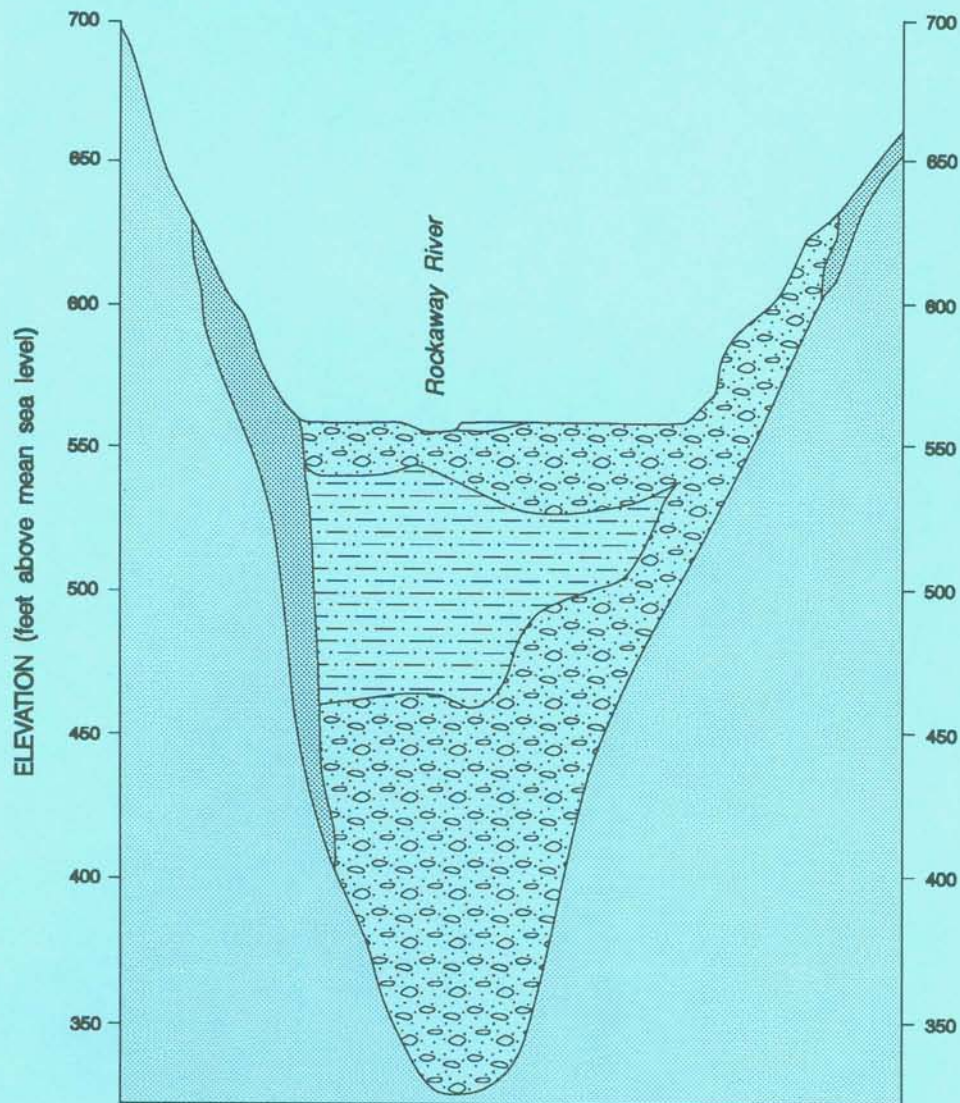




HYDROGEOLOGIC FRAMEWORK OF THE MIDDLE AND LOWER ROCKAWAY RIVER BASIN, MORRIS COUNTY, NEW JERSEY



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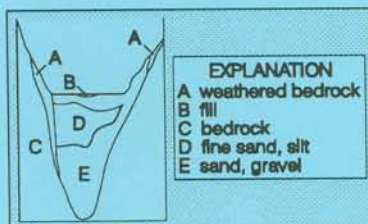
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Cover illustration: Cross section through valley-fill deposits in the Rockaway valley north of Victory Gardens. Vertical exaggeration is 20 times. Modified from plate 3, section C - C'.



**New Jersey Geological Survey
Geological Survey Report GSR 33**

**Hydrogeologic Framework of the Middle and Lower
Rockaway River Basin, Morris County, New Jersey**

by
Robert Canace, Scott D. Stanford, and David W. Hall

New Jersey Department of Environmental Protection and Energy
Division of Science and Research
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HYDROGEOLOGIC FRAMEWORK OF THE MIDDLE AND LOWER ROCKAWAY RIVER BASIN, MORRIS COUNTY, NEW JERSEY

Abstract

The valley-fill deposits of the Rockaway River basin between Wharton and Montville in Morris County, New Jersey, were investigated using geologic mapping, records of wells and borings, and seismic techniques. The valley fill includes unconfined and semiconfined aquifers. The unconfined aquifers consist of late Wisconsinan glaciofluvial and glaciolacustrine sand and gravel. The semiconfined aquifers consist of late Wisconsinan glaciolacustrine sand and gravel and pre-late Wisconsinan glaciolacustrine and glaciofluvial sand and gravel. They occur in the deepest parts of buried bedrock valleys, and are as much as 60 feet thick. The unconfined aquifers are generally less than 50 feet thick. The confining units are as much as 150 feet thick and consist of glaciolacustrine silt, fine sand, clay, and, in places, glacial till.

The study confirmed the presence of a buried bedrock gap, first suggested by Davis and Wood (1889), that connects the upper Rockaway and Passaic buried valley systems. The Troy Hills buried valley was mapped from the Rockaway Valley through this gap to the Passaic buried valley system of Nichols (1968).

Introduction

The Rockaway River basin between Wharton and Montville, together with small areas of the Whippany and Passaic basins included within the study area, encompasses approximately 120 square miles (fig. 1). Included are the Boroughs of Mountain Lakes, Rockaway, and Wharton, parts of the Borough of Morris Plains, the Townships of Rockaway, Randolph, Denville, Roxbury, Boonton, Hanover, East Hanover, Jefferson, Mine Hill, Montville and Parsippany-Troy Hills, and the Towns of Boonton, Dover, and Victory Gardens (figs. 2, 3). Within this area, buried valley aquifers are the principal

source of potable water. They supplied approximately 19.5 million gallons per day (MGD) in 1987 (table 1). Within Morris County as a whole, a 17-percent increase in water consumption is projected by the year 2000 (Havens and Emerson, 1980). A large part of this increase is expected to come from high-capacity wells in valley-fill aquifers.

The study was undertaken as part of an effort to determine the effects that increased withdrawals would have on water levels in aquifers, water supply from ex-

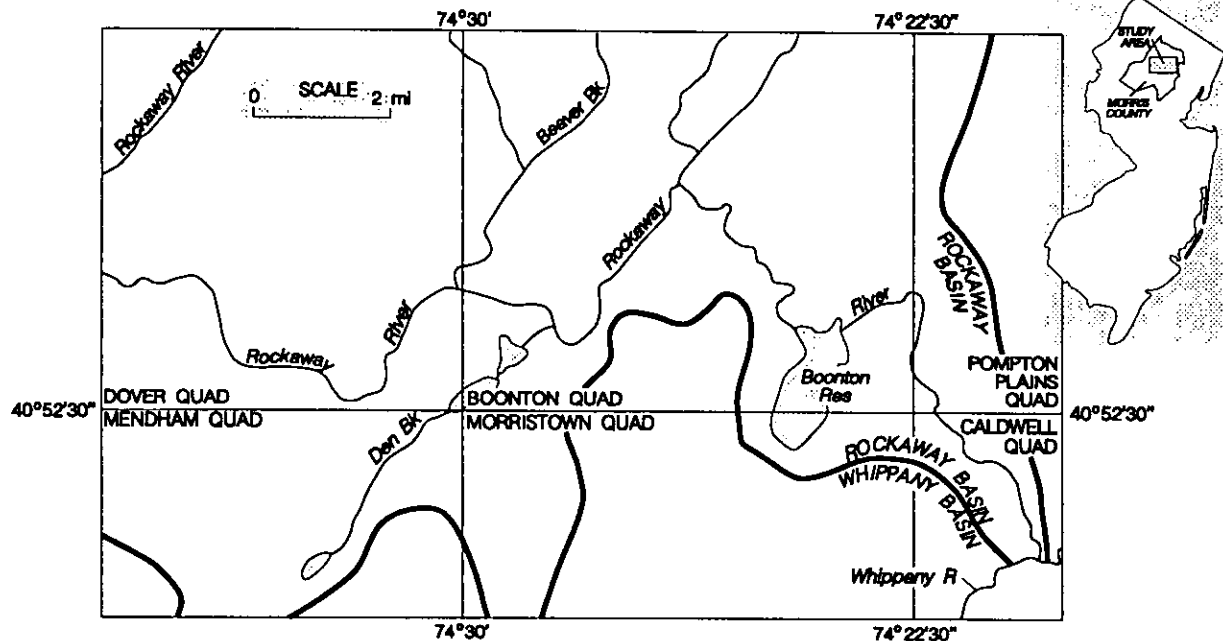


Figure 1. Major drainage basins, waterways, and boundaries of U.S. Geological Survey topographic quadrangle maps in the study area.

