North Carolina Department of Environmental Quality
Energy, Mineral and Land Resources
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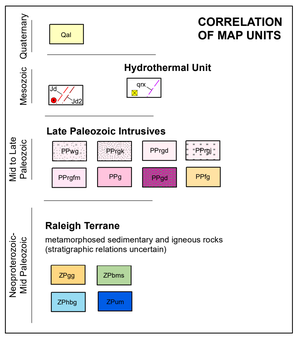
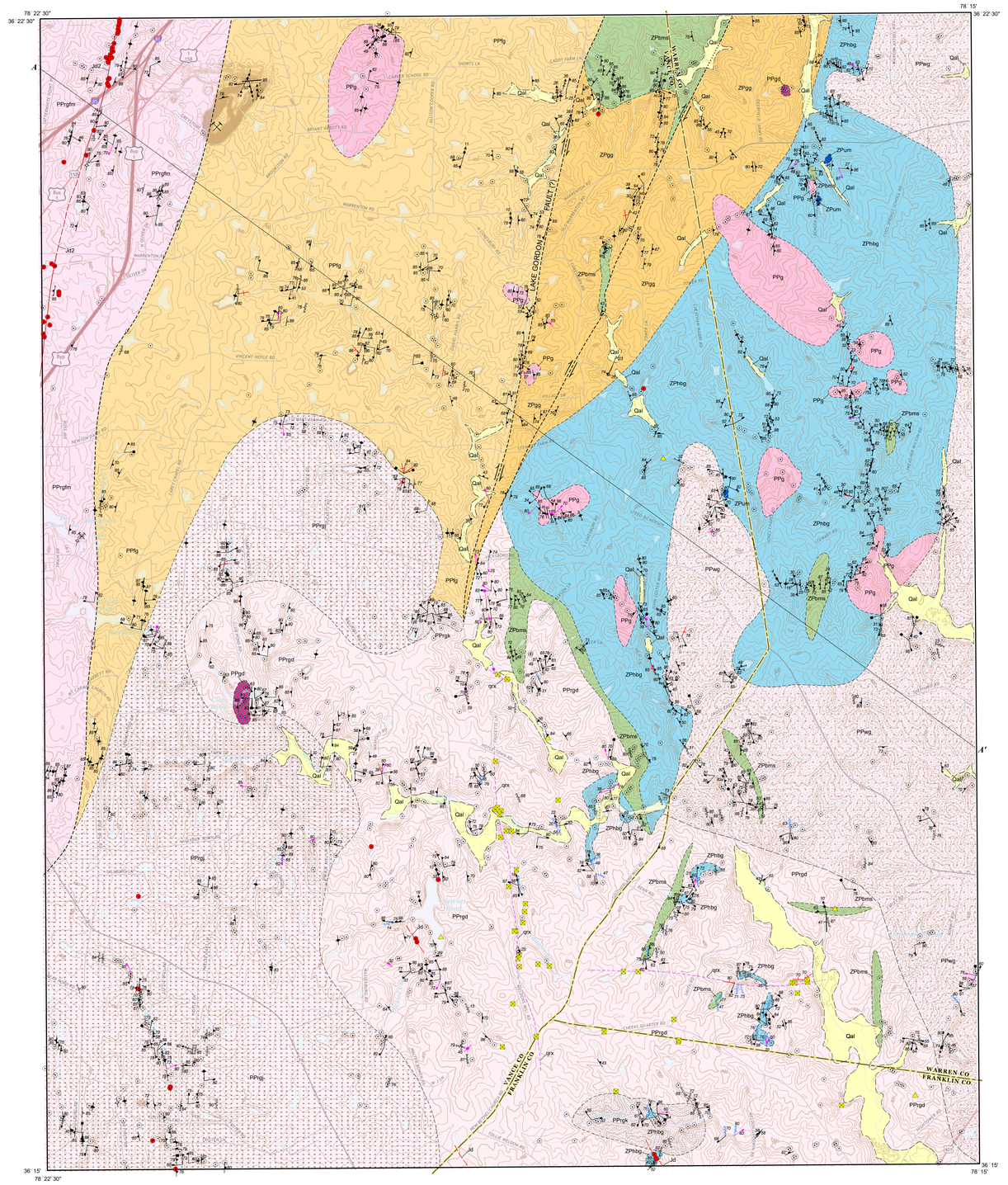
North Carolina Geological Survey
Open File Report 2020-02





