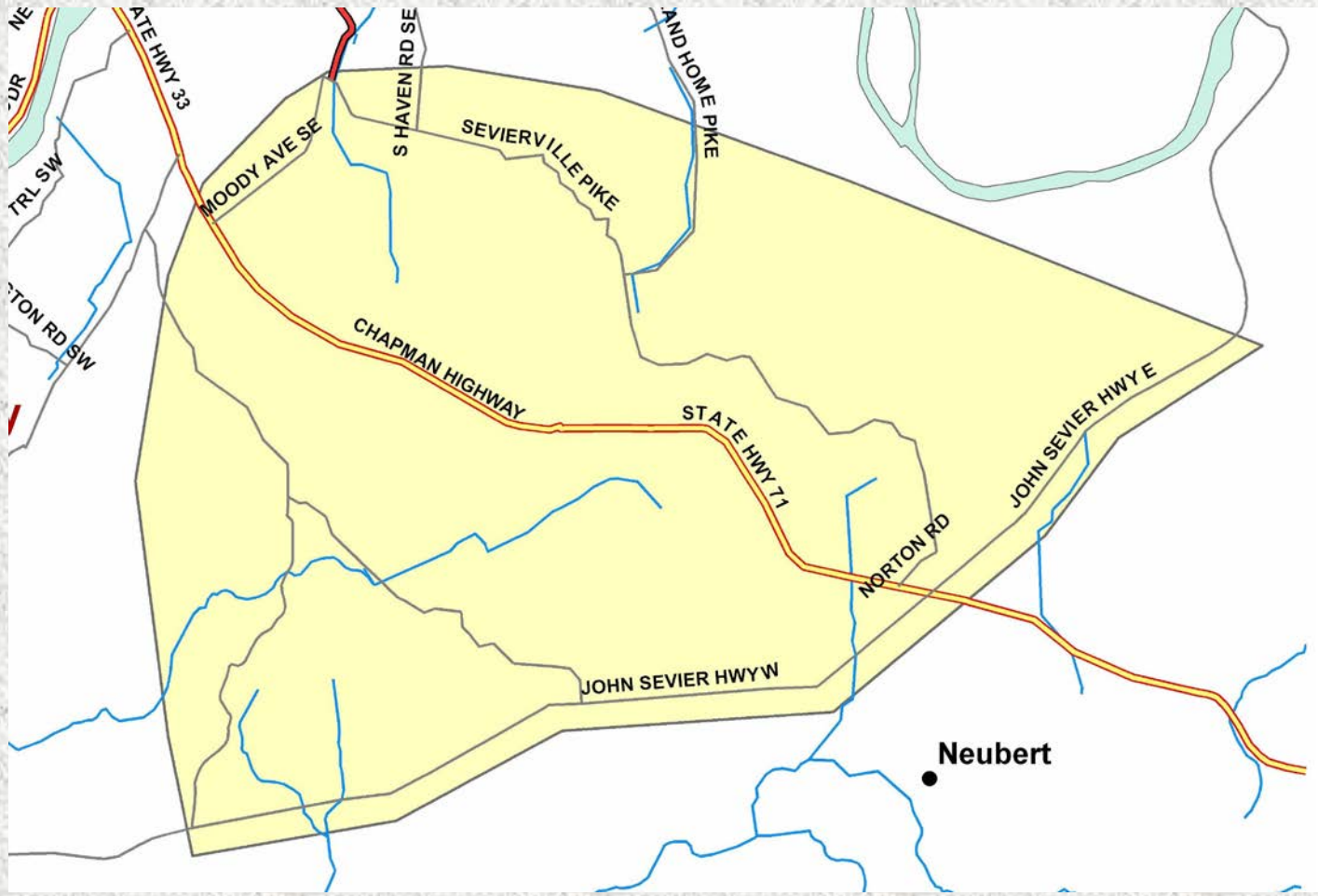
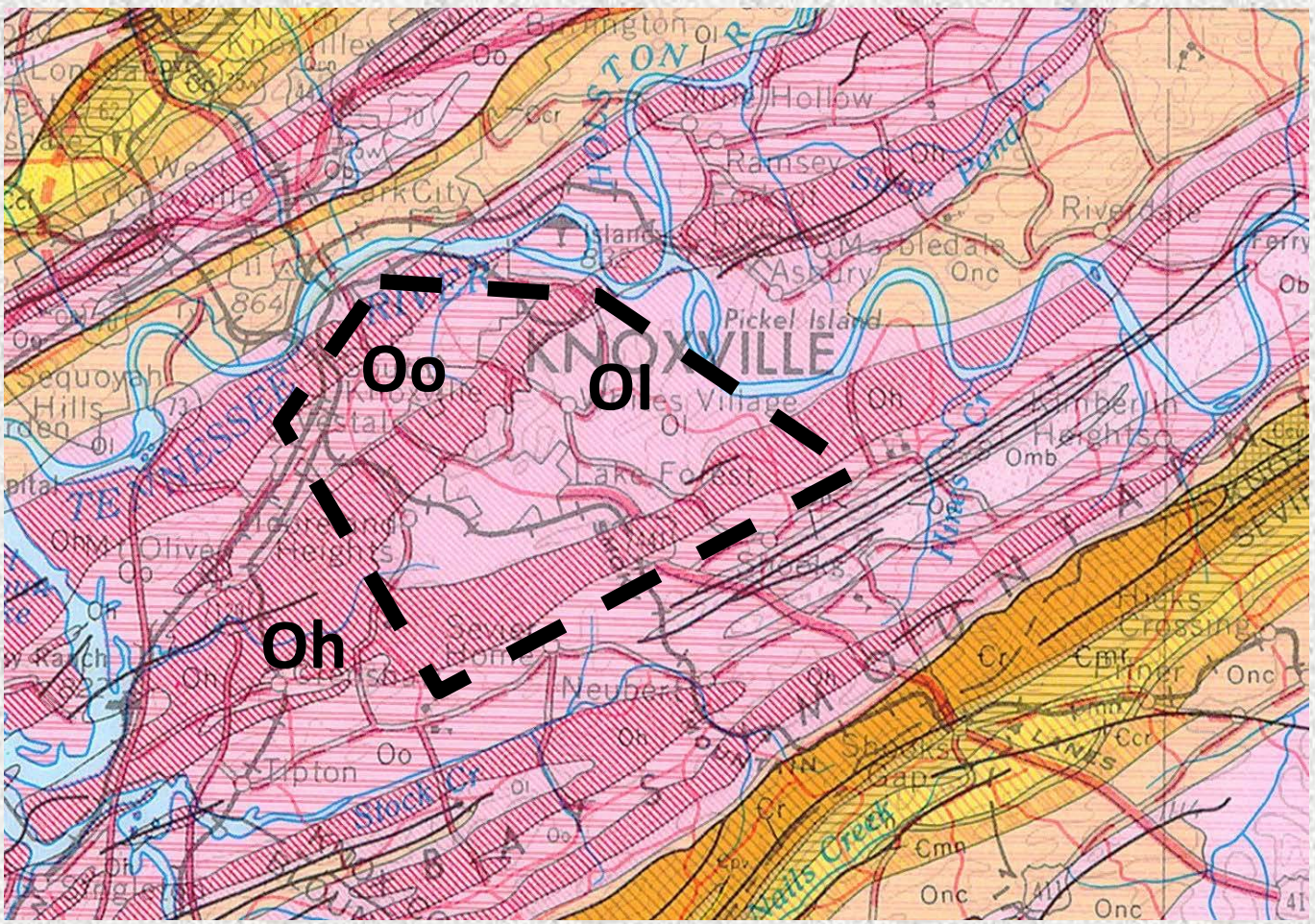
Case Study: Preliminary Geotechnical and Geohazards Investigation for the Extension of South Knoxville Blvd. in Knox County, Tennessee

