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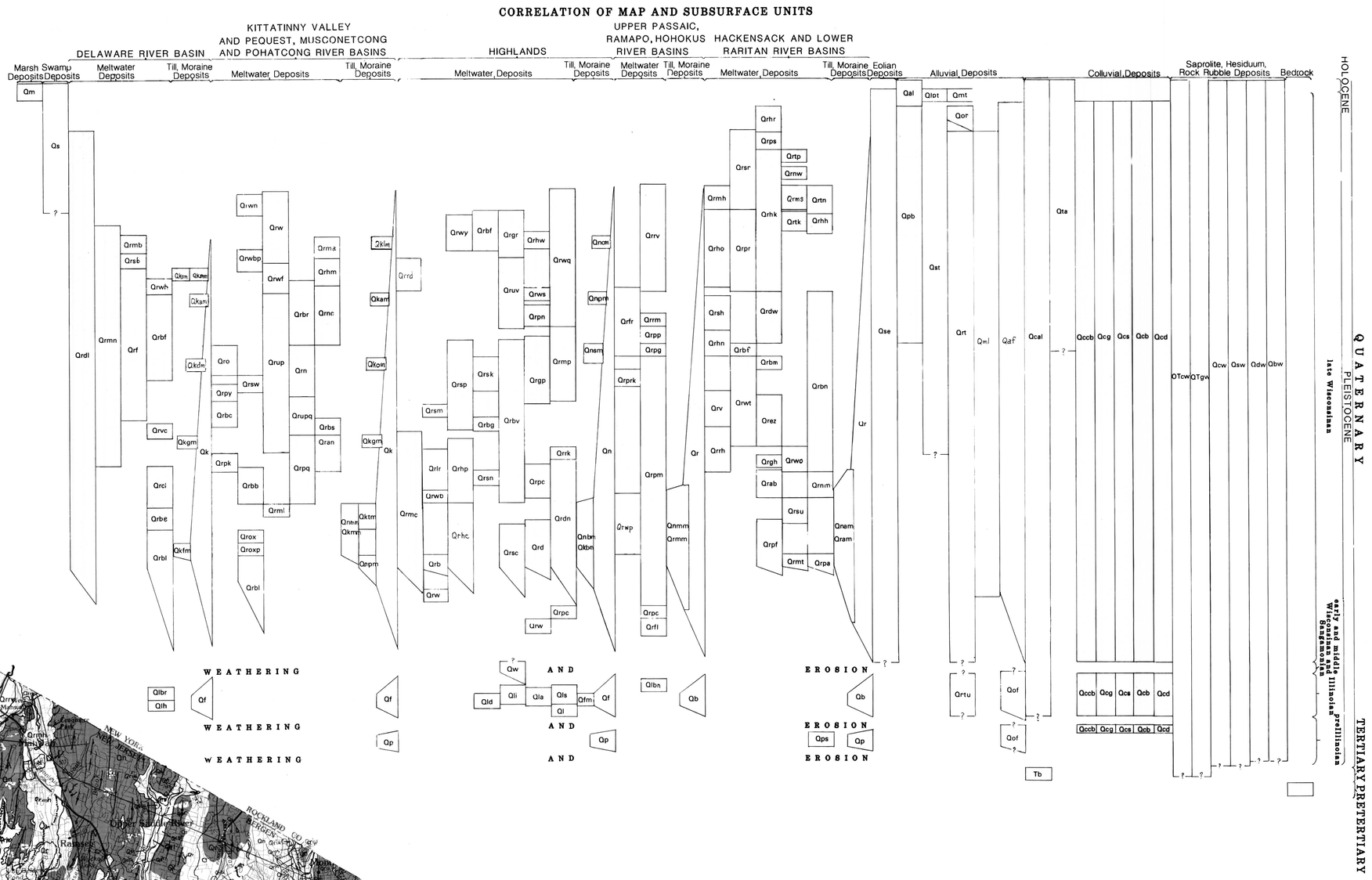
