

United States Department of Agriculture
Soil Conservation Service

160 East 7th Street
Chester, PA 19013

Subject: Soil/Bedrock Investigations
in Clinton County, PA.

Date: 7 December 1992

To: Garland Lipscomb
State Soil Scientist
USDA-Soil Conservation Service
Harrisburg, Pennsylvania

Purpose:

To provide ground-penetrating radar (GPR) transect data on the depth to bedrock in various map units in Clinton County.

Principal Participants:

Jim Doolittle, Soil Specialist, SSQAS, SCS, Chester, PA
Jake Eckenrode, Soil Scientist, SCS, State College, PA

Activities:

Ground-penetrating radar transects were conducted in delineated areas of several map units in Clinton County on 24 November 1992.

Equipment:

The ground-penetrating radar unit used in this study is the Subsurface Interface Radar (SIR) System-8 manufactured by Geophysical Survey Systems, Inc. Components of the SIR System-8 used in this study were the model 4800 control unit, ADTEK SR 8004H graphic recorder, power distribution unit, transmission cable (30 m), and the model 3110 (120 MHz) antenna. The system was powered by a 12-volt battery. A scanning time of 175 nanoseconds was used. This scanning time provided a profiling depth of about 12 feet.

All GPR transects were conducted in open fields. The antenna was towed behind a 4WD vehicle at a speed of about 3 km/hr. At about 130 foot intervals (measured on vehicles odometer), referenced observation points were annotated on the radar profiles. Several of the longer transects were subdivided into shorter transects. Though the GPR provides a continuous record of subsurface conditions, estimates of the depth to bedrock were restricted to these observation points.

Results:

About 2.7 miles or continuous radar profiles were collected within delineated areas Buchanan (map unit BuB), Clymer (map unit ClD), Hazelton (HtD) and Unger (UnD) soils. Buchanan is a member of the fine-loamy, mixed, mesic Aquic Fragiudults family. Clymer is a member of the fine-loamy, mixed, mesic Typic Hapludults family. Hazelton is a member of the loamy-skeletal, mixed, mesic Typic Dystrochrepts family. Unger is a member of the fine-loamy, mixed,

1. Use of trade names in this report is for identification purposes only and does not constitute endorsement by the author or SCS.

mesic Typic Hapludults family. The following tables summarize soil depth (depth to bedrock) observations for each transect. All depths are expressed in inches.

Map unit: BuB

<u>Observation</u>	<u>Depth</u>
0	64 inches
130	79 inches
260	42 inches
390	>140 inches
520	>140 inches
650	>140 inches
780	>140 inches
910	93 inches

Map unit: UnD

<u>Observation</u>	<u>Depth</u>
0	67 inches
130	42 inches
260	45 inches
390	46 inches
520	44 inches
650	37 inches
780	30 inches
910	42 inches
1040	54 inches

Map unit: ClD

<u>Observation</u>	<u>Depth</u>
0	32 inches
130	30 inches
260	>140 inches
390	115 inches
520	69 inches
650	48 inches
780	93 inches

Map unit: BuB

<u>Observation</u>	<u>Depth</u>
0	40 inches
130	50 inches
260	60 inches
390	78 inches
520	68 inches
650	80 inches
780	50 inches
910	60 inches
1040	58 inches

Map unit: BuB

<u>Observation</u>	<u>Depth</u>
0	>140 inches
130	>140 inches
260	83 inches
390	70 inches
520	62 inches
650	85 inches
780	>140 inches
910	65 inches
1040	67 inches

Map unit: BuB

<u>Observation</u>	<u>Depth</u>
0	82 inches
130	70 inches
260	82 inches
390	78 inches
520	80 inches
650	85 inches
780	66 inches
910	81 inches
1040	89 inches
1170	93 inches
1300	73 inches
1430	78 inches

Map unit: UnD

<u>Observation</u>	<u>Depth</u>
0	75 inches
130	47 inches
260	81 inches
390	>140 inches
520	84 inches
650	72 inches
780	108 inches
910	85 inches
1040	82 inches

Map unit: HtD

<u>Observation</u>	<u>Depth</u>
0	60 inches
130	22 inches
260	42 inches
390	45 inches
520	48 inches
650	40 inches
780	39 inches
910	25 inches
1040	24 inches
1170	19 inches
1300	76 inches
1430	100 inches

Map unit: HtD

<u>Observation</u>	<u>Depth</u>
0	>140 inches
130	45 inches
260	40 inches
390	>140 inches
520	>140 inches
650	90 inches
780	72 inches
910	67 inches
1040	55 inches
1170	52 inches
1300	71 inches
1430	61 inches

Map unit: HtD

<u>Observation</u>	<u>Depth</u>
0	55 inches
130	100 inches
260	61 inches
390	85 inches
520	66 inches
650	90 inches
780	43 inches
910	58 inches
1040	65 inches
1170	72 inches
1300	>140 inches
1430	103 inches

Map unit: HtD

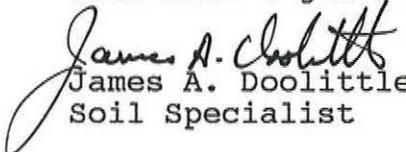
<u>Observation</u>	<u>Depth</u>
0	111 inches
130	85 inches
260	91 inches
390	45 inches
520	75 inches
650	88 inches
780	72 inches
910	>140 inches
1040	>140 inches
1170	32 inches
1300	50 inches
1430	75 inches

Map unit: HtD

<u>Observation</u>	<u>Depth</u>
0	92 inches
130	103 inches
260	52 inches
390	75 inches
520	95 inches
650	78 inches
780	>140 inches
910	83 inches
1040	84 inches
1170	97 inches
1300	>140 inches
1430	89 inches

In most areas underlain by sandstone and some areas underlain by shale and limestone bedrock, GPR provides a more efficient method for determining the depth to bedrock. It was my pleasure to work with Jake Eckenrode. I urge and would welcome further bedrock studies to assist with the update of Clinton County.

With kind regards.


James A. Doolittle
Soil Specialist

cc:

J. Culver, National Leader, SSQAS, NSSC, SCS, Lincoln, NE
J. Eckenrode, Soil Scientist, SCS, 2380 Commercial Boulevard, State College, PA 16801-7495
B. Hudson, Supervisory Soil Scientist (East), SSQAS, NSSC, Lincoln, N