

APPENDIX P

**REPORT OF SITE RECONNAISSANCE FOR
THE PROPOSED WAR FORK AND STEER
FORK DAM SITE**



Report of Site
Reconnaissance

Proposed Dam Site
Turkey Foot Recreation Area
Jackson County, Kentucky

FULLER, MOSSBARGER, SCOTT AND MAY ENGINEERS, INC.
1409 NORTH FORBES ROAD
LEXINGTON, KENTUCKY 40511-2050
859-422-3000 859-422-3100 FAX

Prepared for
The Mangi Environmental Group



Church, Virginia

June, 2000

| Falls

1409
North Forbes Road
Lexington, Kentucky
40511-2050

859-422-3000
859-422-3100 FAX

June 14, 2000

O.1.1.LX2000147R01

Mr. Leon Kolankiewicz
The Mangi Environmental Group
701 West Broad Street, Suite 205
Falls Church, Virginia 22046

Re: Site Reconnaissance
Proposed Dam Site
Turkey Foot Recreation Area
Jackson County, Kentucky

Dear Mr. Kolankiewicz:

As requested on May 25, 2000, I performed a visual reconnaissance at the proposed dam embankment location on War Fork near the U.S. Forest Service Turkey Foot Recreation Area and the area immediately downstream from the proposed dam. Of particular concern in the reconnaissance was the reported presence of limestone outcrops in the vicinity of the proposed dam embankment and the consequent possibility of dam or impoundment leakage affecting caves located north of the site through a karst related hydraulic connection.

1. Published Site Geology

The Geologic Map of the McKee Quadrangle, Jackson and Owsley Counties, Kentucky (GQ 1125, U.S. Geologic Survey, 1973) shows the principal stratigraphic units in the vicinity of the proposed dam site to be, in descending order, the Breathitt Formation, the Pennington Formation and the Newman Limestone. Immediately adjacent to War Fork, the bedrock is shown to be overlain with unconsolidated alluvium.

The Breathitt Formation, which represents the Pennsylvania geologic period, is depicted on the map as extending from the ridge tops to an elevation of approximately 980 feet. The Breathitt consists of cyclic sequences of sandstones, siltstones, shales and coal seams. The Pennington Formation which represents the Mississippian geologic period is depicted from an elevation of approximately 980 feet to an elevation of approximately 880 feet. The Pennington, in the vicinity of the site, consists of an upper sandstone member underlain by interbedded shale (80%), siltstone (10%) and sandstone (10%). The Pennington also contains small, scattered, isolated lenses of dolomite (dolostone). The underlying Newman Limestone (upper member) which also represents the Mississippian geologic period consists of limestone (90%) with interbedded shale. The Newman, which is capable of forming karst drainage systems is depicted as being below drainage south (upstream) of the Turkey Foot Road bridge

over War Fork. The structure contours on the geologic map indicate an essentially monoclinial stratigraphic dip of approximately 30 feet per mile to the southeast.

FULLER, MOSSBARGER, SCOTT & MAY ENGINEERS, INC.
OFFICES IN LEXINGTON, LOUISVILLE, CINCINNATI & COLUMBUS

The Mangi Environmental Group

June 14, 2000

Page 2

2. Site Reconnaissance

Upon arriving at the site, it was noted that there was no flow in War Fork at the Turkey Foot Road bridge. While stream base flows in Kentucky are still somewhat depressed due to the 1999 drought conditions, the no flow condition was unexpected given the size of the watershed and the near normal precipitation of the past six months. Moving upstream from the bridge approximately 800 feet, it was observed that War Fork abruptly sinks in an alluvium filled streambed swallet.

