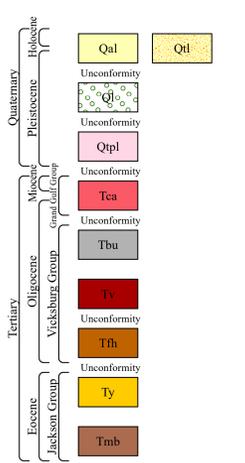


Correlation of Map Units



Descriptions of Map Units

- Qal (Alluvium (Holocene to Pleistocene))**
Sand, yellow- to brownish-white in color, fine- to coarse-grained, subrounded to rounded, predominantly quartzose, locally graveliferous containing aggregate derived from the subcrop; silty to clayey; humus lenses common; floodplain deposits are heavily siliceous. Silicified wood common. Stream Alluvium thickness is interpreted to be approximately 10 feet.
- Qtl (Stream Terrace (Holocene to Pleistocene))**
Flood plain deposits. Sand, yellow- to brownish-white in color, fine- to coarse-grained, subrounded to rounded, predominantly quartzose, locally graveliferous containing aggregate derived from the Pre-loess Terrace deposits, silty to clayey; humus lenses common; floodplain deposits are heavily siliceous. Silicified wood common.
- Qtp1 (Loess (Pleistocene))**
Silt, buff to tan, pale yellow, red, gray to gray-green where in anoxic conditions, quartzose to feldspathic. Loess is considered an eolian deposit derived from glacial outwash. Loess is typically calcareous with dolomite and calcite; however, the upper portion of the loess can be deeply weathered, leached / noncalcareous, and has been commonly referred to as "brown loam". Loess deposits unconformably blanket the pre-loess topography with substantial local variations in thickness but generally thickening towards the west. In places, weathered loess contains secondary deposits of small calcareous concretions (caliche, loess dolls). Loess can be locally and sparingly fossiliferous, commonly containing nests or stickens of palmate gastropods and less commonly containing fossils of Pleistocene vertebrates.
- Qtp2 (Pre-loess Terrace Deposits (Pleistocene))**
Pleistocene ancestral Mississippi River terraces deposited prior to Pleistocene iceoffication. Sand, yellow, orange, purple, red, pink, fine- to coarse-grained, predominantly quartzose, cross-bedded to massive; graveliferous, pea to large cobble size clasts, boulder size ice-rafted clasts of sandstone and chert. Economically significant gravels are predominantly chert with lesser amounts of vein quartz, metaquartzite, agate, sandstone, and rare rhyolite clasts; clay, pink to white, generally occurring as discontinuous lenses and as rip-up clasts up to boulder-size. Conglomeratic ironstone ledges are common in the graveliferous sands at the base of the deposits. Two levels of terrace represented on this map. The first with a base of approximately 340 feet MSL and the second with a base of approximately 300 feet MSL. "Head-of-hollow" terrace-derived valley-fill deposits are common at lower elevations and are isolated to valley walls adjacent to the erosional remnants of the higher of the two terrace deposits. These deposits are of such limited extent as not to warrant representation on this map.
- Tn (Grand Gulf Group)**
- Tea (Catahoula Formation (Oligocene))**
Deltaic sands, silts, and clays. Sand, gray, pale yellow to white, fine- to coarse-grained, cross-bedded to massive, predominantly quartzose with lesser amounts of chert, metaquartzite, mica, and heavy minerals, slightly glauconitic in places with rare thin-bedded pea gravels. Gravels, black chert and milky quartz, highly polished, immature, subangular to well rounded; Clay, green, gray, brown, kaolinitic, weathers white to brown exhibiting a "popcorn" appearance, silty to sandy, lignite common in basal clays. Often indurates to opaline-cemented sandstones and rarer orthoquartzites where exposed, silicified wood and fossil palm common. Ironstone common where sands overlie clays. The Catahoula Formation unconformably overlies the Bucatunna Formation. Total thickness is not represented on this map.
- Tbu (Vicksburg Formation (Oligocene))**
Included in Vicksburg Limestone on Surface Map. Only shown separately as a cross-section unit. Clay, dark brown to dark gray, weathers light brown to light gray, carbonaceous, silty to sandy, micaceous, laminated to massive, sparsely fossiliferous. The Bucatunna Formation conformably overlies the Byram Formation. Thickness is approximately 40 feet except where Catahoula Formation channels have incised.
- Tv (Vicksburg Limestone Unindifferentiated (Oligocene))**
Includes the Byram Formation, Glendon Limestone, Marianna Limestone, and Mint Spring Formation. The fault shown primarily in Section 12, Township 5N, Range 4W was originally documented on the 1945 Geologic Map of Mississippi and repeated in the Hinds County Bulletin 195. Offset from this faulting in the Vicksburg Limestone is apparent in boreholes in the area. The Glendon Limestone is white to gray, commonly indurated to semi-crystalline bioclastic limestone, either massive or with alternating beds separated by thin-bedded glauconitic marl. The Glendon Limestone commonly contains solution cavities at or near outcrop. Larger cavities usually form at the contact with the underlying Marianna Limestone. The Marianna Limestone is white to pale-yellow, soft to indurated, glauconitic marl, containing an admixture of fine-grained sands and clays in places. There is an abundance of the large Foraminifera *Lepidocyclus montellii* in the Marianna Limestone and *Lepidocyclus supra* in the Glendon Limestone and the echinoid *Chapesteria rogersi*. The Vicksburg Limestone unconformably overlies the Forest Hill Formation. Thickness is approximately 90 feet.
- Tth (Forest Hill Formation (Oligocene))**
Deltaic sands, silts, and clays. Sand, fine-grained, silty, quartzose; Clay, carbonaceous, laminated, lignite and silicified wood common. Lignite plant fossils common along fissile partings in clay. The Forest Hill Formation unconformably overlies the Yazoo Formation. Total thickness is approximately 120 feet.
- Ty (Yazoo Formation (Eocene))**
Locally referred to as the Yazoo Clay. Clay, bluish-green to bluish gray, weathers yellowish brown to tan, non-mottled, calcareous, silty, locally fossiliferous, locally contains framboidal pyrite. The Yazoo Formation conformably overlies the Moody's Branch Formation. Total thickness is approximately 480 feet.
- Tmb (Moody's Branch Formation (Eocene))**
Sandy fossiliferous marl containing an abundance of marine invertebrates typically, *Glycymeris* and *Tenercardia* shells. Conformably grades into the overlying Yazoo Formation. Total thickness is approximately 15 feet.



