Virginia Department of Mines, Minerals and Energy

SURFICIAL GEOLOGIC MAP OF THE ELKTON WEST QUADRANGLE, VIRGINIA

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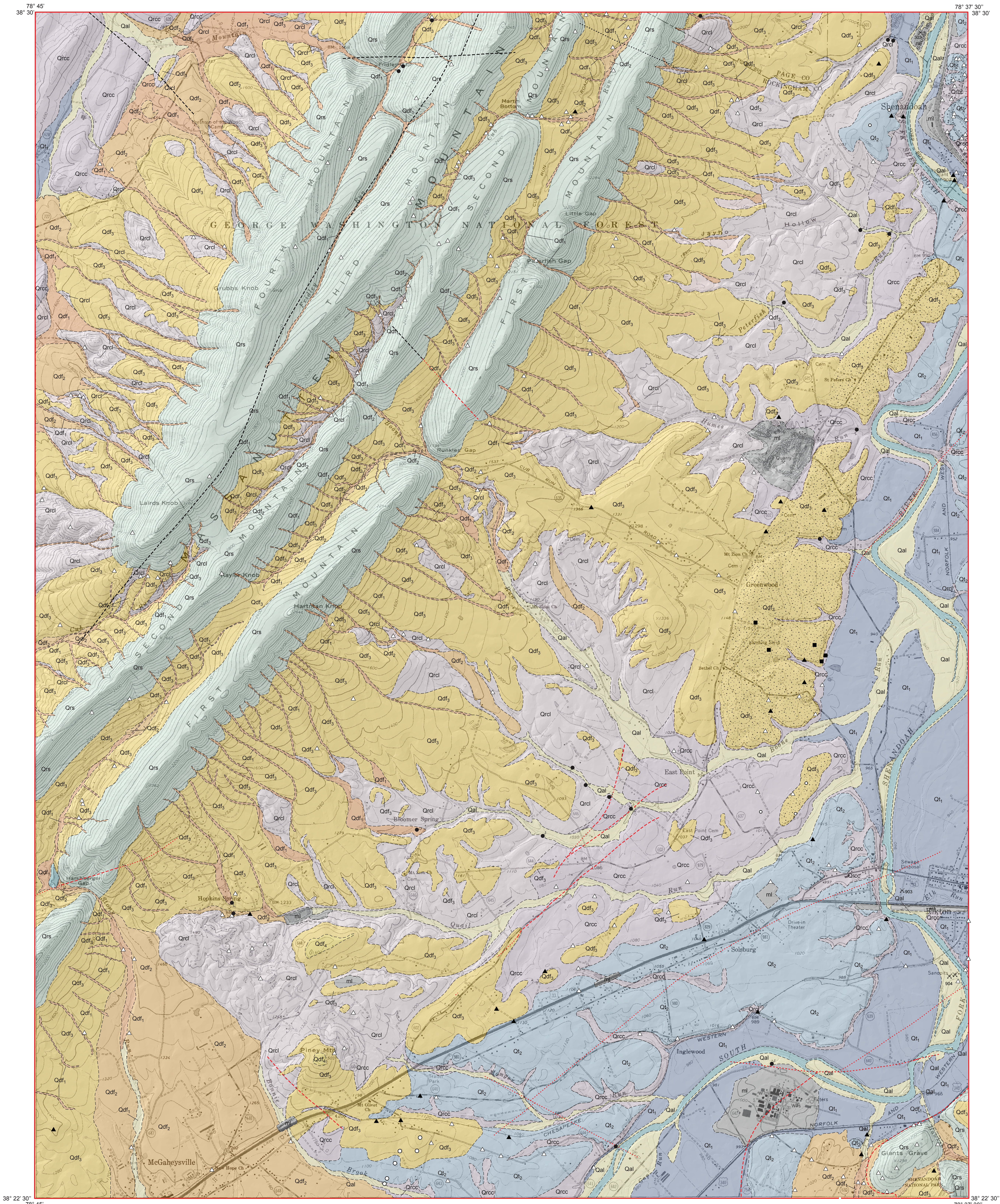
2010



DESCRIPTION OF MAP UNITS

ml — **Modified land** – area of extensive cut and/or fill related to site development.

Qal — **Alluvial channel and flood plain deposits** - Alluvial channel: unconsolidated clay, silt, sand, gravel, cobbles, and boulders. Composition, color, grain size, rounding, and sorting are variable. Streams that drain terrace and debris-flow deposits contain material that is reworked from the older deposits. Alluvial flood plain deposits: overbank deposits of clay, silt, sand, and minor cobbles within active flood plains. Subject to frequent flooding.

Qt_1 — **Younger terrace deposits** - unconsolidated clay, silt, sand, gravel and cobbles. Cobbles are mostly quartzite and quartz sandstone with minor amounts of metamorphosed sedimentary rock. Deposits are clast-supported in a brown to red-brown clay loam to loamy sand matrix; clay content and red color increase with elevation. Cobbles commonly form a cap at land surface and are interlayered with sand to clay loam fines at depth. Terrace deposits occur at elevations from 10 to 75 feet (3 to 23 meters) above the flood plain and are 0 to 30+ feet (0 to 9+ meters) thick. Some terraces are modified by karst in areas underlain by carbonate bedrock and are extensively disturbed by agricultural practices. Lower terraces are subject to infrequent flooding.

