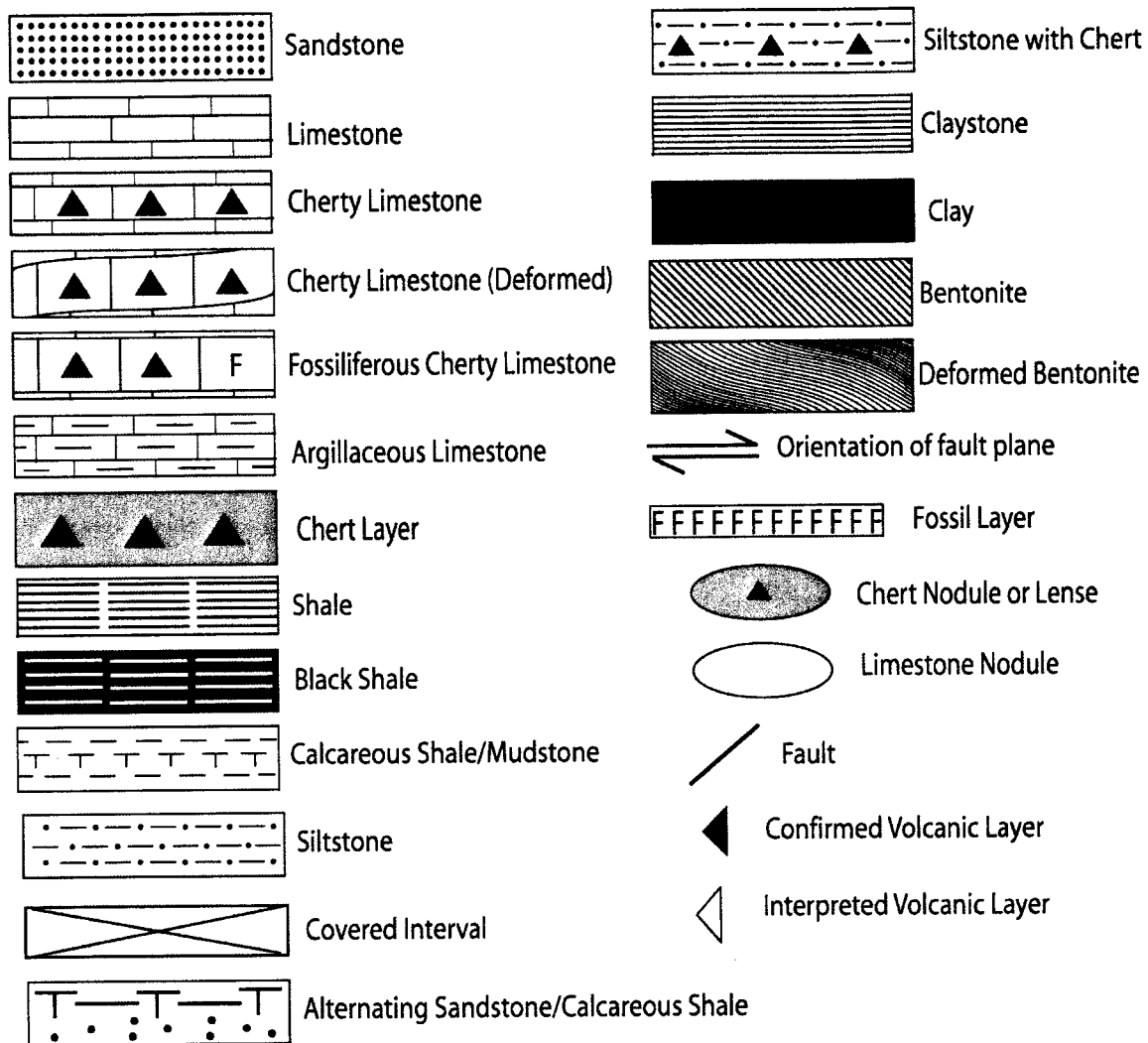


# Appendix A

## Sample Localities

## APPENDIX A.1

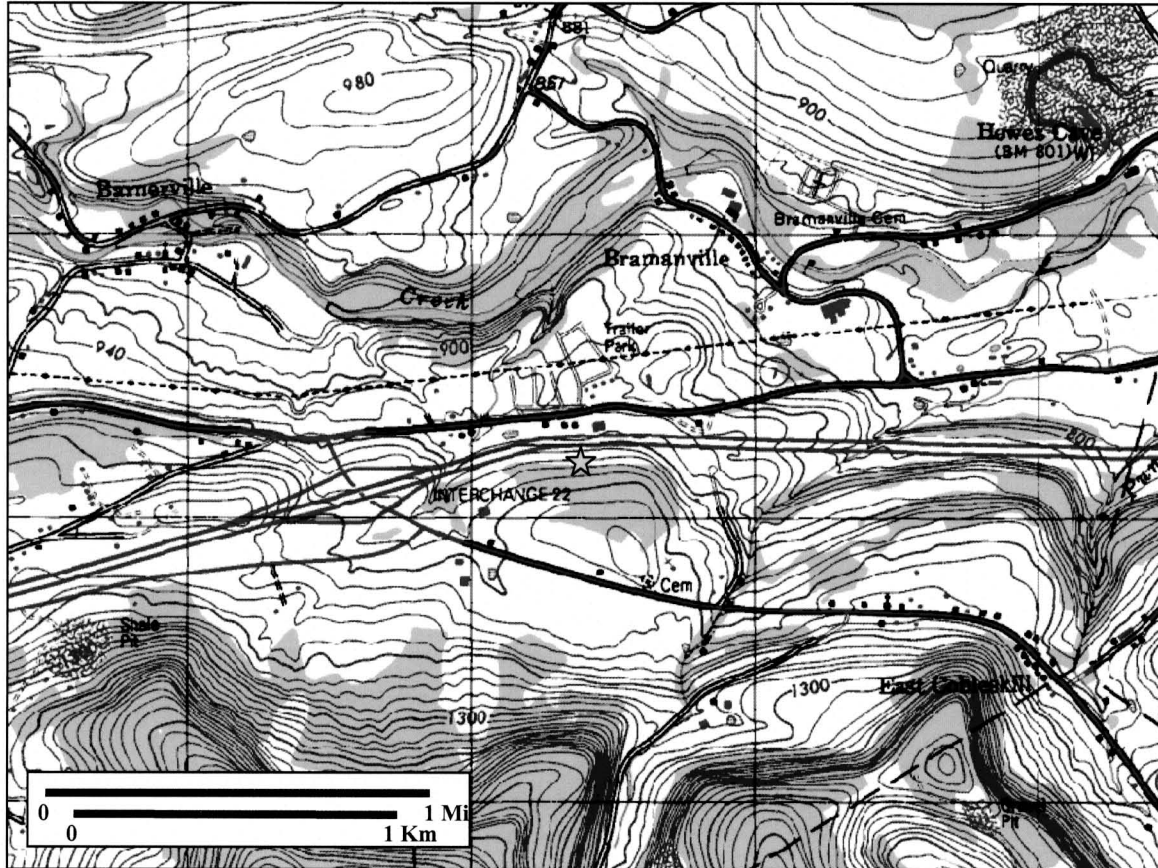
Legend key used for all stratigraphic sections in this study.



