

INTRODUCTION

The Hackensack quadrangle is in the northeast part of the state, in Passaic and Bergen Counties, in a mixed commercial, industrial and residential setting. It is located in the northeastern part of the Piedmont Physiographic Province in the Newark basin. The map area is characterized mainly by relatively subdued topography with elevations of 100 feet or less above sea level, except in the northwestern part where elevations are as much as 300 feet. The south-flowing Passaic, Saddle and Hackensack Rivers are the dominant streams that drain the area. The Oradell Reservoir in the northeastern part of the quadrangle was created by impoundment of the Hackensack River.

STRATIGRAPHY

The Hackensack quadrangle is underlain by bedrock of Mesozoic age that was deposited in the Newark basin, a northeast-trending rift basin that contains approximately 24,600 feet of interbedded sedimentary and igneous rocks. These include conglomerate, sandstone, siltstone, and shale of fluvial and lacustrine origin, three tholeiitic basalt formations, and sills, dikes and bodies of Lower Jurassic diabase. The Upper Triassic Passaic Formation is the predominant unit in the map area. It consists of interbedded siltstone and shale in the eastern part of the quadrangle (Trpm) that coarsens westward through sandstone (Trps), into pebbly sandstone (Trpsp), and then conglomeratic sandstone (Trpc). The coarse-grained pebbly sandstone and conglomeratic facies is continuous to the north into the Park Ridge quadrangle (Monteverde, 2011) and to the west into the Paterson quadrangle, nearly to the base of the Orange Mountain Basalt (Volkert, 2006).

A thin gray bed (Trpg) at the base of a shale and siltstone sequence crops out along Route 80, east of the town of Lodi. The Upper Triassic Lockatong Formation is not exposed in the area of the map and is shown in cross section only. Igneous rocks consist of three small bodies of diabase (Jd) that are present in the southeastern part of the map area. Only one of the bodies crops out; another is no longer exposed, and a third one is known from subsurface boring data.

STRUCTURE

Bedding

The overall trend of the bedrock units is fairly uniform and is influenced by the location of the quadrangle on the east side of the Watchung syncline, a regional, northeast-plunging fold structure (Drake and others, 1996). Bedding ranges in strike from N.02°E. to N.49°E. and averages N.19°E. (fig. 1). It dips northwest at 5° to 14° and averages 9°.

Faults

Small, local, northeast-trending brittle faults typically less than three feet wide deform the Passaic Formation in the southern part of the quadrangle. Because they are so closely spaced they are shown on the map as a single fault. They may extend beyond the area in which they are shown but cannot be traced further because of the poor bedrock exposure. The faults are characterized by closely-spaced fractures, thin zones of breccia and (or) clayey gouge, and slickensides. They strike N.20°E. to N.30°E. and dip northwest at about 65°. Kinematic indicators that consist of slip lineations on fault surfaces and the offset of beds indicate the predominant movement was reverse.

Joints

Joints are a common feature in all sedimentary facies of the Passaic Formation. All joints are planar, moderately well formed, and vary in their spacing from less than 1 foot to several feet apart. Surfaces are unmineralized. Joints in pebbly sandstone and sandstone are better developed and more continuous than those in finer-grained rocks, such as siltstone and shale, in which joints are commonly discontinuous over short distances. Two main strike sets were measured in outcrop (fig. 2). They include a northeast-striking joint set that averages N.29°E. and dips southeast, and less commonly, northwest at 65° to 90°, and a northwest-striking joint set that averages N.65°W. and dips northeast, and less commonly, southwest at 62° to 90°. Joints in both sets dip at an average of 82°.

