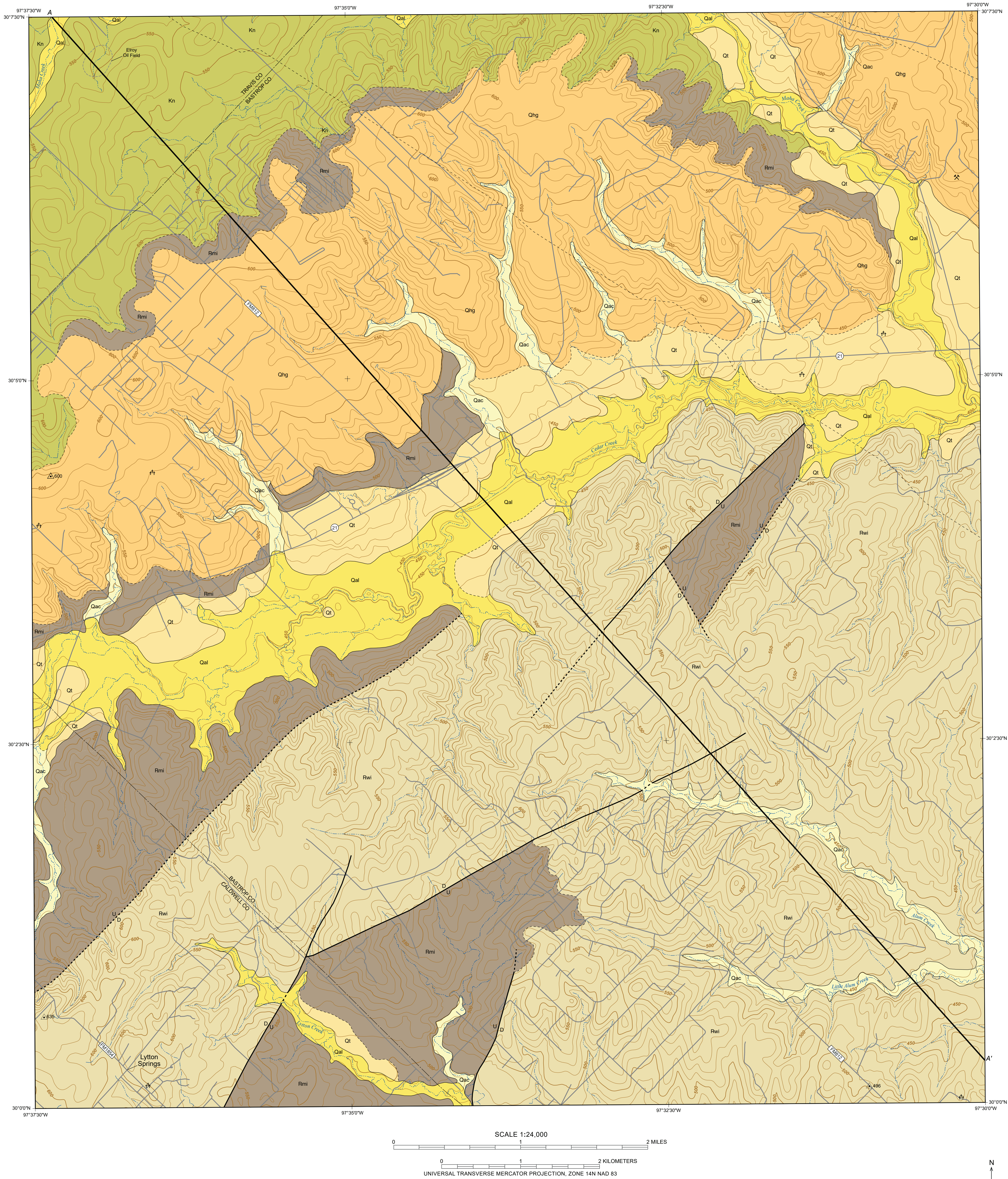




GEOLOGIC MAP OF THE LYTTON SPRINGS QUADRANGLE, TEXAS

C. M. Woodruff Jr. and Lucie Costard
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True North
Magnetic North
3.31°MN
Approximate 2020 Magnetic North
(MN) Declination

GEOLOGIC UNITS

QUATERNARY

- Qal—Quaternary alluvium:** Channel, floodplain, and adjacent low terraces mainly along Cedar Creek; unconsolidated sand, gravel, silt, and clay; dark-colored day-loam soil approximately 3 ft thick; estimated total thickness of unit is 15 ft.
- Qac—Quaternary alluvium and colluvium:** Stream-channel deposits along narrow valley bottoms and slope-wash and mass-movement deposits along valley sides; these processes are expressed as narrow, elongated valleys with concave-upward cross sections. Materials consist of silt, clay, and local sand, with some admixed gravel; local exposures along stream cuts; thicknesses estimated to be as much as 5 ft.
- Qt—Quaternary alluvial terrace:** Sand, gravel, and clay, unconsolidated to weakly cemented by caliche; low-relief, gently sloping terrain adjacent to floodplain and channel; terrace is locally cut by low-order tributaries; typical thicknesses range between 20 and 25 ft.
- Qhg—Quaternary high gravel:** Gravel with admixed sand, silt, and clay; poorly sorted and loosely consolidated to weakly cemented by caliche; clasts consist of chert, vein quartz, and limestone pebbles and cobbles derived from uplands of the Hill Country, Edwards Plateau, and Llano Uplift; variable thickness (up to about 40 ft) on dissected terrain along and south of the drainage divide between Maha Creek and Cedar Creek; soil cover is composed of stony clay. The gravel substrate may provide shallow (perched) groundwater resources as well as local aggregate (for road metal); one abandoned gravel pit is shown on the map.