The placard marking the position of 3rd Battery, Ohio Light Artillery during the Battle of Champion Hill in Section 20, Township 6N, Range 3W. The sign includes detailed eyewitness sketches and first accounts of the battle and was erected by the Champion Heritage Foundation in 2015.



The placard commemorating "The Hill of Death" at the Battle of Champion Hill (a name also given for the hill) depicts an account of the battle by Brig. Gen. Alvin P. Hovey. It was erected at the top of the hill in Section 29, Township 6N, Range 3W by the Champion Heritage Foundation in 2008.



Survey Geologist Tim Palmer photographed along a "sanken road" in Section 30, Township 6N, Range 3W. This is a phenomenon of long-term road use over time typical in the loess terrain.



An outcrop of cross-bedded sands in the Pre-loess Terrace exposed along a highway at an active gravel pit owned by Bolton Sand and Gravel in Section 33, Township 6N, Range 3W. This outcrop demonstrates the Pre-loess Terrace Deposit's fluvial stratigraphy of graveliferous layers separated by cross-bedded sands.



Conglomeratic ferruginous sandstone exposed along the old Jackson Road ascending Champion Hill in Section 29, Township 6N, Range 3W. This ledge of ironstone marks the unconformable contact between the Pleistocene Pre-loess Terrace Deposit and the underlying Late Oligocene Catahoula Clay.

Field Photographs



Champion Hill in the distance as seen from the vantage point of the position of 3rd Battery, Ohio Light Artillery in Section 20, Township 6N, Range 3W. The open field leading up to the hill and the wooded area atop the hill are reminiscent of the eyewitness sketch sketches and accounts of the battle.



The placard commemorating the Fight for the Crossroads at the Battle of Champion Hill details how the junction formed along the Jackson Road details how the vantage of Champion Hill changed possession throughout the battle. This placard was erected on the southern boundary of Section 29, Township 6N, Range 3W by the Champion Heritage Foundation in 2013.