INTRODUCTION AND PREVIOUS MAPPING

The Vicksboro 7.5-minute quadrangle lies at the mutual intersection of Warren, Franklin, and Vance Counties, North Carolina. The eastern outskirts of the city of Henderson, NC, county seat of Vance County, are along the western edge of the Vicksboro Quadrangle. Interstate Highway I-85 and US Highway 1 lie in the northwestern corner of the quadrangle. These highways run between Richmond, VA, and the Raleigh-Durham region of NC. NC Highway 39 lies in the southwestern part of the quadrangle, running northwest from Louisburg in Franklin County to Henderson. US Highway 401 crosses the extreme southeastern corner of the quadrangle, running northeast from Louisburg to Warrenton. The northern part of the area is traversed from west to east by SR 1001, which is known as Warrenton Road in Vance County, and as Dr. Martin Luther King, Jr. Blvd. in Warren County.

In addition to a portion of the city of Henderson, the area contains the communities of Cokesbury, Gillburg, Faulkner Crossroads, Adcock Crossroads, Weldons Mill, Brookston, and Greystone in Vance County, and in Warren County, the populated places of Vicksboro and Axtell. It is a dominantly agricultural area, with several large dairy farms. A large crushed-stone operation, the Greystone Quarry, is operated by Vulcan Materials at the intersection of US Route 1 and Interstate 85 at the northwestern corner of the map area.

Several Vance County public schools lie within the Vicksboro Quadrangle, including Aycock, Carver, and Clarke Elementary Schools, Vance County Middle School and Vance County High School. Aycock Recreation Center and Fox Pond Park, both operated by the City of Henderson, sit near the western edge of the quadrangle, and the North Carolina Motorsports Park lies in southwestern Warren County within the quadrangle.

The area is drained by the upper stretches and by tributaries of Fishing, Shocco, and Sandy Creeks, which themselves are major tributaries of the Tar River. Anderson Creek flows northward into Kerr Lake from its source in the northwest corner of the area. Total relief is about 260 feet, with elevations of slightly less than 270 feet above sea level where Sandy Creek leaves the southern edge of the Vicksboro Quadrangle in the southeast, to over 530 feet above sea level between Greystone and Adcock Crossroads in the northwestern part of the area.

The map area is underlain mainly by a diverse array of granitoid rocks, gneiss, and schist. Many of the rocks are highly deformed, and the western half of the area lies along two zones of intense ductile shear attributed to the Lake Gordon and Nutbush Creek faults. The granitoid rocks in the southern part of the map belong to the late Paleozoic (Allegh anian) Rolesville batholith. Granite along the eastern edge of the map belongs to the undeformed and presumed late Paleozoic Wise pluton. The granites are intrusive into gneisses and schists of the Raleigh terrane, interpreted as an infrastructural component of a Neoproterozoic volcanic arc (Hibbard and others, 2002). This understanding of the metamorphic country rocks in the region has been brought into question as a result of recent geochronological studies that have yielded mid-Paleozoic zircon ages (e.g. Finnerty and others, 2019).

Prior to this investigation, little geologic mapping had been undertaken in the quadrangle, although it has been included in some regional and reconnaissance studies. Parker (1968) defined the structural framework of the region. McDaniel (1980) mapped a multi-county region, including Warren and Vance Counties, at a scale of 1:100,000. Farrar (1985a, b) mapped the entire eastern Piedmont of North Carolina, defined map units for the region, and proposed a model for the tectonic evolution of the region. Sacks (1996a, b, c, d) mapped a strip of four 7.5-minute quadrangles along the Virginia-North Carolina border, along strike to the north-northeast.

