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PRELIMINARY BEDROCK GEOLOGIC MAP OF THE MIDDLE PORTION OF THE SUSQUEHANNA RIVER VALLEY, CUMBERLAND, DAUPHIN, AND PERRY COUNTIES, PENNSYLVANIA

By Margaret S. Jackson, Peter M. Hanley, and Peter B. Sak
Dickinson College

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Margaret S. Jackson, Peter M. Hanley, and Peter B. Sak
Dickinson College, Department of Geology, Carlisle, PA 17013-2896

DESCRIPTION OF GEOLOGIC UNITS

Tuscarora Formation

Fine to coarse-grained gray-green sandstone, siltstone and shale. Cross-bedded and conglomeratic in parts. The Tuscarora (St) is approximately 935 feet thick.

Environmental Characteristics:

Median yield of 23 gal/min; water quality is good; soft water.

Good source of road material, aggregate, silica or building stone (Geyer and Wilshusen, 1982).

Clinton Group

The term Clinton Group (Sc) is being applied to all lithologies between the Tuscarora Formation and the Bloomsburg Formation including Keefer and Rose Hill Formations. Brownish-gray to olive-gray shaly claystone, and a thinly-bedded, fine-grained sandstone. Dark red, fine-grained “iron” sandstone is also present (Dyson, 1967). The Clinton Group is approximately 1640 feet thick.

Environmental Characteristics:

Median yield is 12 gal/min; ridge forming sandstone has very poor topographic position for groundwater development in most areas (Geyer and Wilshusen, 1982).

Good source for road material and fill (Geyer and Wilshusen, 1982).

Bloomsburg Formation

The Bloomsburg Formation (Sb) consists of grayish-red claystone, argillaceous siltstone and very fine to fine-grained sandstone. The sandstone is planar-bedded. The Bloomsburg is approximately 1440 feet thick.

Environmental Characteristics:

Median yield is 45 gal/min; hydrogen sulfide has been noted in some wells. Poor cut-slope stability due to rapid disintegration when exposed to moisture (Geyer and Wilshusen 1982).

Good source material for road material and fill (Geyer and Wilshusen 1982).

Hamilton Group

The Hamilton Group (Dh) has been applied to all strata between the top of the Clinton Group and the base of the Trimmers Rock Formation. The interval includes several units often grouped into the Marcellus and the Mahantango Formations. Due to the relatively thin occurrence in the study area and poor exposure, the Hamilton Group is not be subdivided for the purposes of this study. The Hamilton Group, (Dh) in this study area consists of a well-sorted, gray to olive-gray quartz sandstone and conglomeratic quartz sandstone. Cross-bedding was observed in many of the beds. The Hamilton Group is approximately 1610 feet thick.

Environmental Characteristics:

Well yields range from 1 to 300 gal/min; median is 30 gal/min. Water may have high iron and sulfur content; hydrogen sulfide gas is common (Geyer and Wilshusen 1982). Good to fair cut-slope stability.

Good source of road material and building stone (Geyer and Wilshusen 1982).

Susquehanna Group

The Susquehanna Group (Miller and Conlin, 1961) is a thick deposit of sandstone, siltstone and shale deposited above the Hamilton group including in stratigraphic succession the Catskill, Trimmers Rock, and Harrell Formation. The term Susquehanna Group is often used for designating beds or outcrops that have not been correlated at the formation level (Faill, 1974). The Susquehanna Group is approximately 8,000 feet thick.

Trimmers Rock Formation

The Trimmers Rock Formation (Dtr) in predominantly olive to gray fossiliferous colored siltstone and silty shale with alternating thin beds of fine sandstone. The silty and clay rich layers weather quickly and many of the outcrops in the field area were widely spaced sandstone layers with soil or mud in between. The Trimmers Rock Formation is approximately 1070 feet thick.

Environmental Characteristics:

Median well yield is 30 gal/min; water may be high in total dissolved solids; very soft water.

Good cut-slope and foundation stability (Geyer and Wilshusen, 1982).

Catskill Formation

The Catskill Formation (Dck) is present from the Catskill Mountains in New York across Pennsylvania to the Susquehanna and Juniata Rivers (Faill, 1974). The Catskill Formation is the thickest in the study area by far; it is approximately 7,000 feet thick in the Susquehanna River Valley.

Environmental Characteristics:

Sandstones are the best water-bearing units; maximum potential yield is 35 gal/min; water quality is good (Geyer and Wilshusen, 1982).

Good source of fill or aggregate (Geyer and Wilshusen, 1982).

Irish Valley Member

Interbedded marine and non-marine assemblages of shales, siltstones and sandstones. The marine rocks are gray or greenish-gray siltstones and fine sandstones. The non-marine rocks are red to reddish brown in color. The transition from marine to non-marine sediment is much more closely spaced than in the Sherman Creek member. Bedding is thin to medium and mostly planar. The individual beds display a fining up sequence. Often the red coloration is present in the finer sediments towards the top of a fining up sequence, although the color often has an irregular distribution (Faill, 1974). The Irish Valley Member is approximately 2,360 feet thick.

Sherman Creek Member

Olive-gray to light-gray and reddish gray to grayish red fine grained micaceous sandstones. The unit is made up of interbedded sequences of marine and non-marine sandstone much like the Irish Valley Member that it overlies, however unlike the Irish Valley, the Sherman Creek Member lacks any fining-up sequencing. Most of the unit is non-marine and therefore red in color. It is thickly bedded and often cross-bedded. The Sherman Creek Member is approximately 3,800 feet thick.

