

MEMORANDUM

TO: Michael Carpenter P.E.
Director, Division of Structural Design

FROM: Geotechnical Branch

BY: Tyler Sheffield, P.E.
Geotechnical Branch, Structure Foundation Section

DATE: November 5, 2021

SUBJECT: **Jefferson County**
12F0 FD52 056 0264 021-023D
Mars #:8556402D
Item #: 5-804.00
RECONSTRUCT THE WATTERSON EXPRESSWAY INTERCHANGE
@US 42 INCLUDING SLIP RAMP TO KY 22
4’x4’ RCBC Extension at Westport Rd. Ramp Sta. 15+87 (44’ Rt.)
Geotechnical Engineering Structure Foundation Report

cc: J. Van Zee
C. Van Zee
T. Lovell
T. Wright
P. Perry
R. Gossom
R. Thomas
D. McElmurray
K. Downs (D-5)
D. Deitz (Palmer)

1.0 LOCATION AND DESCRIPTION

The geotechnical investigation for this structure has been completed. The DGN file for the subsurface data sheet has been made available on Projectwise and through email for use in development of structure plans. The onsite geotechnical exploration for the project was performed by the consulting firm of American Engineers Inc.

The proposed 4’x4’ culvert extension will be a part of the proposed improvements on I-264 in Jefferson County. The structure is located at I-264 approximate M.P. 21.14 Eastbound. The structure is located in Louisville, KY.

2.0 SITE GEOLOGIC CONDITIONS

This structure is located in the Jeffersonville, new Albany, and Charlestown Geologic Quadrangle (GQ# 1211). The geologic mapping indicates that this site consists of the Louisville Limestone Formation.

3.0 FIELD INVESTIGATION

One (1) sample hole was taken at this structure’s location as part of the structural geotechnical investigation. After drilling, the soil samples were delivered to the KYTC Geotechnical Branch in Frankfort, KY where the soils were classified and tested in the Branch’s laboratory. No rock core was taken at the structure location.

4.0 LABORATORY TESTING

The laboratory soil testing for this investigation was completed by the Branch’s laboratory. The soil samples obtained from the boring were determined to consist of low plasticity clay. The soil samples were designated as CL by the Unified Soil Classification System. One Unconfined Compression test was conducted with a result of 3541 psf.

5.0 SUBSURFACE CONDITIONS

No rock/refusal was encountered down to a depth of 8.0 ft. This termination depth corresponds

to an elevation of 536.2 ft.

6.0 ENGINEERING ANALYSIS

Due to low embankment heights, embankment stability and settlement analyses were not performed. Please refer to Geotechnical Engineering Roadway Report R-001-2012 and R-003-2018 for geotechnical information related to construction of the roadway embankments.

Due to the rock depths and the proposed flow line elevations the culvert can be designed for a yielding foundation.

7.0 FOUNDATION RECOMMENDATIONS:

Alternate #2 (yielding)

- 7.1 Design this culvert for a yielding foundation. For a yielding foundation, any bedrock or boulders encountered within 2 ft. of the bottom slab must be excavated and backfilled with soil to the base of the footing elevation.
- 7.2 The culvert dropboxes shall be founded on soil. Size the footing at a service limit state using the factored nominal resistance of 3.1 ksf. For checking strength and extreme limit states, the nominal bearing resistance has been determined to be 9.3 ksf. Use a resistance factor of 0.45 for strength limit state analysis and a resistance factor of 1.0 for extreme limit state analysis.
- 7.3 This culvert should be designed with a paved flowline.

8.0 Plan Notes

(Include the notes below at appropriate locations in the Plans, if applicable.)

- 8.1 Temporary sheeting or shoring/cofferdams and/or a dewatering method will be required for installation.

