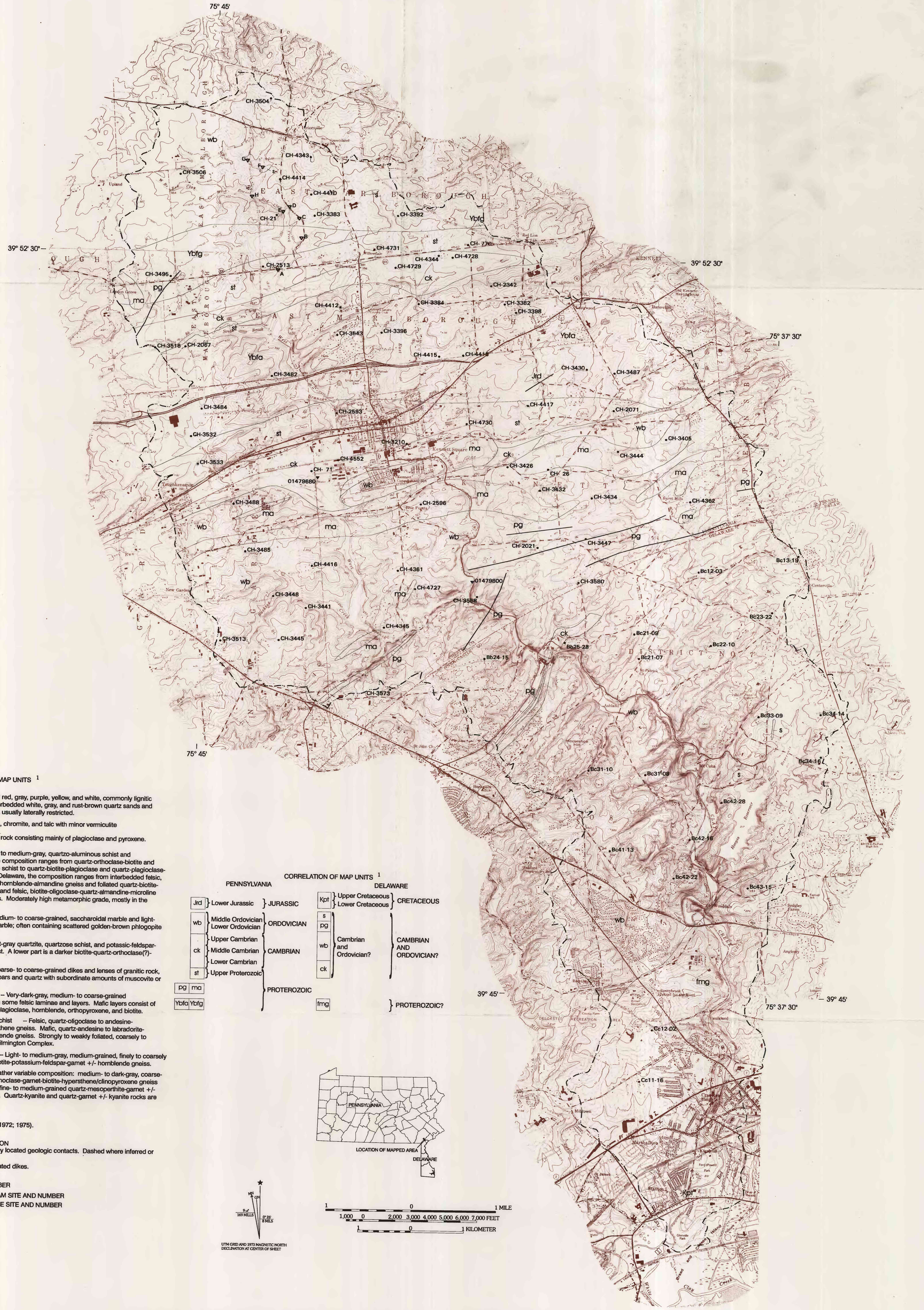
U. S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
RED CLAY VALLEY ASSOCIATION
AND THE
CHESTER COUNTY WATER RESOURCES AUTHORITY

WATER-RESOURCES INVESTIGATION REPORT 96-4288
Senior, L. A., 1996, Ground-water quality and its relation to hydrogeology, land use, and surface-water quality in the Red Clay Creek Basin, Piedmont Physiographic Province, Pennsylvania and Delaware



DESCRIPTION OF MAP UNITS [1]

Kpt Potomac Formation -- Variegated red, gray, purple, yellow, and white, commonly lignitic silts and clays containing interbedded white, gray, and rust-brown quartz sands and some gravel. Individual beds usually laterally restricted.