DESCRIPTION OF MAP UNITS

- Jd** Diabase (Lower Jurassic) – Dark-greenish-gray to black, fine-grained, massive, hard diabase. Composed mainly of calcic plagioclase, clinopyroxene and opaque oxide minerals. Contacts are aphanitic and display chilled, sharp margins against enclosing sedimentary rocks.
- Trpc** Passaic Formation (Upper Triassic) (Olsen, 1980; Olsen and others, 2011) – Interbedded sequence of reddish-brown, and less commonly, maroon or purple conglomeratic sandstone (Trpc), pebbly sandstone (Trpsp), sandstone (Trps), and siltstone, shaly siltstone, and shale (Trpm), separated by olive-gray, dark-gray, or black sandstone, siltstone, and shale (Trpg). Conglomeratic sandstone is medium to coarse grained, feldspathic (as much as 20 percent feldspar), and locally contains pebbles and cobble layers interbedded with pebbly sandstone and sandstone in upward-fining sequences 3 to 6 feet thick. Clasts are subangular to subrounded, locally imbricated milky quartz and white or purple quartzite in a matrix of very coarse- to coarse-grained quartz sand. Pebbly sandstone and sandstone are coarse-grained, thin- to thick-bedded, planar to cross-bedded with local lensoidal interbeds of pebble conglomerate generally a few feet or less thick. Sandstone is reddish-brown to brownish-red, locally gray, fine- to medium-grained, thin- to medium-bedded, planar to cross-bedded, micaceous, and locally mudcracked and ripple cross-laminated. Root casts and load casts are common. Siltstone, shaly siltstone, and shale are fine-grained, very thin- to thin-bedded, planar to ripple cross-laminated, locally fissile, biturbated, and contain evaporite minerals. They form rhythmically fining-upward sequences as much as 15 feet thick that contain local, thin sandstone lenses. Unit is as much as 11,480 ft. thick regionally, but a thickness of about 8,700 feet is present in the quadrangle.
- Tri** Lockatong Formation undifferentiated (Upper Triassic) (Kümmel, 1897) – Cyclical sequences of mainly gray to greenish-gray and reddish-brown siltstone to silty argillite and dark-gray to black shale and mudstone. Siltstone is medium- to fine-grained, thin-bedded, planar to cross-bedded with mudcracks, ripple cross-laminations and locally abundant pyrite. Shale and mudstone are very-thin-bedded to thinly-laminated, platy, with local desiccation features. Maximum thickness regionally is as much as 3,500 ft. Unit is not exposed in the quadrangle and is shown in cross section only.

REFERENCES CITED

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EXPLANATION OF MAP SYMBOLS

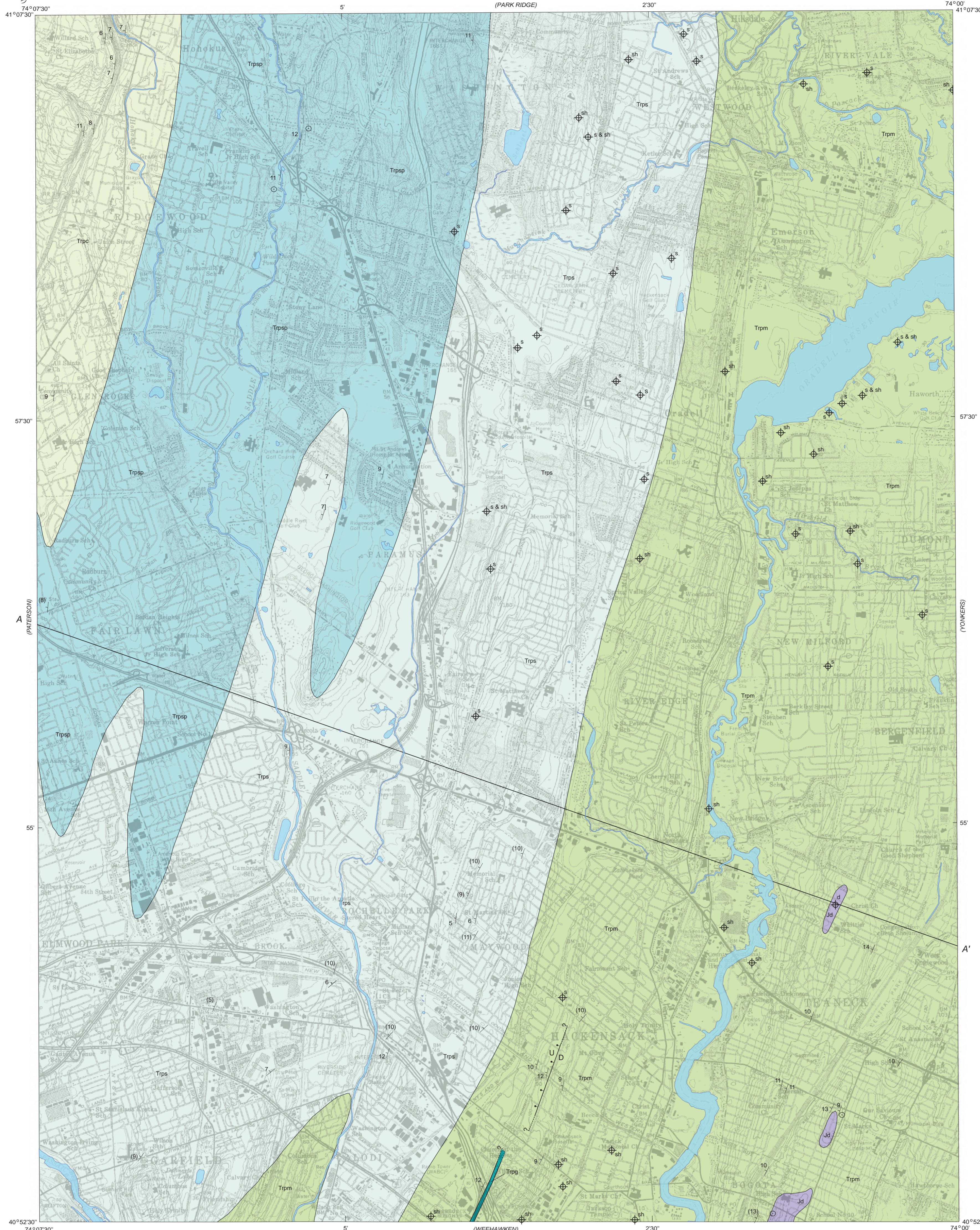
- ? Contact - Queried where uncertain
- |—|—| Fault - Queried where uncertain. Ball and bar show direction of dip.
- |—|—| Reverse fault - U, upthrown side; D, downthrown side