Adjacent to the field area, 1:24,000-scale mapping has been done for the Middleburg Quadrangle to the north (Stoddard and others, 2016). Mapping of the Afton Quadrangle to the east is ongoing (Blake, Peach, Morrow, and Nolan, in progress). To the south and west of the Vicksboro Quadrangle, the Ingleside (Stoddard, 2010) and Henderson (Blake and Stoddard, 2016) Quadrangles have been mapped at 1:24,000.

DESCRIPTION OF MAP UNITS

Sedimentary Unit

Qal - Quaternary alluvium: Unconsolidated, poorly sorted and poorly stratified tan to light gray stream deposits of gravel, sand, silt, and clay.

Hydrothermal Unit

qrx -- Quartz cataclasite: Sizable accumulations of milky and/or smoky quartz, commonly with vuggy crystals. Locally includes breccia with angular fragments of granitoid rock and having a quartz matrix. Possibly related to quartz mineralization along brittle fracture zones or faults. Based on such occurrences, several fault segments are inferred, having typical trends NNW and E-W. Yellow squares indicate isolated outcrop or major float occurrence. Considered to be Mesozoic in age.

Intrusive Units

Jd – Olivine diabase dikes: Steeply dipping to vertical, gray to blue-black, fine to medium crystalline, magnetite-bearing olivine diabase. Locally plagioclase porphyritic. Spheroidal weathering has produced ovoid to round residual cobbles and boulders.

Jd2 – Two-pyroxene diabase dike: Steeply dipping to vertical, gray to bluish black, medium crystalline and typically plagioclase porphyritic, olivine-free augite + pigeonite diabase commonly containing quartz and/or alkali feldspar granophyre. Magnetite bearing. Occurs in a single extensive dike in the northwest corner of the quadrangle, where it can be easily traced along the upper (southern) stretches of Anderson Creek northward into the Middleburg Quadrangle. May be traced toward the south across Interstate Route 85. Enters the Henderson Quadrangle as it crosses US Route 1 Bypass. Spheroidal weathering has produced ovoid to round residual cobbles and boulders. This dike is evident on aeromagnetic maps.

PPg – Granite: Medium-grained, equigranular to weakly porphyritic white, pink, orange or buff biotite ± muscovite granite (CI=8-15). Includes fine to medium-grained, non-porphyritic, locally foliated white mica ± garnet ± biotite leucogranite (CI less than 5), and rare granodiorite (CI=15-20). Pegmatite dikes common. Occurs in numerous pods in the northern half of the Vicksboro quad, typically surrounded by more strongly deformed and/or metamorphosed rocks.

PPgd - Gabbro-diorite: Dark gray, mesocratic, medium to coarse-grained hornblende-biotite diorite and gabbro and their weakly metamorphosed equivalents. Uralitized augite is common. Also contains magnetite and typically titanite. Best exposed along eastern end of Club Pond in the western Vicksboro quad; also occurs along a small creek in the northeastern part of the quad east of Deerfield Farms Rd. CI=40-60.

Wise Pluton

PPwg – Equigranular biotite granite: Leucocratic (CI less than 15), orange-tan to gray-tan, pink or salmon and white, medium to coarse-grained, generally equigranular but locally weakly porphyritic biotite ± epidote granite and sparse weakly porphyritic biotite ± white mica ± garnet leucogranite. Locally crosscuts foliated biotite granite. Locally contains enclaves of hornblende biotite gneiss (ZPhbg). Interpreted as belonging to the Wise pluton. Occurs along the eastern edge of the Vicksboro quad, mainly in the north. **May be equivalent to PPrgd of the Ingleside and Louisburg Quadrangles,** and/or to the Rolesville main phase of Speer (1994).

Rolesville Batholith

PPrgk – Leucogranite: Medium-grained, generally equigranular white, pink, orange or buff biotite +/- muscovite leucogranite and granite, locally with garnet. Garnet commonly present as trapezohedral crystals. Occurs in the south-central Vicksboro quad in the upper stretches of Buffalo Creek where it is associated with and may contain xenoliths of gneiss and schist. Commonly cut by pegmatite dikes locally having smoky quartz. Also occurs near the center of the quad, along a tributary of Weaver Creek. CI = 2-8.