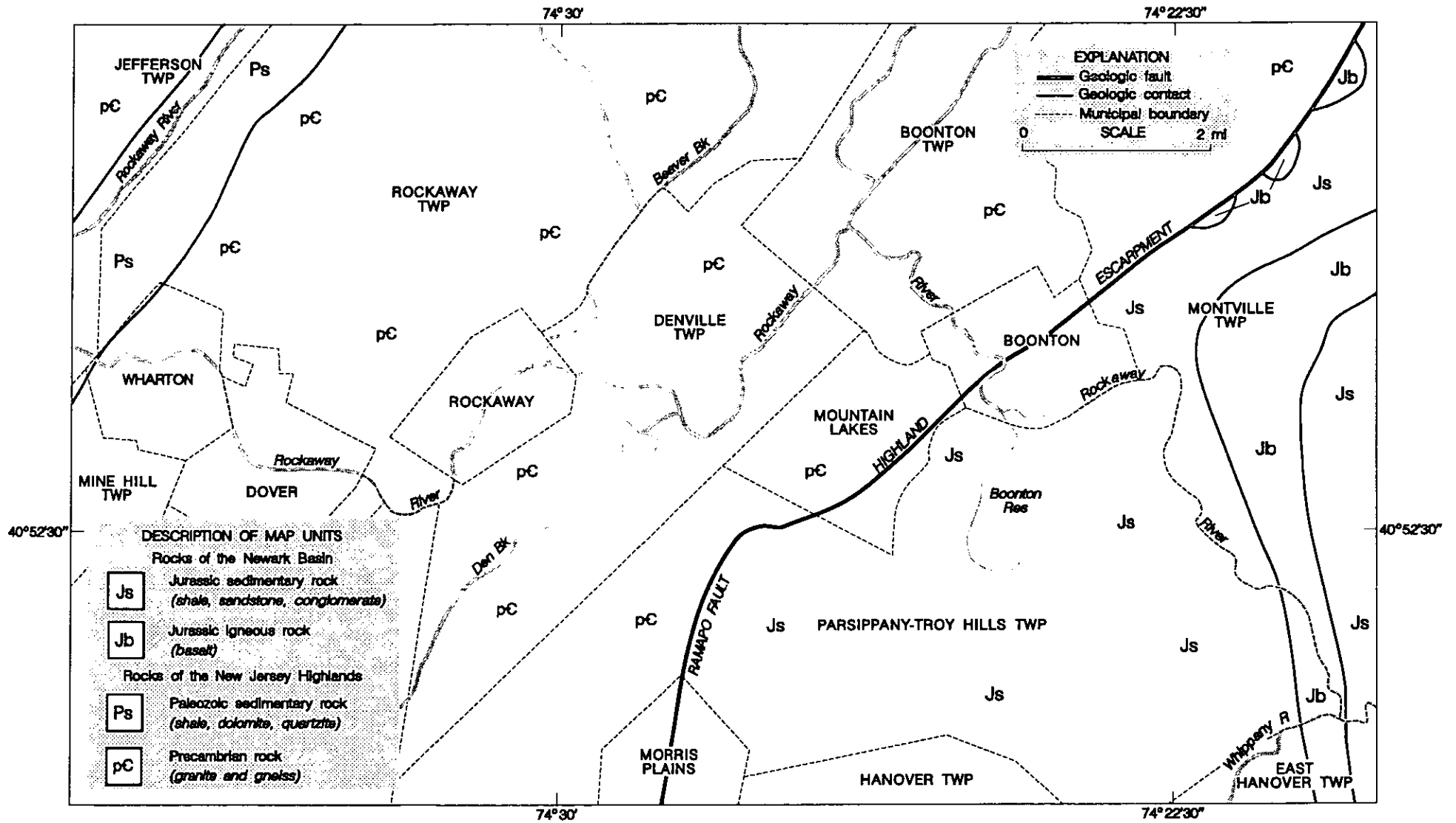


Figure 2. Bedrock geology of the study area. Modified from Lyttle and Epstein (1987).

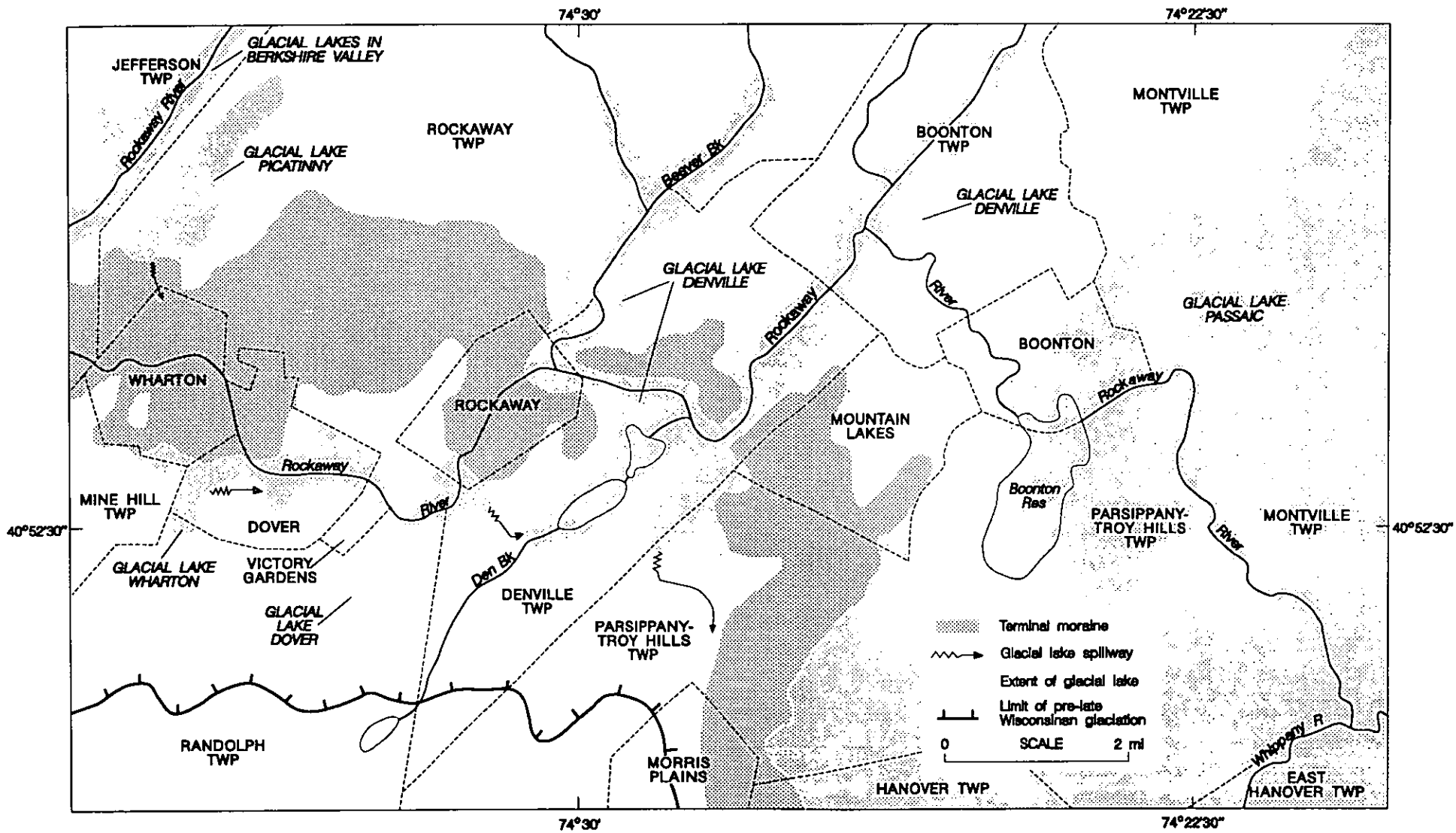


Figure 3. Maximum extent of glacial lakes, location of terminal moraine, and location of glacial lake spillways.