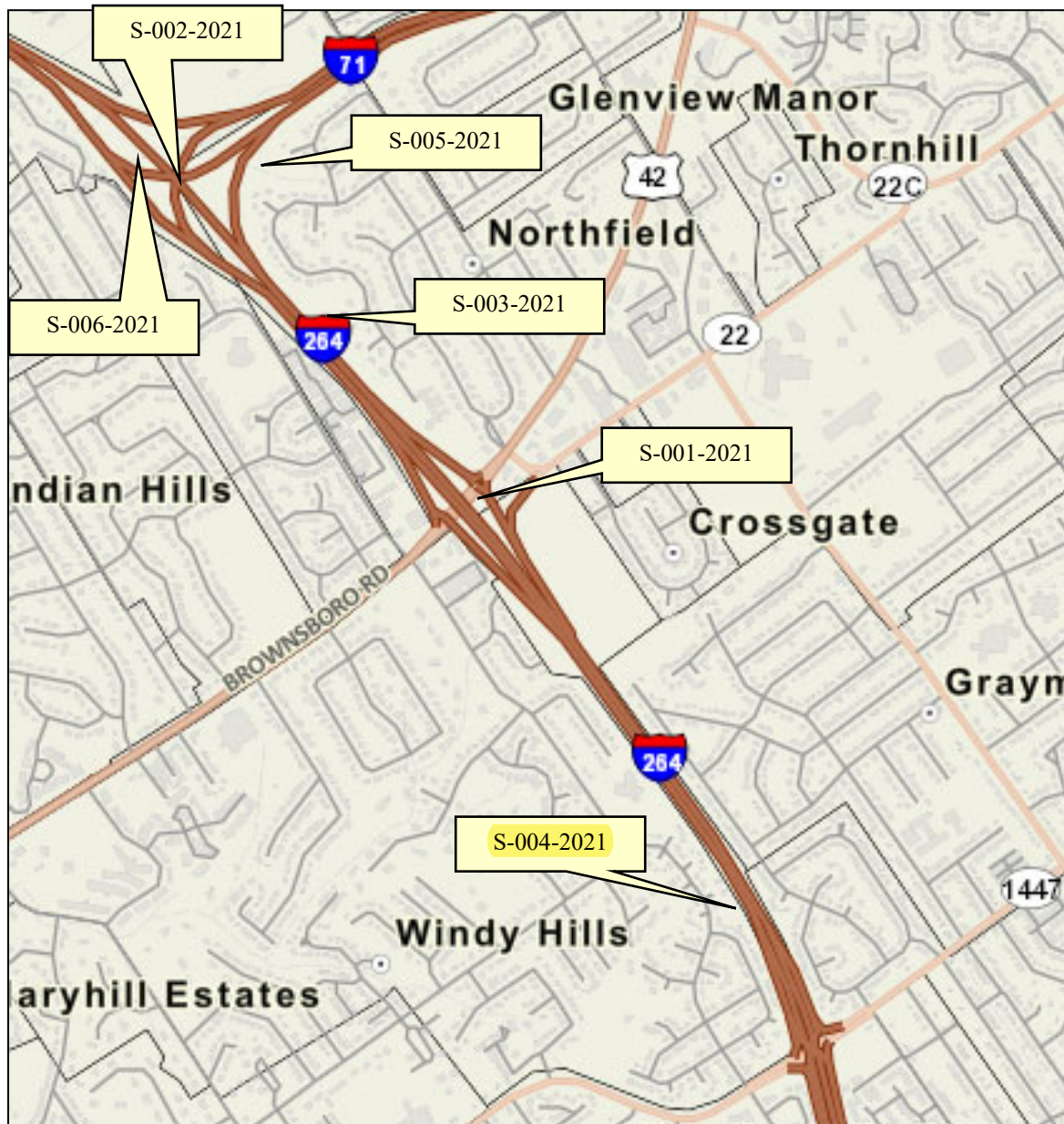
The designer should feel free to contact the Geotechnical Branch for further recommendations, or for any additional questions that arise pertaining to this project, at (502)564-2374.

Attachments:

