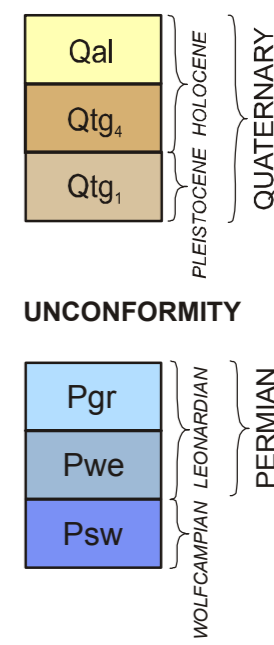


CORRELATION OF MAP UNITS

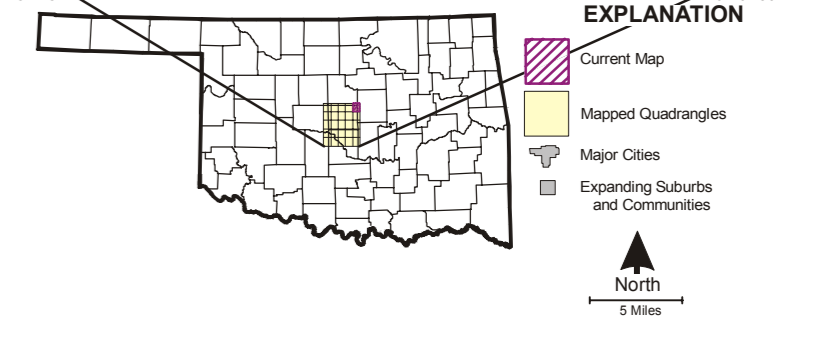
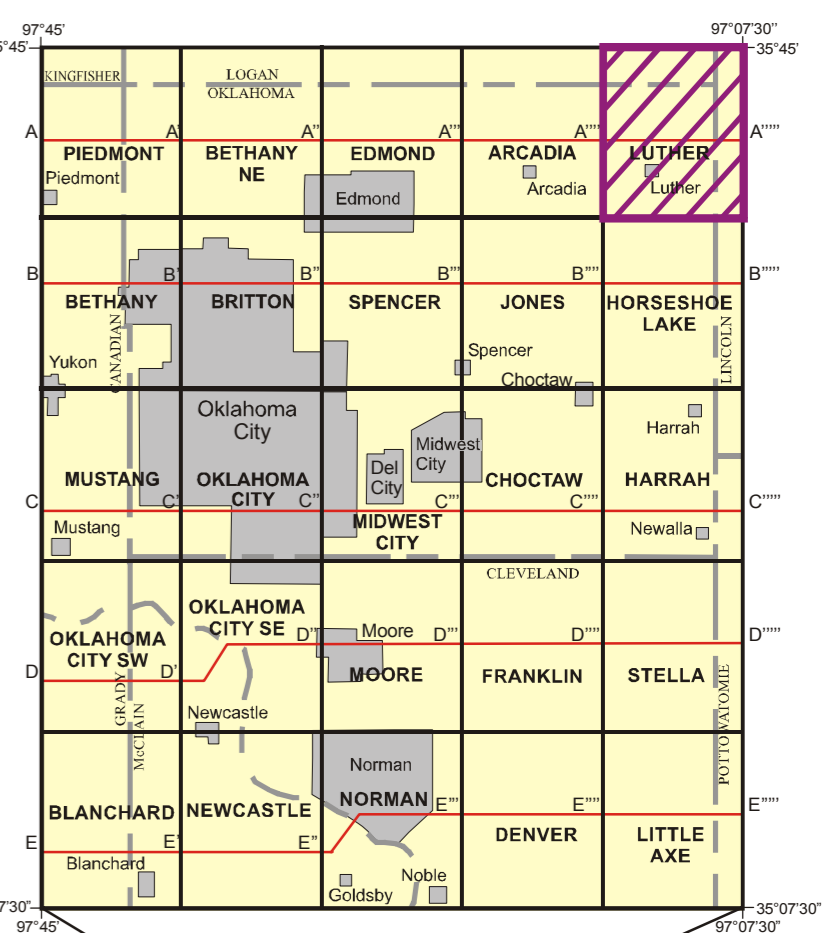