Table 1. Withdrawals from valley-fill aquifers in the lower and middle Rockaway River basin, 1987*

Owner	Well field	Aquifer type	Withdrawal (MGD)
Boontown Township	Rockaway River	Unconfined and semiconfined	0.464
Denville Township	Morris Avenue	Semiconfined	1.194
Dover Town	Princeton Avenue	Unconfined	2.788
Morristown	Lee Meadows	Semiconfined and bedrock aquifers	5.000
Mountain Lakes Borough**	Towpath	Unconfined	0.054
	Tower Hill	Unconfined	0.003
Parsippany-Troy Hills	Troy Brook	Semiconfined	4.800
	Mazda Brook/Forge Pond***	Semiconfined	1.970
	Lee Meadows	Semiconfined	1.310
Rockaway Borough	Borough	Unconfined and semiconfined	1.313
Rockaway Township	Meadow Brook	Semiconfined	1.174
Wharton Borough	Central Avenue	Unconfined	<u>0.705</u>
TOTAL			21.481

* Source: Records of NJDEPE, Bureau of Water Allocation

** 1988

*** 1988 Allocation/planned use

isting wells, and condition of streams and lakes. It defined the hydrogeologic framework for a three-dimensional ground-water flow model of the valley-fill aquifer system developed by the United States Geological Survey (Schaefer and others, 1993; Gordon, in press). The framework of buried bedrock valleys and valley-fill aquifers was shown with a bedrock topography map (pl. 1), a surficial materials map (pl. 2), and geologic sections (pl. 3). These were based on geologic mapping, records of wells and borings, and seismic refraction.

Acknowledgements

This study was funded by a grant from the U.S. Environmental Protection Agency, Underground Injection Control Program, and by the New Jersey Water Bond Issue of 1981.

The authors are grateful to Frank Boyarski, former superintendent of the Parsippany-Troy Hills Water Department, Carl Danser of the Mountain Lakes Water Department, Steve Koval of the Boonton Township Water Department, and Joe Lowell of the Denville Water Department for their assistance and cooperation in obtaining information for this study. We also thank A.D. Randall and P.T. Harte of the U.S. Geological Survey - Water Resources Division, and I.G. Grossman and D.P. Harper of the New Jersey Geological Survey for their expert review of the report. The authors acknowledge Wayne Hutchinson, Evelyn Hall and Jeff Kearns of the New Jersey Geological for assisting in the collection and processing of the data contained in this study.

Geologic setting

The Rockaway River basin lies within two geologic provinces. North and west of the 200- to 400-foot-high

Highlands escarpment, extending from Montville through Boonton to Fox Hill, is the New Jersey Highlands (fig. 2). To the south and east, below the escarpment, is the Newark Basin. The Highlands escarpment coincides with the Ramapo Fault, a major fault which separates Precambrian granite and gneiss of the Highlands to the northwest from Jurassic sedimentary and igneous rocks of the Newark Basin to the southeast. The escarpment is an erosional feature created by the contrast between resistant Precambrian granite and gneiss and less resistant Jurassic sedimentary rock.

Preglacial drainage routes generally coincide with present drainage (Stanford, 1989a,b). In the only major exception, the preglacial Rockaway River flowed northwest-southeast through a valley from Denville across the Highlands escarpment to Troy Hills (fig. 3). This valley subsequently was filled with as much as 400 feet of glacial sediment and the Rockaway River now flows northeast from Denville to Boonton Township, then southeast through a gap near Boonton (fig. 3). From Boonton, the present-day river flows southeastward, following a partially filled tributary of the preglacial Rockaway, to the Passaic River at Pine Brook. In another, smaller change due to glaciation, the preglacial course of the Rockaway was blocked with glacial deposits at Dover and the river now is incised into a bedrock spur about 2,000 feet to the south of the preglacial valley.

Deposits record at least two glaciations (Stanford, 1989a,b). A pre-late Wisconsinan glaciation, of probable Illinoian age, extended south of the Rockaway Valley (fig. 3). The late Wisconsinan glaciation extended to a well preserved terminal moraine which follows the Highlands escarpment from Littleton to Denville, then

traverses the Rockaway Valley westward to Wharton (fig. 3). Deposits of the earlier glaciation occur south of and in places beneath the terminal moraine. They include till as much as 40 feet thick and sand and gravel as much as 50 feet thick. These are overlain by thick late Wisconsinan till and glaciolacustrine deposits in the major valleys and do not occur at the land surface north of the terminal moraine.

Late Wisconsinan deposits are primarily lacustrine. Of the several glacial lakes in the study area (fig. 3), glacial Lake Passaic (Kummel, 1895) was the largest and occupied the entire area east of the Highlands escarpment. Valley-fill sediments within the Lake Passaic basin include interbedded till and glaciolacustrine silt, clay, sand, and gravel. The silt and clay are as much as 120 feet thick. The till and sand and gravel are as much as 80 feet thick.

Smaller glacial lakes occupied the Rockaway River valley and its tributaries. Valley-fill sediments within

the basins of these lakes generally consist of a three-part sequence in which as much as 50 feet of glaciolacustrine sand and gravel is overlain by as much as 150 feet of silt, fine sand, and clay. This is in turn overlain by as much as 50 feet of glaciofluvial sand and gravel. Till is interbedded with these sediments in and near the terminal moraine.

Previous hydrogeologic investigations

Gill and Vecchioli (1965) provided general information on ground water in both bedrock and buried valley aquifers for Morris County. Nichols (1968) showed bedrock topography in the eastern part of the study area. Geonics (1979a) used seismic techniques to determine the thickness of valley-fill sediments in the Rockaway River valley in Denville, Mountain Lakes, Boonton, and Boonton Township. Borings by Geonics (1979a) demonstrated the existence of a semi-confined sand and gravel aquifer in the valley between Denville and Boonton Townships. Geonics (1979b) delineated valley-fill sediments in Montville Township.

Techniques of Investigation

Geologic data

Approximately 750 records of water wells, monitor wells and test borings (table 2) from files at the New Jersey Bureau of Water Allocation and the New Jersey Department of Transportation were used to construct the bedrock topography map (pl. 2) and geologic sections (pl. 3). The locations of public-supply wells were checked in the field; the locations of other wells and borings were obtained from State well permits, site plans, engineering reports, tax maps, drillers' reports, and, in some cases, site visits.

Surficial geologic data were from Kummel (New Jersey Geological Survey, unpublished maps), Salisbury (1895), Darton and others (1908), Bayley and others (1914), Sims (1958), and Stanford (1989a,b; unpublished maps). Interpretations by Geonics (1979a) and Nichols (1968) and subsurface data from Geraghty and Miller (1968) were taken into account in contouring bedrock elevation.

Seismic refraction

Fifty two seismic refraction traverses were taken, following the field procedures described by Haeni (1988), to determine the thickness and composition of the valley-fill sediments. The degree of urbanization and the anticipated depth to bedrock were the limiting factors for seismic profile length and geophone spacing. Both single-channel and 12-channel refraction data

were collected. Initially, a single-channel seismograph was used and the slope-intercept method (Dobrin, 1976) was used to determine depths to the different layers. Later, a 12-channel, signal-enhancement seismograph was used. The 12-channel instrument proved to have superior resolution and filtering capabilities. Multiple-shotpoint data collected with the 12-channel instrument were reduced using two computer programs: HRASSD (Hoffman and Waldner, 1985) to pick the time breaks and layer numbers for individual shotpoints, then FSIP1 (Scott, 1977) to calculate average apparent velocity (speed of a seismic impulse) for layers and assemble multi-shotpoint refraction lines into depth profiles. Generally, multiple shotpoint data are more reliable because depth determinations are based on repeatedly sampling.