- Structure Location Map
- Subsurface Data Sheet
- Coordinate Data Sheet

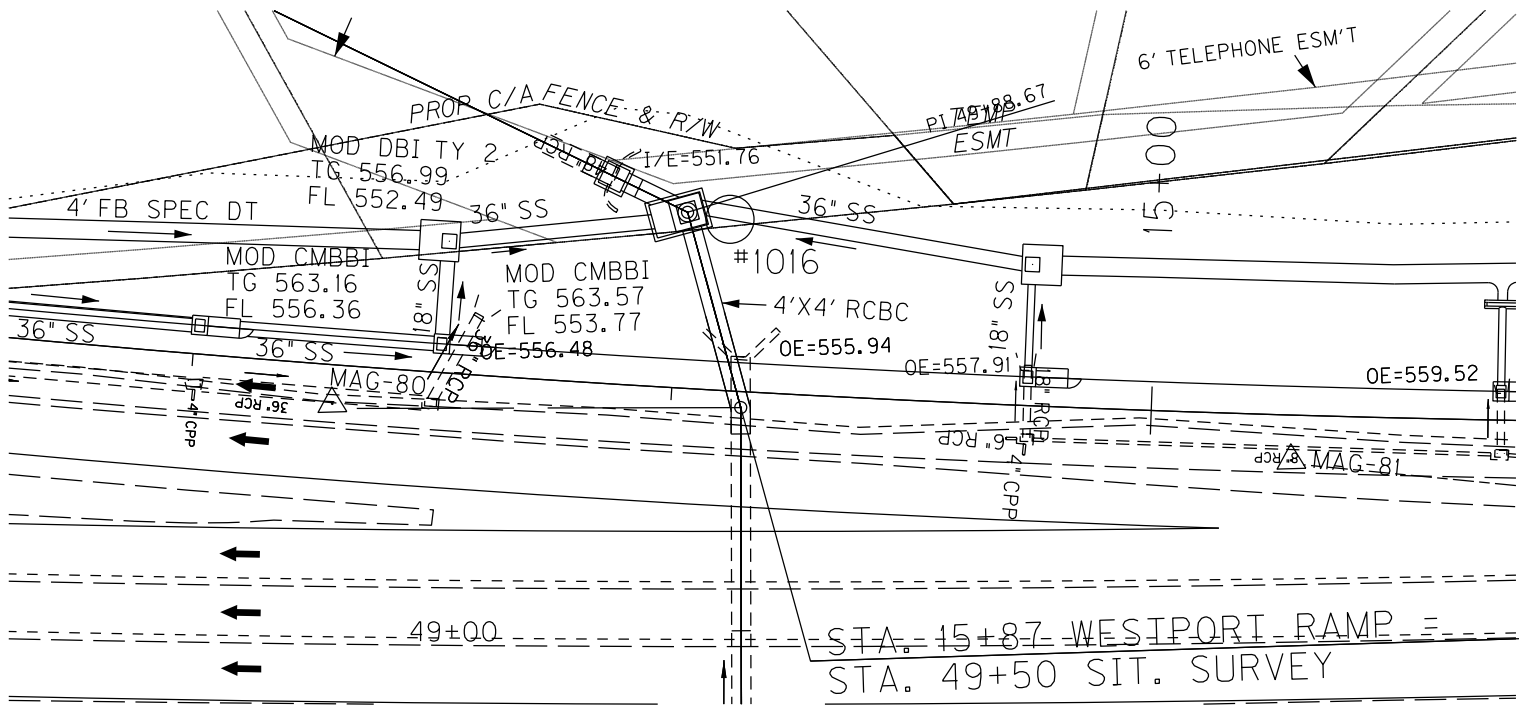
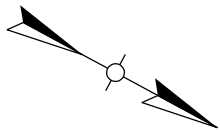
Structure Location Map:

Approximate Lat./Long: 38.268790/-85.626500



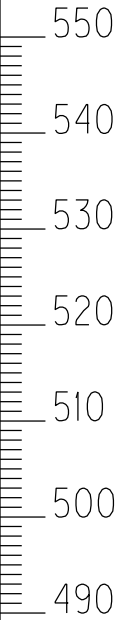
SUBSURFACE DATA

Plan Scale 1" = 20'



Profile Scale:
Vertical 1" = 10'
Horizontal not to scale

Hole No.
Station
Offset
Elev.
(NAVD 88
datum)



1016
15+89.90
35.7' Rt.
544.20

QU (psf)	D50 (mm)	w%	LI	
3541	0.005	21	-0.03	
	0.004	18	-0.02	
	0.008	28	0.38	
				NR

A-6(16), CL, S+C=97(65+33)
A-6(20), CL, S+C=98(61+37)
A-6(12), CL, S+C=70(33+37)



OpenRoads Designer v10.16.0.80

USER: \$\$\$USER\$\$\$

DATE PLOTTED: \$\$\$DATE\$\$\$

FILE NAME: \$\$\$design\$file\$specification\$\$\$

S-004-2021 05-0804.00 Kentucky Transportation Cabinet

ID	Latitude	Longitude	Hole	Station	Offset	Elevation(ft)	Comments
1	38.2687997	-85.6265444	1016	15+89.9	35.7	544.2	