

APPENDIX A: EXPLANATION OF GEOLOGIC UNITS

EAST AUSTIN URBAN CORRIDOR

Bastrop, Bastrop SW, Beaukiss, Coupland, Elgin East, Elgin West,
Fedor, Lake Bastrop, Lexington, McDade, Paige, Smithville,
Smithville NW, Structure, Utley, and Winchester Quadrangles, Texas

(1:24,000 scale)

QUATERNARY

Qal—Alluvium. Unconsolidated gravel, sand, silt, and mud along streams and rivers; inundated regularly. Colorado River gravel is mostly chert, limestone, quartz, and igneous and metamorphic rock. Includes undivided low terrace deposits along minor drainages. Includes some local bedrock outcrops that are undivided.

Qtms—Terrace meander-scar deposits. Unconsolidated gravel, sand, silt, and mud of meander scars within large terraces of Colorado River.

Qt—Terrace deposits. Unconsolidated gravel, sand, silt, and clay along streams and rivers. Deposits of adjacent terraces at different elevations are mapped separately.

Qhg—High gravel deposits. Pebble- to cobble-sized gravel, along with sand, silt, and mud. Gravel is chert, quartz, limestone, and igneous and metamorphic rock; lithologies may vary at different locations. At relatively higher elevations than well-defined Colorado River terraces. Commonly dissected. Some deposits are gravel lag. Some high gravel deposits in the Bastrop area are well cemented with limonite and hematite. Includes some areas where remnant gravel, sand, silt, and mud have been reworked into the soil but where pebbles and cobbles are common.

TERTIARY

Eocene

Ey—Yegua Formation. Sandstone, mudstone, claystone, some lignite. Hematite- and limonite-cemented mudstone to sandstone, sometimes called *ironstone*, is common. Total Yegua thickness is 750 to 1,000 ft. Lower 100 ft of Yegua is in the map area.

Ecm—Cook Mountain Formation. Mudstone, claystone, some sandstone. Sandstone is glauconitic. Marine fossils. Four regional members, undivided in this map area, include (from base) Wheelock marl, calcareous mudstone, claystone and glauconitic sandstone, Landrum shale and marl, Spiller sandstone and lignite, and Mount Tabor calcareous shale and siltstone (Stenzel, 1938; Fisher, 1964). Total Cook Mountain thickness between 200 and 300 ft.

Es+Ecm—Undivided Sparta and Cook Mountain Formations.

Es—Sparta Formation. Sandstone. Sand is quartz; very fine to fine grained; well sorted; micaceous. Minor thin layers and lenses of silt, mud, and clay. Thickness 150 to 200 ft.

Ew+Es—Undivided Weches and Sparta Formations.

Ew—Weches Formation. Glauconite greensand, sand, mudstone, and claystone; partly calcareous. Quartz sand common. Hematite- and limonite-cemented claystone to sandstone, sometimes called *ironstone*, is common. Marine fossils. Commonly forms dark-olive and dark-red, mud-rich soil. Thickness about 50 ft.

Eqc—Queen City Formation. Sandstone. Some mudstone interbeds. Sand is quartz; fine grained. Some glauconite. Total thickness about 200 ft.

Er—Reklaw Formation. Sandstone and mudstone; generally friable. Upper part, sometimes called *Marquez member*, is mud to mudstone and silt to siltstone; carbonaceous; glauconitic. Lower part, sometimes called *Newby member*, is fine- to medium-grained quartz sand to sandstone and mud to mudstone; glauconitic. Hematite- and limonite-cemented mudstone to sandstone, sometimes called *ironstone*, is common. Some ledges of ironstone and eroded pebble-size ironstone. Weathers to brown and yellowish-orange and forms red soil. Total Reklaw thickness about 80 ft.

Ec+Er—Undivided Carrizo and Reklaw Formations.

Ec—Carrizo Formation. Sandstone, fine to coarse grained, with some siltstone and mudstone; generally friable. Crossbedding common. Mudstone-rich intervals are commonly carbonaceous. Some hematite- and limonite-cemented mudstone and sandstone, sometimes called *ironstone*. Unit commonly forms ridges. Thickness about 100 ft.

Eocene to Paleocene

EPawi—Wilcox Group, undivided. Undivided Calvert Bluff, Simsboro, and Hooper Formations. Mudstone, siltstone, and sandstone; friable. Approximate thickness between 1,500 and 1,800 ft. **EPawi-sltsd:** Areas of silt- and sand-rich soils within Bastrop County that may indicate Wilcox Group intervals where siltstone and sandstone are relatively more abundant. **EPawi-sltsd** contacts inferred.

