

Appendix G
Geotechnical Reports



UNIVERSITY OF KENTUCKY

Kentucky Geological Survey
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June 8, 2006

Tom Clouse, P.E.
Kentucky Transportation Cabinet
P.O. Box 780
Somerset, KY 42502

Dear Mr. Clouse:

This letter is to summarize any geologic concerns for the pre-design scoping study:
Cumberland and Metcalfe Counties
Ky. 90 spot improvements
From Burkesville, Ky., to the Metcalfe/Barren County line
Item No. 8-136.00

Physiographic Region

This planning study is in the Mississippian Plateau (Pennyroyal or Pennyrile) Physiographic Region, which is underlain by limestones of varying degrees of purity, dolomites, siltstones, and black shale.

Karst Potential

This planning study might encounter karst features such as sinkholes and caves.

Landslide Potential

This planning study would not encounter any pre- or post-landslide hazard.

Unconsolidated Sediments

This planning study would encounter unconsolidated sediments, such as clay, silt, sand, gravel, and chert rubble in the streams.

Resource Conflicts

This planning study might encounter resource conflicts such as prior ownership of property for quarrying or mining. A pipeline crossing occurs by Stillhouse Branch and Marrowbone Creek in the Sulphur Lick quadrangle.



Materials Suitability

This planning study would encounter the St. Louis Limestone, Salem and Warsaw Limestone, Fort Payne Formation, and the Leipers Member any of which would be suitable for road aggregate. Caution needs to be taken for the St. Louis, Fort Payne, and Leipers Limestones that might contain shaley layers that would not be suitable for road aggregate because of the shale properties to expand when wet and break down.

Fault Potential

This planning study would not encounter faulted areas.

Earthquake Ground Motions

This planning study area has a probable peak ground acceleration (PGA) due to earthquake ground motion of 0.09g. There would be a very low potential for liquefaction or slope failure in the unconsolidated sediments at or near streams by bedrock ground motion.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard A. Smath". The signature is fluid and cursive, with the first name "Richard" being more prominent than the last name "Smath".

Richard A. Smath
Geologist

cc: Mike Blevins

MEMORANDUM

P-001-2006

TO: Tom Clouse, PE
TEBM for Planning
District 8, Somerset

FROM: William Broyles, PE
Geotechnical Engineering
Branch Manager
Division of Structural Design

BY: Michael Blevins, PG
Geotechnical Branch

DATE: July 6, 2006

SUBJECT: Metcalfe/Cumberland County
FD04 085 0090 004-012 D
KY 90 Spot Improvements
Item # 08-136.0
Mars # 7796601D
Geotechnical Overview

The Geotechnical Branch has completed a review of the project and has the following comments and concerns:

The project is underlain by Alluvium and bedrock of the St. Louis Limestone, Salem and Warsaw Limestone, Fort Payne Formation, Chattanooga Shale, Brassfield Dolomite, Cumberland Formation, and Leipers Limestone.

Alluvium ranges in depth from 0 feet to 60 feet throughout the project and consists of clay, silt, sand and gravel and is found along the major streams. Structures constructed along Marrowbone Creek and Cumberland River may require deep foundations (Piles or Drill Shafts) due to the deep alluvium that may be encountered.

The St. Louis Limestone, Salem and Warsaw Limestone, Fort Payne Formation, Cumberland Formation, and Leipers Limestone contain Limestone, Dolomite and Siltstone suitable for rock roadbed.

Sinkholes are common in the St. Louis Limestone and Salem and Warsaw Limestone.

