SURFICIAL GEOLOGY OF WILLIAMSON COUNTY, ILLINOIS

Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

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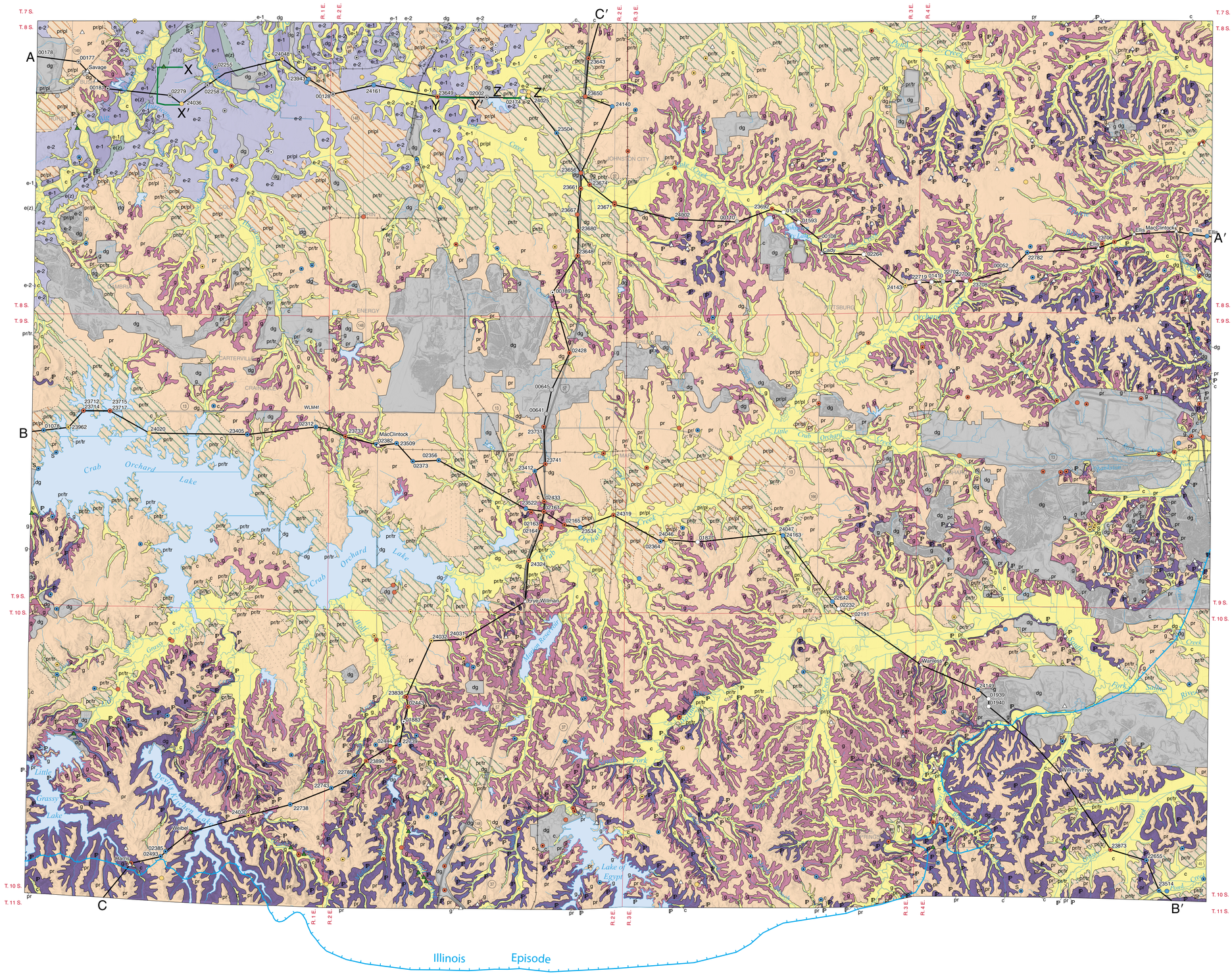
2020

STATEMAP Williamson County-SG



SCALE 1:62,500

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 6 7 KILOMETERS

Base map compiled by Illinois State Geological Survey from digital data (2019 TIGER/Line Shapefiles) provided by the United States Census Bureau. Hillshade from 2011 LiDAR elevation data. Transverse Mercator Projection. North American Datum of 1983.