## APPENDIX A.2.1

## Locality A: Cobleskill, New York

Portion of the Cobleskill, New York USGS 1:50,000 Quadrangle. The yellow star shows the location of Locality A on the south side of the east-bound lane of New York Interstate 88, 5 km east of Cobleskill, New York and approximately 1.8 km southwest of Howes Cave, New York. Scale is provided. Map courtesy of Topozone.com ©. <http://www.topozone.com/map.asp?z=18&n=4725496.00013019&e=548432.00000005&datum=nad83>



**APPENDIX A.2.2**

Photograph showing extent of the Sprout Brook K-bentonite cluster at the Cobleskill site (Locality A). K-bentonite layers of interest are marked by various tools, also used for scale. Yellow field book marks the stratigraphic contact between the lower part of the Spawn Hollow Member of the Esopus Formation and the underlying Oriskany Sandstone.

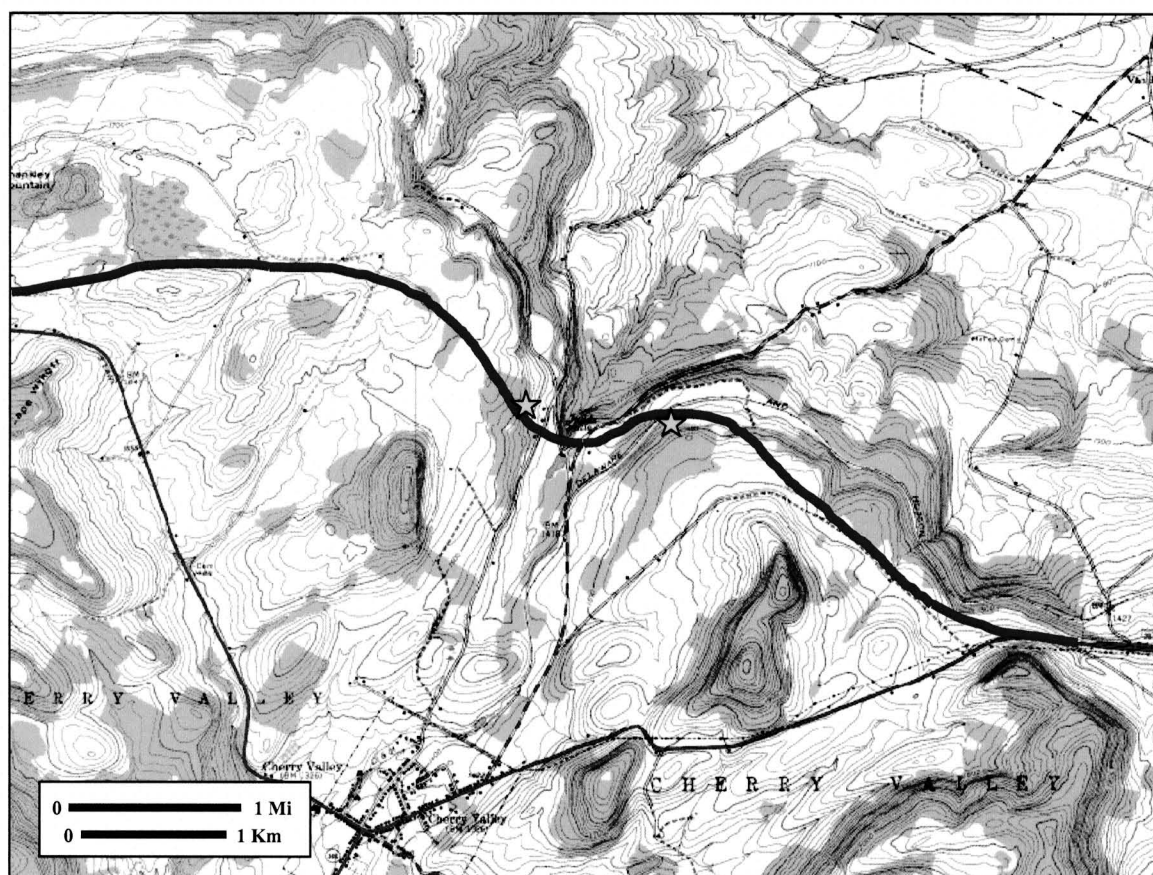


## APPENDIX A.3.1

## Locality B: Cherry Valley, New York

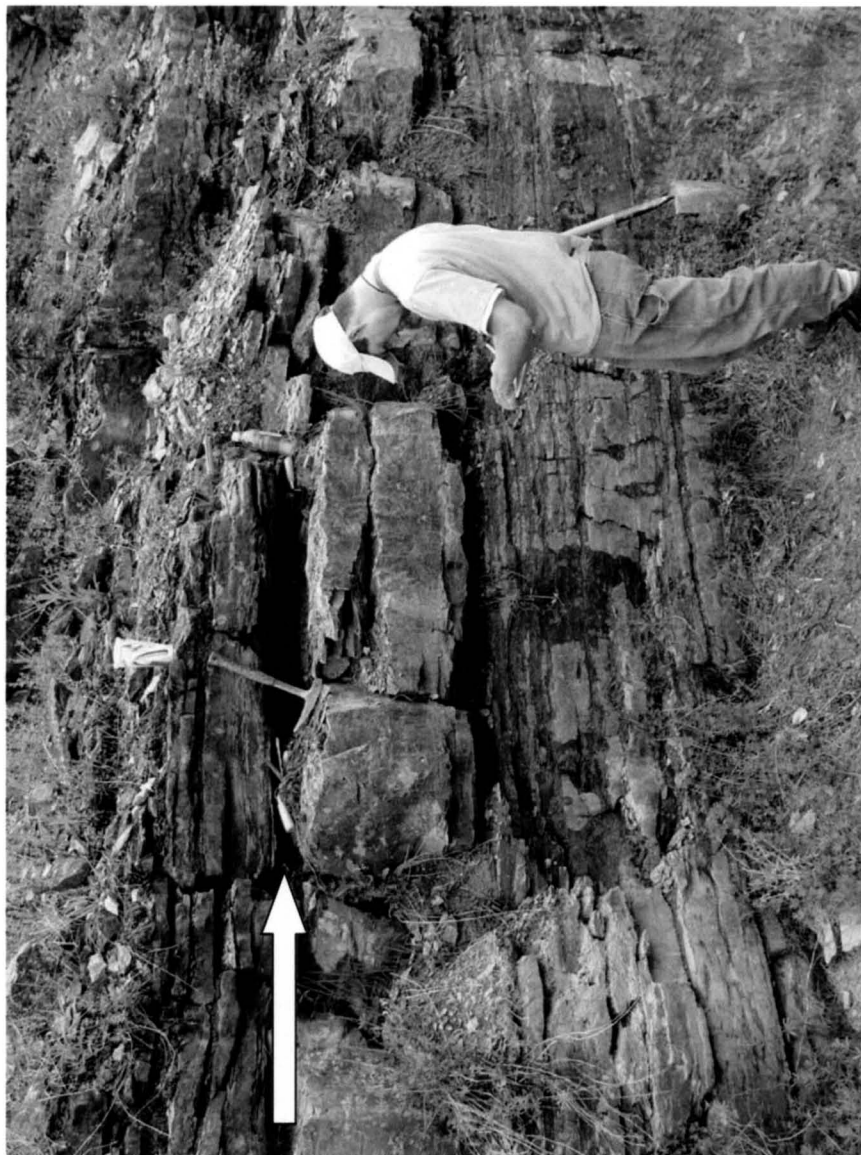
Portion of the Sprout Brook, New York USGS 1:100,000 Quadrangle. The yellow stars (from right to left) indicate the locations of the two sites Cherry Valley #1 and Cherry Valley #2, from Locality B on the north and south