Clarks Ferry Member

Grayish-purple to brownish-gray and light-gray medium to coarse-grained, micaceous, crossbedded sandstone, conglomeratic sandstone and conglomerate. The Clark's Ferry Member is approximately 700 feet thick.

Duncannon Member

Grayish-red sandstone and red claystone to red clay rich soil. The unit displays fining up sequences with sandstone at the base and poorly exposed red claystones and paleosols at the top. The Duncannon Member is approximately 1,250 feet thick.

Pocono Formation

White and gray sandstones overlying the Catskill Formation. The upper contact with the Mauch Chunk Formation in transitional over several feet. The Pocono Formation (Mp) is recognized from northern Pennsylvania into eastern Ohio (Faill, 1974). In central Pennsylvania, previous workers (Trexler et al. 1962; Dyson 1967) divided the Pocono into three members, however due to lack of exposure it will not be divided for the purposes of this study. The Pocono Formation (Mp) is a coarse clastic unit consisting of sandstones and conglomeratic sandstones. The sandstones are gray or brownish-gray in color, thickly bedded and cross-bedded. The sandstones are quartz-rich, very fine- to very coarse- grained, subangular, poorly-sorted and micaceous. The Pocono Formation is approximately 1920 feet thick.

Environmental Characteristics:

Median well yield is 40 gal/min; soft water; good slope stability (Geyer and Wilshusen, 1982).

Good source of building stone and road material (Geyer and Wilshusen, 1982).

Mauch Chunk Formation

Elsewhere the Mauch Chunk is divided into three informal members based on the presence of non-red sandstones and conglomerate beds in the upper and lower members (Faill, 1974). However, the occurrence of these lithologies is limited in this study area and thus the unit is not divided. The Mauch Chunk Formation is recognized from northeastern Pennsylvania to Maryland and West Virginia, and Eastern Ohio (Faill, 1974).

The Mauch Chunk (Mmc) Formation consists of inter-bedded sequence of grayish-red siltstones and shale with some non-red sandstone and conglomeratic sandstones. The conglomeratic sandstone consists of mostly angular quartz grains cemented in a fine red clay matrix. The Mauch Chunk Formation is approximately 5,000 feet thick.

Environmental Characteristics:

Median well yield is 55 gal/min; extensively developed for water supply; water quality is good (Geyer and Wilshusen, 1982).

Good source of road materials and fill (Geyer and Wilshusen, 1982).

Pottsville Formation

Light- to dark-gray and olive gray fine coarse grained sandstone, conglomeratic sandstone and cobbly conglomerate (Hoskins, 1976). The Pottsville Formation is reported as 275 feet thick (Wood et al., 1969).

Environmental Characteristics:

Median well yield is 50 gal/min; good slope stability and foundation stability (Geyer and Wilshusen, 1982).

Good source of road material (Geyer and Wilshusen, 1982).

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Table 1. Planar Structural Measurements.

Field Station	Latitude	Longitude	Type of Plane	Strike	Dip
SV-06-001	40.305080	-77.001180	Overturned Bedding	80	54
SV-06-002	40.314330	-77.004080	Overturned Bedding	83	86
SV-06-003	40.315916	-77.005222	Bedding	92	88
SV-06-004	40.319861	-77.003500	Overturned Bedding	106	87
SV-06-004	40.319861	-77.003500	Bedding	107	89
SV-06-005	40.326277	-76.993472	Bedding	90	76
SV-06-005	40.326277	-76.993472	Overturned Bedding	85	85
SV-06-005	40.326277	-76.993472	Bedding	70	80
SV-06-005	40.326277	-76.993472	Overturned Bedding	85	88
SV-06-006	40.327027	-76.980388	Overturned Bedding	70	80
SV-06-006	40.327027	-76.980388	Overturned Bedding	75	62
SV-06-007	40.326416	-76.971805	Overturned Bedding	80	77
SV-06-007	40.326416	-76.971805	Vertical Bedding	86	90
SV-06-008	40.332555	-76.942861	Overturned Bedding	60	84
SV-06-009	40.321333	-76.963083	Overturned Bedding	45	70
SV-06-013	40.332527	-76.971555	Overturned Bedding	74	80
SV-06-013	40.332527	-76.971555	Bedding	85	79
SV-06-013	40.332527	-76.971555	Bedding	78	89
SV-06-014	40.335777	-76.960777	Bedding	68	70
SV-06-015	40.336277	-76.962555	Overturned Bedding	80	79
SV-06-016			Overturned Bedding	74	88
SV-06-016			Overturned Bedding	63	67
SV-06-017	40.346250	-76.964166	Bedding	78	61
SV-06-018	40.352400	-77.007590	Overturned Bedding	73	84
SV-06-018	40.352400	-77.007590	Overturned Bedding	66	85
SV-06-020	40.354550	-77.008553	Overturned Bedding	68	88
SV-06-020	40.354550	-77.008553	Vertical Bedding	73	90
SV-06-021	40.350530	-77.010660	Overturned Bedding	84	79
SV-06-022	40.357200	-77.018260	Overturned Bedding	86	85
SV-06-022	40.357200	-77.018260	Overturned Bedding	84	87
SV-06-023	40.359060	-77.031250	Bedding	97	24
SV-06-024	40.368710	-77.026490	Bedding	66	61
SV-06-024	40.368710	-77.026490	Bedding	67	63
SV-06-024	40.368710	-77.026490	Bedding	80	60
SV-06-025	40.393100	-77.033660	Bedding	61	42
SV-06-025	40.393100	-77.033660	Bedding	62	39
SV-06-026	40.399080	-77.038060	Bedding	76	22
SV-06-026	40.399080	-77.038060	Bedding	73	23
SV-06-028	40.400630	-77.040160	Bedding	332	13
SV-06-029	40.382520	-77.037960	Bedding	73	50
SV-06-030	40.380990	-77.040650	Bedding	64	44
SV-06-030	40.380990	-77.040650	Bedding	60	46
SV-06-031	40.378290	-77.047940	Bedding	88	59
SV-06-032	40.378110	-77.041890	Bedding	75	42
SV-06-032	40.378110	-77.041890	Bedding	76	44
SV-06-033	40.376290	-77.040770	Bedding	85	44
SV-06-034	40.375340	-77.042070	Bedding	70	43
SV-06-034	40.375340	-77.042070	Bedding	69	40
SV-06-034	40.375340	-77.042070	Bedding	65	48
SV-06-035	40.375080	-77.040970	Bedding	61	51
SV-06-037	40.400360	-77.042530	Bedding	78	13
SV-06-038	40.381390	-77.079440	Bedding	75	40

