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MEMORANDUM

TO: A. Frank, P.E.
Division of Bridge Design

FROM: William Broyles, P.E.
Geotechnical Branch Manager

BY: Ryan Smith, T.E.T. II *RS*
Geotechnical Branch

DATE: September 15, 2004

SUBJECT: **Oldham County**
FD52 093 0393 002-006
OSTPR 05140 006
Mars # 5941401D
KY 393 (From I-71 to North of KY 146)
KY 393 under a new CSXT RR Bridge @ 356+83
Item No. 5-234.00
Geotechnical Engineering Structure Foundation Report

S-077-04
cc: G. Groves
B. Roach
N. Stroop
A. Calvin
B. Greene
Ray Robison
(Skees)

The geotechnical investigation for this structure has been completed. The drilling and testing were completed by the Central Office Geotechnical Branch. This is an existing at grade railroad crossing. The new alignment of KY 393 will go under the railroad and the proposed railroad bridge will be a two span approximately 129-ft structure. The bridge is located in the La Grange (# 901) Geologic Quadrangle. The geologic mapping indicates that the bedrock at this site is the Laurel Dolomite. The .DGN file for the subsurface data sheet will be e-mailed to you.

Eleven holes were drilled at this location. Four of the holes were sample and core holes and seven were rockline soundings. Refusal elevations ranged from 803.26' to 807.26'. Thin-walled tube samples revealed a range of soils from silty sands, poorly graded sand-silt mix to inorganic clayey silts, elastic silts. Rock cores taken from this location revealed buff white-tan-brown and gray, fine-coarse crystalline, granular, weathered to very weathered, solutioned, porous, dolomitic limestone with shale partings and gray, clayey, fissile shale. KY RQD's ranged from 10%-76% and core recoveries were 86%-100% for all cores. SDI and jar slake testing revealed shales at this location have the potential to weather if left exposed to water over a period of time. If the footings are excavated and left exposed to water, we anticipate additional weathering of the shales. Therefore, the spread footings should not be excavated to final grade until just before the concrete is to be placed.

Due to relatively shallow foundation soils and low embankment heights, stability and settlement analyses were not required.

The designer should feel free to contact the Geotechnical Branch for further recommendations or any questions pertaining to this project.

Foundation Recommendations:

- 1.) **Abutment 1 – Spread footings on sound bedrock**
The estimated allowable base of footing elevation for abutment one is 792’.
- 2.) **Pier 1 – Spread footings on sound bedrock**
Rock will have to be excavated at pier one to below the new roadway grade elevation, which is approximately 794’. The estimated base of footing elevation for pier one is 792’, to get below a non-durable shale layer.
- 3.) **Abutment 2 – Spread footings on sound bedrock**
The estimated allowable base of footing elevation for abutment two is 792’.
- 4.) The allowable bearing capacity for spread footings on unweathered bedrock is 30 ksf.
- 5.) If the footings are found on shale the footing steel and concrete should be placed the same day as the footing excavation is made. Water must be kept out of the footing excavations. The shale may degrade and become soft with exposure to the elements. If the bedrock becomes softened at bearing elevation, the softened material should be undercut to unweathered material prior to placing the concrete. Seasonal groundwater fluctuations may cause groundwater infiltration into the footing excavations and a dewatering method may be necessary.

Attachments:

