Institute of Natural Resource Sustainability
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ILLINOIS STATE GEOLOGICAL SURVEY
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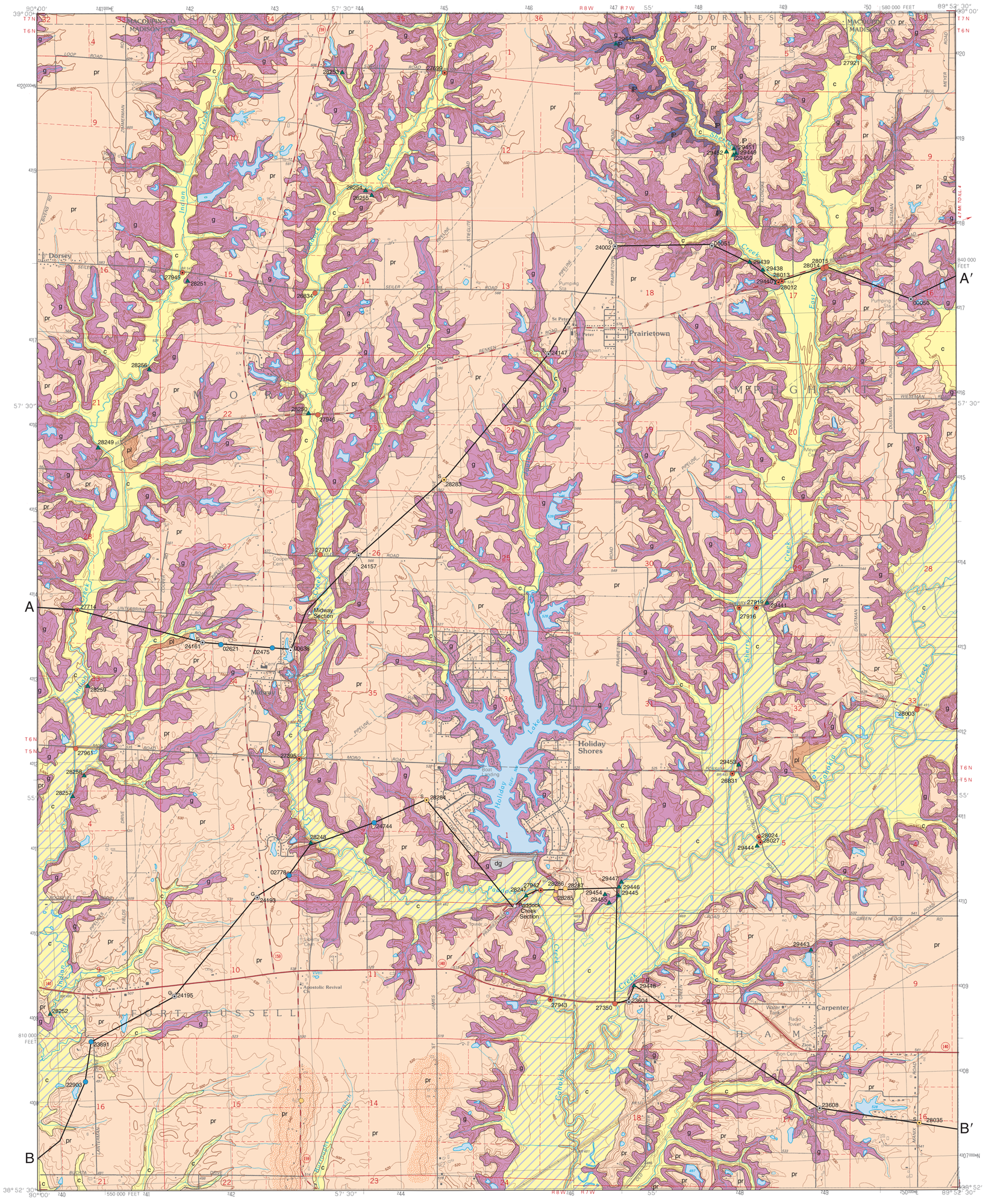
Surficial Geology of Prairietown Quadrangle
Madison and Macoupin Counties, Illinois