sides of U.S. Route 20 roughly 2.5 km north and 2.5 km north-north east respectively of Cherry Valley, New York. The blue line through the center of the map represents the updated position of US Route 20 currently in this area at the time of sampling. Scale is provided. Map courtesy of Topozone.com ©.

<http://www.topozone.com/map.asp?z=18&n=4740973&e=521692&s=100&size=1&datum=nad83&layer=DRG25>



**APPENDIX A.3.2**

Photograph showing the Cherry Valley #1 site. Arrow points to the Bald Hill K-bentonite C within the middle unit of the Kalkberg Formation. Various items provided for scale.





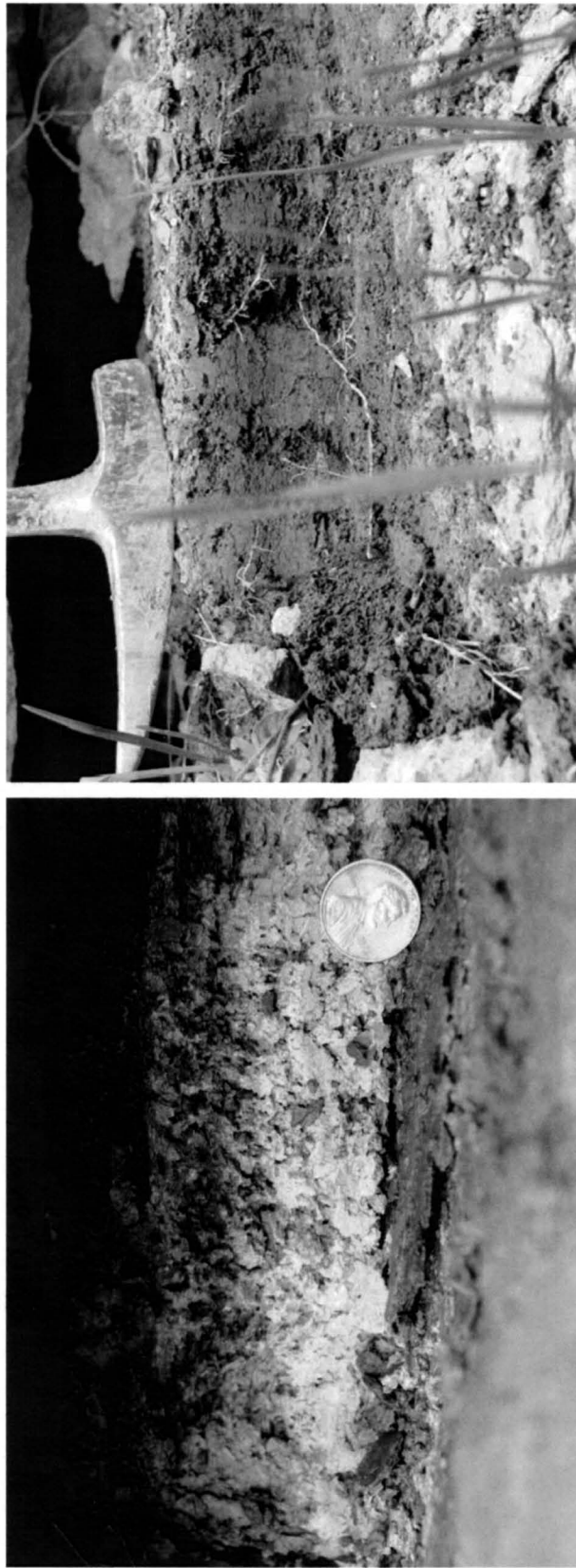
**APPENDIX A.3.3**

Photograph showing the Cherry Valley #2 site. Arrow points to the sub-Onondaga glauconitic K-bentonite bed at the formational contact between the Schoharie and Onondaga Formations. Hammer provided for scale.



#### APPENDIX A.3.4

Photographs showing (from left to right) clay rich K-bentonite layers Bald Hill K-bentonite C and a glauconitic K-bentonite layer at the formational contact between the Schoharie and Onondaga Formations at Cherry Valley # 1 and Cherry Valley #2, respectively. Rock hammer and coin are provided for scale.