Area to study



Terminus of S. Knoxville Blvd.

Geological map

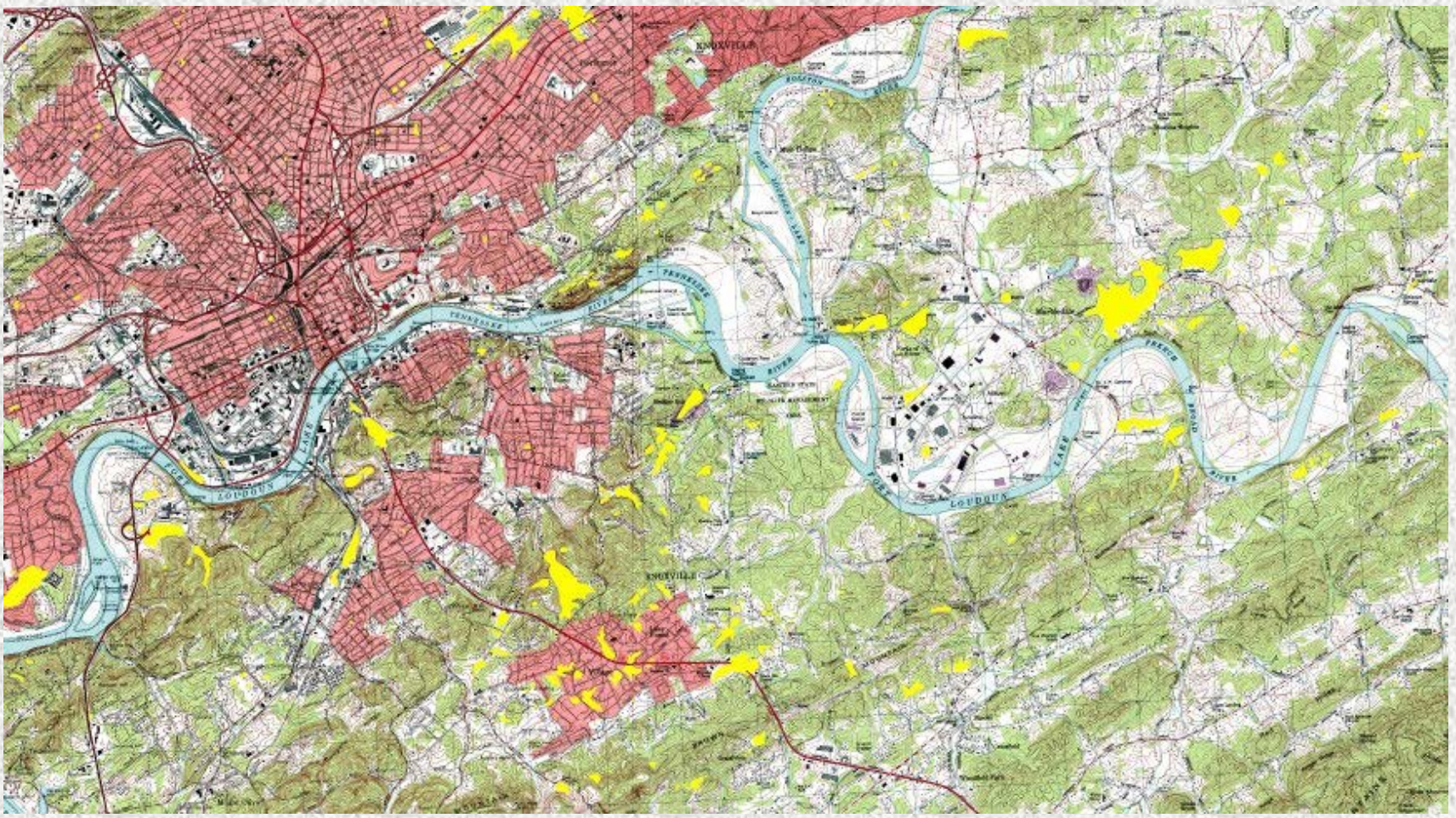


Geoharzards

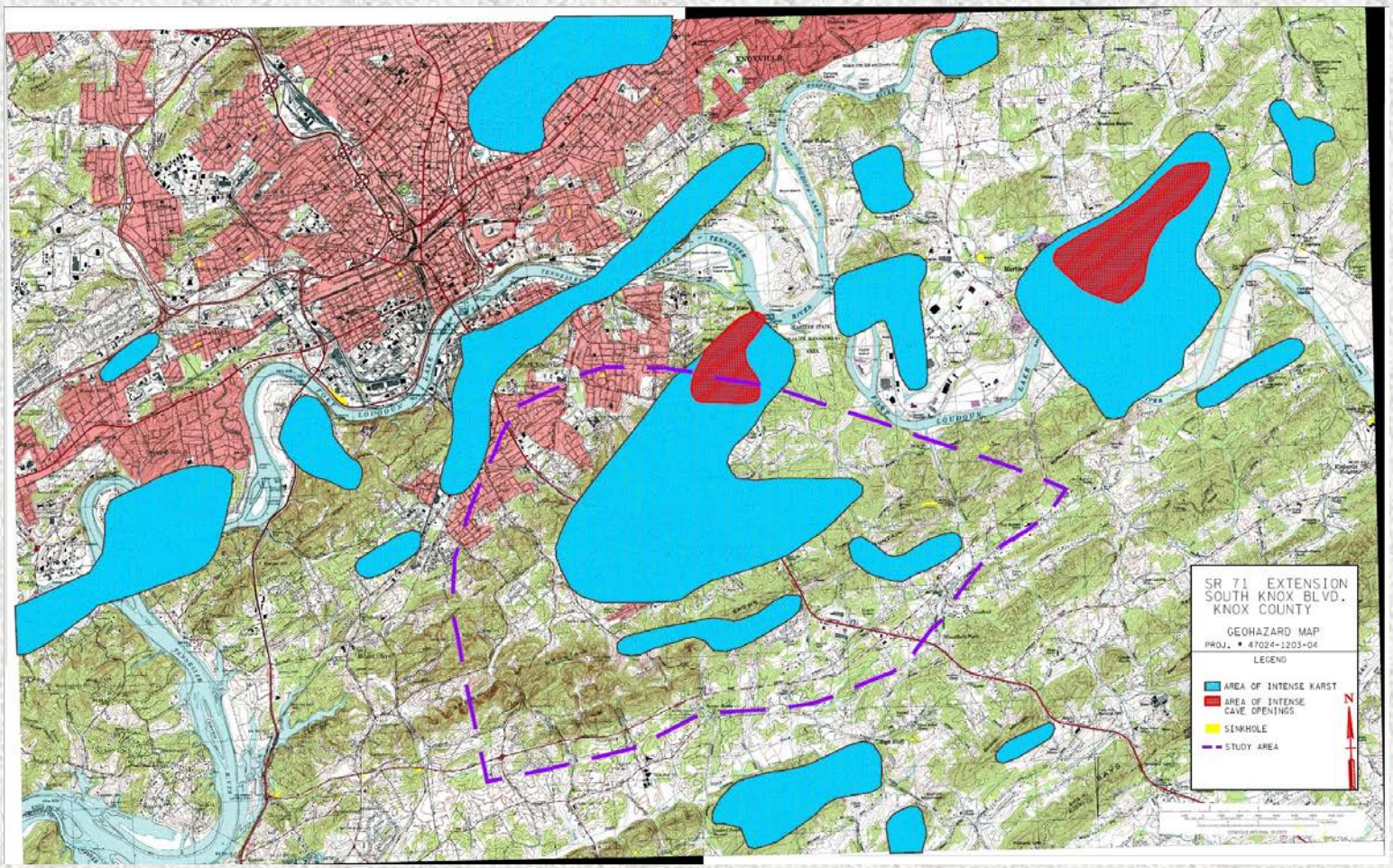
Karst

Sinkholes and Caves

Topographic Map with Highlighted Sinkholes



Intense Karst Zones



Field Investigation of Sinkholes

03 09 2009

Water filled Sinkhole

03/24/2008

03/24/2008

03/24/2008

03/24/2008

03/24/2008

03/24/2008

Sinkhole
Swallet
05/21/2008

Caves

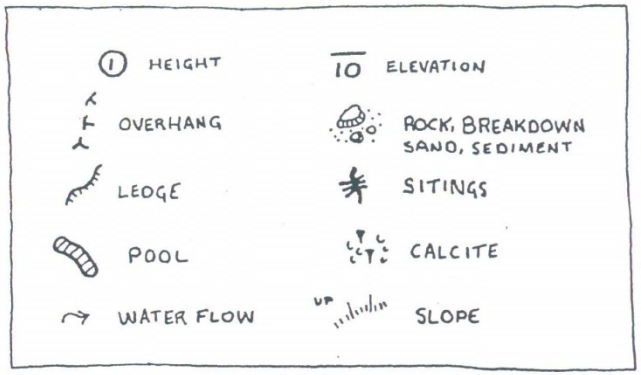
- Total of 8 caves located within study.
- Addition study of:
  - Cruze Cave
  - Meades Quarry Cave System

