

Kansas Geological Survey
1930 Constant Ave.
Lawrence, KS 66047

June 9, 2006

Dr. Dennis Schucker
BHE Environmental
11733 Chesterdale Road
Cincinnati, Ohio 45246

RE: Southern Star Pipeline—Cherokee County, Kansas

Dear Dr. Schucker:

We are responding to your request for comment by the Kansas Geological Survey dated May 23, 2006 for ground-water, karst, landslide, and liquefaction issues related to the pipeline replacement project in Cherokee County, Kansas. The location maps that you provided were mislabeled as in Ohio and not Kansas. After a brief check, it was determined that the maps were of an area in Cherokee County, Kansas. The environmental issues are covered below.

Ground water:

The main source of water supply for this part of Cherokee County is the confined Ozark Plateaus aquifer system. Several wells in the vicinity of the proposed pipeline tap sources in the upper part of the aquifer system (the Springfield Plateau aquifer). These wells are used primarily for turkey farms and the Columbus municipal golf course. Depths to the top of the Springfield Plateau aquifer range approximately from 250 to 400 feet. Columbus and Cherokee Rural Water District #4 wells tap supplies in the deep aquifer (the Ozark aquifer) and the shallow Springfield Plateau aquifer. Depth to the top of the Ozark aquifer is on the order of 500 to 600 feet. Although the depth of burial of the pipeline is not specified in your email, it is unlikely that the pipeline will have any effect on this aquifer system. Most of the units between the top of the aquifer and the surface consist of low permeability shales, thin limestones, and sandstones. You should be aware that there is a well that taps the Springfield Plateau aquifer in the northwest quarter of Section 23, T. 33 S., R. 24 E. The maps you provided suggest the pipeline will be located across the county road from the well. Other, mostly shallow, drilled or hand-dug water wells for which we have no records may exist along or near the pipeline route.

Karst and subsidence:

The surface geology does not suggest that there are any natural karst hazards that would be of concern. However, paleokarst features may exist in the limestones at the top of the Mississippian.

The proposed pipeline and the proposed contractor's yard are northwest of the lead-zinc mining district of southeast Kansas. A slight chance exists of encountering a coal mine, most likely a surface mine, along the proposed pipeline route.

Landslides:

No landslide hazard studies exist for Cherokee County; however, several areas should be examined. 1) Most of the proposed pipeline is in terrace and alluvial deposits (Bennison, 2002). In several areas—for example, SE¼ of section 34 T32S R24E—the pipeline parallels a stream and the possibility exists for erosion and slope failure of the unconsolidated sediments by the stream. 2) The proposed pipeline route will cross some hilly terrain in the SE¼ of section 15, NE¼ of section 22, NW¼ of section 23, and SW¼ of section 14, all of which are in T33S R24E. These hills are underlain by Pennsylvanian-age cyclothems that are mostly shale. Units similar to these are landslide prone in the Kansas City metropolitan area. The slope stability hazard of this area should be investigated. I have no information on landslides at the contractor's yard.

Liquefaction:

No liquefaction studies exist for Cherokee County.

Reference:

Bennison, A., 2002. Geologic Map of Cherokee County, Kansas: Kansas Geological Survey Map M-104.

The above discussion represents our best assessment based on the information that the Kansas Geological Survey has about this locality and/or proposed project at the time of this writing. Other geologic conditions, not discussed herein, or for which the Kansas Geological Survey has no knowledge, may affect the viability or safe operation of this facility or property. The information provided in this letter is from regional or countywide studies and should not be used as a substitute for detailed site characterization by a licensed geologist or engineer. It is the responsibility of the applicant to provide any required site characterizations.

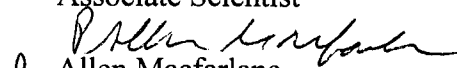
If you have any questions, please contact Gregory Ohlmacher at (785) 864-2194 (ohlmac@kgs.ku.edu) or Allen Macfarlane at (785) 864-2068 (dowser@kgs.ku.edu).

Sincerely,



Gregory Ohlmacher, P.G.

Associate Scientist



p, Allen Macfarlane

Assistant Scientist

Subject: [Fwd: Information request - Cherokee County]

From: Gregory Ohlmacher <ohlmac@kgs.ku.edu>

Date: Tue, 13 Jun 2006 09:18:57 -0500

To: "Daniel R. Suchy" <dsuchy@kgs.ku.edu>

Dan:

We got this request from BHE Environmental for a proposed pipeline project in Cherokee County. Allen and I prepared a response (see attached: BHE Env Cherokee 6 2006 GO and PAM.doc). 1) Please check over the letter. 2) The original request came via e-mail, do we want to respond via e-mail or US Postal Service? If by e-mail, I suggest sending the letter as a pdf file. Less chance it will be altered.

