfill material.

C) Use steel H-piles or oil field pipe piles driven into weathered rock at 634 kg/square cm load in the steel section. The pile tip elevation should be about 277.

D) There should be no settlement problems unless the existing fills are appreciably heightened and widened.

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

FIELD BORING LOG
12 Meter Log

Boring No. 1 Structure B-17-157 County Dunn Sheet 1 of 2
 Project 8110-05-02 Road SH 64
 Station 15+721.50 Offset 6m Right Surface Elevation 298.188

GROUND WATER OBSERVATIONS

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

MOISTURE

D = Damp
 M = Moist
 W = Wet

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

DRILLING METHOD

DM = Drilling Mud
 RB = Rockbit
 SS = Spillspoon
 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 4-24-95 Unit 1Finish 4-25-95 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							
						12m = 40"				
						30 cm Firm B. Fine to med SAND			LA	
						60 cm			KB	
						90 cm			DM	
9	W	9	10			120 cm Firm Grey/Brown sand + a lot of gravel				
		11				150 cm				
						180 cm				
						210 cm				
						240 cm				
						270 cm				
10	W	10	8			300 cm 1524				
		12				330 cm				
						360 cm				
						390 cm				
						420 cm Loose B. silt				
11	W	4	4			450 cm 16.764 seams of sand				
		5				480 cm				
						510 cm				
						540 cm Firm B. Fine to				
						570 cm med SAND				
12	W	6	8			600 cm 18.288				
		10				630 cm				
						660 cm Boulder & gravel				
						690 cm				
13	W	20	7			720 cm 19.812 Firm B. Fine to				
		7				750 cm med SAND 217/6				
						780 cm				
						810 cm				
						840 cm				
14		30	100			870 cm 21.336 V. Dense				
						900 cm Br weathered				
						930 cm SANDSTONE				
						960 cm				
						990 cm				
15		100	150			1020 cm 22.85 gravel				
						1050 cm				
						1080 cm				
						1110 cm				
						1140 cm				
						1170 cm				
						1200 cm 24.38				
						12 m				

Checked by _____

METRIC CONVERSION FACTORS

1 cm = 0.3937 inches

1 inch = 2.54 cm

1 m = 3.281 feet

1 foot = 30.48 cm = 0.3048 m

Boring No. 1

12 Meter Log

Boring No. 1

Structure B-17-157

County Dunn

Sheet 1 of 12

Project 8110-05-02

Road STA 64

Station 15+72.50

Offset 6 m Right of C

Surface Elevation 298.188

GROUND WATER OBSERVATIONS

Streambed Elev. 298.1

Time After Drilling

Water Elev.

Top of Well Elev.

Depth to Water

MOISTURE

DRILLING METHOD

Start 4-24-95 Unit 1

Finish Chief Kowald

D = Damp A = Auger DM = Drilling Mud NW = Casing, 76.2mm I.D. (3")

M = Moist C = Coring RB = Rockbit HW = Casing, 101.6mm I.D. (4")

W = Wet CA = Casing Advancer SS = Splitspoon BV = Corebarrel, 36.5mm Core Dia. (1 7/16")

WA = Wash Ahead ST = Shelby Tube NV = Corebarrel, 47.6mm Core Dia. (1 7/8")

HS = Hollowstem E = Easy M = Medium H = Hard

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 Loose Black / Br				
						60 cm Silt + fine organic				
						90 cm				
						120 cm				
						1.5 m Loose Br / Green SAND that organic SAND				
1	W	2	4			180 cm				
						210 cm				
						240 cm				
2	W	4	4			270 cm Loose Br. Fine to med SAND				
						3 m				
						330 cm				
						360 cm				
						390 cm				
3	W	8	9			420 cm				
						4.5 m				
4	W	8	9			480 cm				
						510 cm				
						540 cm				
						570 cm				
4	W	8	8			6 m				
						630 cm				
						660 cm				
						690 cm				
						720 cm				
5	W	8	6			7.5 m				
						780 cm				
						810 cm				
						840 cm				
						870 cm				
6	W	10	8			9 m				
						930 cm				
						960 cm				
						990 cm				
						1020 cm				
7	W	8	6			10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
						1170 cm				
8	W	8	7			12 m				