Cruze Cave

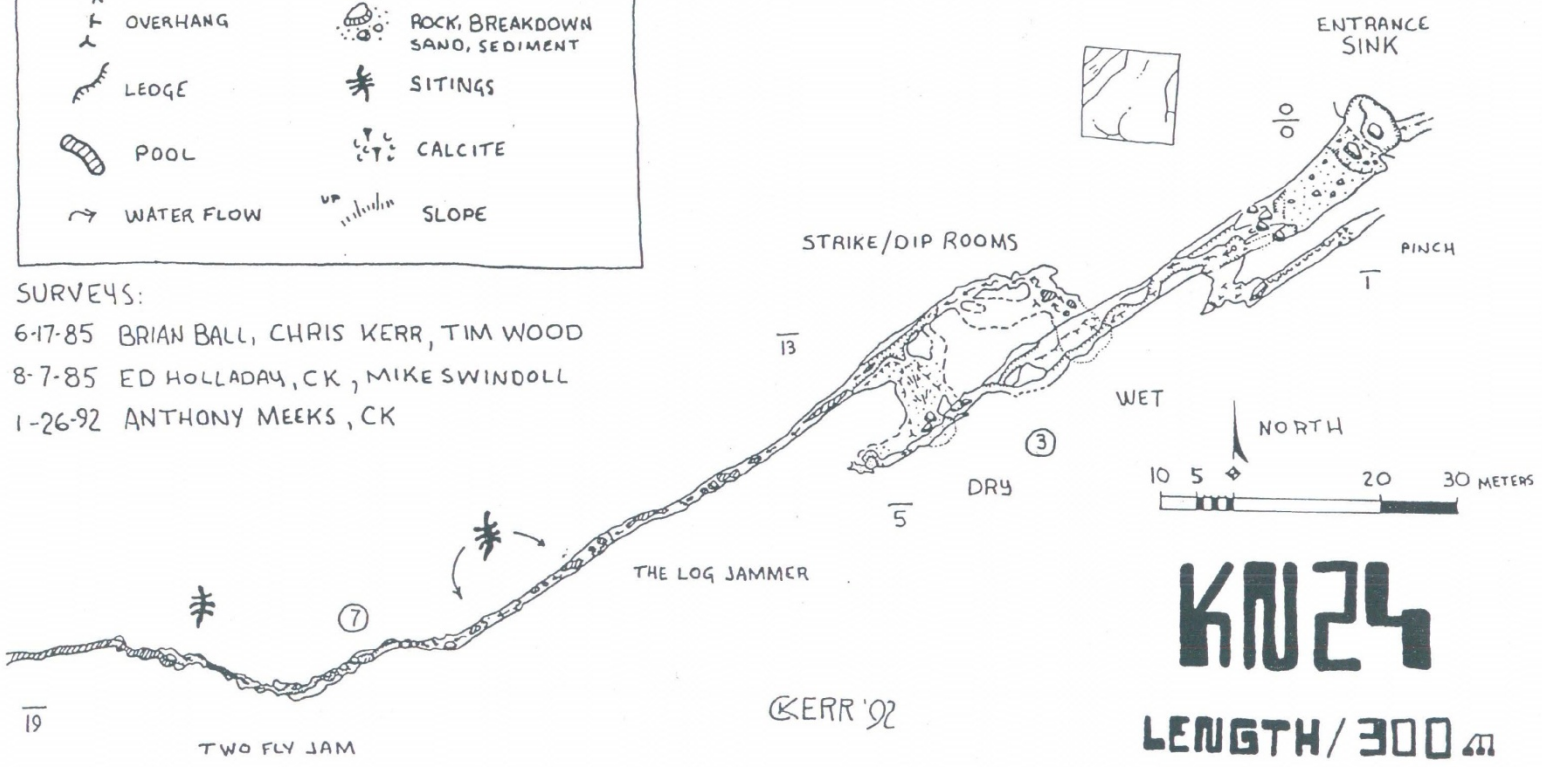
05/20/2008

CRUZE CAVE

Grade 5



SURVEYS:
6-17-85 BRIAN BALL, CHRIS KERR, TIM WOOD
8-7-85 ED HOLLADAY, CK, MIKE SWINDOLL
1-26-92 ANTHONY MEEKS, CK