David A. Grimley and Andrew C. Phillips
2010

Illinois Geologic Quadrangle Map
IGQ Prairietown-SG



QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON EPISODE (~12,000 years before present (B.P.) to today)		
Fill or removed earth; sediment of various types; up to 20 feet thick	Disturbed ground: dg	**Man-made fill or large areas of disturbed sediment;** includes dams and bridge embankments
Silty clay to silt loam to sandy loam to fine sand; occasional sand and gravel beds near base of unit; gray to brown, massive to well stratified, up to 35 feet thick	Cahokia Formation: c	**River deposits (alluvium) in floodplains;** contains significant redeposited loess; coarser sandy beds are common at the base of the unit where the channel has incised into till, outwash, or bedrock
WISCONSIN EPISODE (~55,000–12,000 years B.P.)		
Silty clay to silt loam to fine sand; gray to tan, massive to stratified, stiff, leached to calcareous; up to 30 feet thick	Equality Formation (cross sections only): e; areas on map where buried	**Lake sediment;** deposited in tributary valleys during backflooding of the Mississippi River; underlies Cahokia Formation in Sherry, Paddock, Indian, and Cahokia Creek valleys; also in small terraces along Cahokia Creek; terraces include a cover of 3 to 6 feet of loess
Silt to silt loam; yellow brown to gray to pinkish brown, massive to blocky structure, friable, mainly leached; contains modern soil solum in upper 2 to 4 feet; up to 20 feet total thickness	Peoria and Roxana Silts (>5 feet thick): pr	**Loess;** includes some slope deposits and redeposited loess; upper and thicker portion is Peoria Silt (tan to gray); lower portion is Roxana Silt (pink to tan-gray); thickest on uneroded uplands in southwestern area of quadrangle
ILLINOIS EPISODE (~200,000–130,000 years B.P.)		
Sandy loam to gravelly sand; may be more clayey in upper few feet where it may contain a buried soil; areas with Hagarstown Member are more variable and may contain diamicton beds; may contain some inclusions of diamicton; up to 25 feet thick	Pearl Formation: pl; Hagarstown Member in subsurface	**Outwash or ice-marginal sorted sediments;** deposited by glacial meltwater streams mainly in confined valleys; contains the Sangamon Geosol in upper portions except where eroded; overlies Glasford Formation
Pebbly loam diamicton with common sand and silt lenses up to tens of feet wide and as much as 20 feet thick; olive to gray, upper few feet are weathered brown; softer and more clayey (to clay loam) in lower portion, which is commonly more massive, stiff, and calcareous; up to120 feet thick	Glasford Formation: g	**Till and ice-marginal sediment;** upper portion contains Sangamon Geosol; includes some interbeds or lenses of outwash and channel deposits; lower portion is typically more dense basal till; increased clay content at depth may reflect incorporation of underlying sediment and shale.
PRE-ILLINOIS EPISODE (~700,000–400,000 years B.P.)		
Pebbly silty clay loam diamicton; contains some sand lenses; brown, orange brown, or gray, rarely olive; massive to weakly laminated, shale and coal fragments common, leached to calcareous; up to 100 feet thick	Banner Formation, Omphghent member (cross sections only): b-o	**Till and ice-marginal sediment;** may contain Yarmouth Geosol weathering profile in upper 10 feet (typically truncated); sometimes more clayey in lower portions of unit
Silty clay to silty clay loam; olive gray to gray brown; contains some layers of fine sand and imbricated gravel near base of unit, weakly stratified, leached to weakly calcareous; up to 40 feet thick	Banner Formation, Canteen member (cross sections only): b-c	**Fine-grained alluvium and lake sediment;** sandy beds are more common towards base of unit; overlies bedrock or a few inches of reddish chert gravel (Grover Gravel) over bedrock

TERTIARY OR EARLY QUATERNARY DEPOSITS

Description	Unit	Interpretation
Silty clay to clay; olive brown, somewhat friable, may be laminated in places, noncalcareous, stiff to hard; up to 10 feet thick	Oak Formation (cross sections only): To	**Residuum;** orginates from in-place alteration of bedrock, observed in boring 28283 (highly weathered shale); distribution is likely patchy in the subsurface where protected from later glacial erosion (in lee of bedrock highs)

PENNSYLVANIAN BEDROCK

Description	Unit	Interpretation
Predominantly shale and siltstone, with some coal, limestone, and sandstone; greenish gray to dark gray; laminated to bedded; may contain marine fossils; noncalcareous to calcareous	Near-surface bedrock: IP	**Bedrock exposures or bedrock within 5 feet of land surface;** bedrock underlying glacial deposits on cross sections

Data Type

- ▲ Outcrop
- △ Outcrop in field notes (ISGS archives)
- Stratigraphic boring
- Water-well boring
- Engineering boring
- Coal boring
- ○ Other boring
- SG○26211 Labels indicate samples (s) or geophysical log (G). Numeric labels indicate the county number. Outcrop labels indicate geologist's field number. Dot indicates boring is to bedrock.
- Contact
- Inferred contact
- A—A′ Line of cross section

Note: The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Online well and boring records are available from the ISGS Web site.