Table 1. Planar Structural Measurements.

Field Station	Latitude	Longitude	Type of Plane	Strike	Dip
SV-06-039	40.414560	-77.049110	Bedding	309	8
SV-06-040	40.417930	-77.042100	Bedding	80	3
SV-06-041	40.427500	-77.029560	Bedding	11	21
SV-06-042	40.429970	-77.026240	Bedding	36	10
SV-06-043	40.431120	-77.024420	Bedding	78	41
SV-06-043	40.431120	-77.024420	Bedding	67	40
SV-06-043	40.431120	-77.024420	Bedding	68	60
SV-06-044	40.451080	-77.022730	Bedding	51	15
SV-06-045	40.428100	-77.020720	Bedding	44	15
SV-06-046	40.427490	-77.020500	Bedding	286	24
SV-06-047	40.312660	-77.076270	Overturned Bedding	84	86
SV-06-048	40.325140	-77.066900	Overturned Bedding	285	85
SV-06-049	40.325380	-77.032610	Overturned Bedding	79	61
SV-06-050	40.320230	-77.029730	Overturned Bedding	85	81
SV-06-055	40.462580	-76.957250	Bedding	70	22
SV-06-057	40.475440	-76.968580	Bedding	75	56
SV-06-058	40.476810	-76.971080	Bedding	63	46
SV-06-058	40.476810	-76.971080	Bedding	60	53
SV-06-059	40.469620	-77.010810	Bedding	226	29
SV-06-060			Bedding	68	56
SV-06-060			Bedding	66	67
SV-06-060			Bedding	240	37
SV-06-061	40.455190	-77.018900	Bedding	62	33
SV-06-061	40.455190	-77.018900	Bedding	60	36
SV-06-062			Bedding	70	79
SV-06-062			Bedding	155	11
SV-06-062			Bedding	60	87
SV-06-062			Bedding	0	23
SV-06-062			Bedding	14	18
SV-06-063			Bedding	245	35
SV-06-064	40.453320	-77.016440	Bedding	20	18
SV-06-065	40.452490	-77.015320	Bedding	68	71
SV-06-066	40.439660	-77.006920	Bedding	45	38
SV-06-067	40.438080	-76.996630	Bedding	4	5
SV-06-068	40.440600	-76.990500	Bedding	330	28
SV-06-068	40.440600	-76.990500	Bedding	15	18
SV-06-069	40.454460	-76.992630	Bedding	75	32
SV-06-070	40.449240	-76.981490	Bedding	16	5
SV-06-071			Bedding	58	36
SV-06-071			Bedding	80	60
SV-06-072	40.478800	-76.983350	Bedding	50	40
SV-06-073	40.477290	-76.984330	Bedding	66	15
SV-06-074	40.478050	-76.983900	Bedding	73	34
SV-06-075	40.481870	-76.973480	Bedding	250	51
SV-06-076	40.483320	-76.969570	Bedding	84	46
SV-06-077	40.482890	-76.969120	Bedding	50	43
SV-06-078	40.487550	-76.953050	Bedding	75	65
SV-06-079			Bedding	80	20
SV-06-080			Bedding	50	44
SV-06-081	40.435400	-77.024570	Bedding	76	11
SV-06-082	40.438130	-77.025720	Bedding	263	39
SV-06-083	40.372450	-76.856990	Overturned Bedding	73	84

Table 1. Planar Structural Measurements.