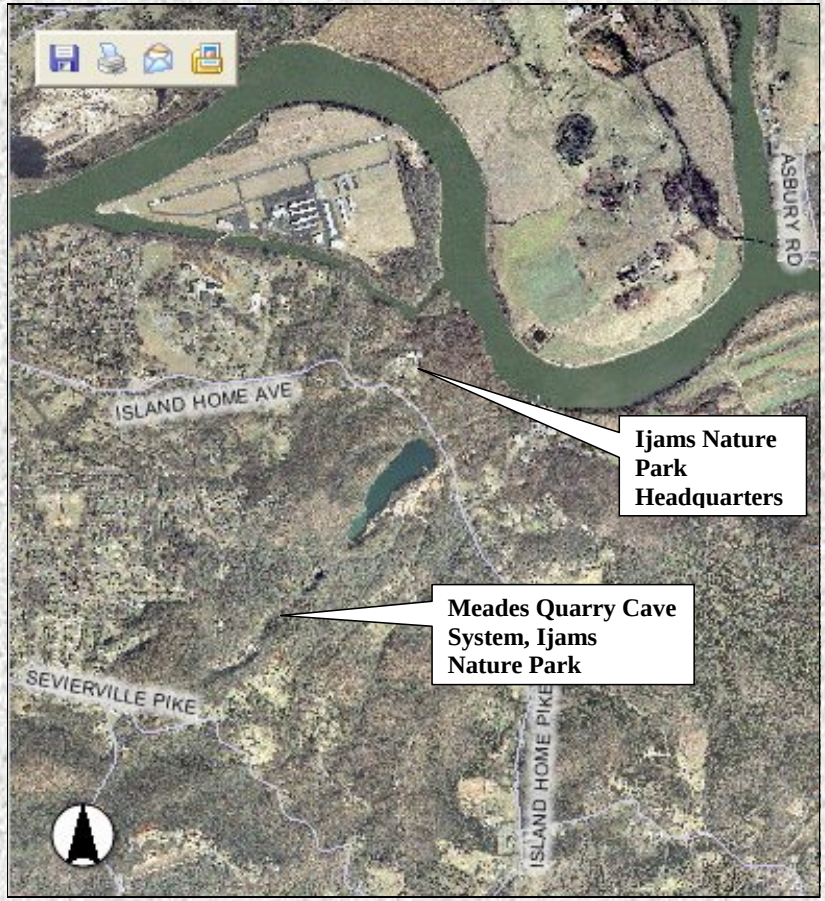
KERR '92

KN24

LENGTH/ 300 m

DEPTH/ 19 m

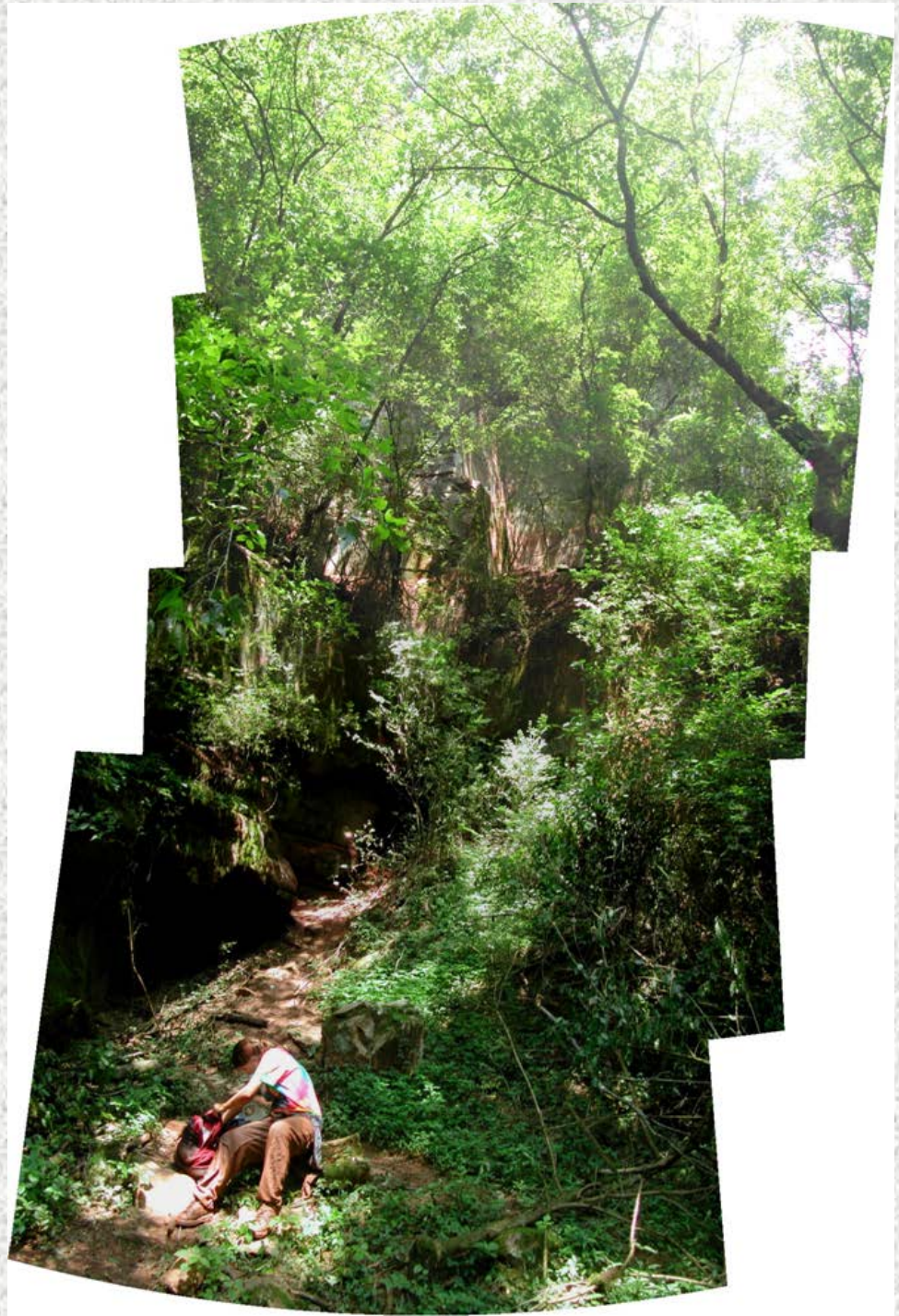
Meades Quarry System

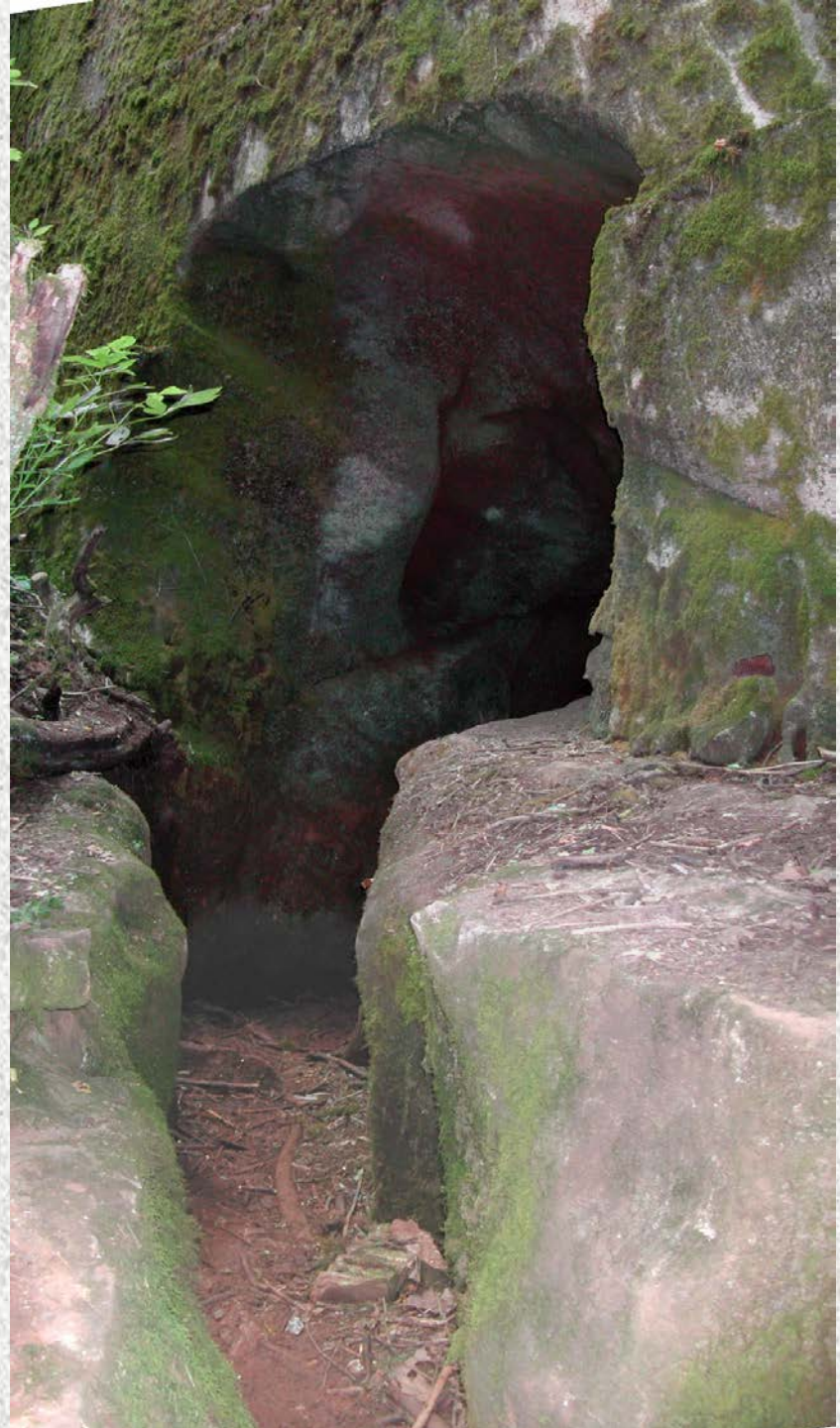