PALEOGENE

- Rwi—Wilcox Group, undivided:** Mudstone, siltstone, and sandstone; mostly friable but may be weakly cemented in local areas; outcrops rare, owing to extensive soil and vegetative cover; total estimated thickness of unit (including subsurface extent) is more than 1,000 ft. Terrain consists of dissected, tree-covered hills cut by many low-order streams; topographic relief up to 150 ft; silty- and sandy-clay soils commonly 3–5 ft thick.
- Rmi—Midway Group, undivided:** Clay, sandy, micaceous and glauconitic, with lenses of glauconite and ferruginous and calcareous concretions (Gamer and Young, 1976; Collins, 2008). This material weathers to form a continuation of the thick, clay-loam Blackland Prairie soils that extend across the nearby Upper Cretaceous claystone units. The contact with the underlying Navarro Group represents the Cretaceous–Paleogene boundary (formerly known as the “K-T” boundary), which marks the interval of geologic time when an asteroid or comet hit the Earth with catastrophic results (demise of nonavian dinosaurs and many other life-forms). Despite the extraordinary geologic event that created this boundary between the Mesozoic and Cenozoic Eras, the contact is not well expressed in this area. Thick soil cover results in this contact being inferred on this map.

CRETACEOUS

- Kn—Navarro Group, undivided:** The dominant constituent of this unit is claystone composed mainly of montmorillonite with variable calcareous content as well as thin siltstone partings. These strata comprise a sequence, several hundred feet thick, underlying the rolling terrain of the Blackland Prairies (Barnes, 1974; Young, 1977). Formations and members that make up the Navarro Group cannot be discriminated, owing to extensive soil cover and overall similarities of substrate properties. This stratigraphic sequence represents open-marine environments that received long-term influx of volcanic ash, with similar substrate materials persisting as part of the overlying Midway Group. The ash deposits weathered to form the predominantly montmorillonite species of clay minerals. These substrates and their weathered surface soils are notorious for engineering problems (low strength, high shrink-swell, low permeability, and high corrosion potential). Thick, dark-colored clay soils are notable as prime agricultural land, typical of the Blackland Prairies of Central Texas.

Map Symbols

- Geologic contact, dashed where approximate
- USGS topographic contour showing elevation (feet above MSL). Contour interval = 10 ft.
- Road
- Intermittent stream
- Fault—showing sense of motion.
U = upthrown block; D = downthrown block.
Dashed where inferred.
- Pipeline
- County Boundary
- Cross section line
- Oil field
- Gravel pit
- Cemetery
- Benchmark

Acknowledgments

The mapping of this quadrangle entailed analyses of aerial photographs, review of existing mapping, and fieldwork. The topographic base was created from digital files of the Texas Natural Resources Information System (TNRIS) for the U.S. Geological Survey’s Lytton Springs, Texas, 7.5-minute topographic quadrangle map. Digital files of roads, county boundaries, drainage, and lakeshores were also obtained from TNRIS. Subsurface data from water wells and petroleum-exploration wells available from online databases of the Texas Water Development Board (TWDB) provided information on thickness of Quaternary high gravels, thereby allowing estimates of depth to the base of those high gravel deposits. Lidar coverage for the quadrangle (at 50-cm resolution) was obtained from Strategic Mapping Program (StratMap) Central Texas Lidar, 2017-01-01. Web. 2021-01-22. Computer graphics work done to construct the map was by Francine M. Mastrangelo, and the cross-section was drafted by Nancy A. Cottingham. Editing was done by Travis Hobbs. Jason Suarez directed and coordinated the graphics and editing work. We are grateful for input from Brian B. Hunt regarding the use of Lidar and GPS tools that greatly aided our field mapping efforts.

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References

- Barnes, V. E., project director, 1974 (reprinted 1995), Austin sheet: The University of Texas at Austin, Bureau of Economic Geology Geologic Atlas of Texas, text to accompany map, scale 1:250,000.
- Collins, E. W., 2008, Geologic map of the southeastern part of the Austin, Texas, 30 x 60-minute quadrangle: Central Texas population corridor encompassing Bastrop and Smithville: The University of Texas at Austin, Bureau of Economic Geology Miscellaneous Map No. 47, scale 1:100,000.
- Gamer, L. E., and Young, K. P., 1976, Environmental geology of the Austin area: an aid to urban planning: The University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 86, 39 p.
- Strategic Mapping Program (StratMap), 2017, Central Texas lidar (database): Texas Water Development Board, Texas Natural Resources Information System, <https://data.tnris.org/collection/0549d3ba-3f72-4710-b26c-28c65df9c70d> (accessed January 22, 2021).
- Young, K., 1977, Rocks of the Austin area, in Student Geological Society guidebook to the geology of Travis County: The University of Texas at Austin, p. 16–35.