Most of the lines were best modeled as 3-layer cases (table 3). In some cases 4 distinct layers could be detected (see pl. 3, RV-4).

The velocity of layer 1 ranged from 650 to 2,000 feet per second (ft/sec). Such relatively low velocities are typical of unsaturated, unconsolidated sediments, and layer 1 was interpreted as being valley fill above the water table.

Layer 2 velocities ranged from 3,480 to 7,400 ft/sec and, in most cases, were interpreted as showing saturated, unconsolidated sediments. Where velocities were

below 4,500 ft/sec, however, layer 2 was interpreted as partially saturated, fine-grained sediment. Within the study area, velocities of 6,900 to 7,400 ft/sec may indicate either sedimentary bedrock (shale or conglomerate), or saturated sediment. Interpretation of seismic data with velocities in this range was based in part on type of bedrock known to underlie the site.

Discussion

The Rockaway buried valley (fig. 4, pl. 1) is the upstream extension of the Passaic buried valley system of Nichols (1968) and the downstream extension of a buried valley system mapped in the upper Rockaway basin by Canace and others (1983). The deepest part of the principal buried valley declines in elevation from approximately 400 feet above sea level near Washington Pond in Wharton Borough to less than 60 feet above sea level under Troy Meadows. The segment between Arrowhead Lake and Troy Meadows, where the buried valley intersects the Millburn buried valley of Nichols (1968; modified by Ghatge and Hall, 1989) is referred to here as the Troy Hills buried valley. The Montville buried valley extends northward from the Troy Meadows area into Montville Township. The northern ends of the Cedar Knolls and Parsippany buried valleys (Hoffman and Stone, 1991) are also within the study area.

Because the area is near the limit of glaciation, bedrock topography is interpreted as being inherited predominantly from stream erosion, rather than as the result of glacial scour. Although the glaciers did scour closed depressions within the Passaic buried valley area (Nichols, 1968), closed depressions were noted in the study area only beneath Picatinny Arsenal and in the southeast corner, where all topography below roughly the 60-foot bedrock elevation contour (pl. 2) is glacially scoured. Both areas are north of the terminal moraine in north-south tributary valleys underlain by easily eroded sedimentary bedrock. The main Rockaway buried valley, in contrast, was less subject to erosion because of its east-west orientation, perpendicular to ice flow, and

Layer 3 velocities indicated either unweathered sedimentary rock (8,870 to 12,000 ft/sec), or crystalline bedrock or basalt (11,000 to 22,000 ft/sec). In the absence of velocities appropriate for the type of bedrock known to underlie a site, bedrock was assumed to be deeper than the maximum calculated depth for refraction of seismic energy.

because it lies along the terminal moraine, where deposition was predominant over erosion.

Ground-water resources

Productive valley-fill aquifers in the Rockaway basin consist of sand and gravel deposits of glaciofluvial and glaciolacustrine origin (table 2). Both unconfined and semiconfined aquifers are present.

Within the glacial Lake Passaic basin, semi-confined aquifers of sand and gravel as much as 80 feet thick are overlain by as much as 120 feet of silt, clay, fine sand, and till. Unconfined aquifers exist where silt and clay are absent, but they are not extensive or thick.

Upstream, within the Highlands, the valley fill of the Rockaway valley and its tributaries generally consists of an unconfined aquifer, a leaky confining layer, and a semiconfined aquifer. The unconfined aquifer consists of sand and gravel as much as 50 feet thick. The underlying leaky confining layer is as much as 150 feet thick and consists of silt, fine sand, clay, and locally till. The semiconfined sand and gravel aquifer ranges in thickness from 30 to 80 feet, but it can be less than 30 feet thick and is absent in places.

The Troy Hills buried valley, connecting the buried valleys in the Passaic basin with those in the Highlands, contains a semiconfined aquifer continuous along its length. Piezometric levels in this aquifer indicate that ground-water underflow is occurring between the Rockaway and Passaic basins through the buried gap at Mountain Lakes (Schaefer and others, 1993).

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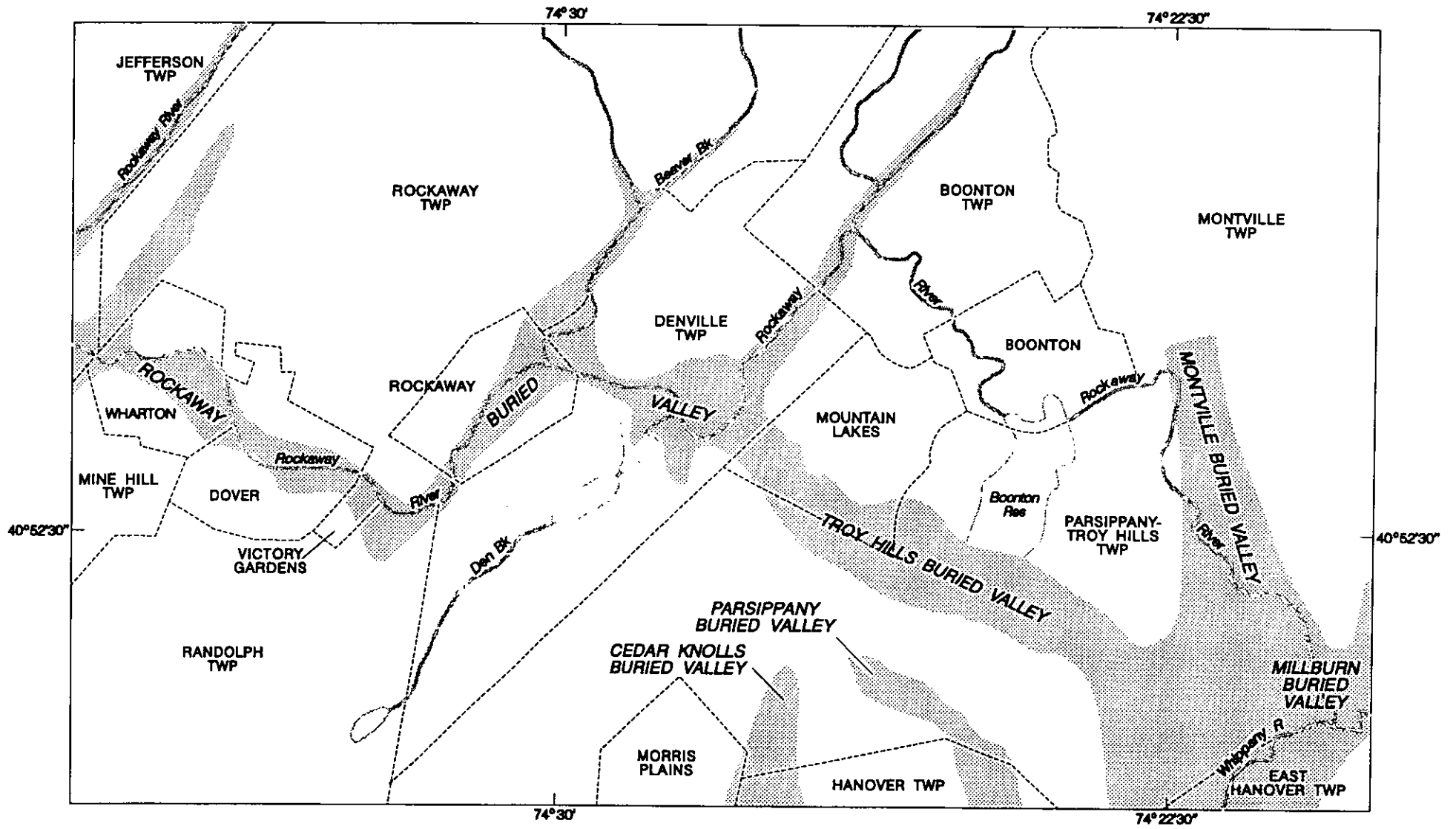


Figure 4. Buried valleys within the study area.