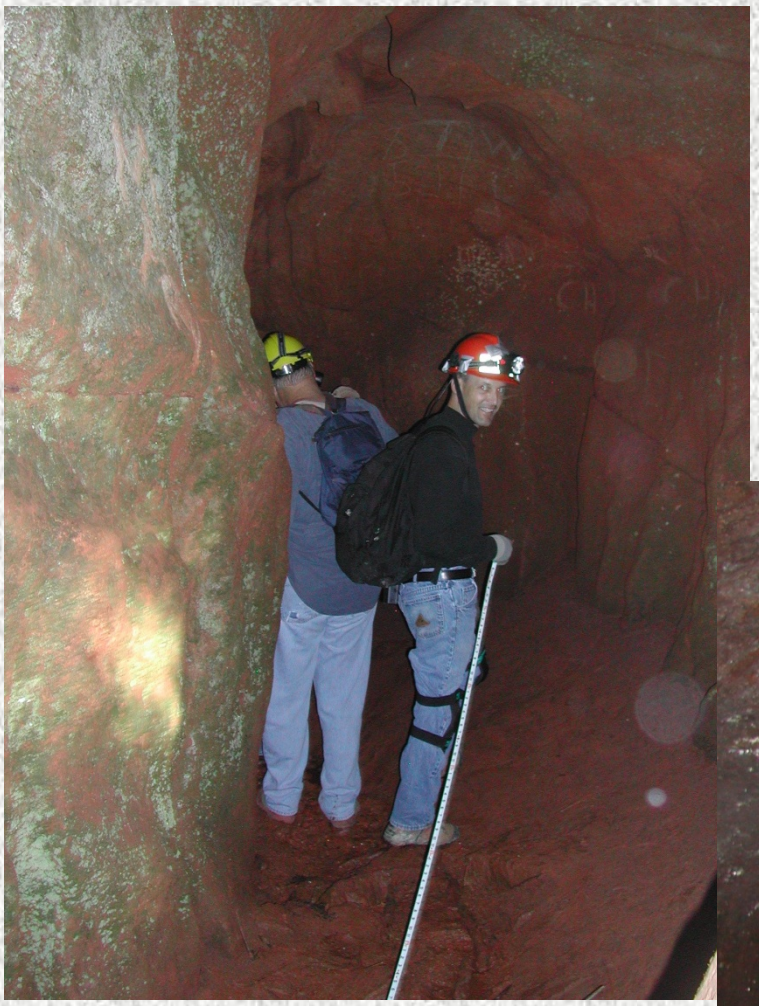
Meades Quarry Cave System

- Old “Tennessee Marble” Quarry
- Five Known openings
- Known endangered species:
  - Berry Cave Salamander