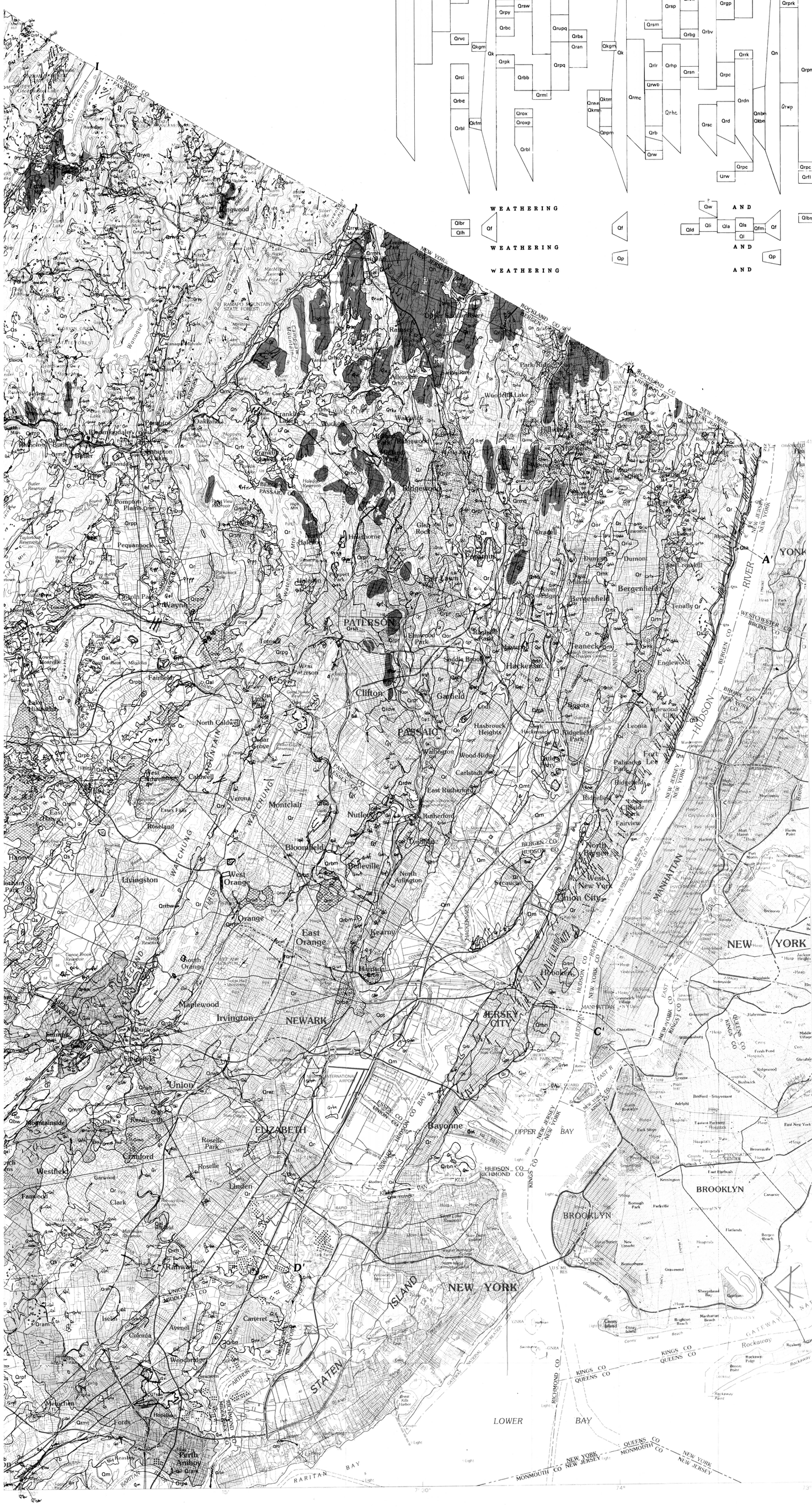
:Y GEOLOGICAL SURVEY

