

PRELIMINARY SURFICIAL GEOLOGY OF THE SEDGWICK COUNTY PORTION OF THE ANDOVER QUADRANGLE, KANSAS

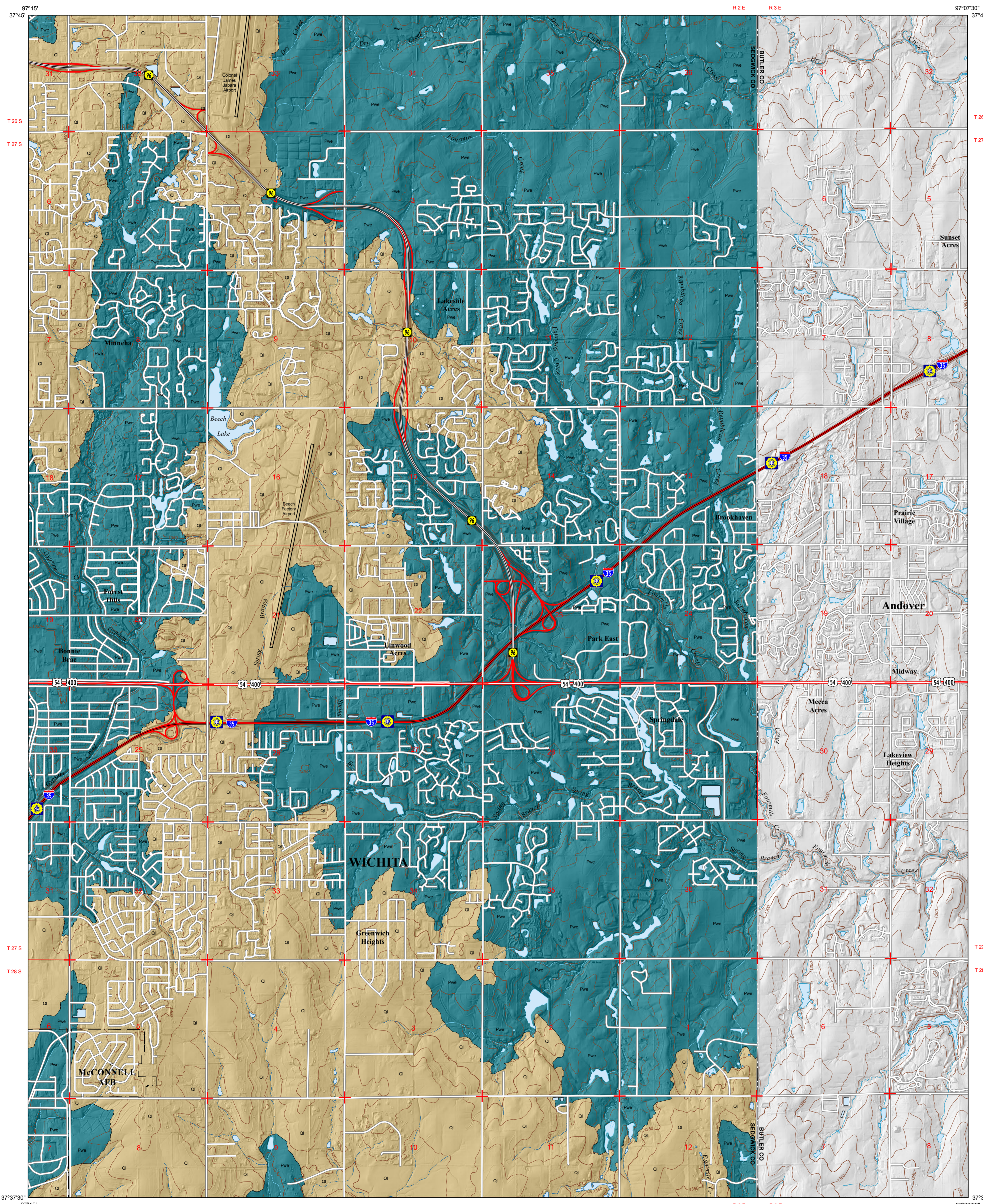
by William C. Parcell, Garet L. Dinkel, Spencer D. Post, and John W. Dunham

2018

Cartographic assistance by Emily G. Bunse

Open-File Report 2018-10

Funded in part by the
USGS National Cooperative
Geologic Mapping Program



GEOLOGIC UNITS
CENOZOIC
Quaternary System
Pleistocene-Holocene

Loess — Loess sediments in Sedgwick County are wind-deposited tan to pink-tan calcareous silt with zones of caliche and fine sand (Bevans, 1989). Loess ranges from Pleistocene to Holocene in age. These deposits cover upland areas (Welch and Hale, 1987) and are considered a mappable unit where loess exceeds 10 feet in thickness, coinciding with a visible rise in landscape of 10 to 20 feet. In the mapping areas, loess deposits occur below soils, reaching 5 feet thick, and sit unconformably above the Permian Wellington Formation.