s serpentinite -- Massive antigorite, chromite, and talc with minor vermiculite

Jrd diabase -- Dark-gray, fine-grained rock consisting mainly of plagioclase and pyroxene.

wb Wissahickon Formation -- Light- to medium-gray, quartzo-aluminous schist and gneiss. In Pennsylvania, the composition ranges from quartz-orthoclase-biotite and orthoclase-quartz-muscovite schist to quartz-biotite-plagioclase and quartz-plagioclase-biotite schistose gneiss. In Delaware, the composition ranges from interbedded felsic, unfoliated quartz-oligoclase-hornblende-almandine gneiss and foliated quartz-biotite-oligoclase-almandine schist and felsic, biotite-oligoclase-quartz-almandine-microline schist and occasional gneiss. Moderately high metamorphic grade, mostly in the amphibolite facies.

ck Cockeysville Marble -- White, medium- to coarse-grained, saccharoidal marble and light-gray, fine-grained, banded marble; often containing scattered golden-brown phlogopite flakes

st Setters Formation -- White to light-gray quartzite, quartzose schist, and potassic-feldspar-quartz-biotite-muscovite schist. A lower part is a darker biotite-quartz-orthoclase(?)-muscovite schist.

pg pegmatite -- Light colored, very-coarse- to coarse-grained dikes and lenses of granitic rock, containing mostly alkali feldspars and quartz with subordinate amounts of muscovite or biotite

ma mafic gneiss amphibolite facies -- Very-dark-gray, medium- to coarse-grained amphibolite, interlayered with some felsic laminae and layers. Mafic layers consist of hornblende, clinopyroxene, plagioclase, hornblende, orthopyroxene, and biotite.

fmg felsic and mafic gneiss and minor schist -- Felsic, quartz-oligoclase to andesine-microcline-hornblende-hypersthene gneiss. Mafic, quartz-andesine to labradorite-augite-hypersthene +/- hornblende gneiss. Strongly to weakly foliated, coarsely to finely phaneritic. Part of the Wilmington Complex.

Ybfa felsic gneiss, amphibolite facies -- Light- to medium-gray, medium-grained, finely to coarsely layered quartz-plagioclase-biotite-potassium-feldspar-garnet +/- hornblende gneiss.

Ybfg felsic gneiss, granulite facies -- Rather variable composition: medium- to dark-gray, coarse-grained plagioclase-quartz-orthoclase-garnet-biotite-hypersthene/clinopyroxene gneiss (stronly lineated) to light-gray, fine- to medium-grained quartz-mesoperthite-garnet +/- biotite +/- hypersthene gneiss. Quartz-kyanite and quartz-garnet +/- kyanite rocks are present locally.

[1]From Sloto (1994) and Woodruff and Thompson (1972; 1975).

CORRELATION OF MAP UNITS [1]

PENNSYLVANIA			DELAWARE		
Jrd	Lower Jurassic	JURASSIC	Kpt	Upper Cretaceous, Lower Cretaceous	CRETACEOUS
wb	Middle Ordovician, Lower Ordovician	ORDOVICIAN	s, pg, wb, ck	Cambrian and Ordovician?	CAMBRIAN AND ORDOVICIAN?
ck	Upper Cambrian, Middle Cambrian, Lower Cambrian	CAMBRIAN			
st	Upper Proterozoic	PROTEROZOIC			
pg, ma, Ybfa, Ybfg		PROTEROZOIC	fmg		PROTEROZOIC?

EXPLANATION

CONTACT -- Includes approximately located geologic contacts. Dashed where inferred or questionable.

DIKE -- Includes approximately located dikes.

BASIN BOUNDARY

• Cc11-16 WELL AND IDENTIFICATION NUMBER

▾ 01479800 BIOLOGICAL MONITORING STREAM SITE AND NUMBER

▿ H STREAM SAMPLING AND SEEPAGE SITE AND NUMBER

UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1 0 1 MILE
1,000 0 2,000 3,000 4,000 5,000 6,000 7,000 FEET
1 0 1 KILOMETER

Base from U. S. Geological Survey
Coatesville, 1:24,000, 1973
Kennett Square, 1:24,000, 1973
Newark East, 1:24,000, 1985
Unionville, 1:24,000, 1973
West Grove, 1:24,000, 1973
Wilmington North, 1:24,000, 1987

GEOLOGY AND LOCATION OF WELLS AND STREAM SITES SAMPLED 1993-94, RED CLAY CREEK BASIN, PENNSYLVANIA AND DELAWARE.

By
Lisa A. Senior
1996

Geology from Woodruff and Thompson, 1972; Woodruff, 1975; Berg and others, 1981; Sloto 1994