Large chert gravel cobbles of the Pre-loess Terrace Deposit exposed from a now inactive gravel pit that removed part of Champion Hill in Section 29, Township 6N, Range 3W. Gravels underlying the hill were deposited by the ancestral Mississippi River during the cyclic Pleistocene glaciation. The provenance of these gravels includes the bedrock geology of some of the home states for both the federal and confederate soldiers who fought at Champion Hill.



A lens of kaolinitic clay exposed along the floor of an active gravel pit owned by Bolton Sand and Gravel in Section 33, Township 6N, Range 3W demonstrating the Pre-loess Terrace Deposit's the various energy of depositional environments represented in the fluvial stratigraphy of the deposit. The clay owes its color to natural manganese mineral staining.



An outcrop of bed of unweathered, gray-green colored clay from the Late Oligocene Catahoula Formation exposed along the old Jackson Road ascending Champion Hill in Section 29, Township 6N, Range 3W. Catahoula sandstone was an important stone resource to the area during the 19th century.



A placard from the vantage point of the position of 3rd Battery, Ohio Light Artillery in Section 20, Township 6N, Range 3W depicting a color-rendered elevation model map of troop positions at 11:00 a.m. during the Battle of Champion Hill. Erected by the Champion Heritage Foundation in 2015.



The placard commemorating Bowen's Counterattack at the Battle of Champion Hill details the efforts by Gen. Pemberton and his youngest division commander to retake Champion Hill. This placard was erected on the southern boundary of Section 29, Township 6N, Range 3W by the Champion Heritage Foundation in 2017.



An outcrop of Pre-loess Terrace exposed as a highway wall in an active gravel pit owned by Bolton Sand and Gravel in Section 33, Township 6N, Range 3W demonstrating the stratigraphy of sand and gravel sequences indicative of a braided stream fluvial setting of the ancestral Mississippi River during the Pleistocene.



A cobble of Proterozoic era Sioux Quartzite at an outcrop of a Pre-loess Terrace Deposit in an active gravel pit owned by Bolton Sand and Gravel in Section 33, Township 6N, Range 3W. This 1.7 billion-year-old clast originated from bedrock near the intersection of Minnesota, South Dakota, and Iowa and its presence here marks the shifting of bedrock source regions to the Lower Mississippi River Valley during the glaciation of the mid-Pleistocene.



An outcrop of a bed of indurated sandstone from the late Oligocene Catahoula Formation exposed along the old Jackson Road ascending Champion Hill in Section 29, Township 6N, Range 3W. Catahoula sandstone was an important stone resource to the area during the 19th century.



The National Historic Landmark monument in Section 29, Township 6N, Range 3W, dedicated to Champion Hill Battlefield in 1977 to the National Register of Historic Places.



This placard commemorating Cockrell's Counterattack at the Battle of Champion Hill details the efforts by Cockrell's brigade, in his own words, on their counterattack. This placard was erected by the Champion Heritage Foundation and is posted near the center of Section 29, Township 6N, Range 3W along the old Jackson Road.



An outcrop of Pre-loess Terrace exposed as a highway wall in an active gravel pit owned by Bolton Sand and Gravel in Section 33, Township 6N, Range 3W demonstrating the stratigraphy of sand and gravel sequences indicative of a braided stream fluvial setting of the ancestral Mississippi River during the Pleistocene.