PPrgd – Porphyritic biotite granite: Fine to coarse-grained, but primarily medium-grained, equigranular to moderately porphyritic (very rarely megacrystic), rarely foliated, pink or salmon and white biotite + muscovite monzogranite. Commonly has an almost idiomorphic fabric with well-formed alkali feldspar and plagioclase grains. Contains common biotite schlieren and local biotite crystal clots. Pegmatite dikes and pods are extremely common. Unit also contains relatively common xenoliths of gneiss and schist. Less commonly contains autoliths of fine granodiorite or tonalite and may display primary igneous layering between biotite-rich and biotite-poor phases. CI = 5-12. Weathered surfaces are commonly nubbly, friable and/or cavernous. Judged to be equivalent to the Rolesville main phase of Speer (1994), but commonly lacks muscovite. Occurs mainly in the southern and southeastern quarter of the Vicksboro quad.

PPrgj – Gneissic biotite granite: Heterogeneous granitoid unit typically consisting of streaky, gneissic, or layered biotite granitoid and biotite granitoid gneiss. Includes granite, leucogranite, and granodiorite and their gneissic counterparts. May contain biotite or feldspar foliation. Commonly contains magnetite. In southwestern Vicksboro quad, notably along Martin and Gills Little Mill Creeks. Rarely mylonitic.

PPrgfm – Foliated to mylonitic granite and granitoid orthogneiss: Leucocratic (CI less than 5-15) medium to coarse grained, pink or salmon and white, commonly porphyritic or porphyroclastic biotite granite, biotite leucogranite, and biotite granitoid orthogneiss. Strongly foliated, protomylonitic, or mylonitic in most exposures. K-feldspar porphyroclasts with local tails indicating a dextral shear sense. Pegmatite and aplite dikes and sills common and may be deformed. Includes some minor undeformed granite. Also includes minor biotite schlieren and biotite and biotite-hornblende gneiss enclaves. In northwestern Vicksboro quad and along the western edge. **Equivalent to Pg1 of Middleburg quad and PPrgm and RRgf of Henderson quad.** Lies between the Nutbush Creek and Lake Gordon mylonite zones.

Rolesville Batholith or Buggs Island Pluton (?)

PPfg – Foliated granitic rocks: Medium to coarsely crystalline, locally megacrystic, porphyroclastic, strongly foliated tan-gray to blue-gray, leucocratic to mesocratic, biotite + white mica granite and white mica ± biotite ± garnet leucogranite. Commonly protomylonitic to mylonitic and ultramylonitic. Commonly porphyroclastic. Includes mylonitized pegmatitic to coarsely crystalline, porphyroclastic white mica ± biotite + quartz + feldspar metagranitoid sills, presenting a migmatitic appearance. Also includes granitoid orthogneiss and numerous enclaves of biotite + hornblende gneiss, notably at the Greystone Quarry. Lies at least partly within the Lake Gordon mylonite zone. **Equivalent to Pg1, Pg2 and Pg3 of the Middleburg Quadrangle.**

Metamorphic Units

Raleigh Terrane

ZPbms - White mica biotite schist: Medium-fine to coarse crystalline, gray-tan to silvery, strongly foliated white mica + biotite schist with or without garnet, and biotite + white mica + garnet + sillimanite schist. Sillimanite and garnet may be overgrown by white mica. Commonly feldspathic. Locally phyllonitic to mylonitic with feldspar porphyroclasts. Locally contains chlorite. May be intruded by pegmatitic to coarsely crystalline, porphyroclastic white mica ± biotite + quartz + feldspar gneissic metagranitoid sills that are locally migmatitic. Locally includes small bodies of leucogranite. **Equivalent to ZPwms of the Middleburg Quadrangle.**