Qdf_1 — **Youngest debris-flow deposits** - blocks, boulders, and cobbles of quartzite and quartz sandstone. Clasts of other bedrock may also be present. Very poorly sorted and supported in a tan to brown loamy sand matrix. Deposits occur along the margins of active stream channels draining steep, mountainous terrain and small fans at the base of slopes. Up to 20 feet (6 meters) thick.

Qdf_2 — **Younger debris-flow deposits** - blocks, boulders, and cobbles of quartzite and quartz sandstone. Weathered clasts of other bedrock may also be present. Very poorly sorted and supported in a tan to brown sandy loam to clay loam matrix. Deposits occur as discontinuous terraces 10 to 50 feet (3 to 15 m) above active stream channels, as small fans at the base of slopes, and as a large fan downslope from Harshberger Gap. Highest terraces could be equivalent to Qdf_3 deposits. Up to 40+ feet (12+ meters) thick.

Qdf_3 — **Older debris-flow deposits** - blocks, boulders, and cobbles of quartzite and quartz sandstone. Quartz sandstone clasts are commonly friable. Highly weathered clasts of other bedrock may also be present. Very poorly sorted and supported in a tan to red-brown sandy loam to clay loam matrix. Deposits are commonly dissected and occur on ridges and hill tops. Some deposits are erosional remnants. A large fan deposit is present downslope of Runkles Gap. The toe of this deposit contains cobbles and boulders of Antietam quartzite that appear to be reworked from Qt_2 terrace deposits. Up to 40+ feet (12+ meters) thick.

Qt_2 — **Older terrace deposits** - unconsolidated clay, silt, sand, gravel and cobbles. Cobbles are mostly quartzite and quartz sandstone with minor amounts of metamorphosed sedimentary rock. Quartz sandstone clasts are commonly friable. Deposits are clast-supported in a red-brown to red, clay loam to loamy sand matrix; clay content and red color increase with elevation. Cobbles commonly form a cap at land surface, and are interlayered with sandy silt to clay loam fines at depth. High terrace deposits occur at elevations from 75 feet to as much as 170 feet (23 to 52 meters) above the current flood plain and are up to 30+ feet (0 to 9+ meters) thick. Terraces are modified by karst in areas underlain by carbonate bedrock and extensively disturbed by agricultural practices.

Qdf_4 — **Oldest debris-flow deposits** - blocks, boulders, and cobbles of quartzite and quartz sandstone. Quartz sandstone clasts are friable. Very poorly sorted and supported in a red-brown clay loam matrix. Occur as intact surfaces or erosional remnants on hill tops at elevations above Qdf_3 deposits. Up to 20+ feet (12+ meters) thick.

Qrs — **Ridge and upper slope deposits** - thin, tan loamy sand residual soil on mountain ridge tops, discontinuous quartzite and quartz sandstone outcrop on ridge tops, in water gaps, and on outcrop slopes, and clast-supported blocks and boulders in a tan to brown loamy sand matrix on outcrop and dip slopes. Loose material occurs as block slopes, landslides, and talus on slopes greater than 15 degrees. Deposits are up to 20 feet (6 meters) thick.

Qrcl — **Residuum and colluvium derived from clastic bedrock** - tan- to orange-brown sandy loam to silty clay residual and colluvial soil derived from the weathering of parent material consisting of shale, siltstone, and lithic sandstone. Colluvial soil is present on some slopes and may contain angular fragments of parent material. Rock outcrops are intermittant and more common in resistant rocks and along streams. Thickness is typically less than 5-10 feet.

Qrca — **Residuum and colluvium derived from carbonate bedrock** - brown to orange-brown clayey loam to clay residual and colluvial soil derived from the weathering of parent material consisting of limestone and dolostone. Colluvial soil is present on some slopes and may contain angular fragments of parent material. Rock outcrops are intermittant and more common in resistant rocks, on outcrop slopes, and along streams. Areas underlain by limestone have been variably modified by karst. Thickness is variable and ranges from from 0 to 50+ feet (0 to 15+ meters).

MAP SYMBOLS

- - - - - - - Contact - approximate

△ Observation made during mapping

▲ Cut exposing surficial deposits

■ Soil Test Pit

○ Soil boring

● Spring

Mineral Resources - identification numbers are preceded by "187B-" in Mineral Resources of Virginia database

⨯ Abandoned sand and gravel pit

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SOURCES USED IN MAP COMPILATION

Bell, Allison M., 1986, Morphology and stratigraphy of terraces in the upper Shenandoah Valley, Virginia, M.S. Thesis: West Virginia University, 160 p.

King, Phillip B., 1950, Geology of the Elkton area, U.S. Geological Survey Professional Paper 230, 82 p.

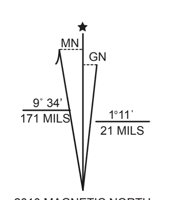
Mason, John E., 1992, Surficial geology of alluvial fans and terraces on the western flanks of the Blue Ridge Mountains between Elkton and Port Republic, Virginia, M.S. Thesis: West Virginia University, 77 p.

SUGGESTED REFERENCE

Heller, Matthew J., and Eaton, L.S., 2010, Surficial geologic map of the Elkton West quadrangle, Virginia: Virginia Division of Geology and Mineral Resources Open File Report 10-02, 1:24,000-scale geologic map.

Basemaps, modified U.S. Geological Survey DRG, 1987, Elkton West Quadrangle, and DTM created using VGIN Aerial Imagery elevation control points, 2007.

Digital Cartography by Matthew J. Heller and Amy K. Gilmer



2010 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
ANNUAL VARIATION 0° 1'

SCALE 1:24000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology mapped from May 2004 to December 2009