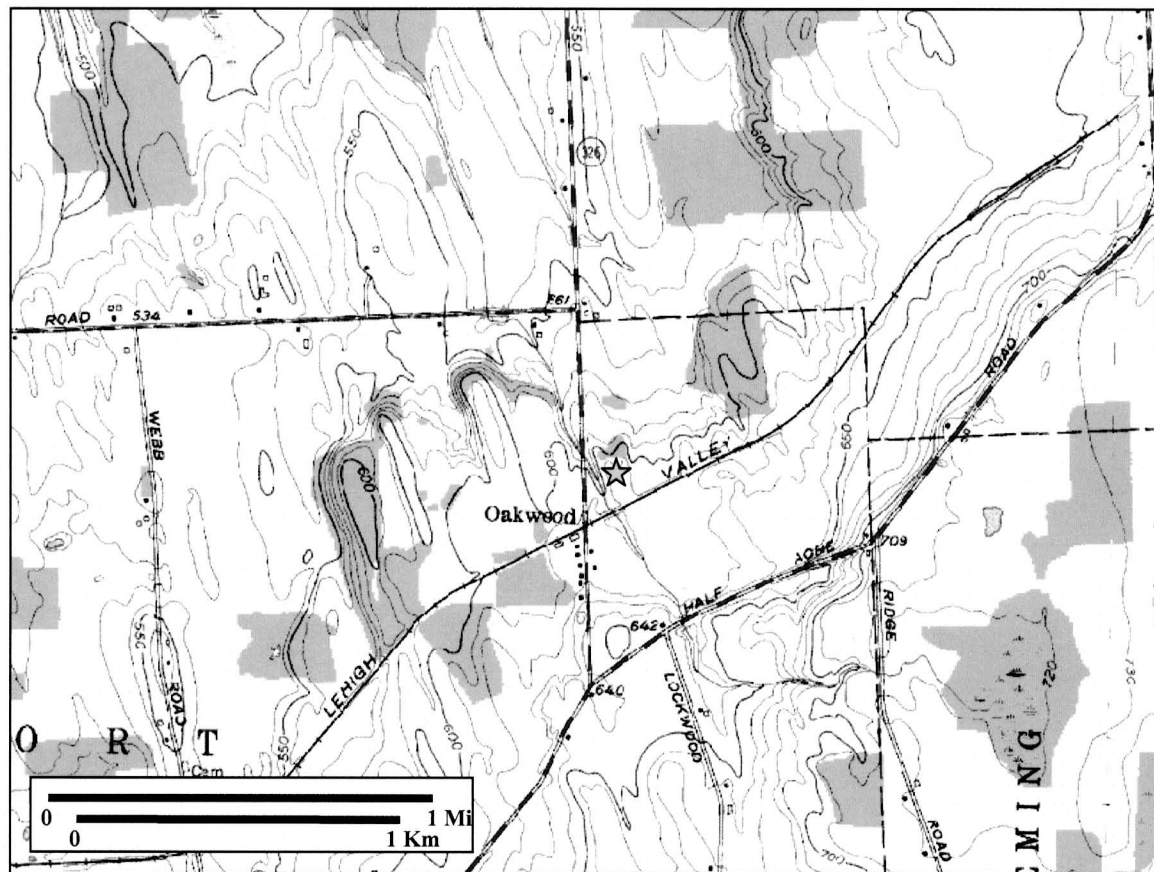


## APPENDIX A.4.1

## Locality C: Auburn, New York

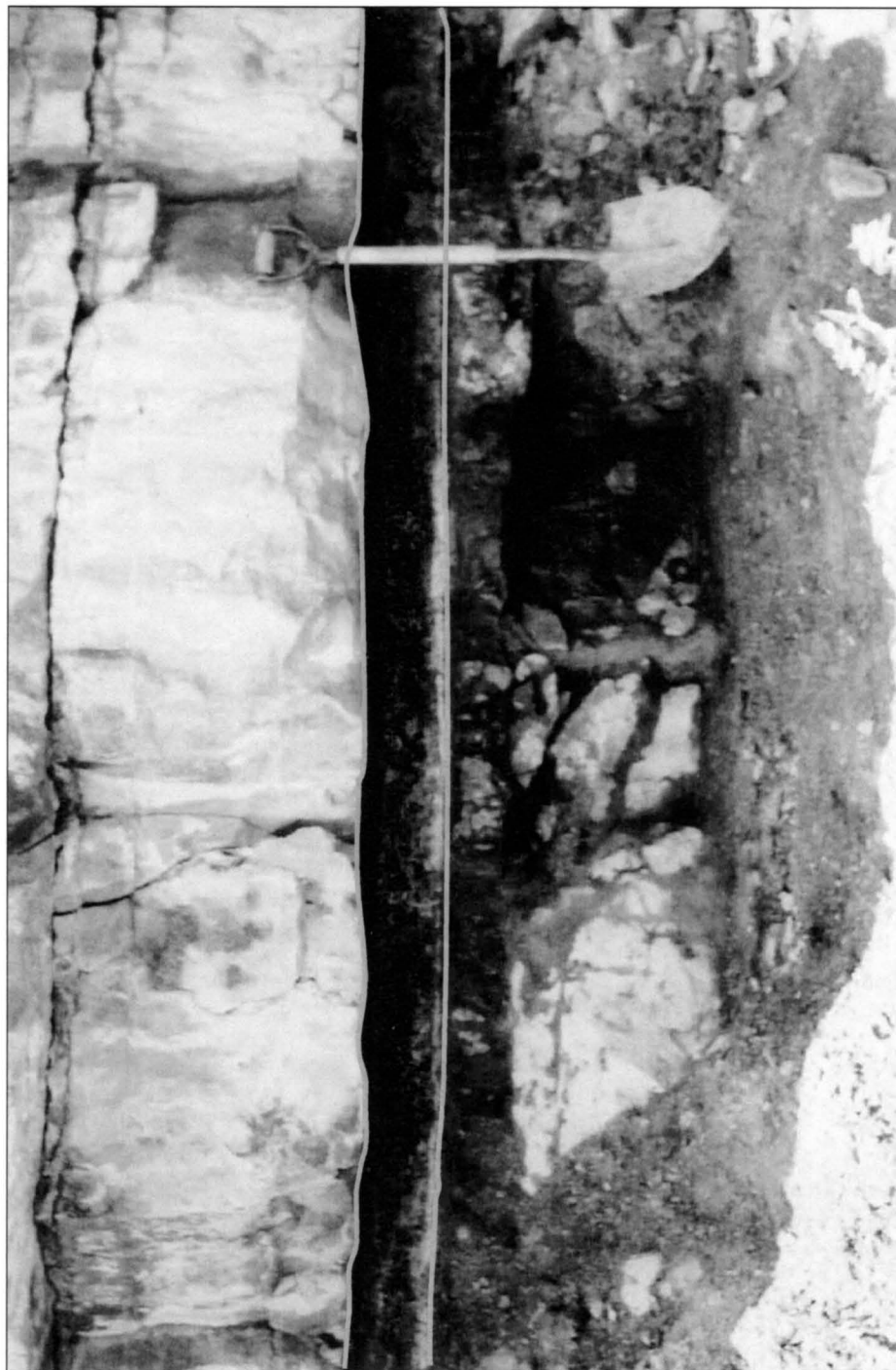
Portion of the Cayuga USGS topographic quadrangle (1:50,000) showing the location of the Hanson Aggregates East Oakwood Limestone Quarry southwest of Auburn, New York. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com ©