ZPgg – Granitoid gneiss: Medium to dark gray, fine to medium grained, moderately to well foliated biotite-quartz-plagioclase ±alkali feldspar gneiss and schist. Varies from unlayered biotite granitoid gneiss to variably layered biotite gneiss to schistose biotite gneiss and rarely biotite schist. Layers are typically discontinuous. Locally protomylonitic, mylonitic, or ultramylonitic. Locally carries garnet, epidote, or sulfide minerals. Locally associated with dikes and/or sills of pegmatite and/or leucogranite. Also occurs as xenoliths within granitoid bodies. **Equivalent to ZPfg of the Middleburg Quadrangle.**

ZPhbg – Hornblende biotite gneiss: Leucocratic to mesocratic (CI~20-45), black-gray to blue-gray, medium grained to porphyroclastic gneiss. More mafic occurrences locally contain clinopyroxene and/or epidote; pyroxene-rich rocks may be granulites. Biotite and/or hornblende define a foliation associated with mm-scale plagioclase and quartz compositional layers and, locally, larger plagioclase porphyroclasts. Weakly to strongly layered. Includes rare fine-grained calcsilicate rock or hornfels consisting of amphibole + quartz + sulfides ± clinopyroxene and/or biotite. Also includes fine to medium-grained, poorly to moderately well-layered amphibolite and amphibolite gneiss. Includes layers and other domains of biotite granitoid gneiss and small unmapped bodies of cross-cutting granite and leucogranite. Dikes and sills of pegmatite are profuse. Local grain size variations in part due to mylonitic overprint. **Equivalent to ZPpg of the Middleburg Quadrangle.**

ZPum - Metaultramafic rocks: Hypermelanocratic to melanocratic (CI greater than 65), green to black-green interlayers and pods of massive, coarse-grained talc ± actinolite schist and, locally, medium-grained metagabbro. Occurs as enclaves in ZPhbg.

EXPLANATION OF MAP SYMBOLS

CONTACTS, FAULTS, AND OTHER FEATURES

- inferred contact
- concealed contact
- quartz cataclasite zone inferred
- quartz cataclasite zone concealed
- inferred ductile strike-slip fault
- concealed ductile strike-slip fault
- Quaternary alluvium contact
- diabase dike, location known
- diabase dike, location inferred
- In cross section, for ductile strike-slip faults, the circle with an X indicates movement away from the observer, the circle with a dot indicates movement towards the observer.
- A A' cross section line
- observation station location
- diabase station location
- crushed stone quarry - active
- quartz cataclasite station location
- bull quartz vein station location
- abandoned quarry

PLANAR FEATURES

- Strike and dip of inclined regional foliation
- Strike of vertical regional foliation
- Strike and dip of inclined regional foliation (multiple observations at one location)
- Strike of vertical regional foliation (multiple observations at one location)
- Strike and dip of inclined schistosity
- Strike and dip of inclined schistosity (multiple observations at one location)
- Strike and dip of crenulation cleavage
- Strike and dip of inclined undifferentiated shear strain foliation (multiple observations at one location)
- Strike and dip of vertical undifferentiated shear strain foliation
- Strike of vertical undifferentiated shear strain foliation (multiple observations at one location)
- Strike and dip of gneissic layering
- Strike of vertical gneissic layering
- Strike and dip of gneissic layering (multiple observations at one location)
- Strike of vertical gneissic layering (multiple observations at one location)
- Strike and dip of compositional layering
- Strike of vertical compositional layering
- Strike and dip of inclined dike
- Strike of vertical dike
- Strike and dip of inclined dike (multiple observations at one location)
- Strike of vertical dike (multiple observations at one location)
- strike and dip of brittle fault
- Strike and dip of inclined joint/fracture surface
- Strike of vertical joint surface
- Strike and dip of inclined joint/fracture surface (multiple observations at one location)
- Strike of vertical joint surface (multiple observations at one location)
- Strike and dip of inclined quartz vein
- Strike of vertical quartz vein

LINEAR FEATURES

- Bearing and plunge of mineral or aggregate lineation
- Bearing and plunge of pencil lineation
- Bearing and plunge of crenulation lineation
- Bearing and plunge of lineation - type undetermined
- Bearing and plunge of mesoscale fold hinge

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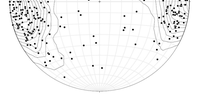
Equal-Area Schmidt Net Projections and Rose Diagram

Plots and calculations created using Stereonet v. 8.6.0 based on Allmendinger et al. (2013) and Cardozo and Allmendinger (2013).