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ILLINOIS
Illinois State Geological Survey

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ADJACENT COUNTIES
1 Franklin
2 Hamilton
3 Saline
4 Pope
5 Johnson
6 Union
7 Jackson
8 Perry

APPROXIMATE MEAN DECLINATION, 2018

ROAD CLASSIFICATION

Interstate Route
State Route
U.S. Route
Local road

Geology based on field work and data compilation by David A. Grimley, 2019-2020; and Leon R. Follmer, and W. John Nelson, 2001-2004.

Digital cartography by Deette Lund, Emily Bunse, Katie Mandera, and Jennifer Carrell, Illinois State Geological Survey.

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This map has not undergone the formal Illinois Geologic Quadrangle map review process. Whether or when this map will be formally reviewed and published depends on the resources and priorities of the ISGS.

QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON EPISODE (~12,000 years before present (B.P.) to today)		
Fill or removed earth; various sediment types; generally, but not exclusively, fine-grained; up to 50 feet thick	Disturbed ground: dg	**Anthropogenic fill or excavations**; much of this area in associated with former strip mines for coal (excavations or fill); also includes interstate interchanges, railroad and road embankments, earthen dams, and other areas of industrial activity or waste material
Mainly silt, silty clay and fine sand; brown to grayish brown, weakly to well stratified; includes some coarser beds; mainly noncalcareous; up to 25 feet thick	Cahokia Formation: c	**Alluvium** (stream deposits); in floodplains of large and small valleys, including the Big Muddy River, South Fork Saline River, and Crab Orchard Creek valleys, as well as numerous tributary valleys; up to 3 feet of post-settlement alluvium
WISCONSIN EPISODE (~60,000–12,000 years B.P.)		
Silt loam to silty clay with some fine sand beds; tan to grayish brown, massive to laminated; leached to calcareous; some secondary carbonate accumulations; may contain mollusk shells (<1 cm) or conifer wood fragments below 10 to 15 feet depth; lower part of e-2 (Cottage Grove Member; typically below 350 feet asl) can be reddish-brown and more clayey than upper unit; up to 80 feet thick in total	Equality Formation (low terrace): e-1 (high terrace): e-2	**Lake deposits**; mainly as slackwater or shoreline deposits in Glacial Lake Muddy during peak last glacial Mississippi River aggradation; the low terrace typically ranges from 370 to 380 feet elevation and the high terrace typically from 383 to 395 feet elevation in the Big Muddy River Valley of Williamson County; terraces covered by ~1 to 2 feet of loess
Silt and fine sand; brown to yellowish brown; predominantly coarse silt to very fine sand (low clay); brown, massive to stratified; mainly noncalcareous; thickness unknown, but may be in repeated sequences up to 25 feet thick in total	Equality Formation (silty facies): e(z)	**Natural levee or shoreline deposits**; in gentle, low ridges within the Big Muddy River Valley; a facies of the Equality Formation high terrace (e-2) deposits
Silt loam; massive; upper 3/5 of unit is typically more yellowish brown to grayish brown (Peoria Silt); lower portion has pinkish-brown hue (Roxana Silt); noncalcareous (leached); up to 12 feet thick; mapped where > 5 feet thick; contains modern soil in upper few feet	Peoria and Roxana Silts: pr	**Loess (windblown silt)**; blankets uneroded uplands; thins eastward from Mississippi Valley bluffs; thickest on uplands in southwestern Williamson County; Peoria and Roxana Silts are not distinguishable in the field where thin
ILLINOIS AND SANGAMON EPISODES (~150,000–60,000 years B.P.)		