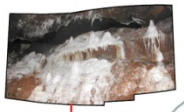
Openings

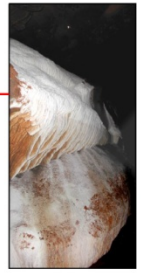


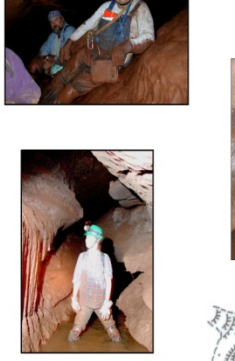




Cave Map Location







MEADES QUARRY CAVE

(WESTERN- MOST ENTRANCE)
IJAM'S NATURE CENTER PARK

SR 71 (EXT.) STUDY AREA
KNOX COUNTY

SCALE: 0 10 20

TAPE & HIPSOMETER/COMPASS SURVEY
AUGUST 2008
BY:

TENN. DEPT. TRANSPORTATION
GEOTECHNICAL ENGINNEERING STAFF
FRED BARRELL
GEORGE DANKER
JOHN KIZER
LORI MCDOWELL
HARRY MOORE
JAY MORGAN (REG.1 DESIGN OFFICE)
SAM WILLIAMS
DRAFTED BY HARRY MOORE

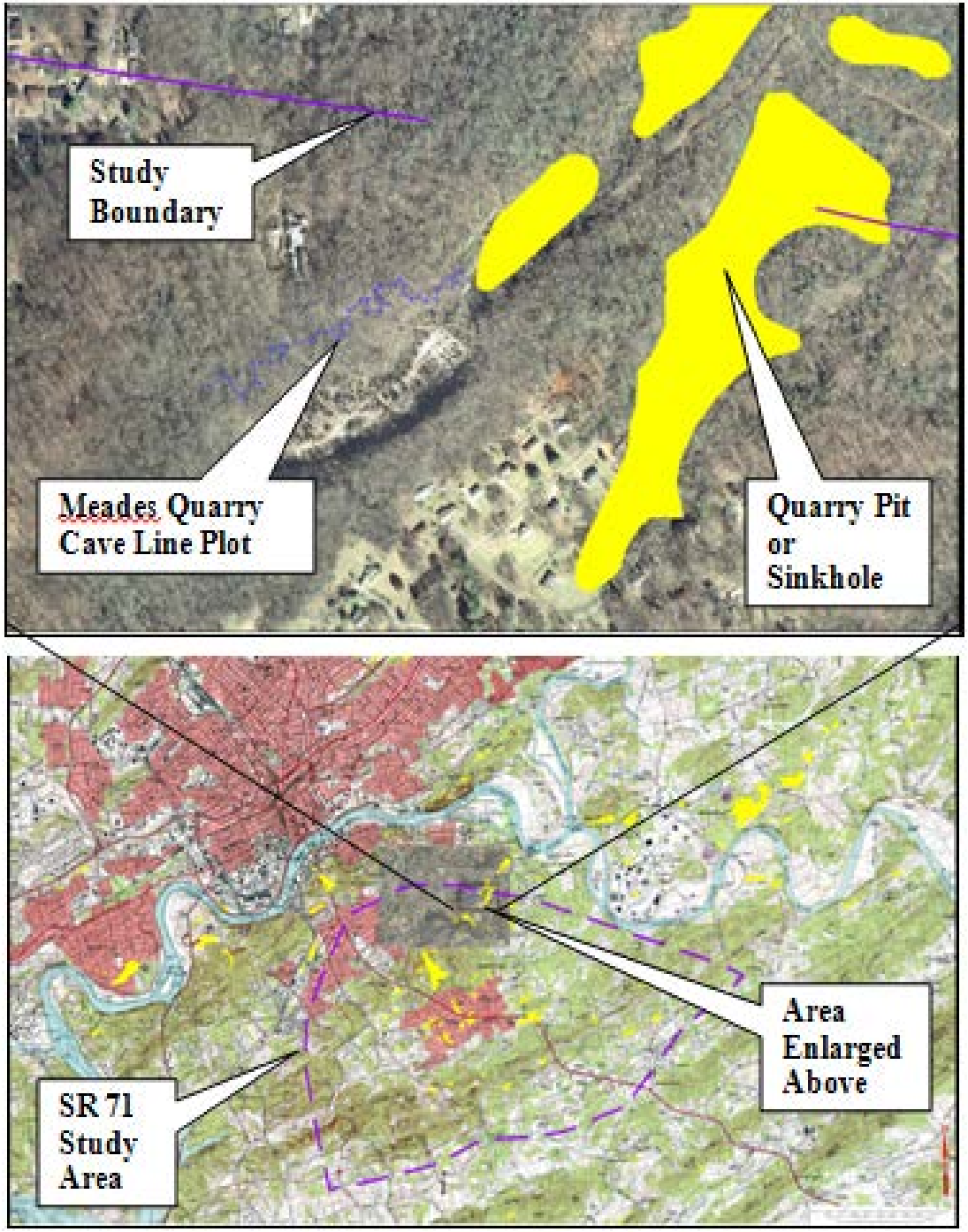
TOTAL LENGTH SURVEY 1,318 FEET

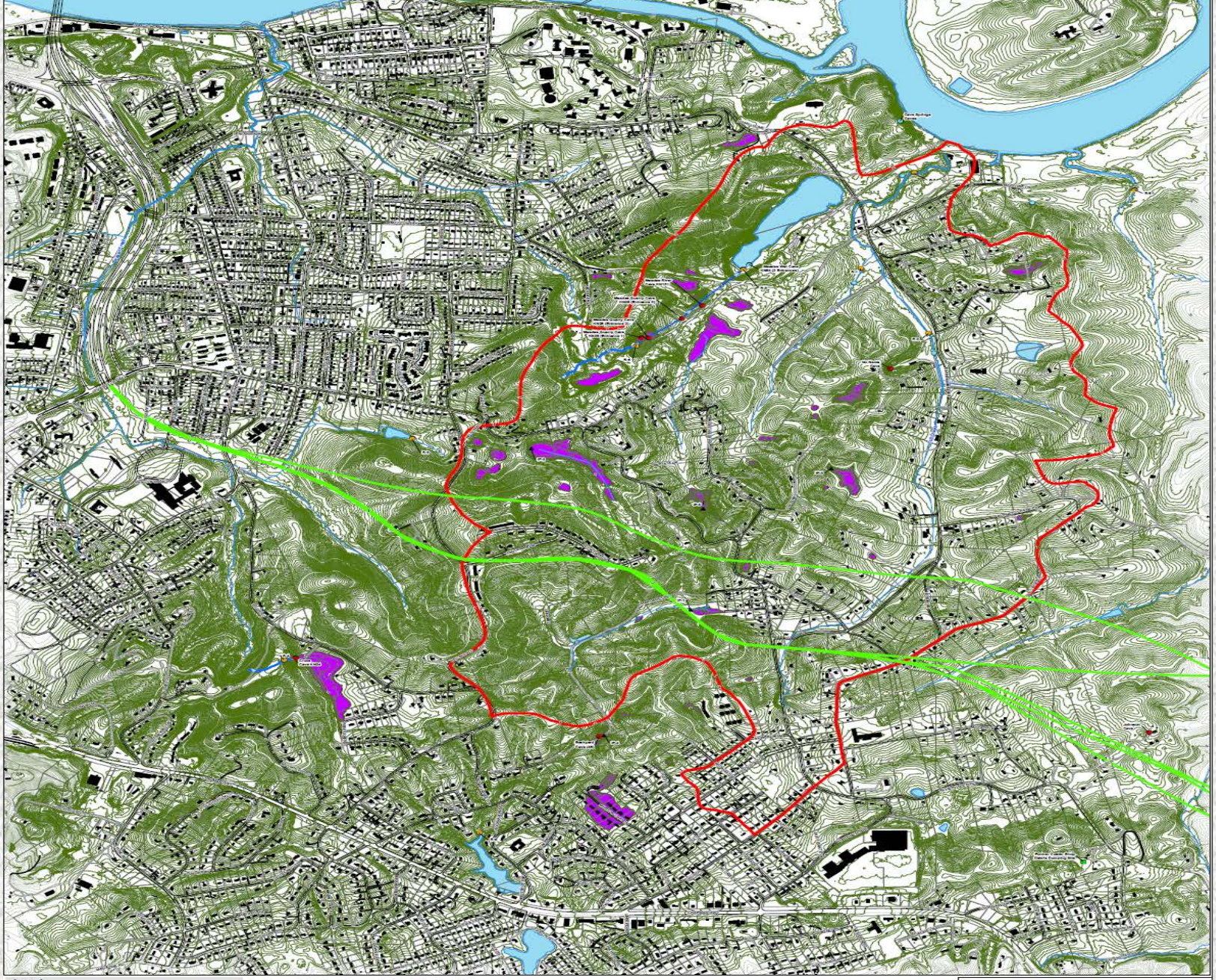
LEGEND

= SURVEYED CAVE PASSAGE
= CAVE PASSAGE LENGTH SURVEYED WIDTH/HEIGHT UN-SURVEYED
= STREAM & FLOW DIRECTION
= SPELEOTHEMS (CAVE FORMATIONS)
= PROMINENT STALGMITE
= STEEP SLOPE (LINES POINT DOWNSLOPE)
= SURVEY POINT
= BREAKDOWN/BLOCKS OF ROCK

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 71 (EXT.)
SOUTH KNOX BLVD.
STUDY AREA
KNOX COUNTY


Study Boundary
Meades Quarry Cave Line Plot
Quarry Pit or Sinkhole
Area Enlarged Above
SR 71 Study Area