Greg

Subject: Information request - Cherokee County

From: "Dennis Schucker" <dschucker@bheenvironmental.com>

Date: Tue, 23 May 2006 15:07:34 -0400

To: <ohlmac@kgs.ku.edu>

To: Greg Ohlmacher

Kansas Geological Survey

phone: 785.864.2194

Mr. Ohlmacher,

BHE Environmental is working on a permit application for Southern Star Pipeline to conduct a pipeline replacement in Cherokee County, KS. As part of this application, a review of geology, groundwater, and surface water resources and hazardous is required.

The proposed work includes replacement of an approximately 7-mile section of pipeline and a contractors yard. The pipeline is located east of Columbus and west of Crestline. The pipeline is aligned N-S. The proposed contractor yard is located south of Columbus.

I have attached an overview map (showing the relative locations of the work areas), and more detailed topo. map for the contractor yard and two maps for the pipeline route.

Can you provide any information concerning the following:

- Groundwater resources in the Cherokee County. (I compared the work areas to the Kansas Sensitive Groundwater Map and the project locations are not over these areas).
- Is KGS aware of any karst features within 0.25 miles of the project areas? Are these areas, or this part of Cherokee County considered as a Karst-containing areas?
- Are you aware if the project locations are in areas susceptible to landslides or liquefaction?

Thank You for your assistance with this issue.



BHE Environmental, Inc.

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Gregory Ohlmacher <ohlmac@kgs.ku.edu>
Associate Scientist
Kansas Geological Survey
Stratigraphic Research Section

BHE_Env_Cherokee_6_2006 GO and PAM.doc

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Information request - Cherokee County