Moving downstream from the bridge, flow returned to War Fork at confluence with Hughes Fork. This flow consisted solely of the discharge from Hughes Fork. No flow was observed from Elsam Fork at its confluence with War Fork. At the entrance to the Turkey Foot campgrounds, War Fork is traversed by a low water bridge. On the upstream side of the bridge, flow in War Fork consists solely of the discharge from Hughes Fork. On the downstream side of the bridge, the flow increases significantly as the result of spring discharge beneath a large ledge of the Newman Limestone that is located near the bridge. It is probable that these springs are the resurgence of the flow in War Fork that sank above the Turkey Foot Road bridge; however, that can not be ascertained without dye testing.

The exposed lithology along the stream and lower valley walls was consistent with the published geologic map. Outcrops along the lower valley wall upstream of the Turkey Foot Road bridge were sandstones belonging to the lower Breathitt and upper Pennington Formations. Downstream from the bridge, the Newman Limestone is exposed at the bottom of a scour hole in the alluvium of the dry stream bed and near the low water bridge at the campground entrance. Based on the sinking of War Fork approximately 800 feet upstream of the Turkey Foot Road bridge, it is reasonable to assume that the stream has completely eroded through the Pennington Formation into the underlying Newman Limestone at that point and that a karst drainage system has developed in the Newman. The karst drainage would be expected to be developed in a downstream (northerly) direction as the intact Pennington shales would be expected to prevent the dissolution of the underlying limestone.

A topographic map extract depicting the site and surrounding area and site photographs are presented in Attachment Nos. 1 and 2.

3. Implications to the Proposed Dam Impoundment

It is our understanding that the principal issue is the possible effect of the impoundment on caves that are located downstream from the proposed impoundment. More specifically, the possibility that leakage from the impoundment may result in the flooding of Indiana bat habitats. Based on the site reconnaissance and the published geologic data, there does not appear to be any hydraulic connection between the proposed impoundment area and

downstream karst features. Based on the outcrops in the vicinity of the proposed dam, the dam abutments will be in shale and sandstone. Even if lenses of dolomite are encountered

LX2000147R01.doc

The Mangi Environmental Group
June 14, 2000
Page 3

in the abutments, they will not be hydraulically connected to the Newman Limestone due to their isolated character. The cutoff trench for the dam is likely to be in shale; however, the thickness of the shale at that location is unknown.

Two issues that should be addressed in the site geotechnical investigation are the actual thickness of shale underlying the proposed dam site and the fate of the water that sinks in War Fork downstream from the proposed dam.

It is desirable to have a sufficient thickness of the lower Pennington shale underlying the proposed dam to assure hydraulic isolation from the underlying Newman Limestone. As the shale will be the thinnest immediately below the stream channel alluvium, one or more rock core borings should be advanced beneath the stream channel at the proposed location of the dam.

To further address the concerns that have been expressed regarding possible hydrologic connections between the site and downstream caves with bat habitats, it would also be useful to perform tracer tests, using fluorescent dyes or other conservative tracers, to determine the fate of the water that sinks in War Fork downstream from the proposed dam. While it is probable that the water resurges in the springs near the campground entrance, other resurgence points can not be precluded without the benefit of tracer tests.

We are pleased to have had the opportunity to be of service to you on this project. Please contact our office should there be any questions or if we can be of additional service to you.

