PRELIMINARY SURFICIAL GEOLOGY OF THE WICHITA EAST QUADRANGLE, SEDGWICK COUNTY, KANSAS

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

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Cartographic assistance by Emily G. Bunse

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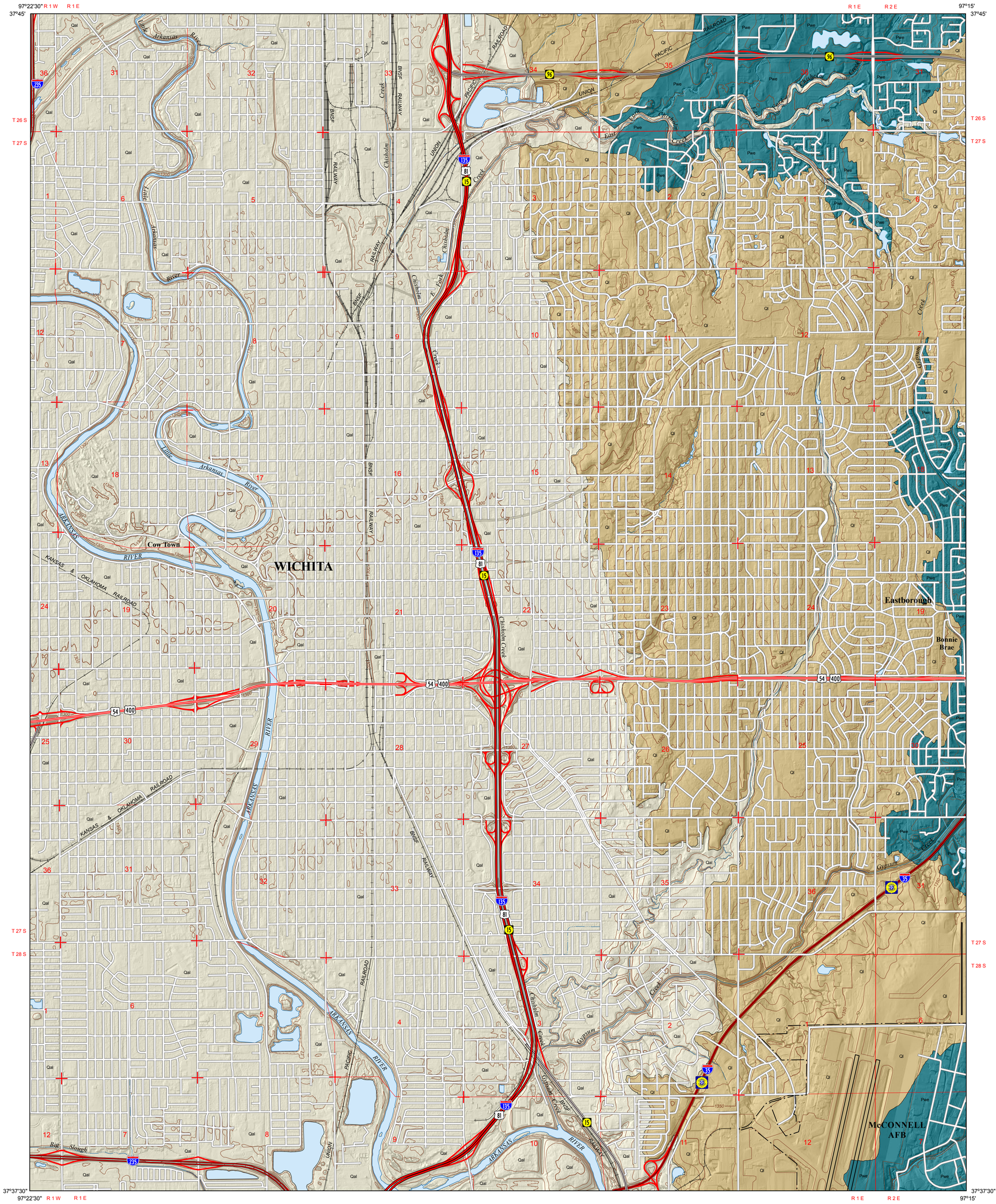

GEOLOGIC UNITS

CENOZOIC

Quaternary System
Pleistocene-Holocene

Qal

Alluvium — Alluvium in Sedgwick County is fine to coarse sand and fine to coarse arkosic gravel containing minor amounts of silt and clay that grade upward into clayey silt. Alluvium from the Arkansas River is composed of unconsolidated gravel, sand, and silt and has an estimated thickness of 75 feet (Williams and Lohman, 1949). Pleistocene-age alluvium is present to a depth of nearly 50 feet and Pleistocene to possibly Pliocene alluvium to a depth of more than 180 feet total (Lane and Miller, 1965). Alluvium is of Quaternary age and lines the floodplain of the Little Arkansas River with limited extension up smaller creeks. In certain areas, alluvium may form low terraces 10–20 feet above the floodplain (Aber, 1991). Alluvial sediment in smaller creeks is composed of finer sediment and variable in lithology (Moore, Jewett, and O'Connor, 1951) and sourced from weathering and erosion of silt, shale, and carbonates in the Permian Wellington and Pleistocene loess.

Ql

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

Pwe

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 insects, 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 Ninnescah 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

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EXPLANATION

Boundaries and Locations

- Military installation boundary
- Township/range line
- Section line
- Section corner

Transportation

- Interstate, U.S., and state highway
- Interstate and U.S. highway
- Interstate highway – Kansas Turnpike
- U.S. highway
- State highway
- Local road
- Railroad
- 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 Wichita East quadrangle, Sedgwick County, Kansas: Kansas Geological Survey, Open-File Report 2018-11, scale 1:24,000, unpublished.

SCALE 1:24 000

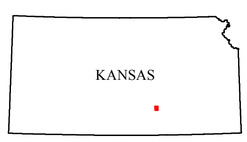
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000

1 0.5 0 1
MILES

1000 500 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

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

APPROXIMATE MEAN DECLINATION, 2018



QUADRANGLE LOCATION

Maize	Valley Center	Greenwich
Wichita West	Wichita East	Andover
Bayneville	Derby	Rose Hill

ADJOINING 7.5′ QUADRANGLES