<http://www.topozone.com/map.asp?z=18&n=4750244&e=365501&s=50&size=1&datum=nad83&layer=DRG25>



**APPENDIX A.4.2:**

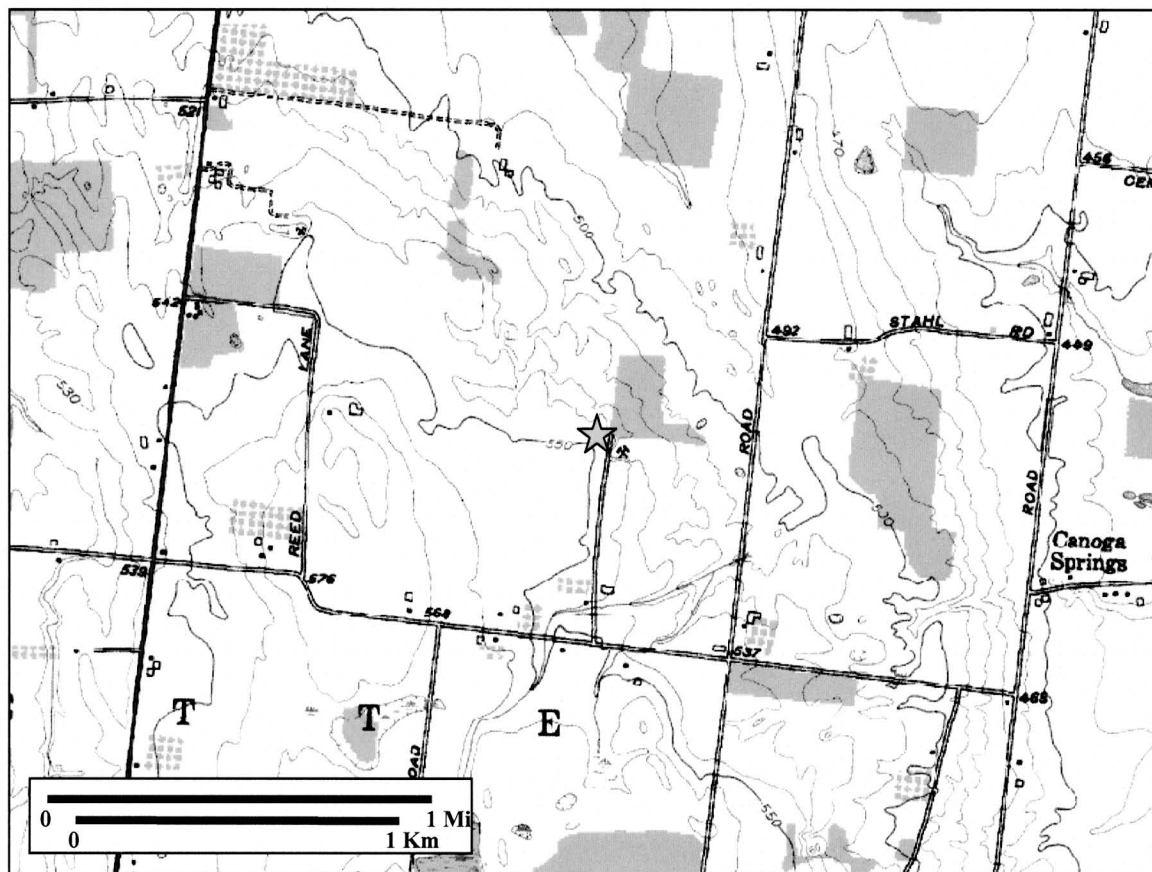
Photograph of showing the 16.0 cm Tioga B K-bentonite at Locality C. Yellow lines mark the extent of the Tioga B K-bentonite at the formational contact between the Moorehouse (below) and Seneca (above) Members of the Onondaga Formation at the Auburn site, southwest of Auburn, New York. A 4 foot shovel provided for scale.