Silty clay to silt loam to clay loam; brown to light olive brown to gray; may contain fine sandy or loamy beds; rare pebbles; mottling or redox features in upper portion; noncalcareous; can be crudely laminated where less altered; up to 15 feet thick (too thin to clearly show on cross sections in many areas)	Berry Clay Member Pearl or Glasford Formation (cross sections only): pl-bc	**Accretionary deposits, lake deposits, and loess**; upper portions contain pedogenic alteration of the Sangamon Geosol (interglacial); can be an upper member of either the Pearl Formation or Glasford Formation
ILLINOIS EPISODE (~190,000–130,000 years B.P.)		
Fine to medium sand with some zones of gravelly coarse sand; brown to grayish brown; stratified to unaltered zones; may include loamy, silty sand, silty or clayey zones; may have iron oxide stains; leached to calcareous; up to 40 feet thick	Pearl Formation (Mascoutah facies) (cross sections only): pl (on map where buried below loess): pr/pl	**Outwash** (proglacial meltwater deposits); in loess-covered terraces mainly within the Big Muddy and Crab Orchard Creek river valleys, locally elsewhere; terraces mostly have surface elevations ~ 395 to 410 feet asl; may contain paleosol in upper portions of unit
Silt loam to silty clay loam, some fine sand beds; brown to gray; stratified to massive, generally laminated; leached to calcareous; contains Sangamon Geosol alteration in upper part (may locally include Berry Clay Member); up to 40 feet thick	Teneriffe Silt (cross sections only): tr (on map where buried below loess): pr/tr	**Lake sediment or loess**; underlies loess-covered terraces in the Big Muddy and Saline River Basins; deposited in slackwater lakes (related to Mississippi or Wabash Valley aggradation) or in ice-marginal proglacial or ice-blocked lakes; loess deposits are typically thin; loess-covered terraces have surface elevations of 400 to 450 feet asl; may contains paleosol in upper portions
Pebbly silt loam to silty clay loam to loam diamicton (mixture of clay, silt, sand, and gravel); yellowish brown to dark grayish brown to gray; generally massive; includes some sand and gravel lenses; leached and weathered in upper several feet (Sangamon Geosol), calcareous and more stiff at depth; up to 90 feet thick (in bedrock valley fill)	Glasford Formation (< 5 feet of loess cover): g	**Till and ice marginal deposits**; includes subglacial and supraglacial deposits; contains Sangamon Geosol alteration in upper 5 to 10 feet; unit is thin on bedrock highlands and thick within infilled preglacial bedrock valleys; does not occur in subsurface beyond the mapped glacial limit in SW and SE part of county
Fine sand to gravelly sand; yellowish brown to grayish brown; stratified; calcareous; up to 25 feet thick	Grigg tongue, Pearl Formation (cross sections only): pl-g	**Outwash**; proglacial deposits from advancing Illinois Episode glaciers; subsequently buried by Glasford Formation
Silt loam to silty clay loam to silty clay; massive to weakly stratified; brown to grayish brown to gray; calcareous to leached; locally may contain conifer wood or small mollusk shells (< 1 cm); up to 20 feet thick	Petersburg Silt: pb	**Lake sediment or loess**; mainly in slackwater lakes (from aggradation in Mississippi or Wabash River valleys) or ice-marginal proglacial lakes (from ice blockage); loess deposits are typically more limited in thickness
YARMOUTH EPISODE (~420,000–190,000 years B.P.); no deposits recognized		
PRE-ILLINOIS EPISODE (~700,000–420,000 years B.P.)		
Pebbly silty clay loam to silt loam diamicton; generally massive; may include sand and gravel lenses or zones of stratified fine-grained deposits; leached to calcareous; up to 15 feet thick (presence of this unit is unconfirmed)	Banner Formation (cross sections only): b	**Till and ice marginal deposits**; may include lake sediment or glaciofluvial sediment; may include Yarmouth Geosol alteration in upper part; may also locally include preglacial alluvium, colluvium, or residuum