Base map compiled by Illinois State Geological Survey from digital data (Raster Feature Separates) provided by the United States Geological Survey. Topography compiled from imagery dated 1986. Field checked 1988. Map edited 1990.

North American Datum of 1927 (NAD 27)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, west zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

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SCALE 1:24,000
1 1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology based on field work by David A. Grimley and Andrew C. Phillips, 2002–2003.

Digital cartography by Melony E. Barrett, Jennifer E. Carrell, and Jane E.J. Domier, Illinois State Geological Survey.

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4		5
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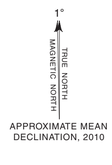
ADJOINING QUADRANGLES
1 Shipman
2 Bunker Hill
3 Gillespie South
4 Bethalto
5 Worden
6 Wood River
7 Edwardsville
8 Marine



APPROXIMATE MEAN DECLINATION, 2010

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
State Route

Introduction

This map depicts the occurrence of geologic units within 5 feet of the land surface in the Prairietown 7.5-minute Quadrangle. The accompanying cross sections illustrate the distribution and succession of geologic units in the subsurface. The study provides a framework for land and groundwater use, engineering assessment, economic development, and archeological and geological studies. The study is part of a broader geologic mapping program undertaken by the ISGS for 7.5-minute quadrangles in developing areas of the St. Louis Metro East region (e.g., Grimley 2005).

Regional Setting

The Prairietown Quadrangle is located within 15 miles of the margins of Illinois and pre-Illinois Episode glacial ice (fig. 1) (Grimley et al. 2001). The mapped area can be divided geomorphically into uplands, hillslopes, valleys, and terraces. The sediments within these landforms contrast considerably due to their differing geologic histories.

The larger river valleys in the quadrangle include Cahokia Creek, Sherry Creek, Paddock Creek, and Indian Creek, all of which generally trend northeast-southwest. These valleys contain postglacial stream deposits near the surface and, in many areas, contain concealed lake deposits and/or outwash deposits from earlier glacial meltwater streams at depth. Uplands in the quadrangle are underlain by glacial till and ice-contact deposits and are blanketed by loess (windblown silt). The loess was deposited during episodic dust storms, as a result of westerly windstorms that periodically swept across the broad Mississippi Valley during glacial times.

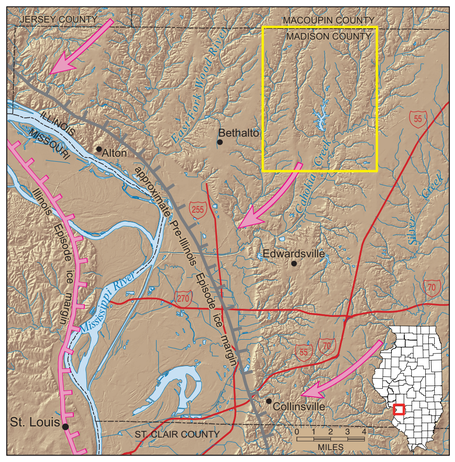


Figure 1 Shaded relief map of the St. Louis Metro East area (northern portion). The Prairietown Quadrangle is outlined in yellow. The quadrangle lies within the ice margins of both the pre-Illinois and Illinois Episode glaciations. Arrows indicate the direction of ice flow for the Illinois Episode glaciation.

Methods

Surficial Map

The surficial geologic map is based in part upon interpretations of soil series parent materials compiled from Goddard and Sabata (1982). These data were modified based upon data obtained from field outcrop studies, soil probings, and drill cores obtained for this STATEMAP project; geotechnical bridge borings from the Illinois Department of Transportation and the Madison County Highway Department; other geotechnical borings; and water-well logs. Data shown in the map and cross sections are on file at the ISGS Geologic Records Unit.