## APPENDIX A.5.1

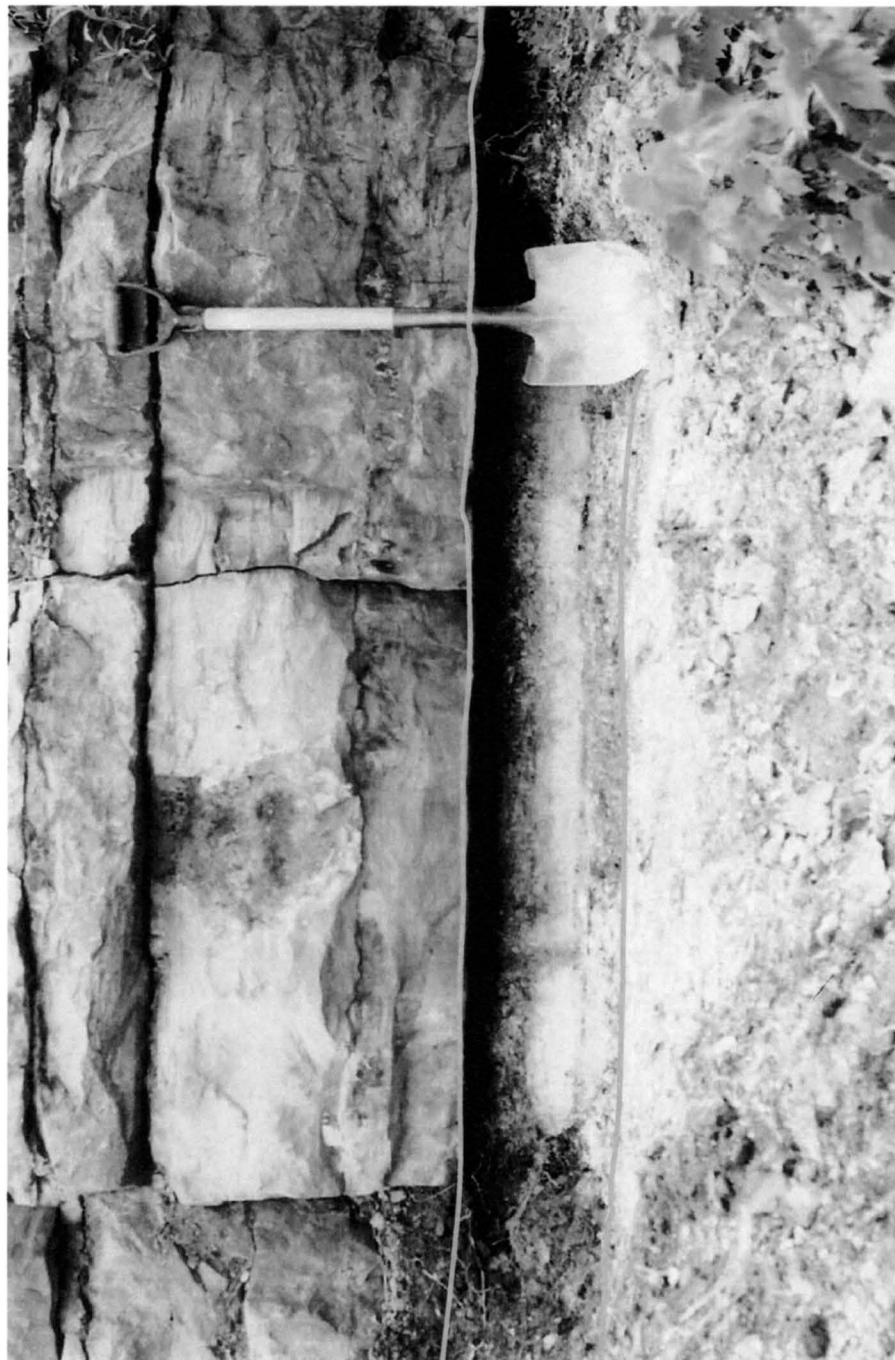
## Locality D: Seneca Stone Quarry

Portion of the Romulus USGS topographic quadrangle (1:50,000) showing the location of the Seneca Crushed Stone Quarry near Seneca Falls, New York. Yellow Star shows the location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com ©  
<http://www.topozone.com/map.asp?z=18&n=4746330&e=354078&s=50&size=1&datum=nad83&layer=DRG25>



**APPENDIX A.5.2:**

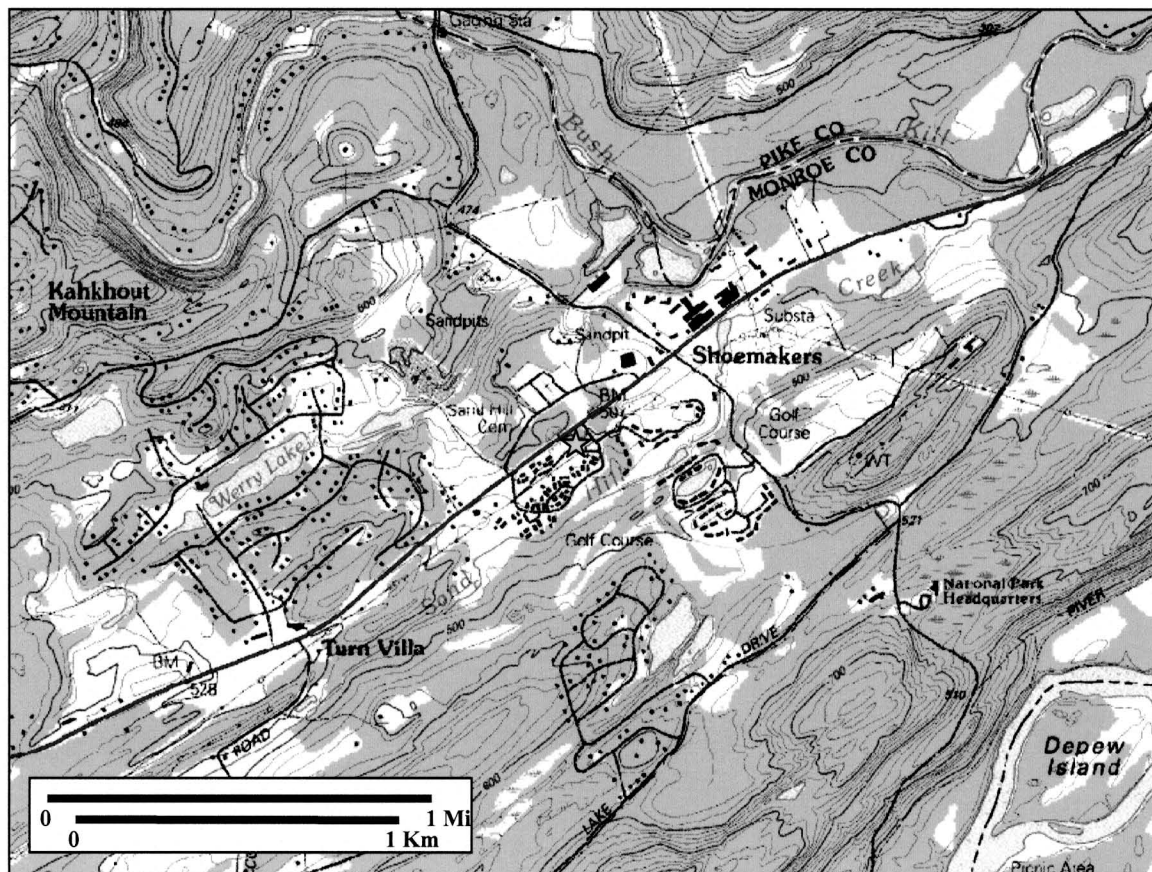
Photograph of the east wall of the Seneca General Crushed Stone Quarry showing the 15.0 cm Tioga B K-bentonite at Locality D. Yellow lines mark the extent of the Tioga B K-bentonite at the formation contact between the Moorehouse (below) and Seneca (above) Members of the Onondaga Formation at the Seneca Stone Quarry site, south-southeast of Seneca Falls, New York. A 4 foot shovel provided for scale.