DESCRIPTION OF UNITS

- Qal** ALLUVIUM (Holocene)—Clay, silt, sand, and minor gravel in channels and on flood plains of modern streams. Includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness: 0 to about 30 ft
- Qtg** TERRACE DEPOSITS (Holocene)—Clay, silt, sand, and gravel on terraces immediately above and adjacent to modern channels and flood plains. Consists of locally derived sediment. Thickness: unknown, possibly 0 to about 20 ft
- Qtg** REMNANTS OF TERRACE DEPOSITS (Holocene and Pleistocene(?))—Concentrations of distally derived sediment, mostly very light colored, subrounded quartz grains, with minor quartzite pebbles; sand may also exhibit re-working by aeolian processes into distinct dune structures. Base of deposits more than 60 ft above modern flood plains. Thickness: 0 to about 30 ft
- Pgr** GARBER FORMATION (Permian)—Sandstone with minor shale and siltstone. Sandstone mostly fine-grained to less commonly medium-fine-grained; moderate reddish brown (10R4/6) and moderate reddish orange (10R6/6). Sandstone typically porous and friable; weathers to smooth, rounded outcrops. Large- and small-scale crossbeds, trough crossbeds common; many outcrops characterized by inclined beds and channel-form deposits. Shale and siltstone intercalated, very sandy, occurring as thin (less than 3 ft thick) intervals situated laterally and above thicker channel-form sandstone intervals. Siltstone and shale moderate red (5R5/4) to pale red (5R6/2); may contain evidence of paleosol development such as blocky weathering, fractures with surfaces marked by small slickensides, or through-going curved fractures; and calcareous concretions. Thickness: about 50 ft, top not exposed
- Pwe** WELLINGTON FORMATION (Permian)—Interbedded sandstone and shale, with minor siltstone. Sandstone mostly fine- to very fine-grained, moderate orange pink (10R7/4) to moderate reddish brown (10R4/6), moderate reddish orange (10R6/6) to pale red (5R6/2), mostly porous and friable, locally with variable amounts of hematite and calcite cement; dolomite-breccia and conglomerate may occur at base of sandstone lenses and channel-form deposits. Shale is moderately to very silty and sandy; moderate reddish brown (10R4/6), moderate red (5R5/4), with local light greenish gray (5GY8/1) streaks; concretions and septarian nodules with conspicuous calcite, dolomite and possible barite crystals lining vugs and radiating fractures common. Concretionary shale more common in upper two-thirds of formation. Siltstone typically color-banded consisting of pale reddish brown (10R5/4) and light greenish gray (5GY8/1) streaks. Sedimentary structures include large- and small-scale crossbeds, trough crossbeds, locally steeply inclined stratification and less common channel-form features. In places, weathers to "slickrock" appearance. Basal third of formation consists of fine- to medium-grained sandstone belonging to Falls Member. Texturally, Falls Sandstone is similar to those in the upper Wellington, except color is predominantly moderate reddish brown (10R4/6) to moderate brown (5YR4/4), and it is slightly more friable due to lack of calcite cement.
- Psw** STILLWATER FORMATION (Permian)—Poorly exposed in quad, consists of moderate red (5R5/4) to moderate reddish brown (10R4/6) silty shale; non-laminated, massive to blocky in appearance. Top of Stillwater placed at first occurrence of Falls Sandstone at the base of the Wellington Formation. Thickness: about 20 ft, base not exposed

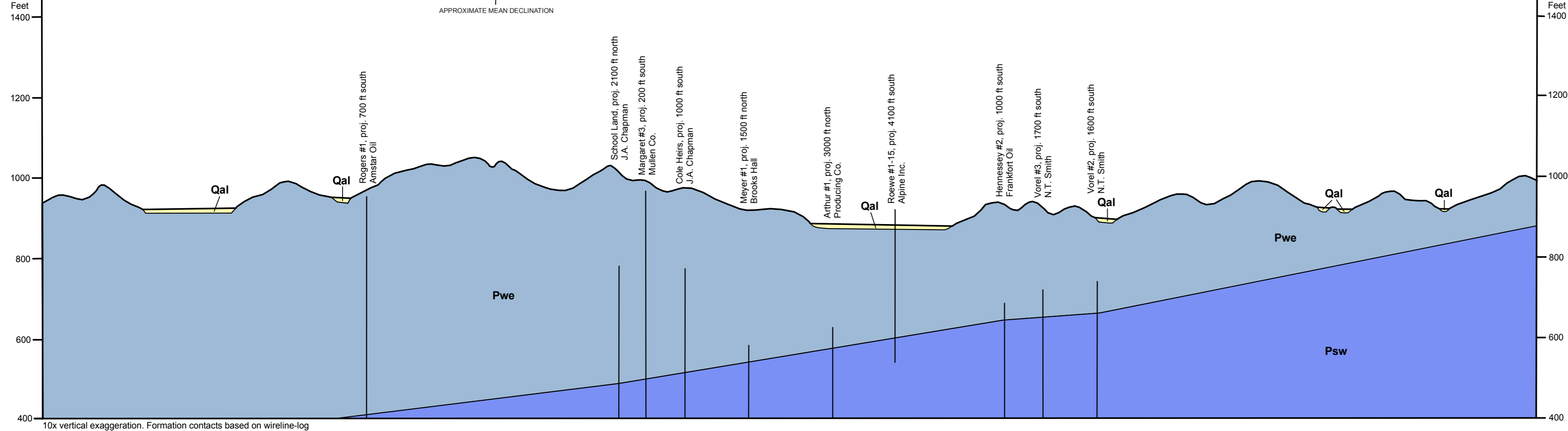
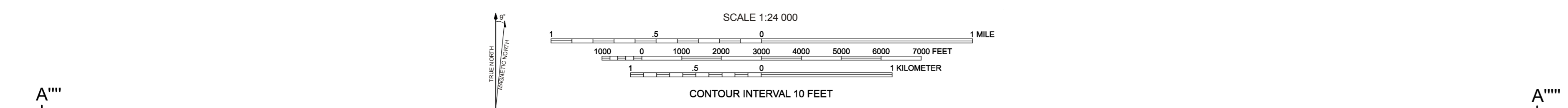
SYMBOLS

- Unit contact, dashed where approximate
- x Outcrop, geologic observation
- Petroleum well. Includes oil, gas, oil and gas, dry service (water supply or injection), junked and abandoned, unknown. Modified from Natural Resources Information System database
- o Municipal water well



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The base map was compiled by the U.S. Geological Survey, Topography from aerial photography by photogrammetric methods (aerial 1964, field checked 1966). Map photocopied 1975. Universal Transverse Mercator (UTM) projection, 1627 North American Datum, 10,000-foot grid ticks based on Oklahoma coordinate system, south zone, 1,000-meter UTM grid, zone 14.

Geologic Map Credits
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**GEOLOGIC MAP OF THE LUTHER 7.5' QUADRANGLE,
LINCOLN, LOGAN, AND OKLAHOMA COUNTIES, OKLAHOMA**
Galen W. Miller and Thomas M. Stanley
2003