Cross Sections

The cross sections portray the near-surface deposits as would be seen in a slice through the earth down to bedrock, although vertically exaggerated 20 times. The lines of cross section are indicated on the surficial map. Data used for subsurface unit contacts are from outcrops studied for this mapping project, field descriptions of outcrops by previous geologists, stratigraphic test holes, geotechnical boring records, coal test hole borings, and water-well records. Units less than 5 feet in maximum thickness are not shown on the cross sections. The full extent of wells that penetrate deeply into bedrock are not shown.

Surficial Deposits

Upland Near-Surface Deposits

Uplands, including most sloping areas, constitute most of the quadrangle's area. Silty loess deposits (Peoria and Roxana Silts), dust windswept from glacial outwash plains in the Mississippi Valley (fig. 1) during the Wisconsin Episode, blanket the uplands. Thicknesses of deposits range from about 8 to 20 feet on uneroded uplands and thin to the northeast. The loess is typically silt loam, but generally contains the modern soil solum in its upper 3 to 5 feet, where it is altered to a heavy silt loam to silty clay loam (Goddard and Sabata 1982). The Peoria Silt is the upper, younger loess unit, and the Roxana Silt, which tends to have a slight pinkish hue, is the lower loess unit (Hansel and Johnson 1996). Their physical properties are similar, so these units are mapped together. In most areas, the loess is leached of carbonates, but it may be weakly dolomitic in the lower Peoria Silt and in areas with greater thickness, i.e., to the southwest.

On side slopes and ravines, where the loess has been eroded to less than 5 feet, older units are mapped. On most slopes, the underlying diamicton (poorly sorted mixture of clay, silt, sand, and gravel) is exposed or is near the surface. The diamicton is interpreted mainly as till. It was deposited during the Illinois Episode and is mapped as Glasford Formation. Near-surface Glasford Formation is much more common to the northeast as the loess cover thins. The Glasford Formation can include discontinuous sand and gravel lenses up to tens of feet wide and 10 feet thick. The upper surface of the Glasford Formation is recognized by a buried interglacial soil, the Sangamon Geosol, in the upper few feet. The Sangamon Geosol exhibits alteration features such as root pores, fractures, oxidation or color mottling, strong soil structure, leaching of carbonate, clay accumulation, and/or clay skins. The solum may be truncated by erosion. These alteration features, as well as its unsorted nature and the presence of pebbles, clearly distinguish the Glasford Formation from overlying loess deposits. In addition, the Glasford Formation is stiffer, having higher unconfined compressive strength (Q_u) and blow count (N), and a lower water content (w) than the loess deposits (table 1). Within the Glasford till, the upper 10 to 15 feet is typically softer, more weathered, and higher in water content than its lower portion, which was deposited and overconsolidated under the weight of glacial ice.

In two small areas along the edges of Indian Creek and Cahokia Creek valleys, sandy deposits were found near the surface based on county soil maps (Goddard and Sabata 1982). These deposits are covered by thin loess and are interpreted as the Pearl Formation (Willman and Frye 1970), an Illinois Episode outwash that overlies the Glasford Formation. They may have originated either from high levels of sediment-bearing meltwater in the main valleys or as restricted outwash plains over the uplands as Illinois Episode glacial ice retreated to the northeast. The Pearl Formation in central Madison County seems to be more common near and below the larger river valleys that drain to the south or southwest. These valleys probably acted as glacial meltwater outlets during the Illinois Episode.

Two elongate hills on the eastern and western edges of Section 14, T5N, R8W, are mapped as having the Pearl Formation in the subsurface, symbolized by brown dots on the map. These areas have sorted sandy deposits intermixed with diamicton, but are buried by 10 to 20 feet of loess. The sand in these ridges may overlie till at depth, but few data are available to confirm this. The ridges are similar in appearance to other ridges on the Illinois Episode till plain that have been classified as the Hagarstown Member of the Pearl Formation (Killey and Lineback 1983). The origin of these landforms has been debated, but in various places they can be esker-like forms, crevasse infillings, or moraines (Jacobs and Lineback 1969, Webb 2009).