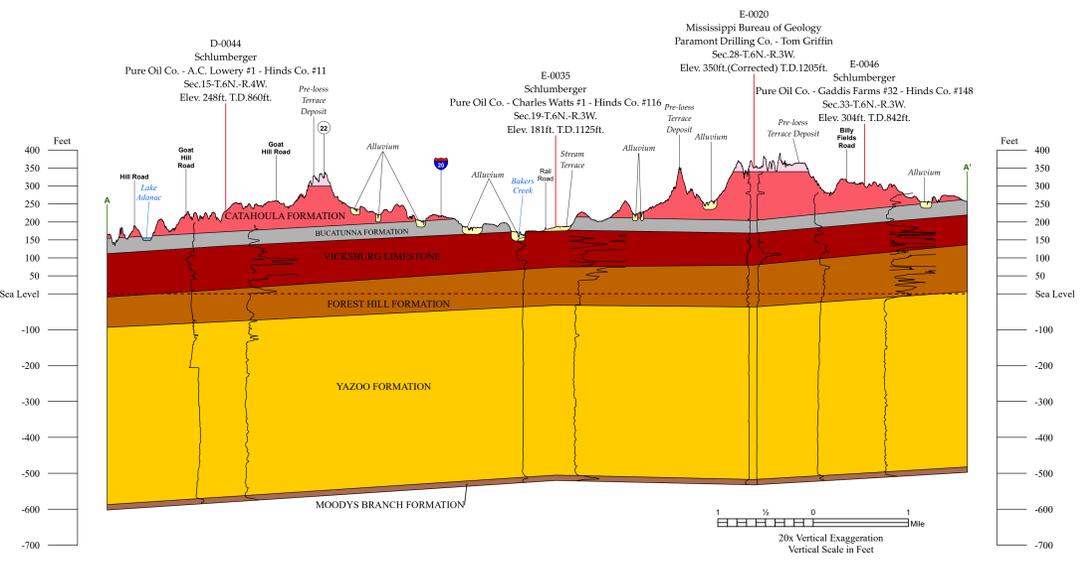


A spring emanating from unconfined groundwater along the contact of the Pleistocene Pre-loess Terrace Deposit and the underlying late Oligocene Catahoula Formation near Bolton Sand and Gravel's pit in Section 33, Township 6N, Range 3W.

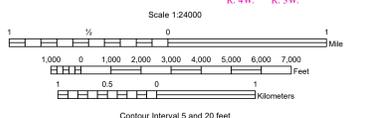


An outcrop of a bed of unweathered, gray-green colored sandy clay from the Late Oligocene Catahoula Formation exposed at the base of the Pre-loess Terrace Deposit in a drainage off Bolton Sand and Gravel's pit in Section 33, Township 6N, Range 3W.

Structural Cross-Section of the Edwards 7.5-Minute Geologic Quadrangle



Base Map produced by the Mississippi Geological Survey
Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter
Declination: World Magnetic Model, December 31, 2019, estimated Magnetic North declination in 7.5-Minute Edwards quadrangle, (90°33'45.187"W, 32°18'43.997"N), center area is 1°12' west of True North ± 0.35". Annual rate of declination change is approximately 0.1" west per year.
Base map data sourced from <https://maris.mississippi.edu/>.
Contours are derived from LIDAR data.
Borehole data from Mississippi Office of Geology and Mississippi Oil and Gas Board.



**Mississippi Office of Geology
Open-File Report 332**

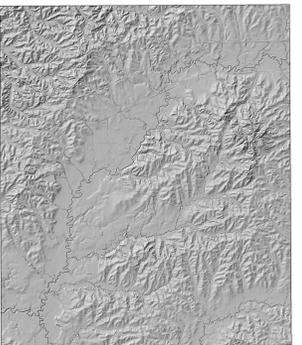
This geologic map was funded by the United States National Park Service, Geologic Resources Division. The Survey expresses gratitude to Sid Champion, National Park Historian and family heir to the Champion Hill property for guiding staff across the Champion Hill Battlefield. The Champions facilitated the transfer of the battlefield to the American Battlefield Trust and the National Park Service.

**GEOLOGIC MAP OF THE EDWARDS
7.5-MINUTE QUADRANGLE
Hinds County, Mississippi
2023**

Geology by
Jonathan R. Leard, RPG, James E. Starnes, RPG, and Timothy J. Palmer, RPG



Mississippi Department of Environmental Quality
Mississippi Office of Geology - Surface Mapping Division
Mississippi Geological Survey
700 North State Street
Jackson, Mississippi 39225



LIDAR derived Bare Earth Hillshade
Geologic maps are only a guide to current understanding and do not eliminate the need for detailed investigations of specific sites for specific purposes. The views and conclusions contained in this Open-File Report are those of the geologists and should not be interpreted as representing the official policies, either expressed or implied, of the State of Mississippi or of the United States Government.

Adjoining 7.5 Quadrangles