FIELD BORING LOG
12 Meter Log

Boring No. 2 Structure B-17-157 County Dunn Sheet 1 of 3
Project 8110-05-02 Road STH 64
Station 15+710 Offset 6m Left Surface Elevation 300.261

GROUND WATER OBSERVATIONS

Streambed Elev. 297.151 Time After Drilling _____
Water Elev. 298.767
Top of Well Elev. _____ Depth to Water _____

MOISTURE

DRILLING METHOD

Start _____ Unit 1

D = Damp
M = Moist
W = Wet

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

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

Finish _____

Chief KOWALC

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				
			4			120 cm				
5	1 M	3	2			1.5 m				
		1				180 cm				
						210 cm				
						240 cm				
10	2 W	4	3			270 cm				
						3 m				
						330 cm				
						360 cm				
						390 cm				
15	3 W	0	1			420 cm				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
20	4 W	5	4			570 cm				
						6 m				
						630 cm				
						660 cm				
						690 cm				
25	5 W	10	7			720 cm				
						7.5 m				
						780 cm				
						810 cm				
						840 cm				
30	6 W	9	8			870 cm				
						9 m				
						930 cm				
						960 cm				
						990 cm				
35	7 W	6	5			1020 cm				
						10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
40	8 W	6	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. 2

FIELD BORING LOG
12 Meter Log

Boring No. 2 Structure B-17-157 County Dunn Sheet 2 of 3
Project 9110-05-02 Road STH 69
Station 15+710 Offset 6m Left of CL Surface Elevation 300.261

GROUND WATER OBSERVATIONS

Streambed Elev. 297.151 Time After Drilling _____
Water Elev. 298.767 4.023
Top of Well Elev. _____ Depth to Water _____

MOISTURE	DRILLING METHOD				Start <u>4-25-95</u> Unit <u>1</u>
	D = Damp	A = Auger	DM = Drilling Mud	NW = Casing, 76.2mm I.D. (3")	Finish <u>11</u> Chief <u>Kowald</u>
	M = Moist	C = Coring	RB = Rockbit	HW = Casing, 101.6mm I.D. (4")	
	W = Wet	CA = Casing Advancer	SS = Split Spoon	BV = Corebarrel, 36.5mm Core Dia. (1 7/16")	
	WA = Wash Ahead	ST = Shelby Tube	NV = Corebarrel, 47.6mm Core Dia. (1 7/8")		
	HS = Hollowstem	E = Easy	M = Medium	H = Hard	

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							
						40' = 12m				
						30 cm				
						60 cm				
						90 cm				
9	W	6	7			120 cm 13.71				
						1.5 m				
						180 cm				
						210 cm				
						240 cm				
10	W	10	10			270 cm 15.24				
						3 m				
						330 cm				
						360 cm				
						390 cm				
11	W	13	13			420 cm 16.76				
						4.5 m				
						480 cm				
						510 cm				
						540 cm				
12	W	4	4			570 cm 18.28				
						6 m				
						630 cm				
						660 cm				
						690 cm				
13	W	9	11			720 cm 19.812				
						7.5 m				
						780 cm				
						810 cm				
						840 cm				
14	W	19	21			870 cm 21.33				
						9 m				
						930 cm				
						960 cm				
						990 cm				
15	W	18	21			1020 cm 22.86				
						10.5 m				
						1080 cm				
						1110 cm				
						1140 cm				
16		100	5			1170 cm 24.38				
						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

Boring No. 2Structure B-17-157County DunnSheet 3 of 3

Project 8110-05-02Road STA 64

Station 15+710Offset 6 m Left of CSurface Elevation 300.261

GROUND WATER OBSERVATIONS

Streambed Elev. 297.151Time After Drilling

Water Elev. 293.761

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 4-25-95Unit 1

Finish 4-25-95Chief 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							
						80' = 24.38 m				
						30 cm			WA	
						60 cm			RB	
						90 cm			DM	
			100/sec			120 cm				
85 7						1.5 m 25.90 EOB 2				
						180 cm				
						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				