Respectfully submitted,

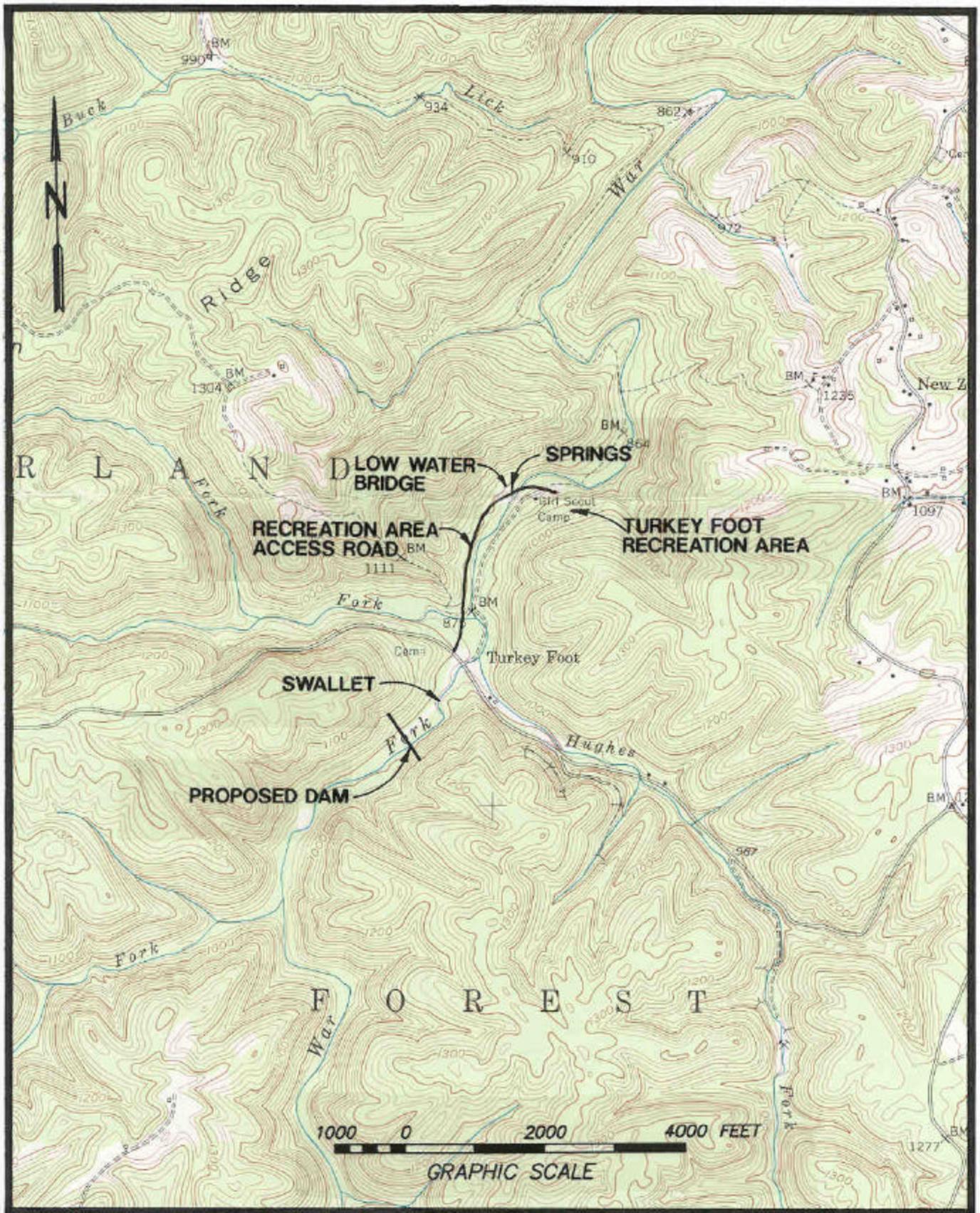
FULLER, MOSSBARGER, SCOTT AND MAY'
ENGINEERS, INC.

Ronald W. Yost, P.G.
Senior Geologist

/sj

Attachment No. 1

Topographic Map
Extract Depicting Site
and Surrounding Area



LX2000147/01-art1.doc

Attachment No. 1
 Portion of USGS 7½-Minute Topographic Map
 of the McKee Quadrangle Depicting the Site and Surrounding Area

Attachment No. 2

Photographs



Photo No. 1 Stream Bed Swallet 800 Feet Upstream of Turkey Foot Road Bridge



Photo No. 2 Dry Stream Bed Between Swallet and Hughes Fork



Photo No. 3 War Fork Upstream of Low Water Bridge



Photo No. 4 War Fork Downstream of Low Water Bridge