Field Station	Latitude	Longitude	Type of Plane	Strike	Dip
SV-06-083	40.372450	-76.856990	Overturned Bedding	253	84
SV-06-084	40.372280	-76.854590	Overturned Bedding	238	83
SV-06-084	40.372280	-76.854590	Overturned Bedding	249	83
SV-06-084	40.372280	-76.854590	Overturned Bedding	248	85
SV-06-085	40.375560	-76.854590	Overturned Bedding	229	54
SV-06-085	40.375560	-76.854590	Overturned Bedding	247	60
SV-06-086	40.376270	-76.848030	Overturned Bedding	256	58
SV-06-087	40.374240	-76.847960	Vertical Bedding	256	90
SV-06-087	40.374240	-76.847960	Bedding	253	81
SV-06-088	40.367340	-76.922200	Overturned Bedding	245	73
SV-06-088	40.367340	-76.922200	Overturned Bedding	255	73
SV-06-089	40.392470	-77.013880	Bedding	262	39
SV-06-089	40.392470	-77.013880	Bedding	253	34
SV-06-089	40.392470	-77.013880	Bedding	245	36
SV-06-090	40.385640	-77.014770	Bedding	243	38
SV-06-090	40.385640	-77.014770	Bedding	238	50
SV-06-090	40.385640	-77.014770	Bedding	245	40
SV-06-091	40.387220	-77.011060	Bedding	249	45
SV-06-091	40.387220	-77.011060	Bedding	250	42
SV-06-091	40.387220	-77.011060	Bedding	248	38
SV-06-092	40.386890	-77.017640	Bedding	233	41
SV-06-092	40.386890	-77.017640	Bedding	230	35
SV-06-093	40.392720	-77.013040	Bedding	248	39
SV-06-093	40.392720	-77.013040	Bedding	245	40
SV-06-094	40.393340	-77.012280	Bedding	242	48
SV-06-094	40.393340	-77.012280	Bedding	245	45
SV-06-095	40.395720	-77.007490	Bedding	257	35
SV-06-095	40.395720	-77.007490	Bedding	255	35
SV-06-096	40.413730	-76.979050	Bedding	268	45
SV-06-096	40.413730	-76.979050	Bedding	260	40
SV-06-097	40.417630	-76.963870	Bedding	239	39
SV-06-097	40.417630	-76.963870	Bedding	250	40
SV-06-098	40.432950	-76.977130	Bedding	260	35
SV-06-099	40.417630	-76.963870	Bedding	231	13
SV-06-099	40.417630	-76.963870	Bedding	251	21
SV-06-100	40.422850	-76.975730	Bedding	278	11
SV-06-101	40.422550	-76.978730	Bedding	188	1
SV-06-101	40.422550	-76.978730	Bedding	351	6
SV-06-102	40.421060	-76.978760	Bedding	20	4
SV-06-103	40.432650	-76.955710	Bedding	72	55
SV-06-104	40.437010	-76.952440	Bedding	89	23
SV-06-104	40.437010	-76.952440	Bedding	77	60
SV-06-105	40.438830	-76.933810	Bedding	68	32
SV-06-105	40.438830	-76.933810	Bedding	60	48
SV-06-106	40.494680	-76.924080	Bedding	30	25
SV-06-107	40.495430	-76.929710	Bedding	33	25
SV-06-107	40.495430	-76.929710	Bedding	68	62
SV-06-108	40.495910	-76.929900	Bedding	40	9
SV-06-109	40.486260	-76.922690	Bedding	243	53
SV-06-109	40.486260	-76.922690	Bedding	250	50
SV-06-109	40.486260	-76.922690	Bedding	245	52
SV-06-109	40.486260	-76.922690	Bedding	245	51

Table 1. Planar Structural Measurements.

Field Station	Latitude	Longitude	Type of Plane	Strike	Dip
SV-06-109	40.486260	-76.922690	Bedding	251	55
SV-06-110	40.492030	-76.914010	Bedding	247	43
SV-06-110	40.492030	-76.914010	Bedding	245	34
SV-06-111			Bedding	240	60
SV-06-112	40.412028	-76.930403	Bedding	259	59
SV-06-113	40.425678	-76.953838	Bedding	248	13
SV-06-114	40.494080	-76.908411	Bedding	252	59
SV-06-115	40.494632	-76.906645	Bedding	250	50
SV-06-116	40.493895	-76.904347	Bedding	248	37
SV-06-117	40.492822	-76.903845	Bedding	249	44
SV-06-118	40.470306	-76.918283	Bedding	251	34
SV-06-119	40.482210	-77.045161	Bedding	240	75
SV-06-120	40.488530	-77.037719	Bedding	278	81
SV-06-122	40.450810	-76.909170	Bedding	99	10
SV-06-122	40.450810	-76.909170	Bedding	82	13
SV-06-123	40.458370	-76.881500	Bedding	87	30
SV-06-123	40.458370	-76.881500	Bedding	72	17
SV-06-123	40.458370	-76.881500	Bedding	82	26
SV-06-123	40.458370	-76.881500	Bedding	81	41
SV-06-124	40.463330	-76.871510	Bedding	25	17
SV-06-124	40.463330	-76.871510	Bedding	53	14
SV-06-125	40.464840	-76.880630	Bedding	60	35
SV-06-125	40.464840	-76.880630	Bedding	54	32
SV-06-126	40.469110	-76.898950	Bedding	59	11
SV-06-126	40.469110	-76.898950	Bedding	60	14
SV-06-127	40.468520	-76.914170	Bedding	53	23
SV-06-127	40.468520	-76.914170	Bedding	60	19
SV-06-127	40.468520	-76.914170	Bedding	54	14
SV-06-128	40.472700	-76.906650	Bedding	240	24
SV-06-128	40.472700	-76.906650	Bedding	255	26
SV-06-129	40.482190	-76.899890	Bedding	243	24
SV-06-129	40.482190	-76.899890	Bedding	262	34
SV-06-130	40.480460	-76.886820	Bedding	255	38
SV-06-130	40.480460	-76.886820	Bedding	254	37
SV-06-131	40.444280	-76.874520	Bedding	86	73
SV-06-131	40.444280	-76.874520	Bedding	93	84
SV-06-132	40.442980	-76.877830	Bedding	255	50
SV-06-132	40.442980	-76.877830	Bedding	258	44
SV-06-132	40.442980	-76.877830	Bedding	250	11
SV-06-132	40.442980	-76.877830	Bedding	260	40
SV-06-132	40.442980	-76.877830	Bedding	265	40
SV-06-132	40.442980	-76.877830	Bedding	245	68
SV-06-132	40.442980	-76.877830	Bedding	260	50
SV-06-133	40.416200	-76.889000	Bedding	70	63
SV-06-133	40.416200	-76.889000	Bedding	68	87
SV-06-134	40.416700	-76.887100	Bedding	75	64
SV-06-135	40.399400	-76.928700	Bedding	60	64
SV-06-136	40.387000	-76.957100	Bedding	250	43
SV-06-137	40.380900	-76.965200	Bedding	80	59
SV-06-138	40.372600	-76.958600	Bedding	64	65
SV-06-139	40.435000	-76.896400	Bedding	241	42
SV-06-140	40.432000	-76.901700	Bedding	72	51