EPacb—Calvert Bluff Formation. Mudstone, along with some siltstone and sandstone, all friable, and various amounts of lignite. Hematite- to limonite-cemented concretions. Locally glauconitic in upper part of unit. Mudstone is massive to thinly bedded with silt and sand. Sandstone is medium to fine grained, crossbedded, and burrowed. Lignite, with seams generally 1 to 5 ft, most common in lower part of unit. Unit thickness as much as 1,000 ft. **EPacb-sltsd:** Areas of silt- and

sand-rich soils within Bastrop County that may indicate Calvert Bluff intervals where siltstone and sandstone are relatively more abundant. **EPacb-sltsd** contacts inferred.

EPacb+PAsb—Undivided Calvert Bluff and Simsboro Formations. Mudstone, siltstone, and sandstone; friable. **EPacb-sltsd+PAsb:** Areas of silt- and sand-rich soils within undivided Calvert Bluff and Simsboro deposits of Bastrop County that may indicate siltstone and sandstone are relatively abundant. **EPacb-sltsd+PAsb** contacts inferred.

EPawi+Ec—Undivided Wilcox Group and Carrizo Formation.

Paleocene

PAsb—Simsboro Formation. Sandstone and some mudstone and mudstone conglomerate; all generally friable. Sandstone is typically medium- to coarse-grained, along with some fine-grained sandstone to sandy mudstone. Crossbeds common. Minor lignite. Typically forms gently rolling hills. Thickness generally between 50 and 150 ft in study area pinches out south of the Colorado River, although thickness outside of the study area is as much as 300 ft.

PAh—Hooper Formation. Mudstone and some sandstone; all generally friable. Minor lignite. Concretions of hematite- and limonite-cemented mudstone and sandstone, sometimes referred to as *ironstone concretions*. Some glauconite in lowermost part. Local oyster (*Ostrea duvali*) beds in lower third of unit in Bastrop County (Plummer, 1949). Sandstone in upper part of the unit is typically fine to medium grained and crossbedded, whereas sandstone in lower part of the unit is generally very fine grained and crossbedded. Thickness as much as 500 to 600 ft.

PAmi—Midway Group. Mud to mudstone and lesser sand. Outcrops are rare. Two undivided formations are Wills Point (upper) and Kincaid (lower). Wills Point mud to mudstone is more silt

and sand-rich in the upper part where it grades into the Wilcox. Concretions. Wills Point contains glauconitic sand and limestone lenses near its base (Cocovinis, 1949; Gipson, 1949; Plummer, 1949). Kincaid upper part, named *Pisgah*, is mud to mudstone, limestone lenses, and minor gypsum within some of the mud (Cocovinis, 1949; Plummer, 1949). Kincaid lower part, named *Littig*, is a thin interval of 2 to 15 ft of glauconitic sand and mud to mudstone (Cocovinis, 1949; Plummer, 1949). Midway Group characteristically contains thick mud- to clay-rich soils that are commonly cultivated. Midway Group thickness is between 325 and 400 ft. Pisgah thickness is between 185 and 280 ft. Kincaid thickness is between 140 and 180 ft.

Pami+Qhg—Undivided Paleocene Midway Group and Quaternary high terrace gravel deposits.

CRETACEOUS

Upper Cretaceous

Kntm—Navarro Group and Marlbrook Formation of Taylor Group, undivided. Marl and calcareous clay of undivided Navarro Group Kemp and Corsicana Formations and upper Taylor Group Marlbrook Formation. Total thickness of undivided Navarro and Taylor Groups as much as 1,300 ft.

Knt—Navarro and Taylor Groups, undivided. Marl and calcareous clay of undivided Navarro Group Kemp and Corsicana Formations and Taylor Group Marlbrook Formation. Areas where chalk and argillaceous limestone of Taylor Group Pecan Gap Formation have graded into marl and calcareous clay similar to overlying Marlbrook Formation. Total thickness of undivided Navarro and Taylor Groups as much as 1,300 ft.

Kpg—Pecan Gap Formation of Taylor Group. Chalk, limestone, argillaceous limestone, and marl. Thick clay-rich soils. Minor occurrence at northwest part of study area.

Map Symbols



Fault; **U**, upthrown side; **D**, downthrown side; dashed where relatively less distinct than solid; dotted where covered.



Approximate locations of lignite outcrops reported by Dietrich and Lonsdale (1958).



Approximate location of pre-1945 underground lignite mine reported by Dietrich and Lonsdale (1958).



Approximate location of lignite pit reported by Avakian and Wermund (1993).



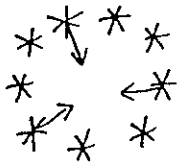
Approximate location of oyster *Ostrea duvali* intervals in lower third of Wilcox Group Hooper Formation, Wilcox Group (Plummer, 1949). Locations at Caldwell Knob area of Utley, Texas, Quadrangle were field verified.



Location of clay pit.



Pit. Sand, clay, or aggregate. Many are intermittently used or abandoned.



Area where oil-field practices, including the drilling of wells and construction of pits, pipelines, and roads, have been abundant.



Approximate boundary of interfingering facies. Nomenclature boundary.

Unit contacts drawn as solid lines are relatively more distinct in the field and on aerial photographs than those drawn by dashed lines.