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Table 2. Records of wells shown on plate 1.

Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Form-ation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pump-ing level ⁷				
BOONTON TWP.																
B 1	25 14523	Zieger, John		02/07/75	Soren Nelson Jr.	580	73	24	40	NA	NA	NA	5	NA	PC	0-24 overburden 24-45 black rock 45-73 gneiss
B 2	22 07157	Harrison, Willard		11/27/64	Soren Nelson Jr.	510	82	>82	82	NA	30	55	10	NA	Qsd	0-41 silty, sand gravel 41-47 clay 47-76 water-bearing silty sand 76-82 water-bearing sand, gravel, stones
B 3	22 09142	Sands, Alex		08/01/68	Mabey Bros.	510	95	>95	95	95	20	65	12	0.3	Qsd	0-15 gravel 15-30 clay 30-95 sand, gravel
B 4	25 08411	Duffee		04/16/59	Pine Brook	510	30	22	22	30	4	25	37	1.8	PC	No log
B 5	22 08626	Tasker, Gordon		03/13/67	Frank Bott	530	105	50	86	NA	18	88	20	NA	PC	0-22 sand, gravel, boulders 22-50 fine sand 50-108 decomposed gneiss
B 6	22 04163	Cusack, Charles		06/15/59	Pine Brook	510	44	>44	44	44	29	35	10	1.7	Qsd	0-21 sand, very large stones 21-42 silty sand 42-44 water-bearing sand, gravel
B 7	25 10746	Kuser, John		08/03/62	Pine Brook	510	45	24	28	45	11	20	36	400	PC	0-24 sand, gravel, large boulders 24-41 gneiss 41-45 conglomerate
B 8	25 07927	Duffee, Thomas F.		09/02/58	Pine Brook	520	158	100	103	158	19	100	8	0.1	Qsd	0-18 gravel 18-100 silty sand, gravel 100-158 limestone
B 9	25 03203	Witty, Ernest		02/24/54	Beatty	510	114	>114	114	NA	25	30	10	200	Qsd	0-20 sand 20-100 gravel 100-114 fine gravel
B 10	22 09159	Martin, Charles		08/13/68	H. Kieffer	700	132	17	30	132	16	60	30	0.7	PC	0-17 hardpan 17-132 gneiss
B 11	25 19912	NA		NA	NA	520		65	NA	NA	NA	NA	NA	NA	PC	No log
B 12	22 02435	Sundstrom, Nils		10/17/56	Bott Inc.	500	74	>74	74		10	24	9	0.6	Qsd	0-72 fine sand 72-74 gravel
B 13	22 06942	Meyer, John		07/10/64	Bott Inc.	510	61	44	48	61	17	25	12	1.5	PC	0-28 sand, gravel 28-36 hardpan 36-40 fine sand 40-44 hardpan 44-61 decomposed rock
B 14	22 08470	Ricker, Henry		10/20/66	H.C. Fitzpatrick	520	138	109	109	138	15	94	25	0.3	PC	0-109 sand, gravel 109-138 sandstone
B 15	22 18489	Peter Seats		03/22/79	Soren Nelson Jr.	510	128	>128	131	131	19	100	12	NA	Qsd	0-39 sand, gravel 39-88 water-bearing silty fine sand with gray clay 88-128 water-bearing silty sand, gravel
B 16	22 20793	Budgin, Alex & Jean		02/23/82	Soren Nelson Jr.	520	147	>147	147	147	25	35	12	NA	Qsd	0-6 sand, gravel with boulders 6-41 brown sand, gravel 41-132 very fine silty sand with varved gray clay 132-142 heaving water-bearing silty gray sand with gravel 142-147 water-bearing gray sand, gravel

NOTES: 1) Numbers beginning with UN lack NJDEPE permit numbers. UN numbers were assigned sequentially as records were processed
 2) Total depth of borehole.
 3) From log or approximated from casing length.

4) Bottom of casing for bedrock wells; top of screen for wells in valley fill.
 5) Bottom of well for bedrock wells; bottom of screen for wells in valley fill.
 6) Below top of casing.
 7) To water (pumping test) or end of drill stem (air-lift test).

8) Gallons per minute per foot of drawdown.
 9) PC = Precambrian gneiss, related rock; Qsd = Pleistocene glacial sediment (unit not specified); JTrb = Brunswick Group (Jurassic in study area); Jbs = Jurassic basalt; Sgp = Silurian Green Pond Conglomerate; Cl = Cambrian Leithsville Formation.

Table 2. Records of wells (cont.)

Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Form-ation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pump-ing level ⁷				
B 17	25 17440	Deer Lake Club		05/03/78	DF Well Drilling	550	223	38	50	NA	NA	NA	9	NA	PC	0-38 gravel, boulders 38-79 brown gneiss 79-223 weathered gray gneiss
B 18	22 08547	Manella, Thomas		11/10/66	Mabey Bros.	590	105	7	21	105	7	84	15	0.2	PC	0-7 dirt 7-98 gneiss
B 19	22 07144	Makosky, John		12/03/64	Bott Inc.	520	169	134	136	169	28	60	20	0.6	PC	0-15 sand, gravel 15-93 sand 93-134 clay 134-169 gneiss
B 20	NA	NA, reported in Geonics (1979)		NA	NA	NA	NA	35	NA	NA	NA	NA	NA	NA	NA	No log
B 21	22 20395	Aircraft Radio	Aircraft 5	07/21/81	Fritts & Assoc.	523	32	>32	22	32	NA	NA	NA	NA	Qsd	0-24 medium to fine brown sand, trace coarse sand 24-30 fine sand, trace silt 30-32 fine sand 32-34 medium to fine brown sand, trace coarse sand
B 22	22 20107	NA		NA	NA	670		52	NA	NA	NA	NA	NA	NA	PC	No log
B 23	22 21657	Johanson Mfg. Corp.	Well 2	10/16/80	Moretrench	502	34	>34	14	34	NA	NA	10	NA	Qsd	0-15 coarse to fine brown sand, gravel 15-24 fine to coarse brown sand with gravel 24-34 fine to coarse brown sand
B 24	22 21658	Johanson Mfg. Corp.	Well 3	10/17/80	Moretrench	530	34	>34	14	34	NA	NA	3.25	NA	Qsd	0-15 fine to coarse brown sand, gravel 15-34 fine to coarse brown sand
B 25	22 07532	Johanson Mfg. Corp.		05/17/65	Bott Inc.	515	300	64	66	300	23	150	20	0.2	PC	0-15 sand, gravel 15-60 fine sand 60-64 dirty sand, gravel 64-301 gneiss
B 26	25 20396	NA		NA	NA	525		>26	NA	NA	NA	NA	NA	NA	Qsd	No log
B 27	25 23055	Ronardson, Inc.		08/27/82	DF Well Drilling	560	323	9	50	NA	NA	NA	5	NA	PC	0-9 overburden 9-323 gneiss
B 28	25 24405	McWilliams, John		11/09/83	DF Well Drilling	780	600	6	50	NA	NA	NA	0.1	NA	PC	0-6 overburden 6-600 gneiss
B 29	25 23054	Dutton, Mitchell		08/23/82	DF Well Drilling	560	273	3	50	273	NA	NA	20	NA	PC	0-3 overburden 3-278 gneiss
B 30	25 20642	Aircraft Radio & Control	Monitor Well 9	10/24/81	Fritts & Assoc.	501	15	>15	7	17	NA	NA	NA	NA	Qsd	0-10 silty brown clay 10-15 medium to fine brown sand, trace coarse sand, silt
B 31	25 20643	Aircraft Radio & Control	Monitor Well 10	NA	Fritts & Assoc.	501	35	>35	25	35	NA	NA	NA	NA	Qsd	0-30 medium to fine gray, brown sand, trace coarse sand, fine gravel, silt 30-35 coarse to fine gray, brown sand, trace fine gravel, silt
B 32	25 15800	Olsen, Tobias		01/28/71	DF Well Drilling	610	148	0	31	148	NA	NA	10	NA	PC	0-7 overburden 7-148 gneiss
B 33	25 21368	Aircraft Radio & Control	Monitor Well 1	06/12/80	Moretrench	499	30	>30	10	20	3.70	NA	60	NA	Qsd	0-3 coarse to medium sand with silt 3-4 peat, silt 4-13 gray silt with fine sand 13-18 medium to coarse sand with silt 18-24 fine to medium brown sand with silt 24-30 coarse sand with gravel