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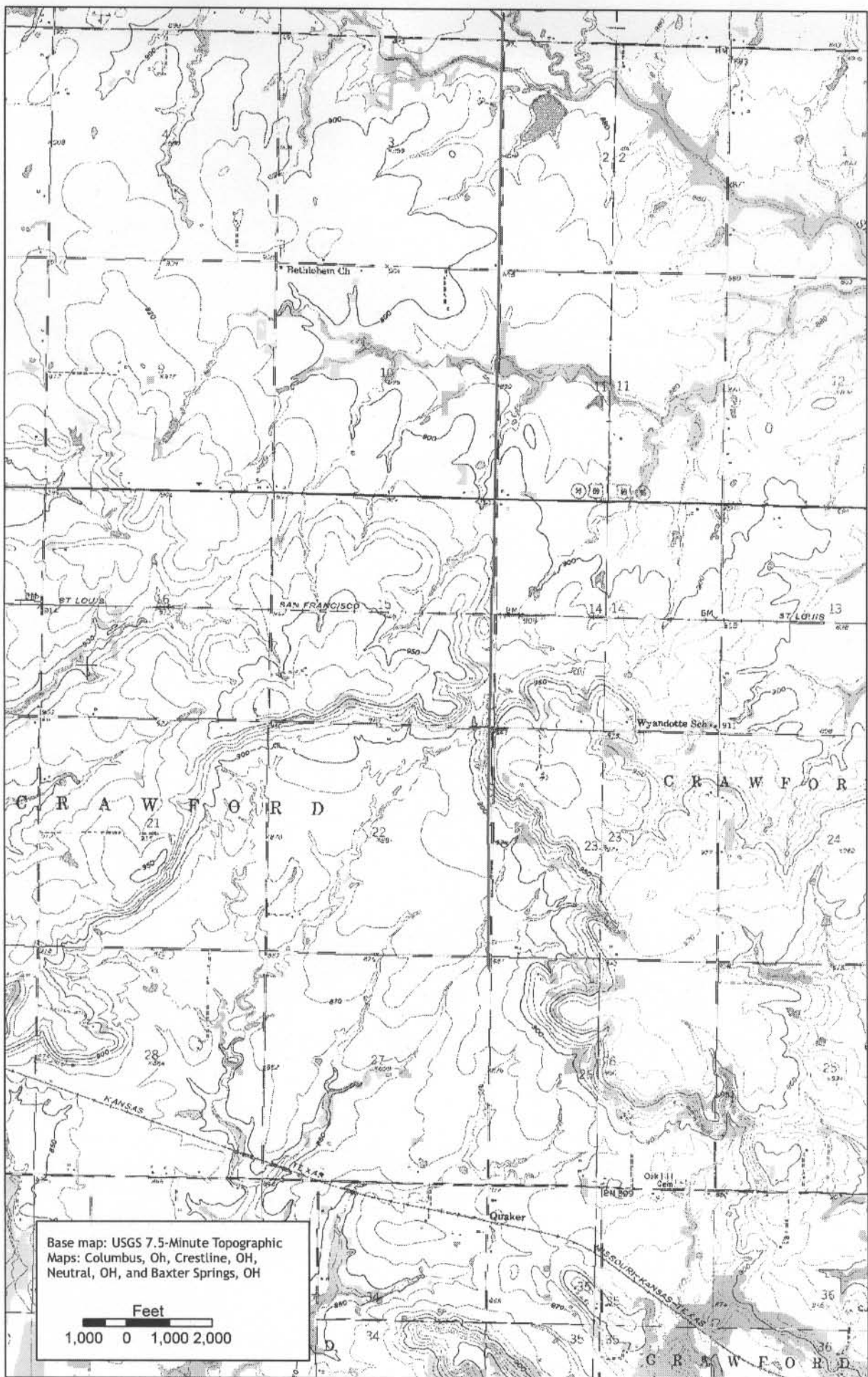
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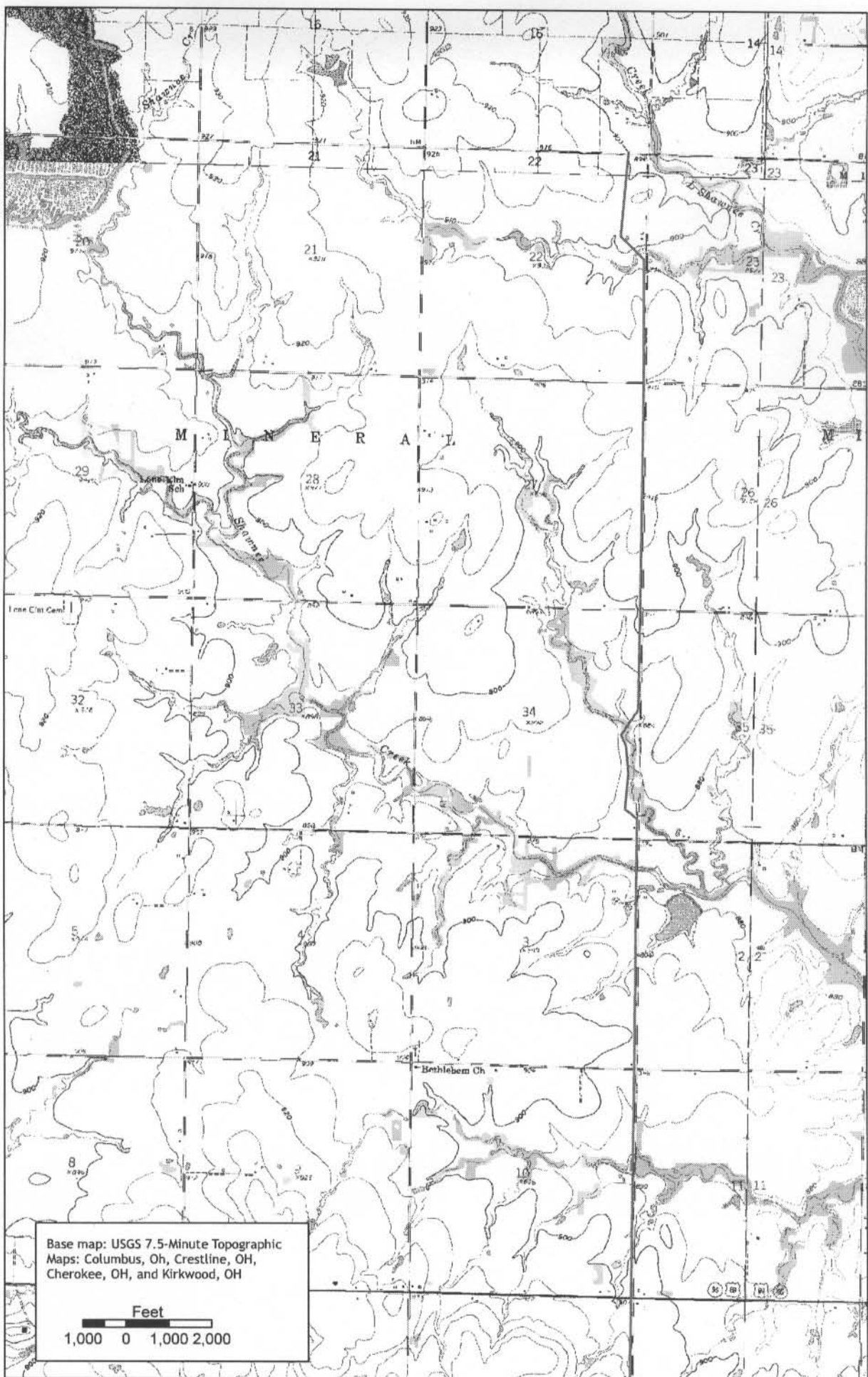