OPEN-FILE REPORT 95-543-B
PLATE 1 OF 2

CORRELATION OF MAP AND SUBSURFACE UNITS





LIST OF MAP AND SUBSURFACE UNITS

For the purpose of map legibility, artificial fill deposits are not shown on the map. These deposits underlie large areas in the urban and suburban areas in the eastern part of the map, and highway and railroad corridors, earthen dams, and mine tailings throughout the area. Also for legibility, numerous small, circular and irregular areas of swamp deposits (unit Qs) in the northern part of the map area are not labelled on the map. Some elongate areas of alluvium deposits (unit Qal) along small tributary streams are not labelled.

Holocene and late Wisconsinan, alluvial, swamp, marsh, estuarine, slope, and eolian deposits

Qal	**Alluvium**	Qaf	**Alluvial-fan deposits**
Qcal	**Colluvium and alluvium, undifferentiated**	Qst	**Stream terrace deposits**
Qmt	**Moonachie terrace deposits**	Qlpt	**Passaic terrace deposits**
Qpb	**Pine Brook terrace deposits**	Qor	**Oradell terrace deposits**
Qrt	**Raritan terrace deposits**	Qml	**Millstone terrace deposits**
Qs	**Swamp and Marsh deposits**	Qm	**Tidal marsh and estuarine deposits**
Qta	**Talus deposits**	Qse	**Eolian sand**

Late Wisconsinan Glacial Meltwater Deposits

Rockaway Formation--Stratified and sorted gravel, sand, silt, and clay deposited by meltwater in glacial streams and glacial lakes

Deposits of glacial streams--Interbedded sand and gravel, and pebbly coarse sand, horizontally stratified, and sorted

Qrsr	**Saddle River outwash deposit**	Qrps	**Pascack outwash deposits**
Qrdl	**Delaware terrace deposit**	Qrwq	**Wanaque outwash deposits**
Qrbf	**Big Flat Brook outwash deposit**	Qrpn	**Pequannock terrace deposits**
Qrpp	**Pompton Plains outwash deposit**	Qrbd	**Brookdale terrace deposit**
Qrbc	**Blairs Creek outwash deposits**	Qrvc	**Van Campens outwash deposit**
Qrrh	**Rahway River outwash deposit**	Qrmc	**Musconetcong terrace deposits**
Qrrk	**Rockaway terrace deposits**	Qrlr	**Lubbers Run outwash deposit**
Qrbb	**Beaver Brook outwash deposits**	Qrhc	**Hackettstown outwash deposit**
Qrpf	**Plainfield outwash deposit**	Qrbl	**Belvidere outwash deposits**
Qrmt	**Metuchen outwash deposit**	Qrpa	**Perth Amboy outwash deposit**
Qrfl	**Florham outwash deposit**	Qrtu	**Terrace and meltwater fan deposits, undifferentiated**

Deposits of major glacial lakes--Interbedded sand and gravel, and coarse pebbly sand in delta topset beds and tributary stream deposits (shown by stipple pattern), and in esker deposits; interbedded sand and some gravel in inclined foreset beds and subhorizontal bottomset beds of deltas and glaciolacustrine fans; and thinly bedded fine sand, silt, and clay in lake-bottom deposits (shown by dashed-line pattern)

Highlands areas

Qrbf	**Glacial Lake Bearford deposits**	Qrgr	**Glacial Lake Greenwood deposits**
Qrwy	**Glacial Lake Waywayanda deposits**	Qrgp	**Glacial Lake Green Pond deposits**
Qrsp	**Glacial Lake Sparta deposits**	Qrhp	**Glacial Lake Hopatcong deposits**
Qrdn	**Glacial Lake Denville deposits**	Qrpc	**Glacial Lake Picatinny deposits**
Qrd	**Glacial Lake Dover deposits**	Qrsc	**Glacial Lake Succasunna deposits**
Qrb	**Glacial Lake Budd deposits**		

Kittatinny Valley, Pequest, Musconetcong, and Pohatcong River basins

Qrw	**Glacial Lake Wallkill deposits**	Qrma	**Glacial Lake McAfee deposits**
Qrhm	**Glacial Lake Hamburg deposits**	Qrwf	**Glacial Lake Wallkill deposits, Frankford Plains phase**
Qrbr	**Glacial Lake Beaver Run deposits**	Qrnc	**Glacial Lake North Church deposits**
Qro	**Glacial Lake Owassa deposits**	Qrn	**Glacial Lake Newton deposits**
Qrsw	**Glacial Lake Swartswood deposits**	Qrbs	**Glacial Lake Big Springs deposits**
Qrpk	**Glacial Lake Paulins Kill deposits**	Qrpq	**Glacial Lake Pequest deposits**
Qroxp	**Glacial Lake Oxford deposits, Pophandusing stage**	Qroxb	**Glacial Lake Oxford deposits, Buckhorn stage**

Delaware River basin

Qrmb	**Glacial Lake Millbrook deposits**		

Upper Passaic, Ramapo, and Hohokus River basins

Qrpg	**Glacial Lake Passaic deposits, Great Notch Stage**	Qrwp	**Glacial Lake Whippany deposits**
Qrpm	**Glacial Lake Passaic deposits, Moggy Hollow Stage**	Qrpc	**Glacial Lake Passaic deposits, Chatham Phase**