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B 34	25 20640	Aircraft Radio & Control	Monitor Well 7	10/22/81	Fritts & Assoc.	501	12	>12	5	15	NA	NA	NA	NA	Qsd	0-10 coarse to fine gray, brown sand, trace silt 10-14 coarse to fine gray, brown sand, trace fine gravel, trace silt 14-32 coarse to fine grey, brown sand, trace silt
B 35	25 20641	Aircraft Radio & Control	Monitor Well 8	10/22/81	Fritts & Assoc.	498	32	>32	33	43	NA	NA	NA	NA	Qsd	0-10 coarse to fine gray, brown sand, trace silt 10-14 coarse to fine gray, brown sand, trace fine gravel, trace silt 14-31 coarse to fine grey, brown sand, trace silt
B 36	25 14950	Lombreglia Builders		10/09/68	DF Well Drilling	610	273	39	39	273	NA	NA	10	NA	PC	No log
B 37	25 03744	Dixon, Bryant H.		09/23/54	Bott Inc.	540	160	0	20	160	7	84	6	0.1	PC	0-160 gneiss
B 38	25 23412	Aircraft Radio & Control	Monitor Well 17D	10/20/82	Fritts & Assoc.	500	65	>55	55	65	NA	NA	NA	NA	Qsd	0-4 coarse to fine brown sand, trace silt 4-8 coarse to medium brown sand 8-20 coarse brown sand with medium sand, trace gravel 20-24 coarse to fine brown sand, trace dirty silt 24-28 coarse gravel, sand 28-38 brown, gray silt 38-42 water-bearing fine brown sand 42-52 fine gray sand with silt 52-58 water-bearing gray silt 58-63 coarse to fine gray sand with silt 63-65 coarse to fine gray sand with gravel
B 39	25 21367	Aircraft Radio & Control	Monitor Well 2	06/12/80	Moretrench	510	30	>30	10	30	NA	NA	7.5	NA	Qsd	0-5 fill, sand, gravel 5-6 peat, silt 6-15 gray silt with fine sand 15-20 fine silty brown sand 20-30 coarse brown sand with gravel
B 40	22 20645	Aircraft Radio & Control		10/23/81	J.E. Fritts	517	35	>35	26	38	NA	NA	NA	NA	Qsd	0-20 fine gray sand, trace sand, gravel 20-34 silty medium to fine, gray to brown sand, trace silt
B 41	25 23410	Aircraft Radio & Control	Monitor Well 16	10/18/82	Fritts & Assoc.	499	42	>32	32	42	NA	NA	NA	NA	Qsd	0-17 coarse to medium brown sand, trace silt 17-41 brown sand with sand, trace clay 41-42.5 fine sandy gray silt
B 42	25 20431	Country Contracting		08/15/79	DF Well Drilling	570	173	5	50	NA	NA	NA	20	NA	PC	0-5 overburden 5-173 gneiss
B 43	25 20708	Formica, Michael		08/13/79	NA	620	197	8	50	NA	NA	NA	10	NA	PC	0-8 overburden, boulders 8-12 soft brown gneiss 12-197 gneiss
B 44	25 21338	Aircraft Radio & Control	Monitor Well 3	06/11/80	Moretrench	510	30	>30	10	30	15	NA	2.5	NA	Qsd	0-5 fill 5-10 medium to coarse sand 10-11 silty sand 11-20 fine to medium sand 20-29 medium to coarse sand 29-30 silty sand
B 45	25 21339	Aircraft Radio & Control	Monitor Well 4	06/11/80	Moretrench	510	30	>30	10	30	14.2	NA	2	NA	Qsd	0-6 medium to coarse sand 6-11 coarse sand 11-12 fine silty sand 12-28 fine to medium sand 28-38 silty fine sand

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 7) To water (pumping test) or end of drill stem (air-lift test).

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Table 2. Records of wells (cont.)

Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
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B 46	25 24560	Dowty RFL Industries, Inc.		02/14/84	Soren Nelson Jr.	530	38	37	38	NA	7.50	33	30	1.2	PC	0-11 hardpan, large stones with sand, gravel 11-19 coarse water-bearing sand, gravel 19-37 very fine water-bearing sand 37-38 gneiss
B 47	25 10637	Radio Laboratories	Radio 1-17	06/11/62	Moretrench	520	26	>41	12	26	9	NA	NA	NA	Qsd	0-3 fill 3-8 sand, gravel 8-14 coarse sand, gravel 14-24 medium-grained sandy sand 24-41 fine silty sand 41 rock
B 48	25 23414	Aircraft Radio & Control	Monitor Well 18D	10/27/83	Fritts & Assoc.	497	65	>65	59	69	NA	NA	NA	NA	Qsd	0-20 silty brown sand 40-55 silty gray sand 60-66 silty fine gray sand
B 49	UN 00253	NA		NA	NA	520		>20	NA	NA	NA	NA	NA	NA	Qsd	No log
B 50	UN 00254	RFL Industries	B2	03/19/66	NA	530	20	>20	NA	NA	5.5	NA	NA	NA	Qsd	0-5 brown silt, trace fine sand 5-15 coarse to fine gray, brown sand, trace silt 15-20 brown silt, fine sand
B 51	UN 00255	RFL Industries	B3	03/21/66	NA	530	20	>20	NA	NA	4	NA	NA	NA	Qsd	0-10 medium to fine sand, trace silt 10-20 fine gray sand, silt, trace gravel
B 52	UN 00256	RFL Industries	B4	03/21/66	NA	530	15	>15	NA	NA	7	NA	NA	NA	Qsd	0-7 organic black silt 7-15 fine sand, brown silt 15 rock?
B 53	25 24814	Hallmark Homes		04/27/84	Ballentine	640	223	13	50	NA	28	NA	12	NA	PC	0-13 clay, sand, gravel 13-223 gneiss
B 54	25 19891	Rast Builders		04/25/78	Ballentine	510	80	>80	80	80	18	NA	35	NA	Qsd	0-65 sand 65-80 sand, gravel
B 55	UN 00185	Boonton Town	Well 1	--/--/29	Layne-New York	500	113	113	NA	NA	NA	NA	100	NA	Qsd	0-2 overburden 2-10 fine sand, gravel 10-80 fine muddy brown sand 80-103 fine gray mud 103-113 coarse muddy sand, gneiss
B 56	25 21342	RFL Industries		06/10/80	Moretrench	512	30	>30	NA	20	5.4	NA	38	NA	Qsd	0-5 medium to coarse sand 5-20 fine to medium sand with silt 20-30 coarse to very coarse sand
B 57	UN 00176	Sullivan, W. S.		06/--/33	Stothoff	780	235	28	NA	NA	NA	NA	10	NA	Qsd	0-28 gravel 28-235 rock
B 58	25 21343	RFL Industries	Well 2	06/11/80	Moretrench	511	26	20	2	22	2.5	NA	20	NA	Qsd	0-10 cobbles, fine to medium gray sand 10-25 medium to coarse tan sand, 25 gravel 26 rock
B 59	UN 00184	Boontown Town	Well 2	--/--/29	Layne-New York	510	12	10	NA	NA	NA	NA	NA	NA	PC	0-2 overburden 2-7 sandy yellow clay 7-10 hardpan 10-12 gneiss
B 60	25 16167	Edwards, John J.	Well 1	11/20/21	Soren Nelson Jr.	700	100	30	NA	NA	2.5	50	15	0.3	PC	0-3 fill 3-14 hardpan, clay 14-18 sand, gravel with boulders 18-30 fractured gneiss 30-100 gneiss
B 61	25 12731	Johnson, Arnold		05/08/65	DF Well Drilling	590	174	6	24	174	12	165	4	0.3	PC	0-6 overburden 6-174 gneiss
B 62	25 21174	Geonics		09/24/79	DF Well Drilling	490	147	140	140	NA	5	140	NA	NA	Qsd	0-20 sand 20-35 clay, sand 35-120 clay 120-140 sand, gravel 140-147 rock