PLANAR FEATURES

- 10 Strike and dip of beds. Dip numbers in parenthesis are from Kümmel (1900) and Parker (1993) of outcrops no longer exposed.

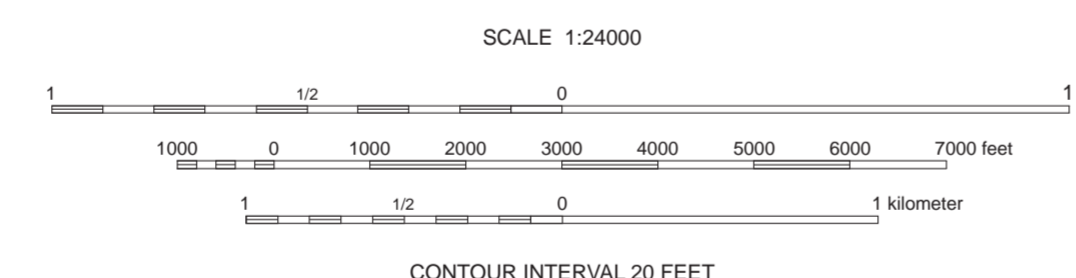
OTHER FEATURES

- Bedrock outcrop or float used to draw contact
- ⊕ Location of well or boring from Stanford (1994). Abbreviations: s, sandstone; sh, shale; d, diabase



Base map from U.S. Geological Survey, 1954.

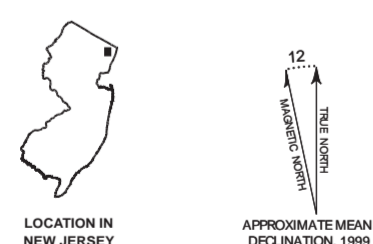
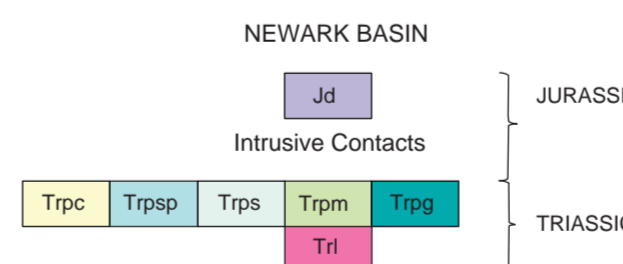
Bedrock geology mapped by R.A. Volkert in 2013
Digital cartography by M.W. Girard
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BEDROCK GEOLOGIC MAP OF THE HACKENSACK QUADRANGLE
PASSAIC AND BERGEN COUNTIES, NEW JERSEY

by
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2015

CORRELATION OF MAP UNITS



FEET
1,000
SEA LEVEL
-1,000
-2,000
-3,000