Table 1. Planar Structural Measurements.

Field Station	Latitude	Longitude	Type of Plane	Strike	Dip
SV-06-141	40.418100	-76.957700	Bedding	71	50
SV-06-142	40.425200	-76.958900	Bedding	245	42
SV-06-143	40.430900	-76.940400	Bedding	350	5
SV-06-144	40.443600	-76.896400	Bedding	280	32
SV-06-145	40.445100	-76.897800	Bedding	255	54
SV-06-145	40.445100	-76.897800	Bedding	82	41
SV-06-146	40.371100	-76.928000	Bedding	251	78
SV-06-146	40.371100	-76.928000	Bedding	248	66
SV-06-146	40.371100	-76.928000	Bedding	238	64
SV-06-147	40.382600	-76.901800	Overturned Bedding	253	74
SV-06-148	40.407700	-76.821700	Bedding	268	74
SV-06-149	40.486500	-76.891200	Bedding	259	38
SV-06-149	40.486500	-76.891200	Bedding	270	50
SV-06-150	40.483000	-76.883000	Bedding	263	31
SV-06-152	40.500600	-76.874700	Bedding	248	56
SV-06-153	40.494200	-76.870000	Bedding	38	34
SV-06-154	40.451700	-77.020200	Bedding	80	56
SV-06-154	40.451700	-77.020200	Bedding	60	46
SV-06-154	40.451700	-77.020200	Bedding	62	55
SV-06-155	40.452400	-77.020600	Bedding	240	41
SV-06-155	40.452400	-77.020600	Bedding	60	44
SV-06-155	40.452400	-77.020600	Bedding	60	30
SV-06-159	40.459360	-77.025420	Bedding	240	42
SV-06-159	40.459360	-77.025420	Bedding	234	41
SV-06-159	40.459360	-77.025420	Bedding	240	41
SV-06-160	40.436250	-77.028070	Bedding	210	10
SV-06-160	40.436250	-77.028070	Bedding	270	12
SV-06-160	40.436250	-77.028070	Bedding	244	12
SV-06-160	40.436250	-77.028070	Bedding	243	25
SV-06-160	40.436250	-77.028070	Bedding	260	28
SV-06-160	40.436250	-77.028070	Bedding	247	11
SV-06-160	40.436250	-77.028070	Bedding	238	21
SV-06-161	40.470400	-77.030500	Bedding	240	42
SV-06-161	40.470400	-77.030500	Bedding	243	43
SV-06-163	40.477950	-77.043530	Bedding	237	70
SV-06-163	40.477950	-77.043530	Bedding	242	88
SV-06-163	40.477950	-77.043530	Bedding	252	88
SV-06-163	40.477950	-77.043530	Bedding	327	70
SV-06-164	40.479110	-77.046120	Bedding	71	86
SV-06-164	40.479110	-77.046120	Bedding	76	90
SV-06-165	40.486090	-77.030810	Bedding	260	82
SV-06-165	40.486090	-77.030810	Bedding	252	72
SV-06-166			Bedding	259	81
SV-06-167	40.446900	-77.029000	Bedding	248	55
SV-06-167	40.446900	-77.029000	Bedding	233	36
SV-06-168	40.448060	-77.030230	Bedding	228	21
SV-06-169	40.472280	-77.040250	Bedding	252	11
SV-06-170	40.455960	-77.056970	Bedding	251	51
SV-06-171	40.442440	-77.108780	Bedding	251	61
SV-06-171	40.442440	-77.108780	Bedding	253	64
SV-06-172	40.471210	-77.071000	Bedding	263	66

