Drift Thickness of Oak Hill Quadrangle
Peoria County, Illinois

Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

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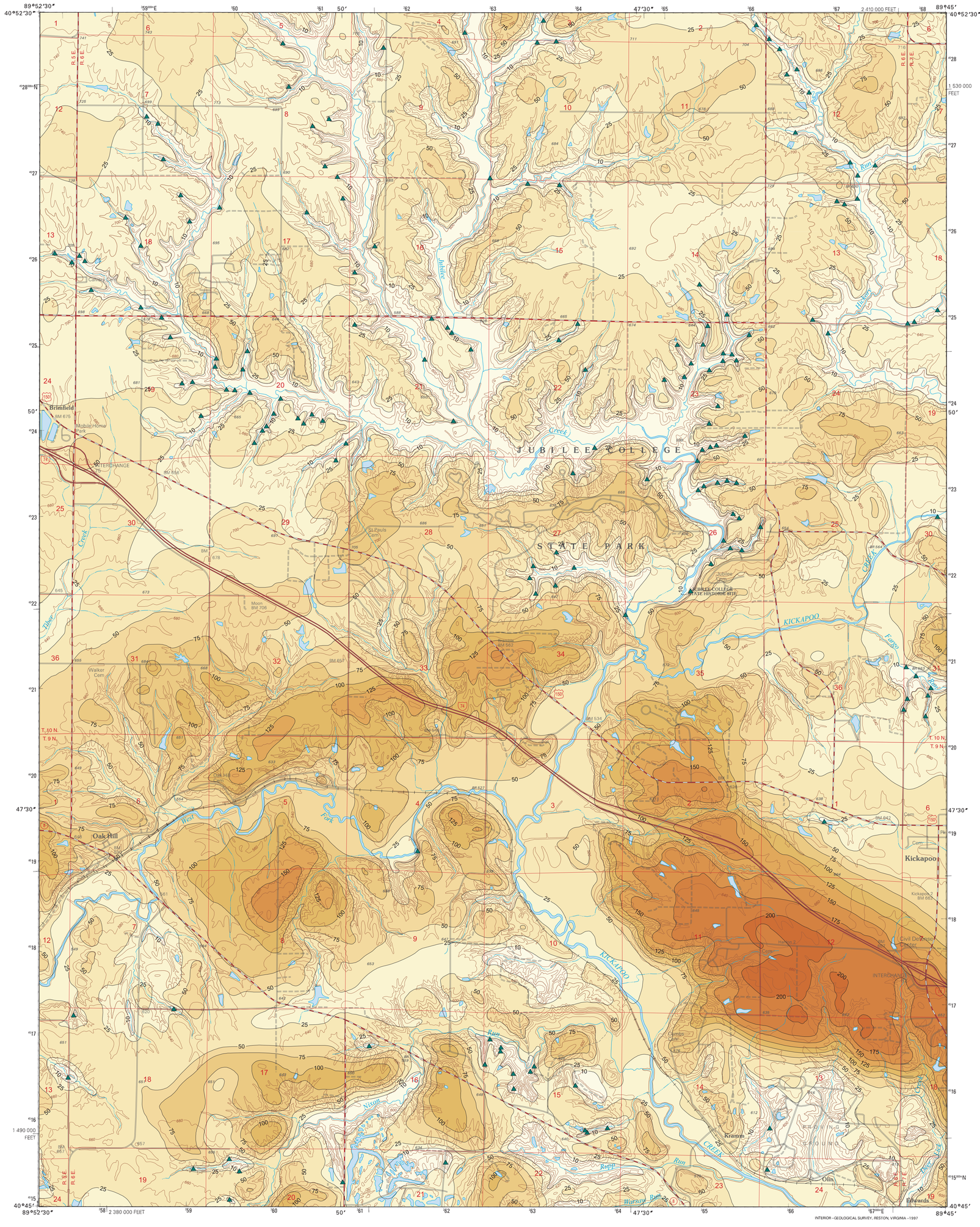
2007

Illinois Geologic Quadrangle Map
IGQ Oak Hill-DT



Base map compiled by Illinois State Geological Survey from digital data provided by the United States Geological Survey. Surface topography and planimetry compiled from imagery dated 1994. Digital base created 1996.

North American Datum of 1983 (NAD 83)
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 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

BASE MAP CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Released by the authority of the State of Illinois: 2007

Geology based on data collection and analysis by C.P. Weibel and F. Hardy, 2000–2001.

Digital cartography by C.P. Weibel, T. Goeppinger, J. Carrell, Z. Golshani, and J. Domier, Illinois State Geological Survey.

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ADJOINING QUADRANGLES
1 Laura
2 Princeville
3 Edelstein
4 Elmwood
5 Dunlap
6 Farmington East
7 Hanna City
8 Peoria West

APPROXIMATE MEAN DECLINATION, 2007

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U.S. Route
State Route

Drift Thickness

This map depicts the thickness of Quaternary-age drift (glacial and postglacial sediment) that lies over Pennsylvanian bedrock (Carbondale Formation) in the Oak Hill Quadrangle. Drift is composed mostly of till (an unsorted and nonstratified mixture of clay, silt, sand, and rock clasts), outwash (sorted and stratified silt, sand, and gravel) and lacustrine deposits (clay and silt), and loess (wind-blown silt and fine sand). These sediments were deposited during the last two major episodes of glaciation over the last 500,000 years. Earlier Illinois Episode till blankets most of the quadrangle. An end moraine marking the westernmost extent of glaciers during Wisconsin Episode glaciation lies near the eastern edge of the quadrangle (fig. 1). Glacial outwash and loess (not shown on fig. 1), however, were deposited within the Oak Hill Quadrangle during this episode.

