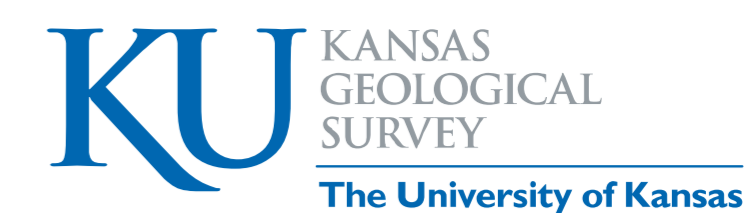


PRELIMINARY SURFICIAL GEOLOGY OF THE GODDARD QUADRANGLE, SEDGWICK COUNTY, KANSAS

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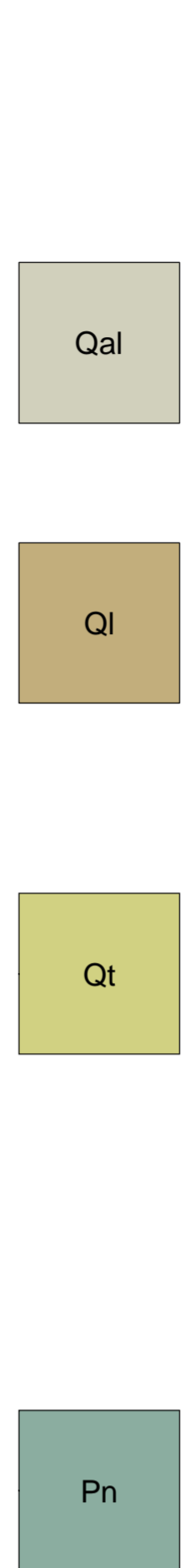
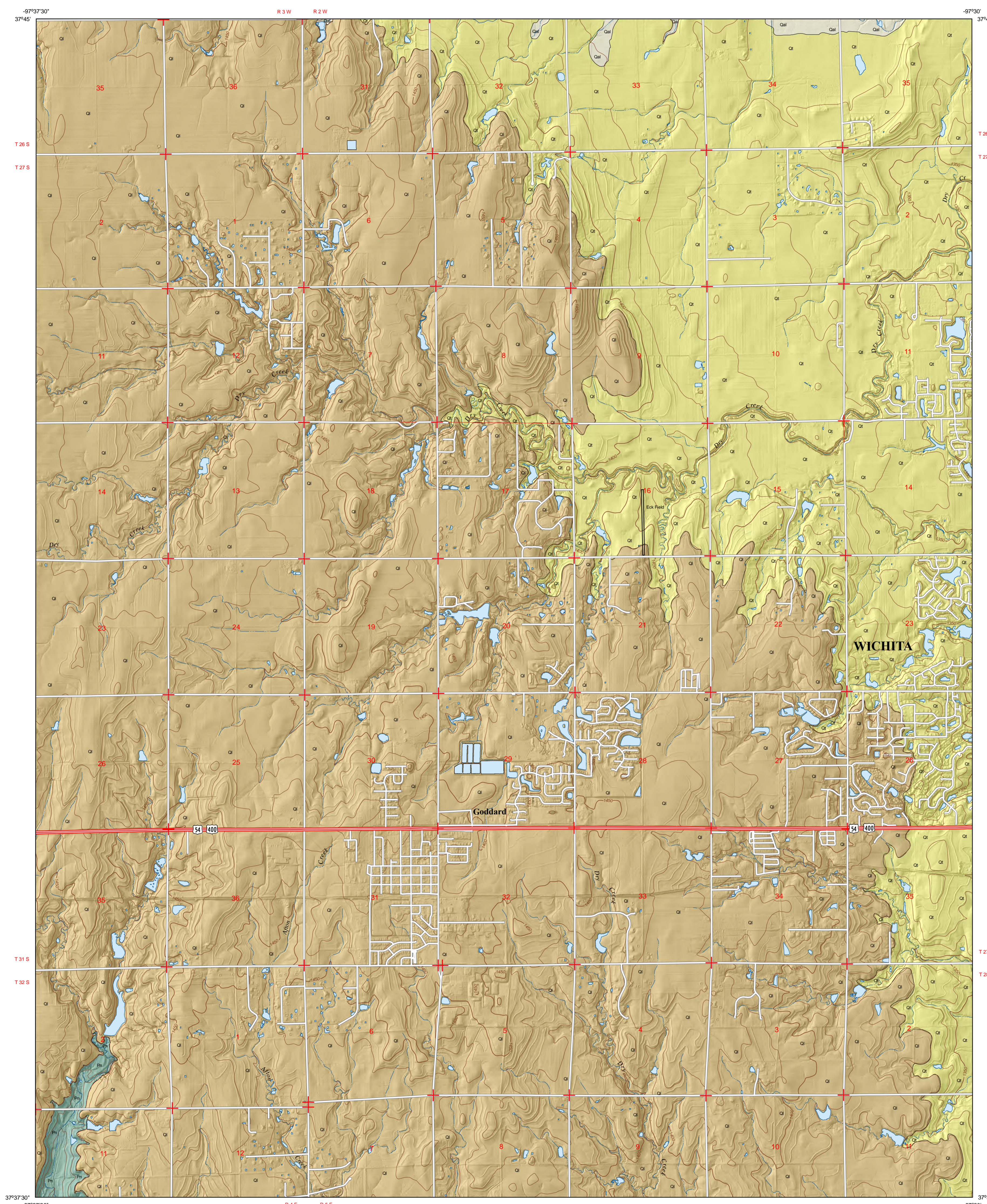
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GEOLOGIC UNITS CENOZOIC

