

CORRESPONDENCE/MEMORANDUM

Date: July 15, 1988

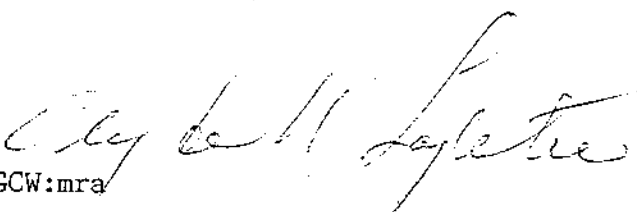
File Ref:

To: S. W. Woods, P.E.
State Bridge Engineer for Hwys.
Attn: Larry Graham

From: Gary C. Whited, P.E.
State Materials Engineer for Hwys.

Subject: Materials
Soils
Site Investigation Report - Addendum
USH 12 Over Kinkinnic River - Roberts to Hammond Road
Structure B-55-114
St. Croix County

As requested we have reviewed the boring data and our report submitted April 8, 1988. To attenuate both total and differential settlement, we suggest that the culvert footprint be subexcavated to a depth of three feet below culvert subgrade, say elevation 88[±]. The excavation should be some three feet wider than the outer limits of the triple box and backfilled with granular soil compacted to 90% AASHTO T-99 maximum density. A moderate strength geotextile beneath the granular backfill will make a better working platform for construction and also tend further to mitigate differential settlement.


GCW:mra

cc: Bridge (Orig. +1)
District 6 (4)
CODesign
GCWhited
M.O. File
Soil File✓

DATE: April 8, 1988

TO: Fred Ross, District Transportation Director
Attn: Bruce Eastenson, District Materials Engineer

FROM: Gary C. Whited
State Materials Engineer for Hwys.

SUBJECT: SITE INVESTIGATION REPORT
Project I.D. 8949-09-00
USH 12 over Kinkinnic River
Roberts to Hammond Road
Structure C-55-
St. Croix County

It is proposed to replace the existing single span bridge carrying USH 12, station 392+40, over the Kinkinnic River some 2 1/2 miles east of Roberts. The approach fills are some 5 feet high. The existing bridge has large cracks in the full height abutment walls. The general topography is gently rolling to level farmland. There are numerous small boulders and cobbles in the stream bed.

Two borings conforming essentially to AASHTO Method T-206, Standard Penetration Test, were made to estimate relative density, evaluate culvert support, and secure samples for soil identification and classification. Soil textures noted are driller's field identification with a later check in the Central Soils office.

Boring 1 logged loose to very loose black topsoil from the ground surface, elevation 993± down to 981±, where firm brown sand with layers of silt was noted down to 978±. Below this sandstone/shale was logged to elevation 976± with limestone below.

Boring 2 logs topsoil with boulder infusions from the surface, elevation 993± down to 991± with a loose block silty topsoil then noted to 988. Below this firm medium to coarse sands were encountered to sandstone and shale at elevation 978±. This sandstone/shale strata was about 2 feet thick with limestone below.

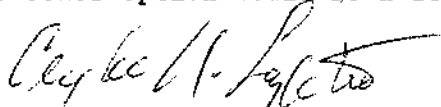
No groundwater was logged during the drilling operations. In fact, the logged soils were dry to moist. The proposed replacement is 4 - 13'3" x 9'4" S.P.F.A. with a 3' spacing between arches. The flow line is set at elevation 992.5 with roadway grade at 1006.5.

The loose topsoil materials have two handicaps for culvert support. The first is that it will be very compressible under a 14 foot free fill and some 5 feet overfill above culvert crown. Settlements of a magnitude to damage culvert is to be expected. The second problem is the obvious difference in depths of the topsoil above the rather good sands. The sands for these fill loadings should be relatively stable. This will create measurable and severe differential settlement which can create serious damage or failure.

One corrective approach would be to drive piles for slab or footing support. This within itself is not a total assurance for the new fill over the loose soil will cause settlement of fill with drag or shoving on culvert wales.

A second and most positive approach is sub-excavate the loose top soils down to the firm sands and backfill with granular soil to give a good working table for construction and added assurance of long term adequate performance.

The other option would be a replacement with another short span bridge.


by Clyde N. Laughter, P.E.
Chief Soils Engineer

CNL/clh/c185

cc: District 6 (Orig. + 3)
Bridge (2)
CO Design
GCW
MO File
Soils File✓

State of Wisconsin/Department of Transportation

FIELD BORING LOG

EL34(S) 385

State of Wisconsin/Department of Transportation

Boring No. 2 Structure Kin Kinnick River County St. Croix Sheet Lot 1Project 8949-09-00 Road USH-12 Hammond - Roberts Rd.Station 392+40 Offset 28' L E Surface Elevation 993.1While drilling Dry to bottom GROUND WATER OBSERVATIONS

Before casing removal _____ Time after drilling _____

After Boring Completed _____ Depth to water _____

Cave in _____ Depth to cave-in _____

Water Notes _____

MOISTURE _____ DRILLING METHOD _____ Start 2/19/88 Unit FEETD = Damp HS = Hollowstem ST = Shelby tube A = Auger E = Easy M = Medium H = Hard Finish _____ Chief Nguyen

W = Wet WA = Washhead RB = Rockbit SS = Split spoon C = Coring W = Wash

Sample No. Moisture Blows on Sampler Sample and Recovery VISUAL FIELD CLASSIFICATION AND REMARKS Unconfined Strength Boulders Blows on Casing Probe Size Drilling Method

0/6 6/12

1 M 1 2 2 2

2 M 5 7 8 11

3 M 6 7 10 12

4 Auger Sample

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100