Near-surface bedrock in the quadrangle consists predominantly of Pennsylvanian shale and sandstone that crop out in Sections 6 and 7, T6N, R7W. The bedrock exposures are relatively small (typically <15 feet high) and occur mainly on lower slopes or on the cutbanks of Sherry Creek and its tributaries. This north-central portion of the quadrangle is a bedrock high area (cross section A–A′). Where buried below the Quaternary deposits, bedrock lithologies include shale, sandstone, coal, and limestone. Some areas in Section 7, 8, and 18, T6N, R7W, have been undermined by room-and-pillar mining of the Herrin Coal between the late 1800s and 1944 (Chenoweth and Louchios 2004). None of these coal mines are active today.

Valley and Low Terrace Near-Surface Deposits

Valleys and low terraces with less than 5 feet of loess cover occupy a small portion of the quadrangle area, but are important with respect to the distribution of surficial deposits and the Quaternary history of the area. Fine-grained postglacial stream deposits (Cahokia Formation) fill Sherry Creek, Paddock Creek, and Indian Creek valleys and are typically 10 to 25 feet thick. They are as much as 35 feet thick under the broad, southern portion of the Cahokia Creek valley (cross section B–B′). Sediment in the Cahokia Formation is mainly derived from erosion of loess and the Glasford Formation on nearby uplands and sloping areas. Although primarily silty clay to silt loam in texture, the Cahokia Formation includes layers of fine to medium sand, particularly in basal portions and in river channels. In many areas that are directly underlain by till, the lowermost one to two feet of Cahokia Formation is stratified sand, as a result of concentration of coarser particles during fluvial erosion.

Geotechnical borings from the lower reaches of the Cahokia, Sherry, Paddock, and Indian Creek valleys indicate a soft, weakly laminated, fine-grained silty clay that underlies the Cahokia Formation. These deposits are classified as the Equality Formation. Their extent is shown on the map by purple hachures. The Equality Formation deposits are distinctively soft, having lower strength (Q_u) and higher water contents than till or loess (table 1). The Cahokia and Equality Formations may be more difficult to distinguish from each other since they may both be soft and clayey. However, these formations are commonly separated by a thin (<5 foot) sandy layer that represents the basal Cahokia Formation, commonly as a fining-upward sequence. The elevation of the top of the Equality Formation never exceeds about 480 feet above sea level (asl) (see cross sections). Therefore, the Equality Formation does not occur in the northern reaches of the valleys. There, the Cahokia Formation commonly overlies Illinois Episode outwash or till. Equality Formation deposits are interpreted as slackwater lake deposits, which formed when high levels of glacial meltwater in the Mississippi River Valley caused blockage and damming of these tributary valleys for several miles. A small terrace in the Cahokia Creek valley at ~480 feet asl was mapped as Equality Formation where Goddard and Sabata (1982) indicated that Wisconsin Episode fine-grained, stratified sediments occur. A cover of loess from about 3 to 6 feet thick conceals the stratified sediments, which likely range from silty clay to fine sand; however, we were unable to confirm this.

Deeper in the subsurface along the Paddock Creek, Sherry Creek, and Cahokia Creek valleys, geotechnical borings indicate the presence of 10 to 20 feet of sand below the fine-grained deposits and above till. This sand is classified as the Pearl Formation and interpreted as Illinois Episode outwash. The Pearl Formation occurs below the Cahokia and Equality Formations in the lower reaches of the valleys, but directly below the Cahokia Formation in the upper reaches.

Concealed Deposits (Pre-Illinois Episode)

In many areas, older pre-Illinois Episode deposits are preserved in the subsurface below the Glasford Formation. These deposits, classified as the Banner Formation, are divisible into the Omphghent member (upper unit), a clayey diamicton with relatively few sand and gravel bodies, and the Canteen member (lower unit), an olive-gray, weakly laminated silty clay with some beds of fine sand.