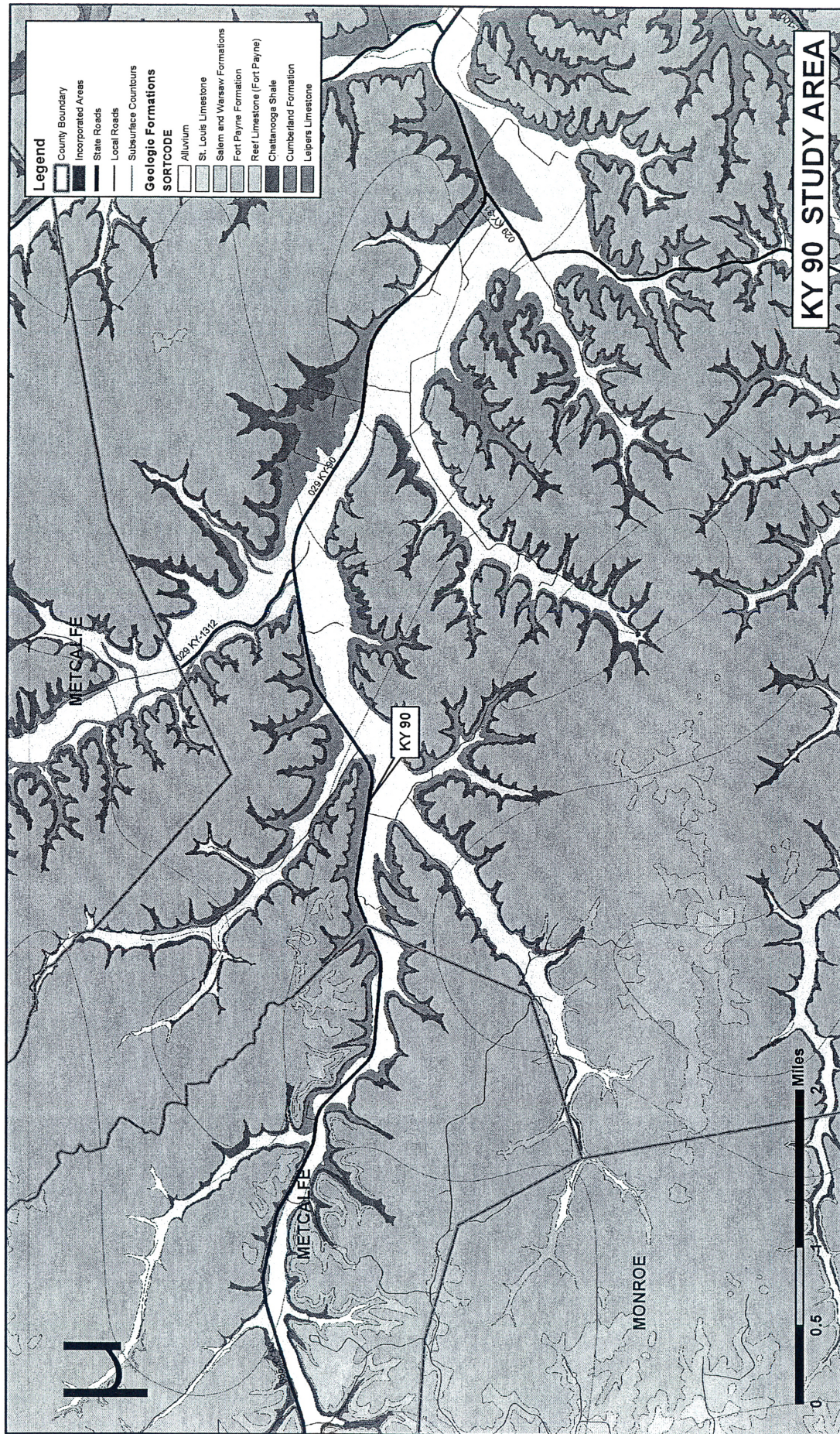
Talus deposits may be encountered in steep valleys in mountainous regions of the project.

Memorandum
Tom Clouse
July 6, 2006
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The main concern of the Branch is the Chattanooga Shale. The shale contains Pyrite and Marcasite which when exposed to water and air can produce acidic runoff conditions. Currently in order to comply with DEP Environmental Performance Measures and to protect surface and groundwater, the Branch has on past projects usually recommended over excavating a serrated 2:1 cut slope and covering the shale with approximately 4 feet of clay shale and soil to prevent acidic runoff. When the shale is used in embankments, it is encased with clay shale and soil. The Chattanooga Shale, in most areas, can be avoided by shifting the alignment horizontally and vertically. The locations of the Chattanooga Shale are shown on the attached Geologic Maps indicated by DC.

If there are any questions, please advise.







Legend

- County Boundary
- Incorporated Areas
- State Roads
- Local Roads
- Subsurface Contours

Geologic Formations

Geologic Formation	SORTCODE
Alluvium	01
St. Louis Limestone	02
Salem and Warsaw Formations	03
Fort Payne Formation	04
Reef Limestone (Fort Payne)	05
Chattanooga Shale	06
Cumberland Formation	07
Leipers Limestone	08

KY 90 STUDY AREA

KY 90

BURKESVILLE

CUMBERLAND