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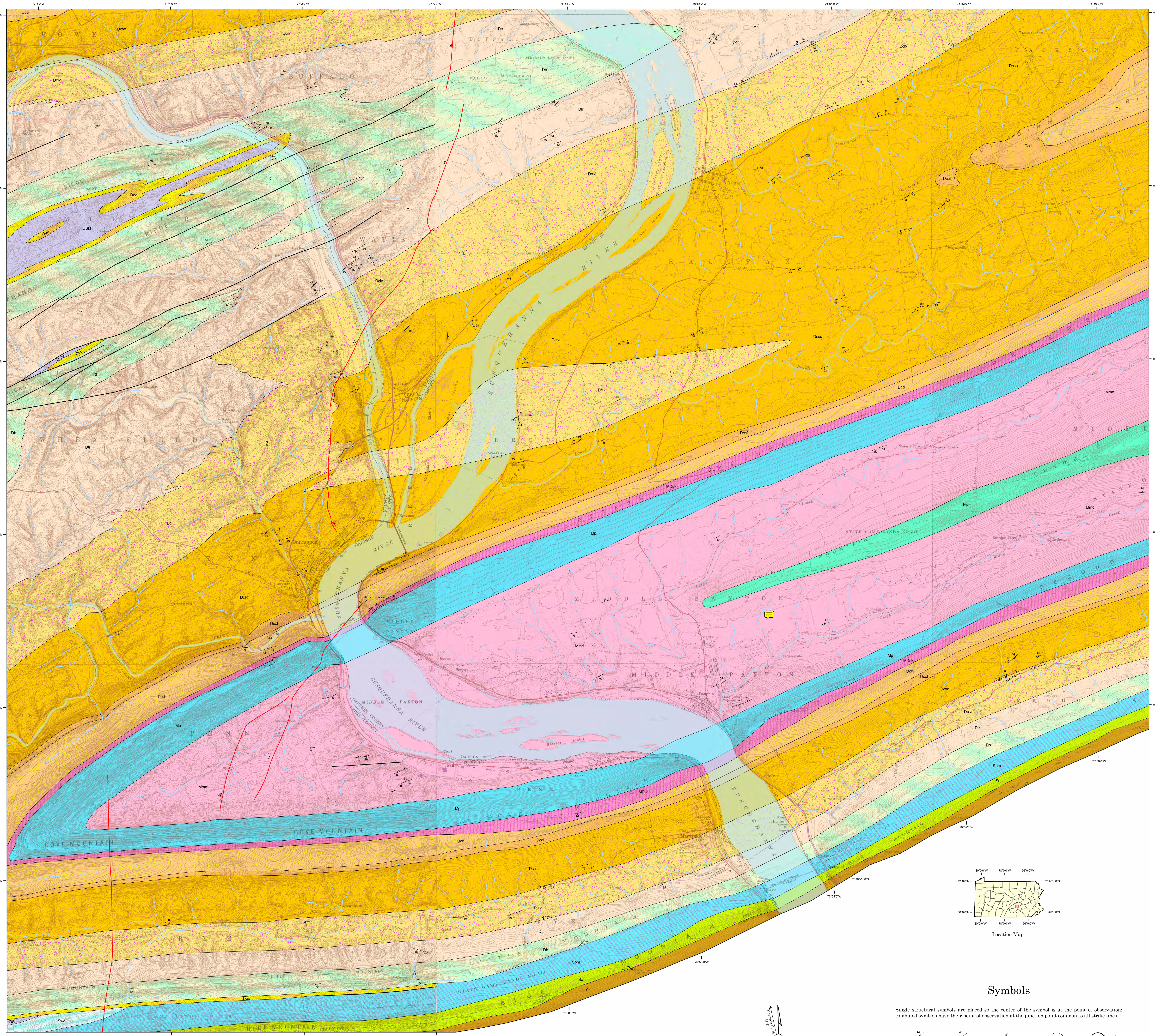