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B 63	25 23404	Rockaway Church		01/12/83	Pine Brook	510	145	111	132	145	19	120	10	0.1	Qsd	0-29 brown sand 29-86 very fine silty sand with gray clay 86-98 water-bearing silty gray sand, gravel 98-111 hardpan, stones 111-145 conglomerate
B 64	25 18434	RVR, Inc.		05/17/76	Pine Brook	500	125	>125	NA	NA	12	100	15	0.2	Qsd	0-33 sand, gravel 33-97 silty sand with clay 97-121 silty sand, gravel 121-125 water-bearing sand, gravel
B 65	25 10860	Schrader, Helmut		09/14/62	Bott Inc.	510	90	68	70	90	18	40	15	0.7	PC	0-25 sand 25-61 clay 61-68 hardpan, gravel 68-90 gravel
B 66	25 24671	Stratton, Inc.		06/07/84	Ballentine	820	98	30	50	NA	20	NA	15	NA	PC	0-30 sand, gravel, clay 30-98 gneiss
B 67	25 19958	Rockaway Church		06/30/78	Soren Nelson	510	130	101	118	130	13	110	10	0.1	PC	0-33 water-bearing sand, very fine silt 33-90 sand with varved clay 90-101 sand, gravel 101-130 conglomerate
B 68	25 17766	RVR Inc.		12/18/74	Pine Brook	500	142	>142	142	142	13	75	15	0.2	Qsd	0-46 sand, gravel 46-108 silty fine sand 108-135 water-bearing fine sand 135-142 sand, gravel
B 69	25 17271	Lonergan, John J.		11/24/73	Pine Brook	510	90	>90	NA	NA	8	40	15	0.5	Qsd	0-24 sand 24-67 clay 67-86 silty sand 86-90 water-bearing sand, gravel
B 70	25 19537	Kovalcik, Frank		10/18/77	Pine Brook	510	126	112	116	126	16	110	4	0.04	Sgp	0-29 sand 29-101 silty sand with varved gray clay 101-112 water-bearing sand, gravel 112-126 conglomerate
B 71	25 18202	RVR Inc.		12/19/75	Pine Brook	510	116	112	NA	NA	14	60	10	0.2	Sgp	0-31 sand, gravel 31-103 silty sand with clay 103-112 heaving sand and gravel with boulders 112-116 conglomerate
B 72	25 19026	RVR Inc.		03/14/77	Pine Brook	510	125	93	105	125	14	85	5	0.07	Sgp	0-37 sand, gravel 131 37-77 silty fine sand with clay 77-84 hardpan, stones 84-93 water-bearing silty sand, gravel 93-125 conglomerate
B 73	25 20107	Kipnis Construction		07/25/78	Pine Brook	510	63	63	NA	NA	12	50	15	0.4	Sgp	0-19 sand 19-48 silty fine sand with varved gray clay 48-52 water-bearing silty sand, gravel 52-62 fractured conglomerate 62-63 fractured conglomeratic rock
B 74	25 23457	Fitsler, Harry		12/29/82	Pine Brook	510	68	62	67	68	14	45	20	0.6	PC	No log
B 75	25 12575	Van Orden, Fred		12/24/64	J. Lauritsen	510	112	65	65	112	20	60	6	0.2	Jbs	0-20 sand 20-60 clay 60-65 hardpan 65-112 trap rock
B 76	25 18350	RVR, Inc.		04/14/76	Pine Brook	510	115	115	115	115	14	85	12	0.2	Qsd	0-39 sand, gravel 39-88 silty fine sand with clay 88-107 hardpan 107-112 water-bearing silty sand, gravel 112-115 water-bearing sand, gravel 115 rock
B 77	25 19027	RVR, Inc.		03/16/77	Pine Brook	510	103	103	NA	NA	14	85	9	0.1	Qsd	0-33 sand, gravel 33-71 silty fine sand with gray clay 71-97 hardpan, sand 97-103 water-bearing sand, gravel
B 78	25 19585	Marve Assoc.		10/27/77	Pine Brook	510	110	56	63	110	9	105	8	0.08	Sgp	0-14 sand 14-53 silty sand, varved gray clay 53-56 water-bearing silty sand, gravel 56-110 conglomerate

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B 79	25 21905	Allyne, Tom		03/16/81	Pine Brook	510	120	27	33	120	5	60	8	0.1	PC	0-2 overburden 2-9 brown sand 9-27 gray clay with fine gray sand 27-41 conglomerate 41-120 gneiss
B 80	25 24673	Stratton Enterprises		06/05/84	Ballentine	840	248	70	70	NA	15	NA	4.5	NA	PC	0-70 sand, clay, gravel 70-248 gneiss
B 81	25 20036	Ventre, Frank		06/14/78	Soren Nelson Jr.	510	121	>121	123	NA	13	60	NA	NA	Qsd	0-31 sand 31-74 silty fine sand 74-103 clay 103-121 heaving water-bearing sand, gravel
B 82	25 20106	Kipnis Construction		08/11/78	Pine Brook	510	63	54	54	63	11	50	10	0.3	Sgp	0-17 sand 17-46 silty fine sand with gray clay 46-54 water-bearing silty sand, gravel 54-63 fractured conglomerate
B 83	25 20977	Fitser, Harry		09/26/79	Soren Nelson Jr.	510	105	43	49	NA	7	30	NA	NA	PC	0-2 overburden 2-13 water-bearing silty sand 13-27 clay 27-39 silty very fine water-bearing sand 39-43 hardpan, gravel with larger stones 43-105 conglomerate
B 84	25 19269	Richard Jenkins		06/17/77	Soren Nelson Jr.	500	85	31	47	NA	4	60	NA		Jrcg	No log
B 85	25 17647	Burghardt, Walter		09/15/74	Mabey Bros.	520	105	64	64	105	15	65	10	0.2	PC	No log
B 86	22 08528	Pavone, Samuel		10/19/66	DF Well Drilling	530	155	36	37	155	NA	NA	5	NA	PC	0-36 sand, gravel, boulders 36-155 gneiss
B 87	25 88879	NA		NA	NA	510		>90	NA	NA	NA	NA	NA	NA	Qsd	No log
B 88	25 01500	Hamilton, Howard		02/15/52	Algier Bros.	510	163	10	18	163	8	80	5	0.07	PC	0-10 sand, hardpan 10-163 gneiss
B 89	25 18093	RVR, Inc.		09/17/75	Pine Brook	500	140	131	140	14	12	18	20	3.3	Sgp	0-42 sand, gravel 42-131 water-bearing silty sand with clay 140 conglomerate
B 90	25 19025	RVR, Inc.		01/17/78	Pine Brook	510	133	>133	133	13	12	25	15	1.2	Qsd	0-33 sand 33-89 fine silty sand with gray clay 89-121 hardpan 121-133 water-bearing sand, gravel
B 91	25 13508	Dombrowski, Leon		02/03/66	Pine Brook	600	150	20	40	150	NA	NA	12	NA	PC	0-20 overburden 20-150 gneiss
B 92	25 19028	RVR, Inc.		07/19/77	Pine Brook	510	157	6	6	157	11	140	4	0.03	PC	No log
B 93	25 24025	Fitser, Harry		09/06/83	Pine Brook	456	200	30	39	200	3	195	NA	NA	PC	0-9 sand with clay 9-14 water-bearing silty sand 14-28 gray clay 28-30 water-bearing silty sand with gravel 30-200 gneiss
B 94	25 19335	Giessler, Jorgen		08/05/77	Pine Brook	500	95	56	56	95	4	80	7	0.09	PC	0-11 sand 11-37 clay, silty sand 37-48 hardpan, stones 48-56 conglomerate 56-95 gneiss
B 95	25 21424	Fitser, Harry		07/17/80	Pine Brook	500	100	38	52	100	4	15	20	1.8	Sgp	0-17 sand with gravel 17-38 silty fine sand with varved gray clay 38-100 conglomerate
B 96	25 22578	Frankowski, Edward		03/01/82	Pine Brook	510	140	0	111	140	18	90	10	0.1	PC	0-39 brown sand, gravel 39-87 silty very fine gray sand with varved gray clay 87-96 water-bearing silty sand, gray gravel 96-140 brown conglomerate