## APPENDIX A.6.1

## Locality E: Echo Lake, Pennsylvania

Portion of the Bushkill USGS topographic quadrangle (1:50,000) showing the location of Locality E at Fairway Ridge near Echo Lake, Pennsylvania. Yellow Star shows the location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com®  
<http://www.topozone.com/map.asp?z=18&n=4547104&e=497396&s=50&size=1&datum=nad83&layer=DRG25>





**APPENDIX A.6.2:**

Photograph showing the extent of the Tioga B K-bentonite at Echo Lake site (Locality E). Yellow lines bracket the 80 cm layer (at maximum thickness). The upper hammer, penny, and arrow mark a 5 cm fossil rich layer containing multiple chonetid *Hallinetes halli* brachiopod fossils (see also Figure 5 in text). The bottom of the handle of the lower hammer marks the formational contact between the Moorehouse and Seneca Members of the Onondaga Formation.



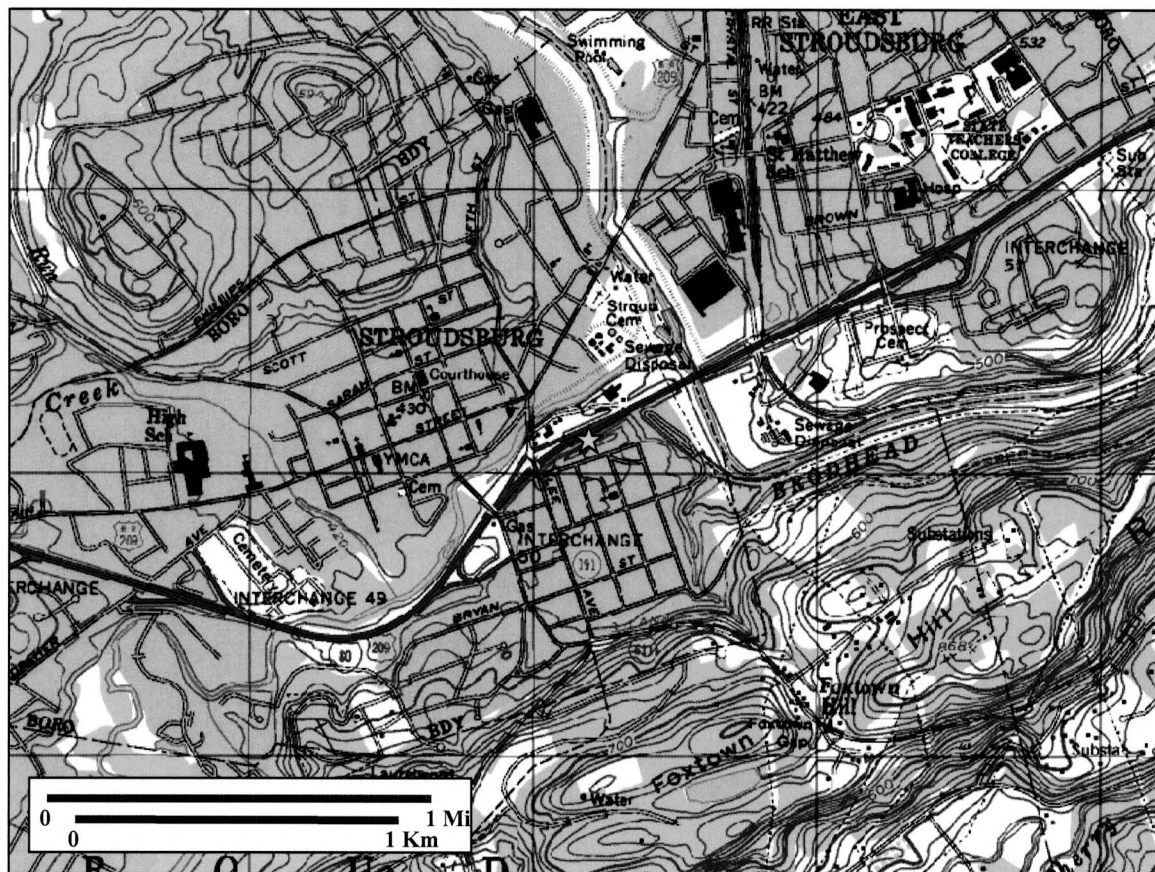


## APPENDIX A.7.1

## Locality F: Stroudsburg, Pennsylvania

Portion of the Stroudsburg USGS topographic quadrangle (1:50,000) showing the location of Locality F in Stroudsburg, Pennsylvania. Yellow Star shows the location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com®

<http://www.topozone.com/map.asp?z=18&n=4537159&e=484197&s=50&size=1&datum=nad83&layer=DRG25>



#### APPENDIX A.7.2

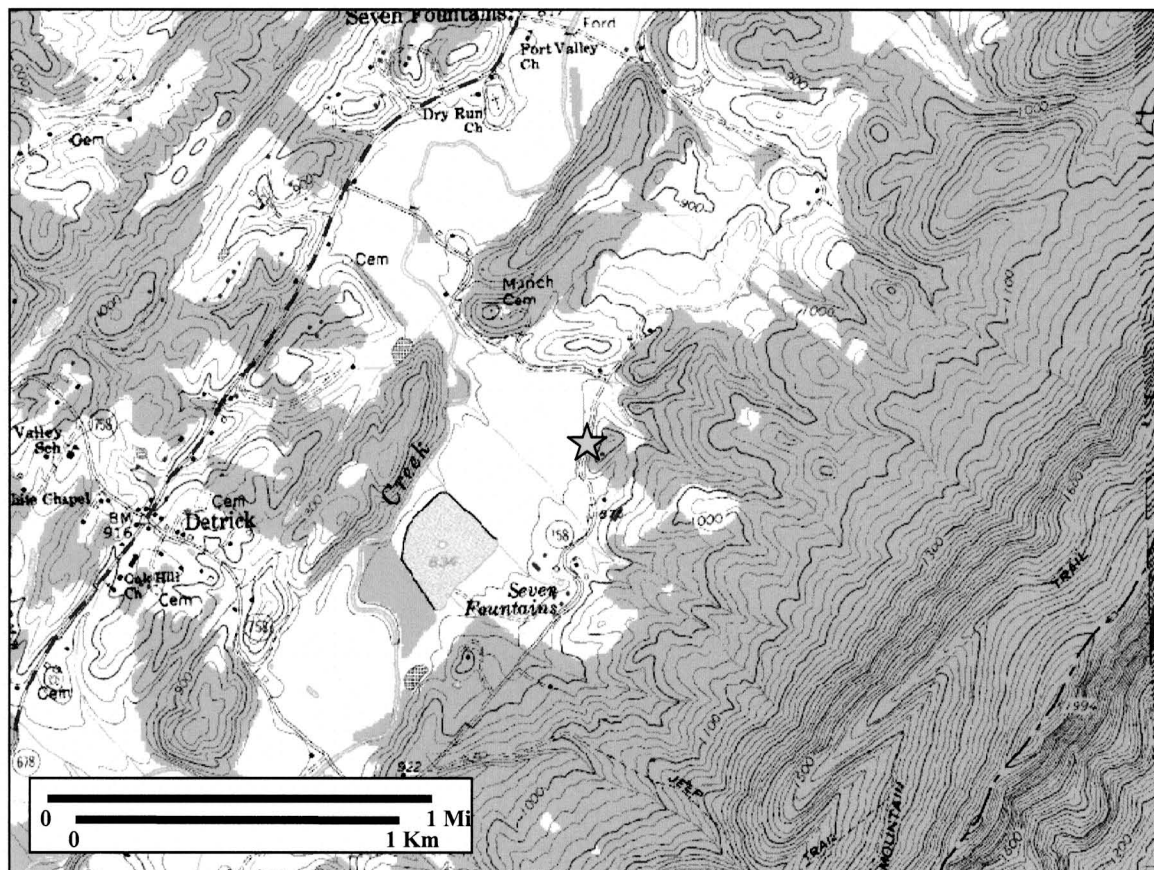
Photograph showing the 50 cm Tioga B K-bentonite at Locality F. Yellow lines mark the extent of the Tioga B K-bentonite at the formational contact between the Moorehouse (below) and Seneca (above) Members of the Onondaga Formation at the Stroudsburg site. I am included for scale.