The Omphghent member is interpreted as mainly till with few lenses of ice-marginal (sorted) sediments. Compared with till in the Glasford Formation, the Banner Formation till is consistently more clayey, less sandy, higher in water content, and slightly less stiff (table 1). These differences were used to help differentiate the two units in engineering borings. Natural gamma-ray logs from coal test borings portray slightly higher gamma counts in lower portions of unconsolidated sediment, which were interpreted as the clay-rich Banner till. The more clayey nature of the Banner till is probably due to the incorporation of significant amounts of shale and clayey bedrock residuum into pre-Illinois Episode glacial ice, the first ice of the Quaternary Period to cross this area. In some areas, particularly in bedrock valleys, the Omphghent member may contain a buried interglacial soil, the Yarmouth Geosol, preserved in the upper few feet. However, the upper horizons of this soil are commonly truncated, probably by stream or glacial erosion. The weathering features typically preserved include a zone of greater fracturing, leaching, and oxidation. Lower portions of the Omphghent till are unoxidized, gray, and calcareous and contain more unweathered shale fragments than do the upper portions. Although the Omphghent member is primarily a subsurface unit (see cross sections), its uppermost 5 to 10 feet are exposed at the base of the Paddock Creek Section (Sec. 1, T5N, R8W; fig. 2). This exposure is one of the few in the region where the Glasford and Banner Formations are both visible and easily distinguishable in the field due to the presence of a truncated Yarmouth Geosol (one foot thick and leached) developed into the upper Banner Formation. McKay (1979) presented detailed descriptions and laboratory data from the Paddock Creek Section that clearly distinguish the Banner and Glasford Formations. The Banner Formation may also be exposed at outcrops 28247 (Sec. 1, T5N, R8W) and 28255 (Sec. 11, T6N, R8W); however, this unit is unconformably overlain by recent alluvium, so the stratigraphic relations are not clear.

Table 1 Physical and chemical properties of selected map units. Typical ranges for Prairietown Quadrangle are listed).

Unit	Engineering properties[1] w (%)	Q_u (tons/ft²)	N	Particle size and composition[2] Sand (%)	Silt (%)	Clay (%)	Clay mineralogy	MS[3]
Cahokia Formation	7–25	0.5–2.0	1–9	variable texture			ND[4]	ND
Equality Formation	24–31	0.3–1.0	0–3	variable texture but typically a silt loam to silty clay loam			high expandables	ND
Peoria and Roxana Silts	20–28	0.75–1.75	1–9	0–5	65–90	10–30	high expandables	5–80
Glasford Formation (till)[5]	11–21	1.5–9.5	3–50	38–46	37–42	15–22	47–56% illite	5–40
Banner Formation (till)[5]	19–29	1.2 –4.5	2–32	26–32	40–49	23–30	approx. 40–50% illite	5–40
Canteen member, Banner Formation	ND	0.2–3.5	ND	ND	ND	ND	ND	5–40

[1]Engineering properties are based on hundreds of measurements (total for all units) from about 20 engineering (bridge) borings and 3 stratigraphic test borings in the quadrangle. Abbreviations: w, moisture content = mass of water/mass of dry solids; Q_u, unconfined compressive strength; N, blows per foot (standard penetration test).

[2]Particle size and composition data are based on a limited data set (~50 samples) from 5 stratigraphic borings and 13 outcrops. Sand = % <2 and ≥63 µm; silt = % ≥4 and <63 µm; clay = % <4 µm. Clay mineralogy = proportions of expandables, illite, and kaolinite/chlorite (in <4-µm clay mineral fraction); these calculations using Scintag diffractometer traces have about one-fourth more illite than previous data using the General Electric X-ray diffractometer.

[3]Magnetic susceptibility (×10⁻³ SI units) (detailed data from 5 stratigraphic borings).

[4]No data available.

[5]Properties for the Glasford and Banner Formations are mainly for calcareous till (excludes sand and gravel lenses and strongly weathered zones); weathered upper portions can be less stiff and more clay-rich, have higher water contents, and can be leached of carbonates.

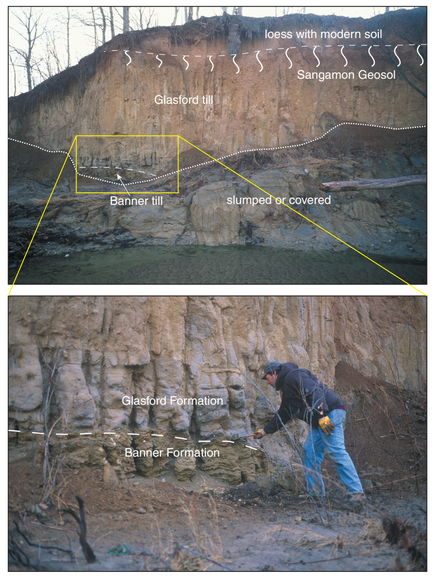


Figure 2 Paddock Creek Section (SW¼ SE¼ Sec. 1, T5N, R8W). This outcrop provides a rare glimpse of the pre-Illinois Episode Banner Formation.