EXPLANATION

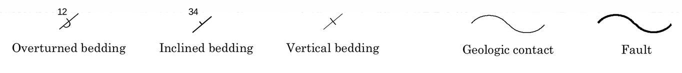
LITHOLOGIC DESCRIPTIONS	FORMATION OR LITHOLOGIC UNIT	ENVIRONMENTAL CHARACTERISTICS [1]
Not observed in this investigation. Contacts from Miles and Whitfield (2001).	DIABASE Jd	Small in areal extent. Characteristics not analyzed for this quadrangle.
Light to dark-gray and olive gray fine and coarse grained sandstone, conglomeratic sandstone and cobbly conglomerate (Hoskins, 1976). Thickness is reported as 275 feet (Wood et al., 1969).	POTTSVILLE FORMATION IPp	Median groundwater yield is 50 gal/min. Excavation is difficult. Fair cut-slope stability. Good foundation stability, except where on or above underclay. Good source of road material and fill, building stone, riprap, and embankment facing.
Interbedded grayish-red siltstones and shale with some non-red sandstone and conglomeratic sandstones. The conglomeratic sandstone consists of mostly angular quartz grains cemented in a fine red clay matrix. Thickness approximately 5,000 feet.	MAUCH CHUNK FORMATION Mmc	Median groundwater yield is 55 gal/min. Extensively developed for water supply. Water quality is good. Excavation is moderately easy to moderately difficult. Good cut-slope stability unless resistant beds are undercut. Good foundation stability. Good source of road material and fill.
Gray or brownish-gray, thickly bedded and cross-bedded sandstone and conglomeratic sandstone. Sandstone is quartz-rich, very fine to very coarse grained, subangular, poorly sorted, and micaceous. Thickness approximately 1,920 feet.	POCONO FORMATION Mp	Median groundwater yield is 40 gal/min. Water is soft. High iron may be a problem. Excavation is difficult. Good cut-slope stability; subject to rockfalls if cut and joint surfaces are favorably oriented. Good foundation stability. Good source of building stone, embankment facing, road material, and riprap.
Light- to olive-gray fine- to medium-grained crossbedded sandstone, locally grading upward into olive-gray siltstone. Near the middle of the unit is about 30 feet of coarse to very coarse conglomeratic sandstone. Thickness is approximately 435 feet (Hoskins, 1976).	SPECHTY KOPF FORMATION MDsk	Generally unproductive on ridge crests but favorable for development below ridge crests. Median groundwater yield is 25 gal/min. Water quality is generally good; iron content may be high. Excavation is difficult. Good cut-slope stability, except rockfalls may occur in steep cuts, or where slope parallels bedding. Foundation stability is excellent. Good source of crushed stone and aggregate, riprap, and fill.
Grayish-red sandstone and red claystone to red clay rich soil. The unit displays fining up sequences with sandstone at the base and poorly exposed red claystones and paleosols at the top. Thickness approximately 1,250 feet.	DUNCANNON MEMBER Dcd (CATSKILL FORMATION)	Well yields are good. Sandstones are the best water-bearing units. Water quality is generally good; Irish Valley Member may have hydrogen sulfide. Excavation is difficult. Cut-slope stability is good in sandstone and conglomerate; siltstone and shale disintegrate rapidly; undercutting of resistant coarser beds may result in rockfalls. Good foundation stability when excavated to sound bedrock. Good source of road material and fill.
Grayish-purple to brownish-gray and light-gray medium to coarse-grained, micaceous, crossbedded sandstone, conglomeratic sandstone and conglomerate. Thickness approximately 700 feet.	CLARKS FERRY MEMBER Dccf (CATSKILL FORMATION)	
Olive-gray to light-gray and reddish-gray to grayish-red fine-grained micaceous sandstone. The unit is made up of interbedded sequences of marine and non-marine sandstone much like the Irish Valley Member that it overlies. Unlike the Irish Valley, the Sherman Creek Member lacks any fining-up sequencing. Most of the unit is non-marine and therefore red in color. It is thickly bedded and often cross-bedded. Thickness approximately 3,800 feet.	SHERMAN CREEK MEMBER Dcsc (CATSKILL FORMATION)	
Interbedded marine and non-marine assemblages of shales, siltstones and sandstones. The marine rocks are gray or greenish-gray siltstones and fine sandstones. The non-marine rocks are red to reddish brown in color. Bedding is thin to medium and mostly planar. The individual beds display a fining-up sequence. Thickness approximately 2,360 feet.	IRISH VALLEY MEMBER Dciv (CATSKILL FORMATION)	
Predominantly olive to gray fossiliferous colored siltstone and silty shale with alternating thin beds of fine sandstone. The silty and clay rich layers weather quickly. Many of the outcrops in the field area are widely spaced sandstone layers with soil or mud in between. Thickness approximately 1070 feet.	TRIMMERS ROCK FORMATION Dtr	Median groundwater yield is 30 gal/min. Very soft water. May contain hydrogen sulfide and dissolved solids. Excavation is moderately difficult. Cut-slope stability is good in sandstone, fair in siltstone and shale. Good foundation stability. Good source of road material and fill.
Well-sorted, gray to olive-gray quartz sandstone and conglomeratic quartz sandstone. Cross-bedding was observed in many of the beds. Thickness approximately 1610 feet.	HAMILTON GROUP Dh	Well yields range from 1 to 300 gal/min; median is 50 gal/min. Water may have high iron and sulfide content. Hydrogen sulfide gas is common. Excavation is moderately easy to difficult. Cut-slope stability is good in sandstone, fair in shale. Good foundation stability. Good source of road material, building stone, riprap,
Medium- to medium-dark-gray argillaceous limestone, calcareous shale, and non-calcareous shale. Medium- to medium-dark- and olive-gray sandstone, chert, siltstone, claystone, and limestone. Combined thickness approximately 260 feet (Hoskins, 1976).	ONONDAGA AND OLD PORT FORMATIONS, UNDIVIDED Doo	Well yields range from 1 to 100 gal/min; median is 10 gal/min. Water from shale may contain iron and hydrogen sulfide. Excavation is difficult. Cut-slope and foundation stability are good. Good source of road material, sand, and fill.
Medium- to dark-gray, fossiliferous, nodular, platy, and laminated limestone and olive-gray shaly claystone (Hoskins, 1976).	KEYSER AND TONOLOWAY FORMATIONS, UNDIVIDED DSkt	Median groundwater yield is 30 gal/min. Water may be hard, and may have high iron. Excavation is difficult; bedrock pinnacles are a special problem. Cut-slope stability is good; fair if highly fractured. Good foundation stability; should be thoroughly investigated for solution openings. Good source of road material, riprap, embankment
Not observed in this investigation. Contacts from Miles and Whitfield (2001).	WILLS CREEK FORMATION Swc	Characteristics not analyzed for this quadrangle.
Grayish-red claystone, argillaceous siltstone and very fine to fine-grained sandstone. The sandstone is planar-bedded. Thickness approximately 1440 feet.	BLOOMSBURG AND MIFFLINTOWN FORMATIONS, UNDIVIDED Sbm	Median well yield is 45 gal/min. Hydrogen sulfide has been noted in some wells. Excavation is moderately easy. Poor cut-slope stability due to rapid disintegration when exposed to moisture. Good foundation support in sound material. Good source of road material and fill.
The term Clinton Group is applied to all lithologies between the Tuscarora Formation and the Bloomsburg Formation, including Keefer and Rose Hill Formations. Brownish-gray to olive-gray shaly claystone, and a thinly-bedded, fine-grained sandstone. Dark red, fine-grained "iron" sandstone is also present (Dyson, 1967). The Clinton Group is approximately 1640 feet thick.	CLINTON GROUP Sc	Median groundwater yield is 12 gal/min. Ridge-forming sandstone has poor topographic position for groundwater development in most areas. Moderately difficult to excavate. Good cut-slope stability and foundation support. Good source of road material and fill.
Fine to coarse-grained gray-green sandstone, siltstone and shale. Cross-bedded and conglomeratic in parts. Thickness approximately 935 feet thick.	TUSCARORA FORMATION St	Median groundwater yield is 12 gal/min. High topographic position is unfavorable for high yields. Water quality is good. Water is soft. Excavation is difficult; boulder fields are a special problem. Cut slope and foundation stability are good. Good source of road material, riprap, aggregate, embankment facing, building stone, and silica.