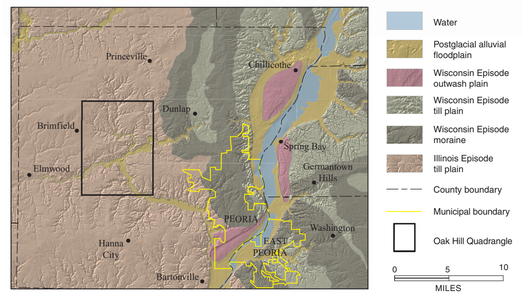

Figure 1 Surficial geology and shaded relief map (derived from a digital elevation model) of the Oak Hill Quadrangle area. The quadrangle (black outline) lies near the edge of Wisconsin Episode glacial deposits. Modified from Illinois State Geological Survey (2000), Luman et al. (2003), and Willman and Frye (1970).

The thickness of the drift, which includes the modern soil, varies considerably across the quadrangle. The thickest drift, more than 200 feet, is present within a prominent southeast-trending bedrock valley near the southeastern corner of the quadrangle in Sections 11, 12, and 13, T9N, R6E. This bedrock valley generally parallels Kickapoo Creek, located just to the southwest. There are additional thick deposits of drift within the valley of the West Fork of Kickapoo Creek in the southwestern part of the quadrangle. Just over one-tenth of the quadrangle is covered by drift greater than 100 feet thick, all in the southern half. Drift that is 50 feet thick or less covers about two-thirds of the quadrangle. In this area small exposures of bedrock are numerous, cropping out primarily along streams and gullies. The considerable variation in drift thickness is mostly due to the irregular surface of the underlying bedrock (fig. 2). The modern land surface has less relief than the bedrock surface, but areas recently incised by Kickapoo Creek and its tributaries are evident in the thickness contours of this map. Contours of the drift thickness also reflect the many small water bodies in the quadrangle.

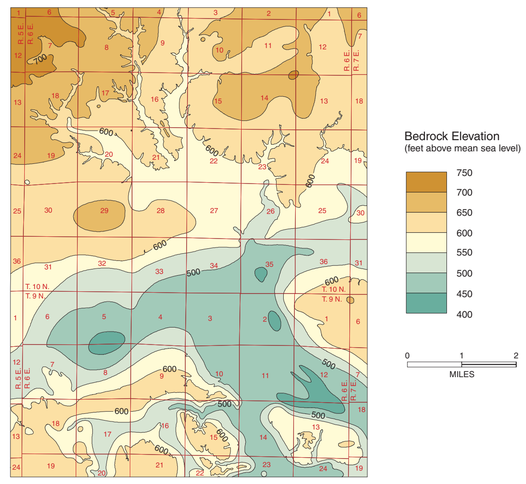

Figure 2 Topographic map of the bedrock surface of the Oak Hill Quadrangle. Contour interval is 50 feet. Simplified from Weibel and Hardy (2007).

Map Use

The drift thickness map provides information that is useful in exploring for sand and gravel deposits within the Quaternary-age sediments. Thick sand and gravel deposits that infill bedrock valleys commonly are sources of abundant groundwater. Near-surface sand and gravel deposits may also be a source of construction aggregate. Drillers, engineers, and geoscientists can use this map to predict the depth to bedrock.

Mapping Methods

This map was derived using data from topographic maps (digital elevation models [DEMs]) of the bedrock surface (fig. 2) and the land surface. A 5-meter (16.4-foot) DEM of the land surface was prepared at the Illinois State Geological Survey using high resolution digital data provided by the Tri-County Regional Planning Commission. The digital data of the land surface include the elevations of the surfaces of water bodies. The ArcGIS Spatial Analyst raster calculator tool was used to subtract the elevations in the DEM of the bedrock surface (Weibel and Hardy 2007) from the DEM of the land surface. Because the land surface DEM has a resolution that is significantly better than that of the more generalized bedrock surface DEM, this resultant grid (cell size of about 164 feet) was skewed toward the higher resolution DEM. In other words, most of the topographic details in the resultant grid and its contours are derived from the land surface and few are from the bedrock surface. The initial contours were derived from the resultant grid using ArcGIS's Surface Analysis Contour tool. These contours were manually edited to better fit the geological interpretation of the drift thickness of the quadrangle.

Weibel and Hardy (2007) included an inset map displaying locations of data used to derive the digital grid of the bedrock surface. The map was based on field data and data from subsurface borings held at the Geological Records Unit of the Illinois State Geologic Survey. The data consist of 161 field observations and 617 borings, including logs of water wells, engineering and structure borings, and ISGS stratigraphic test borings. Twenty data points derived from seismic refraction analyses were also used. This data map is also relevant to the drift thickness map.

References

Illinois State Geological Survey, 2000, Surficial deposits of Illinois [map], digitally adapted by B.J. Stiff; compiled from J.A. Lineback 1979; M.M. Killey and J.A. Lineback 1983; R.C. Berg et al. 1984, 1985; and A.K. Hansel and H. Johnson 1996: Illinois State Geological Survey, Open File Series 2002-7, 1:5,000,000.

Luman, D.E., L.R. Smith, and C.C. Goldsmith, 2003, Illinois surface topography: Illinois State Geological Survey, Illinois Map 11.

Weibel, C.P., and F. Hardy, 2007, Bedrock topography of Oak Hill Quadrangle, Peoria County, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Oak Hill-BT, 1:24,000.

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Drift Thickness
(feet)
225
200
175
150
125
100
75
50
25
10
0

Data Type
Bedrock outcrop