PALEOZOIC
Permian System
Leonardian Series

Wellington Formation — The Wellington Formation in Sedgwick County is predominately soft calcareous gray and blue-gray shale with thin beds of gypsum, argillaceous limestone, and minor siltstone near the surface (Ver Wiebe, 1937). In Sedgwick County, minor beds of gypsum crop out where the Wellington is exposed along riverbanks or lakes. The thick Hutchinson Salt Member, present in western Sedgwick County (Bass, 1929), is not exposed in the eastern portion of the county where the salt truncates due to dissolution (Schumaker, 1966). Thin beds of the Carlton Limestone Member, a lenticular dolomitic limestone with fossil invertebrates, are known to crop out in the eastern portion of the mapping area (Williams and Lohman, 1949). The uppermost member of the Wellington, the Milan Limestone Member, is not present in central Kansas, and the contact between the Wellington and overlying Ninneschale Shale is determined from the change in color from a gray to brick red shale (Zeller, 1968). The Wellington Formation in the western Kansas subsurface can be up to 700 feet thick, but in south-central Kansas, the exposed formation is 150 to 200 feet thick (Williams and Lohman, 1949). Outcrops of Wellington closely follow drainage system patterns where streams have cut through loess deposits to expose the underlying bedrock. In non-drainage areas, the Wellington is overlain by either Quaternary alluvium deposits or Pleistocene loess.

CITED REFERENCES

Bass, N. W., 1929, The geology of Cowley County, Kansas: Kansas Geological Survey, Bulletin 12, 203 p.
 Bevans, H. E., 1989, Water resources of Sedgwick County, Kansas: U.S. Geological Survey, Water Resources Investigations Report 88-4225, 119 p.
 Schumaker, R. D., 1966, Kansas Permian evaporite formations: unpublished M.S. thesis, Department of Geology, Wichita State University, Wichita, Kansas, 87 p.
 Ver Wiebe, W. A., 1937, The Wellington formation of central Kansas: Municipal University of Wichita, Bulletin, vol. 12, no. 5, 18 p. [University Studies, Bulletin, no. 2]
 Welch, J. E., and Hale, J. M., 1987, Pleistocene loess in Kansas — Status, present problems, and future considerations; in Quaternary Environments of Kansas, W. C. Johnson, ed., Kansas Geological Survey, Guidebook Series 5, p. 67-84.
 Williams, C. C., and Lohman, S. W., 1949, Geology and ground-water resources of a part of south-central Kansas, with special references to the Wichita municipal water supply, with analyses by Robert H. Hess and others: Kansas Geological Survey, Bulletin 79, 455 p.
 Zeller, D. E., ed., 1968, The stratigraphic succession in Kansas: Kansas Geological Survey, Bulletin 189, 81 p.; <http://www.kgs.ku.edu/Publications/Bulletins/189/index.html>.

EXPLANATION

- Boundaries and Locations**
- County boundary
 - Military installation boundary
 - Township range line
 - Section line
 - Section corner
- Transportation**
- Interstate highway — Kansas Turnpike
 - U.S. highway
 - State highway
 - Local road
 - Airport runway
- Hydrology and Topography**
- Perennial stream
 - Intermittent stream
 - Water body
 - Water body — manmade shoreline
 - Elevation contour (50-foot interval)
 - Elevation contour (10-foot interval)
 - Depression contour (50-foot interval)
 - Depression contour (10-foot interval)
- Geologic Unit Boundaries**
- Observed contact

Elevation contours are presented for general reference. Used in the U.S. Geological Survey's current US Topo 1:24,000-scale topographic map series, they were generated from hydrographically improved 1/3 arc-second National Elevation Dataset (NED) data and smoothed during processing for use at 1:24,000 scale. In some places, the contours may be more generalized than the base data used for compilation of geologic outcrop patterns. Outcrop patterns on the map will typically reflect topographic variation more accurately than the associated contour lines. Repeated fluctuation of an outcrop line across a contour line should be interpreted as an indication that the mapped rock unit is maintaining a relatively constant elevation along a generalized contour.

1/9 arc-second (3.4-meter) LIDAR hillshades and 1-meter U.S. Department of Agriculture — Farm Services Agency (USDA-FSA) National Agriculture Imagery Program (NAIP) 2009 digital imagery were used as references in the digital mapping. USGS 7.5-minute 1:24,000-scale topographic maps, USDA Natural Resources Conservation Service (NRCS) Web Soil Survey Geographic Database (SSURGO), and other geologic maps, bulletins, and GIS data were also used in the mapping. Roads and highways are shown on the base map as represented by data from the U.S. Census Bureau. U.S. Department of Agriculture — Farm Services Agency (USDA-FSA) National Agriculture Imagery Program (NAIP) imagery also was used to check road locations.