Hackensack, Rahway, and lower Passaic River basins

Qrhr	**Glacial Lake Hackensack and Lake Hackensack deposits, Oradell Stage**	Qrhk	**Glacial Lake Hackensack deposits, Kill Van Kull Stage**
Qrtn	**Glacial Lake Tenakill deposits**	Qrpr	**Glacial Lake Paramus deposits**
Qrtk	**Glacial Lake Teaneck deposits**	Qrwt	**Glacial Lake Watsessing deposits**
Qrwo	**Glacial Lake Woodbridge deposits**	Qrab	**Glacial Lake Ashbrook deposits**
Qrhd	**Glacial Lake Hudson deposits**	Qrbn	**Glacial Lake Bayonne deposits**

Deposits of small glacial lakes and ponds--Interbedded sand and gravel, and coarse pebbly sand in delta topset beds and tributary esker deposits; interbedded sand and some gravel in inclined foreset beds and subhorizontal bottomset beds of deltas and glaciolacustrine fans; and thinly bedded fine sand, silt, and minor clay in lake-bottom deposits

Highlands area

Qrhw	**Hewitt deposits**	Qruv	**Union Valley deposits**
Qrws	**West Brook deposits**	Qrmp	**Macopin deposits**
Qrbv	**Berkshire Valley deposits**	Qrsk	**Stockholm deposits**
Qrsm	**Sussex Mills deposits**	Qrbg	**Bowling Green deposits**
Qrsn	**Shawnee deposits**	Qrwb	**Wills Brook deposits**

Kittatinny Valley, Pequest, Musconetcong, and Pohatcong River basins

Qrwn	**Wantage deposits**	Qrwbp	**West Branch Papakating deposits**
Qrrd	**Rudeville deposits**	Qrup	**Paulinskill deposits**
Qrpy	**Plymouth Pond deposits**	Qrupq	**Pequest deposits**
Qran	**Andover deposits**	Qrml	**Mountain Lake deposits**

Delaware River basins

Qrmn	**Minisink deposits**	Qrsb	**Shimers Brook deposits**
Qrwh	**White Brook deposits**	Qrf	**Flatbrook deposits**
Qrcl	**Columbia deposits**	Qrbe	**Bridgeville deposits**

Upper Passaic, Ramapo, and Hohokus River basins

Qrrv	**Ramapo Valley deposits**	Qrrm	**Ramapo deposits**
Qrfr	**Franklin Lakes deposits**	Qrprk	**Preakness deposits**

Hackensack, Rahway, and lower Passaic River basins

Qrtp	**Tappan deposits**	Qrnw	**Norwood deposit**
Qrmh	**Mahwah deposits**	Qrms	**Musquapsink deposits**
Qrho	**Hohokus deposit**	Qrhh	**Highwood deposits**
Qrdw	**Delawanna deposits**	Qrsh	**Sandy Hill deposits**
Qrhn	**Haledon deposits**	Qrbf	**Bloomfield deposits**
Qrv	**Verona deposits**	Qrez	**Elizabeth deposits**
Qrgh	**Galloping Hills deposits**	Qrnm	**Nomahegan deposits**
Qrsu	**Summit deposits**	Qrlu	**Small glacial lake deposits, undifferentiated**
Qriu	**Ice-contact deposits, undifferentiated**		

Late Wisconsinan Tills and Moraine Deposits

Sandy, sandy-to-silty, and silty-to-clayey deposits consisting of a very poorly sorted matrix of sand, silt, and clay containing commonly 5-50 percent pebbles, cobbles, and boulders; generally nonstratified and homogeneous; chiefly compact; deposited directly from glacial ice

Tills

Qr	**Rahway Till**	Qn	**Netcong Till**
Qk	**Kittatinny Mountain Till**		

Moraine deposits

Qncm	**Cherry Ridge moraine deposit**	Qnpm	**Mud Pond moraine deposits**
Qnsm	**Silver Lake moraine deposit**	Qnu	**Moraine deposits, undifferentiated**
Qklm	**Libertyville moraine deposit**	Qkmu	**Moraine deposits, undifferentiated**
Qkvm	**Millville moraine deposit**	Qksm	**Steeny Kill Lake moraine deposit**
Qkmm	**Montague moraine deposit**	Qkam	**Augusta moraine deposit**
Qkdm	**Dingmans Ferry moraine deposit**	Qkom	**Ogdensburg-Culvers Gap moraine deposit**
Qkgm	**Franklin Grove moraine**		