[1]Blue type refers to groundwater characteristics, red type to engineering characteristics, and black type to mineral resources. Information from the following source:
Geyer, A. R., and Wilshusen, J. P., 1982, Engineering characteristics of the rocks of Pennsylvania (2nd ed.): Pennsylvania Geological Survey, 4th ser., Environmental Geology Report 1, 300 p.

Location Map

Symbols

Single structural symbols are placed so the center of the symbol is at the point of observation; combined symbols have their point of observation at the junction point common to all strike lines.



Strike and dip of planar structural features

Linear geologic features
Locations inferred

Contacts modified from the following source:
Miles, C. E., and Whitfield, T. G., compilers, 2001, Bedrock geology of Pennsylvania: Pennsylvania Geological Survey, 4th ser., dataset, scale 1:250,000.

Descriptions from field observations and the following sources:
Dyson, J. L., 1963, Geology and Mineral Resources of the Northern Half of the New Bloomfield Quadrangle, Pennsylvania Geological Survey, 4th ser., Atlas 137ab, 63 p., 1 pl., geol map.
Dyson, J. L., 1967, Geology and Mineral Resources of the Southern Half of the New Bloomfield Quadrangle, Pennsylvania Geological Survey, 4th ser., Atlas 137cd, 86 p., 1 pl., geol map.
Hoskins, D. M., 1976, Geology and mineral resources of the Millersburg 15-minute quadrangle, Dauphin, Juniata, Northumberland, Perry, and Snyder Counties, Pennsylvania: Pennsylvania Geological Survey, 4th ser., Atlas 146, 38 p., 2 pls.
Miles, C. E., and Whitfield, T. G., compilers, 2001, Bedrock geology of Pennsylvania: Pennsylvania Geological Survey, 4th ser., dataset, scale 1:250,000.
Miller, J.T., and Conlin, R.R., 1961, Upper Devonian Rock Stratigraphic Nomenclature in Pennsylvania. American Journal of Science, v.259,p. 784-790.
Trexler, J.P., Wood, G.H. Jr., Arndt, H.H., 1962, Uppermost Devonian and Lower Mississippian rocks of the western part of the Anthracite Region of Eastern Pennsylvania, U.S. Geological Survey Professional Paper 450-C, p. 395-400.
Wood, G.H., Jr. and Trexler, J.P., and Kehn, T.M., 1969, Geology of the west-central part of the Southern Anthracite field and adjoining areas, Pennsylvania, U.S. Geological Survey Professional Paper 602.

Miles
1 0.5 0 1
2 1 0 2
Kilometers

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

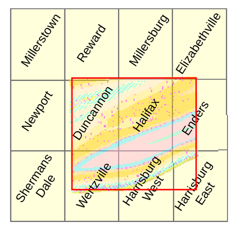
The base map has been modified from the USGS digital raster graphic files of the Duncannon, Elizabethville, Enders, Halifax, Harrisburg East, Harrisburg West, Millersville, Reward, and Wertzville 7.5 Minute quadrangles.

The map projection is universal transverse Mercator, UTM Zone 18 north, NAD 1927.

The structural measurements were collected by the authors in 2007.

This open-file report has been prepared in accordance with the open-file reporting standards of the Bureau and Topographic and Geologic Survey. It has not undergone external peer review.

This map is a single page from the open-file report referenced in the upper right corner. The complete open-file report can be obtained from the web site of the Bureau of Topographic and Geologic Survey at:
<http://www.dcnr.state.pa.us/topogeo>



Quadrangle Index

Preliminary Bedrock Geologic Map of the Middle Portion of the Susquehanna River Valley, Cumberland, Dauphin, and Perry Counties, Pennsylvania

by
Margaret S. Jackson, Peter M. Hanley, and Peter B. Sak
Dickinson College
2007

PRINTING INSTRUCTIONS

All pages of the document except the geologic plate are 8.5 x 11 inches. The geologic plate is 46 inches wide and 36 inches high. To print the entire document on letter paper, simply execute the print command in Adobe Acrobat Reader or Adobe Acrobat. The geologic plate should automatically be reduced to fit on the letter-sized paper.

If you wish to plot the map at its published size of 46 x 36 inches, open the Acrobat file and display the map. Next, execute the File/Print command. When the print dialog opens click the radio button for "Current Page." Next, make sure the plotting device is selected as the current printer and open the properties for that device. Navigate to the page setup and select a paper size that is at least 46 x 36 inches. Your plotting device may include the ability to specify the exact dimensions of the paper. If you select paper that is smaller than 46 x 36 inches, the Acrobat Print dialog provides a "fit to page" option that will automatically resize the map to fit on the paper selected. Just keep in mind that the verbal scale will only be correct when the map is printed at its published size of 46 x 36 inches.