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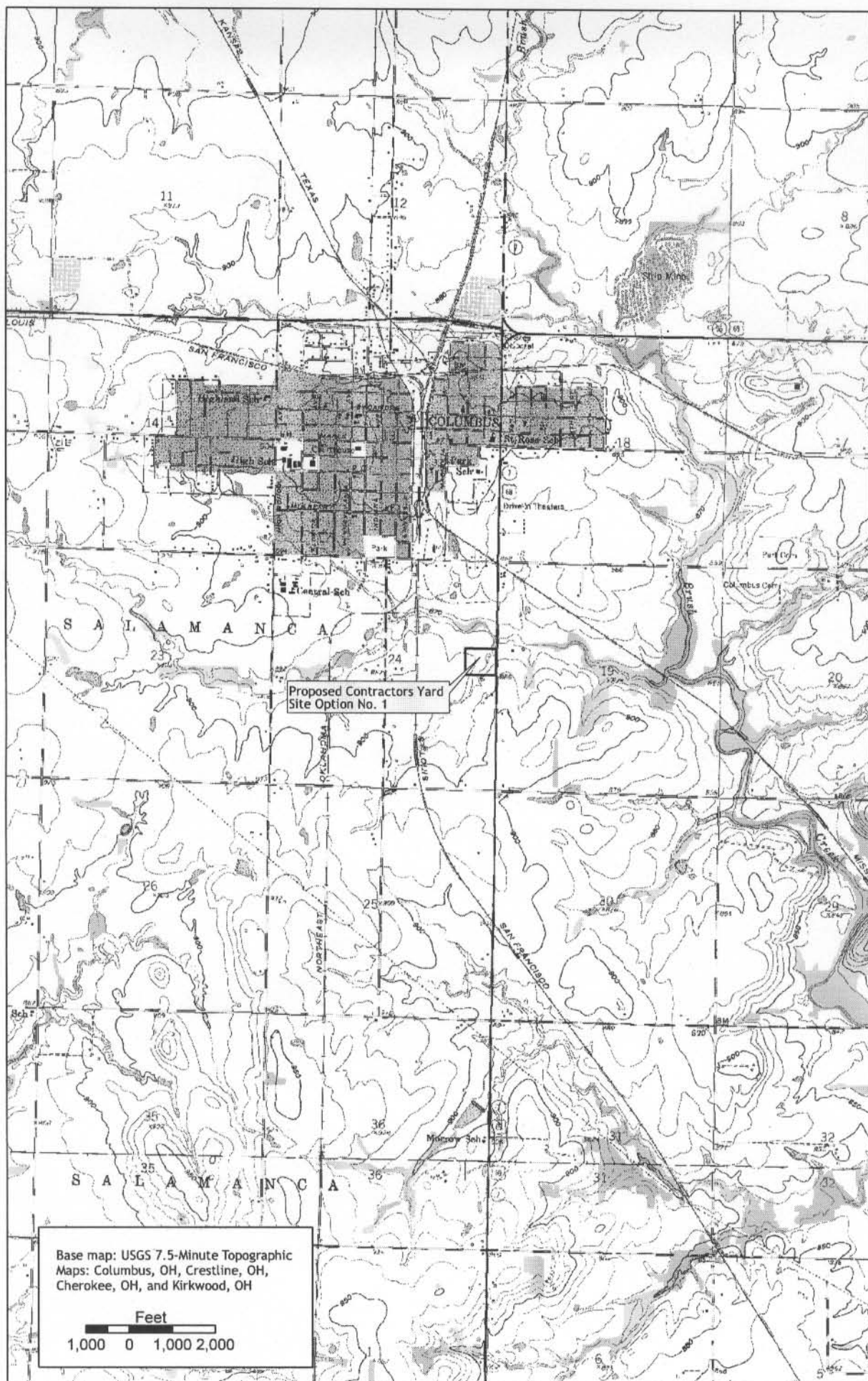
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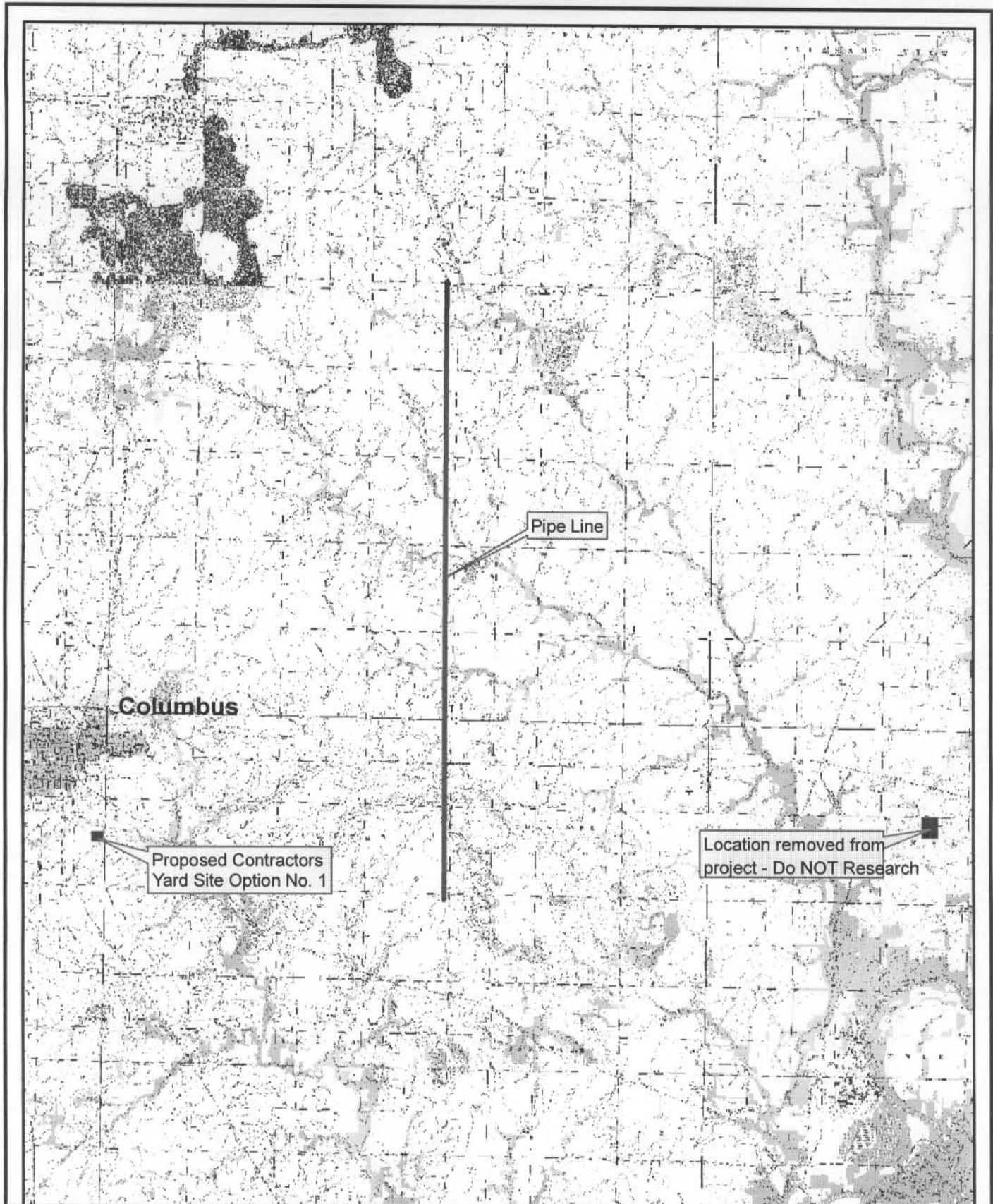


Figure 1. Approximate locations of the proposed contractors yard site options, Cherokee County, Kansas.

May 2006
Project No. 1538.011

1 0 1 2 Miles