Quaternary System
Pleistocene-Holocene

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 ft (23 m) (Williams and Lohman, 1949). Pleistocene-age alluvium is present to a depth of nearly 50 ft (15 m) and Pleistocene to possibly Pliocene alluvium to a depth of more than 180 ft (55 m) 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 (0-20 ft (3-6 m) above the floodplain (Aber, 1991). Alluvial sediment in smaller creeks is composed of finer sediment and variable in lithology (Moore et al., 1951) and sourced from weathering and erosion of silt, shale, and carbonates in the Permian Wellington Formation and Pleistocene loess.

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 ft (3-6 m). In the mapping areas, loess deposits occur below soils that reach 5 ft (1.5 m) thick and sit unconformably above the Permian Wellington Formation.

Alluvial terrace deposits — The terrace deposits in Sedgwick County consist of unconsolidated alluvial and floodplain sediments in the Arkansas River floodplain (Lane and Miller, 1965). Terraces are predominantly gravel, sand, clay, and silt varying in thickness and occasionally form clay and silt lenses (Bayne and O'Connor, 1968). In nearby Cowley County, the lower part consists of silt, clay, and arkosic sand and gravel with predominantly arkosic gravel along larger river valleys (Bayne, 1962). Sand and gravel beds are also known to contain clay and silt lenses locally (Bayne and O'Connor, 1968). Loess-derived silts, largely yellowish to reddish-brown in color, are found in the upper portion of these terrace deposits. These loess-derived deposits are on the order of 40 ft (12 m) thick in the Sedgwick County area (Lane and Miller, 1965). Later rejuvenation of the Arkansas River caused the river's incision into earlier terrace and alluvial deposits. This process deposited arkosic sand and gravel and subsequently silt and clay deposits (Bayne, 1962). In south-central Kansas, this formation is derived from Paleozoic and Mesozoic deposits and can reach 55 ft (17 m) in thickness (Bayne, 1962).

PALEOZOIC Permian System

Leonardian Series

Nimnesch Shale — The Nimnesch Shale in Sedgwick County, Kansas, is composed largely of red shale and silt with minor green shale along with thin argillaceous limestone near the base (Williams and Lohman, 1949). Secondary veins of gypsum are present in the red and green shales (Walters, 1961). The Nimnesch forms bedrock under overlying Quaternary loess and soil. In south-central Kansas, the Nimnesch can be observed along tributaries to the Nimnesch River (Norton, 1939) and creates low relief with poor exposures. The formation conformably overlies the Wellington Formation, and the Kansas Geological Survey classifies the Nimnesch as the middle formation of the Summer Group, Leonardian Series (Zeller, 1968).

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EXPLANATION

- Boundaries and Locations**
- Township/range line
 - Section line
 - Section corner
- Transportation**
- U.S. highway
 - Local road
 - Unimproved 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 G18AC00197 (FY2018).

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., Swanson, W. J., Wernert, J. A., and Dunham, J. W., 2019, Preliminary surficial geology of the Goddard quadrangle, Sedgwick County, Kansas: Kansas Geological Survey, Open-File Report 2019-11, scale 1:24,000, unpublished.