## Appendix A.8.1

## Locality G: Seven Fountains, Virginia

Portion of the Rileyville USGS topographic quadrangle (1:50,000) showing the location of Locality G near Seven Fountains, Virginia. Yellow Star shows the location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com®  
<http://www.topozone.com/map.asp?z=17&n=4303761&e=725542&s=50&size=1&datum=nad83&layer=DRG25>



**Appendix A.8.2**

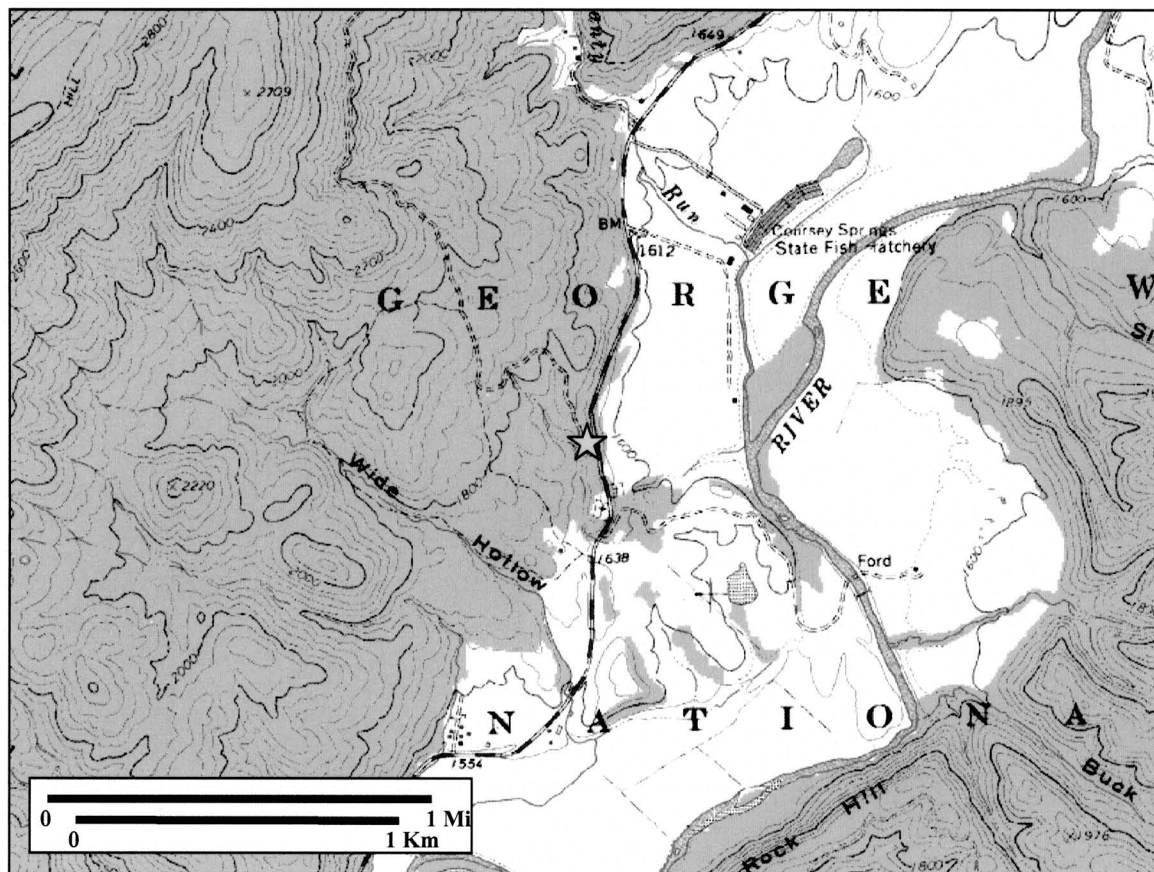
Photograph showing the K-bentonite layer 7 Fount 3 at Locality G near Seven Fountains, Virginia. This layer is within rocks equivalent to the Lower Moorehouse Member of the Onondaga Formation in New York State. Field notebook provided for scale.



## Appendix A.9

## Locality H: Williamsville, Virginia

Portion of the Williamsville USGS topographic quadrangle (1:50,000) showing the location of Locality H near Williamsville, Virginia. Yellow Star shows the approximate location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com®  
<http://www.topozone.com/map.asp?z=17&n=4225793&e=623691&s=50&size=1&datum=nad83&layer=DRG25>





## Appendix A.10

## Locality I: Wytheville, Virginia

Portions of the Wytheville and Bland USGS topographic quadrangles (1:50,000) showing the location of Locality I north of Wytheville, Virginia. Yellow Star shows the approximate location of the sampling site. North is up and scale is shown at the bottom left-hand side of the figure. Figure Courtesy of TopoZone.com® <http://www.topozone.com/map.asp?z=17&n=4094164&e=493051&s=50&size=1&datum=nad83&layer=DRG25>