Legend
Cave Entrance
Cave Entrance/Spring
Proposed Injection Point
Proposed Receptor/Monitoring Location
Former Dumping Site
Toll Subwatershed
Parcels
Sinkhole/Closed Depression (Primary Features within/near the Toll Subwatershed only)
Water Bodies
Topographic Contour Contour Interval (4 ft)
Surveyed Cave with cave stream - arrows indicate direction of flow
Inferred Cave
Initial Proposed Alternative Routes (Parsons, 2008)
Map layers provided by Knoxville Geographic Information Systems (KGIS):
Topographic Contours (2003) Shapefile and Annotation Data.
Street Centerlines/Edge of Pavement (2008) Shapefile Data.
Water Bodies (2003) Shapefile Data.
Streams (2003) Shapefile Data.
Parcels (2007) Shapefile Data.
Building polygons (2003) Shapefile Data.
NOTE:
Sinkholes/closed depressions identified based on ARCADIS review of KGIS data, and updated based on field observations of limited select features.
GRAPHIC SCALE
TENNESSEE DEPARTMENT OF TRANSPORTATION
KNOX COUNTY, TENNESSEE
DYE TRACE STUDY WORK PLAN
Project Area Location Map with Dye Injection and Monitoring Locations
ARCADIS
PLATE 2

QUESTIONS?