Segments of Terminal Moraine

Qram	**Perth Amboy moraine deposit**	Qrmm Qnmm	**Madison moraine deposit**
Qnlm	**Mountain Lakes moraine deposit**	Qnpm	**Pequest moraine deposit**
Qkbm Qnbm	**Budd Lake moraine deposit**	Qktm Qntm	**Townsbury moraine deposit**
Qkfm	**Foul Rift moraine deposit**		

Middle Wisconsinan to Illinoian Alluvial Deposits

Qw	**Wharton deposits**	Qof	**Older alluvial fan deposits**
Qrtu	**Raritan terrace deposit**		

Illinoian Glacial Meltwater Deposits

Lamington Formation--Stratified and sorted gravel, sand, silt, and clay deposited by meltwater in glacial streams and glacial lakes

Deposits of glacial streams--Interbedded sand and gravel, and pebbly coarse sand, horizontally stratified, and sorted

Qld	**Drakes Brook outwash deposit**	Qlbr	**Brainards outwash deposit**

Deposits of glacial lakes--Interbedded sand and gravel, and coarse pebbly sand in delta topset beds (shown by stipple pattern); interbedded sand and some gravel in inclined foreset beds and subhorizontal bottomset beds of deltas and glaciolacustrine fans; and thinly bedded fine sand, silt, and clay in lake-bottom deposits

Qlh	**Harmony Station deposits**	Qli	**Glacial Lake Ironia deposits**
Qls	**Glacial Lake Shongum deposits**	Qlbn	**Bernardsville deposits**
Qla	**Almatong deposit**	Ql	**Lamington Formation, undifferentiated**

Illinoian Tills and Moraine Deposits

Silty-to-sandy and silty-to-clayey deposits consisting of a very poorly sorted matrix of sand, silt, and clay containing commonly 5-20 percent pebbles, cobbles, and few boulders; generally nonstratified and homogeneous; generally very compact; deposited directly from glacial ice

Tills

Qf	**Flanders Till**	Qb	**Bergen Till**

Moraine deposits

Qfm	**Flanders moraine deposit**

Pre-Illinoian Stratified and Till Deposits

Port Murray Formation

Qps	**Stratified deposits**	Qp	**Till**

Late Wisconsinan to Middle Pleistocene Colluvium Deposits

Silty sand, sandy silt, clayey silt, or gravelly sand deposits consisting of a very poorly to poorly sorted matrix of sand, silt, and clay, commonly containing 5-60 percent angular rock chips, pebbles, cobbles, and small boulders; commonly massive to indistinctly layered; locally stratified; deposited on slopes by creep, sheetwash, debris-flow, and solifluction processes; includes local boulder talus

Qcg	**Gneiss-clast silty-sand colluvium**	Qcb	**Basalt-block colluvium**
Qcd	**Diabase-block colluvium**	Qcs	**Sandstone-, siltstone-, conglomerate-, or shale-clast colluvium**
Qccb	**Carbonate-clast colluvium**		

Quaternary and Tertiary Saprolite, Residuum, and Rock Rubble

Silty sandy to clayey silty matrix, very poorly sorted or nonsorted weathered-rock materials, commonly containing 5-50 percent angular pebbles and cobbles; loose to compact; materials derived from inplace chemical weathering of underlying bedrock; materials include: 1) sandy to clayey, homogeneous **decomposition residuum** derived from weathering of clastic rocks, 2) clayey silty sand to silty clay, homogeneous **solution residuum** derived from weathering of carbonate rock, and 3) silty sand to clayey structured **saprolite** that preserves original rock structure and fabric

Qbw	**Clayey silty basalt saprolite and rock rubble**	Qdw	**Sandy silty diabase saprolite and rock rubble**
Qsw	**Silty clayey to sandy silty sandstone, siltstone, and shale residuum, silty sandy quartzite and conglomerate saprolite and rock rubble**	QTcpw	**Silty sandy to clayey sand, silt, and clay residuum**
Qtgw	**Silty sandy gneiss saprolite and rock rubble**	QTcw	**Clayey silty carbonate rock residuum and rock rubble**
Tb	**Bridgeton Formation (Tertiary)**		

W JERSEY

Geology mapped by Byron D. Stone, 1982-1992, and Scott D. Stanford and Ron W. Witte, 1984-1992
Assisted by Grahame J. Larsen, 1983, A. Von Schondorf, 1985, 1986,
Geology compiled by Stone, Stanford, and Witte, 1989-1993
Edited and integrated by Stone, 1989-1995

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code.