Equal-Area Schmidt Net Projection of Contoured Poles to Foliation and Schistosity
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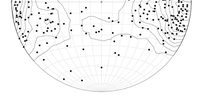

Equal-Area Schmidt Net Projection of Contoured Poles to Compositional and Gneissic Layering
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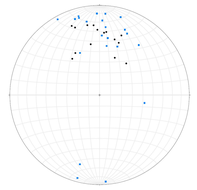
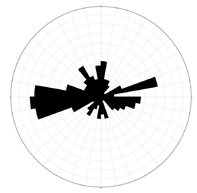


Equal-Area Schmidt Net Projection of Fold Hinges (black circles) and Lineations (Mineral, Pencil and other) (blue squares)
Fold Hinges N = 15
Lineations N = 22



Unidirectional Rose Diagram of Joints N = 204
Outer Circle = 10%
Mean vector = 92 degrees

Produced by the United States Geological Survey.
Altered by the North Carolina Geological Survey for use with map.
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 17S
10 000-foot ticks: North Carolina Coordinate System of 1983

Imagery.....NAIP, May 2012
Roads.....©2006-2012 TomTom
Names.....GNIS, 2012
Hydrography.....National Hydrography Dataset, 2012
Contours.....National Elevation Dataset, 2008
Boundaries.....Census, IBWC, BC, USGS, 1972 - 2012

MN 9° 25' 167 MILS
GN 1° 35' 28 MILS
UTM GRID AND 2013 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
QA
Grid Zone Designation
17S

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

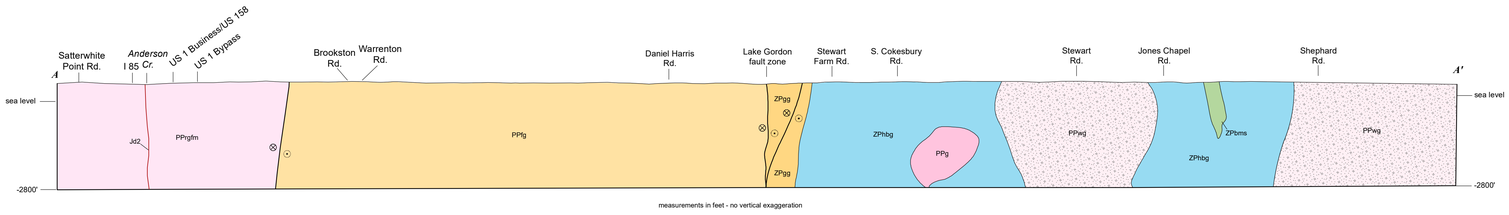
CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.11

NORTH CAROLINA
QUADRANGLE LOCATION
Townsville | Middleburg | Warrenton
Henderson | Vicksboro | Afton
Kittrell | Ingleside | Gold Sand
ADJOINING 7.5 QUADRANGLES

ROAD CLASSIFICATION
Expressway | Local Connector
Secondary Hwy | Local Road
Ramp | 4WD
Interstate Route | US Route | State Route

VICKSBORO, NC
2013



TRAVERSE MAP

Hillshade derived from a 20 foot LiDAR digital elevation model.
Red lines show paths of field traverses. All roads traversed by car.

by foot
by car

This is an Open File Map. It has been reviewed internally for conformity with North Carolina Geological Survey mapping standards and with the North American Stratigraphic Code. Further revisions or corrections to this Open File map may occur.

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Bedrock Geologic Map of the Vicksboro 7.5-minute Quadrangle, Warren, Vance and Franklin Counties, North Carolina

By Edward F. Stoddard and Randy Bechtel

Digital representation by Michael A. Medina and Philip J. Bradley

2020