The informal Canteen member of the Banner Formation is interpreted as preglacial alluvium and lake deposits. The Canteen member tends to occur in the deepest portions of preglacial valleys, generally below 400 feet asl (see cross sections), and is not known to crop out. It is the basal unit of the Banner Formation, present below the Omphghent member and above bedrock. The Canteen member is interpreted as preglacial because it lacks erratic pebbles (igneous and metamorphic lithologies likely to have originated far from southwestern Illinois) and is almost entirely leached of carbonates. Some of this unit may be slackwater lake deposits that are related to early Quaternary glaciations in the upper Mississippi River drainage basin. The upper two-thirds of the unit are mainly fine-grained, lacking sand and gravel. Natural gamma-ray logs record slightly higher counts for the Canteen member than for to the Omphghent member. The uppermost 5 to 10 feet of the Canteen member sometimes exhibits a greater degree of blocky soil structure, probably representing a buried soil that formed prior to deposition of the calcareous Omphghent till. The lowermost 10 to 15 feet of the Canteen member is commonly stratified silt to fine sand and may contain gravelly beds of angular local rock fragments (shale or coal). In samples from two stratigraphic test cores (PRT-1 and PRT-2), several subrounded reddish chert pebbles with a brown patina and up to 2 inches in size were concentrated in a 4-inch layer at the base of the Canteen member, immediately above the top of Pennsylvanian shale bedrock. This chert gravel is tentatively correlated to the Grover Gravel, which was interpreted as late Pliocene-early Pleistocene in age by Willman and Frye (1970), but is much too thin and sporadic to be mapped in the Prairietown Quadrangle.

Economic Resources

Sand and Gravel

Economically minable sand and gravel in the Prairietown Quadrangle is elusive. Sand and gravel in the Pearl Formation is less than 25 feet thick and does not occur extensively near the surface. The Pearl Formation in the upland ridges is likely to be poorly sorted and intermixed with diamicton. Sand and gravel bodies within till units (i.e., Glasford Formation) are limited in thickness and extent and are not predictable in their dimensions.

Groundwater

Groundwater from near-surface deposits is extensively used for household, public, and industrial water supplies. Sand and gravel lenses in the Pearl and Glasford Formations constitute the most significant Quaternary aquifer material (stippled areas of cross sections). In upland areas, the most common Quaternary groundwater aquifer materials are sand and gravel bodies within, between, or on top of till units. However, many domestic supplies are obtained from large-diameter, bored wells because these bodies are discontinuous and thin. In valleys, the Pearl Formation is the most significant aquifer. The Village of Worden exploits the Pearl Formation in Cahokia Creek for its supply. The Omphghent member appears to contain few sand and gravel lenses, although few data are available for this unit. The Canteen member does contain some poorly sorted to moderately sorted fine sand near its base, but this unit is relatively deeply buried (>140 feet) and not likely to be extensive or have high groundwater yield. Bedrock aquifers are also commonly utilized for high-production wells.

Environmental Hazards

Groundwater Contamination

Surface contaminants pose a potential threat to groundwater supplies in near-surface aquifers that are not overlain by a confining (clayey, unfractured) unit. Shallow sand and gravel aquifers exposed at the surface are most vulnerable to agricultural or industrial contaminants. Confining units, such as clayey till units (Banner or Glasford Formations) or lake deposits (Equality Formation), can serve to protect aquifers. A summary of the factors used to determine the potential for contamination in shallow aquifers in Illinois is provided by Berg et al. (1984).

Subsidence

Subterranean mining of the Herrin Coal Member of the Carbondale Formation occurred in the northeastern portion of this quadrangle in Sections 7, 8, and 18, T6N, R7W, between the late 1800s and 1944 (Chenoweth and Louchios 2004). Land subsidence by collapse of these mines can be a serious potential problem for developers and construction projects (Treworgy and Hindman 1991).

Acknowledgments

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Cross Sections

Diamicton, loess, or other fine-grained sediment

Laminated silt and clay

Mainly sand; may contain some gravel

Contact

Inferred contact

Horizontal scale: 1 inch = 2000 feet
Vertical scale: 1 inch = 100 feet
Vertical exaggeration: 20×

dg Disturbed ground
e Equality Formation
pl Pearl Formation
b-o Omphghent member Banner Formation
To Oak Formation
c Cahokia Formation
pr Peoria and Roxana Silts
g Glasford Formation
b-c Canteen member Banner Formation
Bedrock