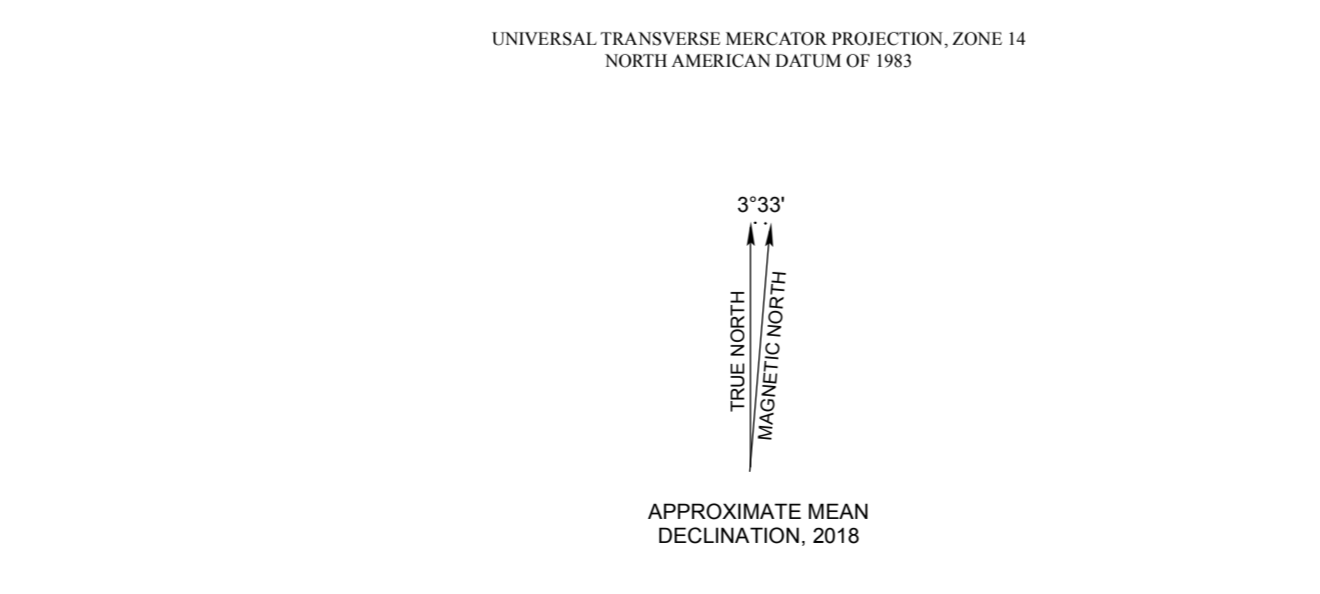
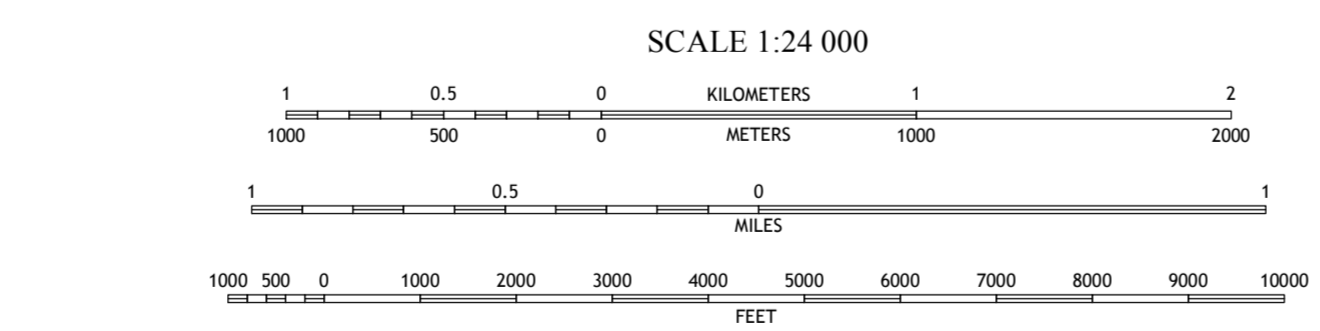
Shaded relief is based on 1-meter hydroflattened bare-earth DEMs from the State of Kansas LIDAR Database. The DEM images, in ERDAS IMAGINE format, were mosaicked into a single output DEM, downsampled to 2-meter resolution, and reprojected to decimal degrees. The output DEM was then converted to a hillshade, a multidirectional shaded-relief image using angles of illumination from 0°, 225°, 270°, and 315° azimuths, each 45° above the horizon, with a 4x vertical exaggeration.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, award number G17AC00261 (FY2017).

This map was produced using the ArcGIS system developed by Esri (Environmental Systems Research Institute, Inc.). This map is a preliminary product and has had less scientific and cartographic review than the Kansas Geological Survey's M-series geologic maps. KGS does not guarantee this map to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations made from the map or decisions based thereon.

SUGGESTED REFERENCE TO THE MAP

Parcell, W. C., Dinkel, G. L., Post, S. D., and Dunham, J. W., 2018, Preliminary surficial geology of the Sedgwick County portion of the Andover quadrangle, Kansas: Kansas Geological Survey, Open-File Report 2018-10, scale 1:24,000, unpublished.



UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 14
NORTH AMERICAN DATUM OF 1983

TRUE NORTH
MAGNETIC NORTH

APPROXIMATE MEAN DECLINATION, 2018