PRE-QUATERNARY DEPOSITS

Description	Unit	Interpretation
Shale, siltstone, mudstone, sandstone, limestone, coal or underclay; laminated, bedded or massive; up to 50 feet thick in exposures; upper portion may be more weathered; rocks may contain marine or terrestrial fossils	Pennsylvanian bedrock: IP	**Bedrock outcrops or bedrock within 5 feet of land surface;** most common in southern and eastern areas of the county; includes Pennsylvanian rocks in the Shelbourne-Patoka, Carbondale or Caseyville Formations

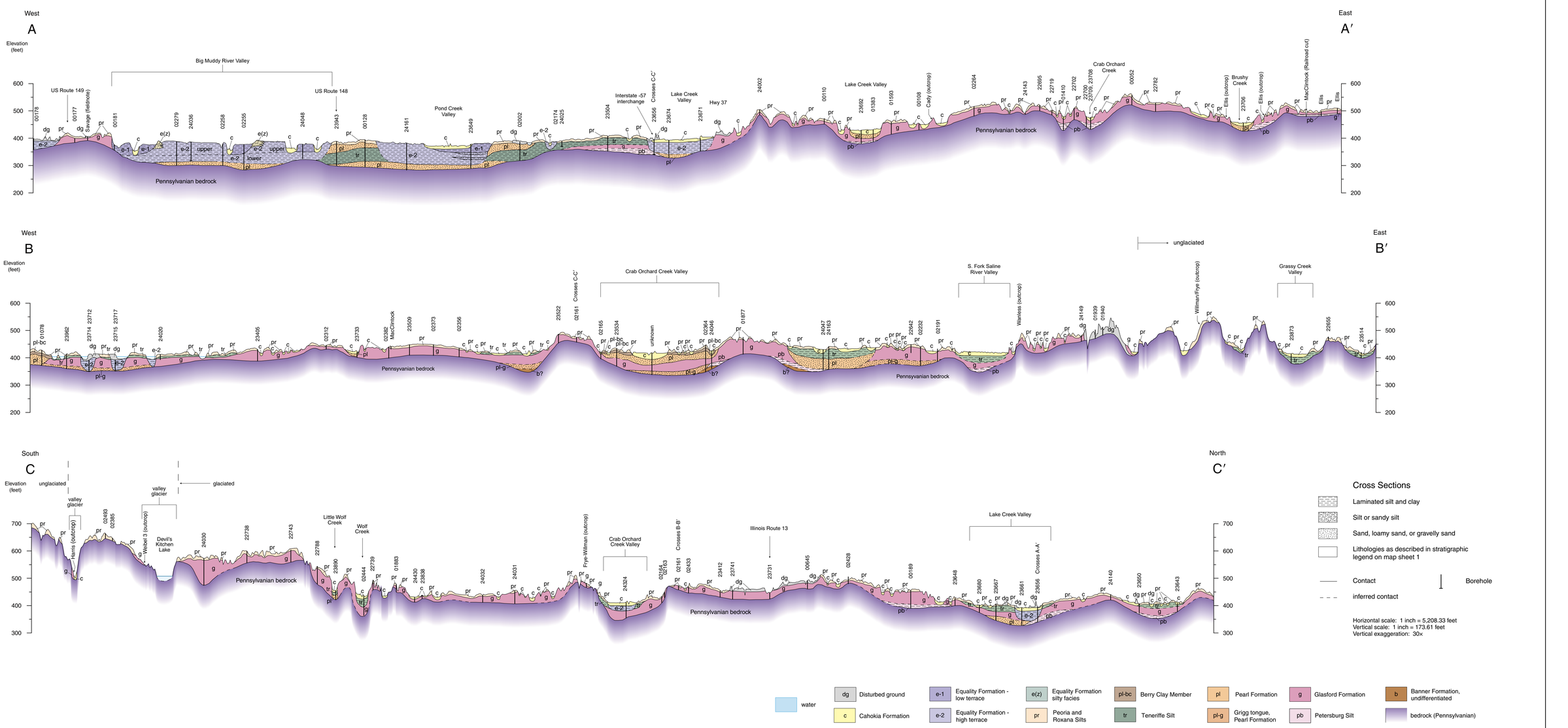
Data Type

- Outcrop
- Outcrop from field notes (ISGS Archives)
- Stratigraphic boring
- Water-well boring
- Engineering boring
- Coal boring
- Other boring, including oil and gas

S 26211 — Labels indicate samples (s) from borings, and boring/outcrop labels indicate the county number or other database ID. A dot inside the symbols indicates the boring or outcrop extends to bedrock.

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

- Contact
- Inferred contact
- Buried contact
- Limit of significant glacial advance, hachures on side of advancing ice
- Z — Z′ Electrical resistivity profile line (profiles shown in Fig. 1 of report)
- A — A′ Line of cross section



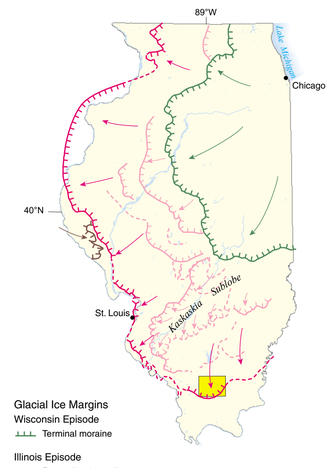


Figure M1 Glacial ice margins in Illinois during the middle to late Pleistocene. The location of Figure M2 is outlined in black. Arrows indicate approximate glacial ice flow directions.

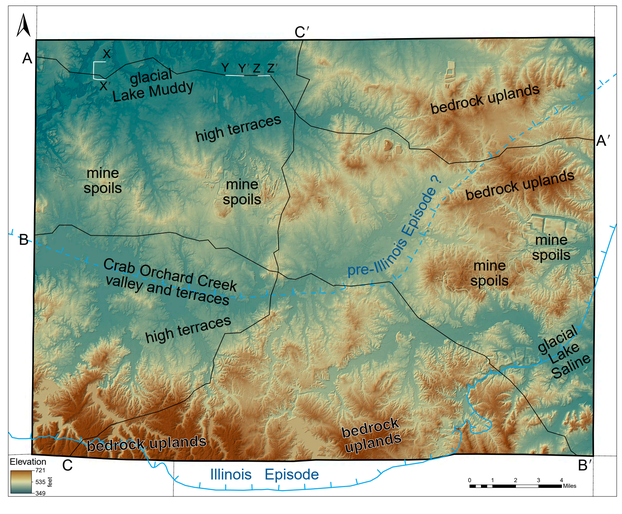


Figure M2 Digital elevation map (with hillshade) of Williamson County, highlighting key geomorphic features. This map is based on 2011 lidar elevation data acquired from the ISGS Clearinghouse (original data from Federal Emergency Management Agency).

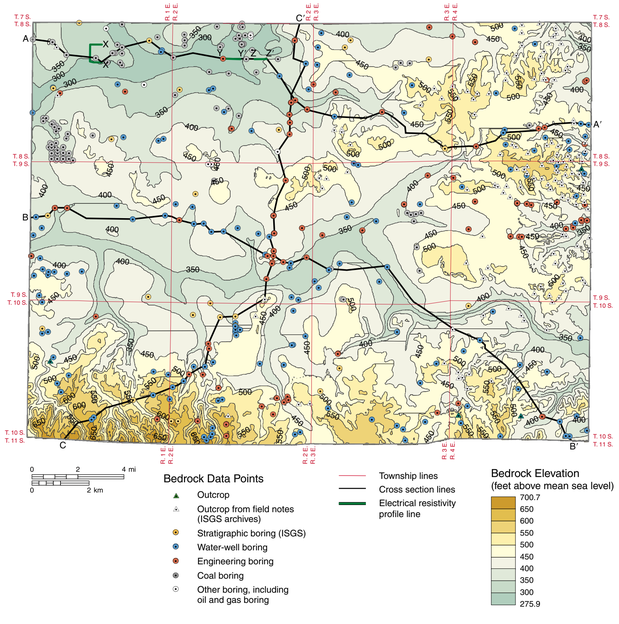


Figure M3 Bedrock topography of Williamson County. Localities of all data that reliably indicate the bedrock surface are shown (many of of the oil and gas type data are not shown on the surficial map). Map scale is 1:200,000.

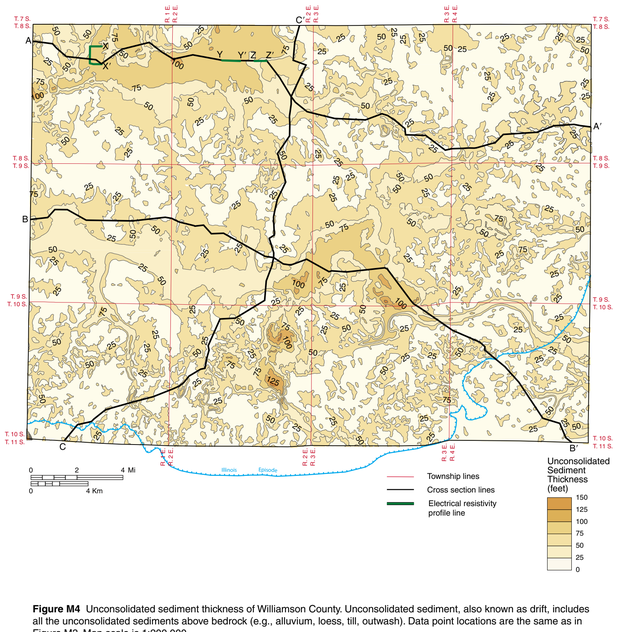


Figure M4 Unconsolidated sediment thickness of Williamson County. Unconsolidated sediment, also known as drift, includes all the unconsolidated sediments above bedrock (e.g., alluvium, loess, till, outwash). Data point locations are the same as in Figure M3. Map scale is 1:200,000.