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B 97	25 19538	Shanks, Allen		10/03/77	Pine Brook	510	76	74	NA	76	8	70	10	0.2	Sgp	0-18 sand 18-69 clay with silty gray sand 69-74 water-bearing sand, gravel 74-76 conglomerate
B 98	25 20037	Ventre Construction		06/19/78	Soren Nelson Jr.	510	123	>124	125	NA	13	80	NA	NA	Qsd	0-34 sand 34-96 silty fine sand with clay 96-118 hardpan, stones 118-124 water-bearing sand, gravel
B 99	25 22158	Fitser, Harry		07/24/81	Pine Brook	510	193	51	51	193	6.5	180	4	0.02	PC	0-18 brown sand with gravel 18-39 very fine silty gray sand with varved clay 39-43 hardpan, stones 43-91 conglomerate 91-193 gneiss (various colors)
B 100	25 17803	RVR, Inc.		03/31/75	Pine Brook	500	176	124	135	176	9	80	9	0.1	PC	0-33 sand, gravel 33-84 very fine sand 84-107 clay 107-124 heaving sand, gravel 124-167 conglomerate 167-176 gneiss
B 101	25 19024	RVR, Inc.		04/29/77	Pine Brook	500	95	86	86	95	11	40	10	0.3	PC	0-21 sand 21-83 clay, silty sand 83-86 water-bearing silty sand, gravel 86-95 limestone
B 102	25 18092	RVR, Inc.		09/19/1975	Pine Brook	500	91	86	NA	91	8	30	15	0.7	Qsd	0-31 sand, gravel 31-85 silty fine sand with clay 85-91 water-bearing sand, gravel 91 rock
B 103	25 20187	Denwood Homes, Inc.		07/28/78	Pine Brook	500	91	91	NA	NA	9	75	10	0.2	Qsd	0-29 sand 29-77 sandy very fine gray sand with varved clay 77-85 water-bearing sand, gravel
B 104	25 21251	Manella, Thomas J.		02/27/80	Pine Brook	500	125	27	27	125	9	35	15	0.6	PC	0-11 hardpan with boulders, sand, gravel 55-125 fractured gneiss
B 105	25 13489	Glenboume Estates		12/22/65	DF Well Drilling	540	122	48	44	122	NA	NA	5	NA	PC	0-10 boulders, silty clay 10-28 sand, gravel 28-48 sandstone 48-122 gneiss
B 106	25 11722	Willis, Henry R.		12/27/63	Frank Bott	510	62	>62	NA	NA	5	25	10	0.5	Qsd	0-25 hardpan, boulders 25-62 sand, gravel
B 107	25 24383	Ahmed, M. R.		11/23/83	DF Well Drilling	560	425	22	50	NA	NA	NA	1.5	NA	PC	0-22 overburden 22-425 gneiss
B 108	25 21419	Arnold, A. F.		07/02/80	DF Well Drilling	580	273	2	50	273	NA	NA	3	NA	PC	0-2 overburden 2-273 gneiss
B 109	25 14534	Moulton, William		10/02/67	Bott Inc.	530	310	10	21	310	12	NA	6	NA	PC	0-10 clay, boulders 10-310 gneiss
B 110	25 13685	Glenboume Estates		05/05/66	DF Well Drilling	530	173	19	34	173	NA	NA	5	NA	PC	0-19 overburden with boulders 19-173 gneiss
B 111	25 13114	Glenboume Estates		08/05/65	DF Well Drilling	550	300	32	32	300	NA	NA	NA	NA	PC	0-22 gravel, boulders 22-32 gneiss 32-300 white gneiss
B 112	25 21171	Liman Associates		04/28/80	DF Well Drilling	620	500	35	50	500	NA	NA	15	NA	PC	0-35 boulders 35-500 gray gneiss
B 113	25 14269	Vedvik, Olav D.		05/10/67	DF Well Drilling	530	106	57	40	106	NA	NA	6	NA	PC	0-24 sand, gravel, boulders 24-56 gray gneiss 56-57 decomposed seamy rock 57-106 gneiss

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Table 2. Records of wells (cont.)

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
B 114	25 18692	Ippolito, Joseph		08/26/76	DF Well Drilling	520	123	70	77	123	NA	NA	18	NA	PC	0-10 overburden 10-30 water-bearing gravel, boulders 30-40 sand, clay, gravel, 40-70 hard clay 70-123 gneiss
B 115	25 15118	A & C Paving		04/01/69	Mabey Bros.	580	105	3	20	105	2	60	6	0.1	PC	0-3 dirt 3-102 gneiss
B 116	25 10430	Bogue, Robert		02/12/62	Bott Inc.	540	176	45	76	176	20	80	3	0.05	PC	0-45 hardpan, boulders 45-80 gneiss
B 117	25 16646	Sutton, Isadore		12/15/72	Soren Nelson Jr.	560	152	>152	156	NA	18	25	NA	NA	Qsd	0-46 sand, gravel, clay, boulders 46-152 water-bearing sand, gravel
B 118	22 19097	Bott, E.		09/28/79	Wm. Beatty	520	140	20	50	140	15	60	15	0.3	PC	0-20 clay 20-140 gneiss
B 119	25 09709	Rainer, Erwin J.		07/24/61	Bott Inc.	500	84	53	55	84	NA	60	9	0.2	PC	0-53 sand, gravel, boulders 53-84 gneiss
B 120	25 16732	Manella, Tommy		01/23/73	Mabey Bros.	530	210	4	20	210	26	200	1	0.01	PC	0-4 dirt 4-210 gneiss
B 121	25 17405	Fabel, Charles		04/22/74	Mabey Bros.	520	148	76	75	148	NA	NA	10	NA	PC	0-75 boulders, gravel 76-148 gneiss
B 122	25 13955	Webster, Terry		09/03/66	DF Well Drilling	660	200	5	20	200	36	180	3	0.02	PC	0-5 overburden 5-200 gneiss
B 123	25 24427	Ackert, C.		11/09/83	Wm. Beatty	710	225	35	40	NA	20	200	2	0.01	PC	0-5 overburden 5-35 hardpan 35-225 gneiss
B 124	25 16354	Seneca Hills, Inc.		05/24/72	DF Well Drilling	630	149	139	45	149	NA	NA	10	NA	PC	0-4 overburden 5-136 gray gneiss 137-138 soft seam 139-149 gray gneiss
B 125	25 15868	Robert Robinson & Son		04/15/71	DF Well Drilling	500	115	>115	95	95	NA	NA	25	NA	Qsd	0-35 boulders, clay 36-60 red clay, sand 61-65 water-bearing gravel 66-113 sand 114-115 gravel
B 126	28 88254	Scott, Charles		06/10/75	Somerville Well Drilling	500	81	>80	81	NA	6	21	NA	NA	Qsd	0-41 sand, stones 69-77 silty water-bearing sand 80-81 water-bearing sand, gravel
B 127	25 24635	Gal-lec/Tedesco, Inc.		03/28/84	Nelson, Soren Jr.	570	100	20	25.7	NA	3	21	20	1.1	PC	0-17 hardpan with sand, gravel, stones, large boulders 17-20 weathered gneiss 20-100 gneiss
B 128	25 17213	Nielsen, James		11/14/73	DF Well Drilling	760	222	0	50	222	NA	NA	8	NA	PC	0-222 gray gneiss
B 129	UN 00160	Boonton Twp. Water Dept.	Test Well 8	12/--/63	American Dewatering	500	117	>117	117	117	NA	NA	25	NA	Qsd	0-3 fill 3-15 medium sand 15-40 fine gray sand, silt 40-78 fine to medium sand with silt 78-105 fine gray sand 105-115 medium to fine gray sand 115-117 coarse sand, fine gravel 117 refusal
B 130	25 24042	Morel Builders, Inc.		09/28/83	Ballentine	700	172	8	50	NA	85	NA	18	NA	PC	0-8 sandy hardpan 8-172 gneiss

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B 131	25 12046A	Boonton Twp. Water Dept.	Test Boring B-6	08/--/64	American Dewatering	500	127	126	NA	NA	4	8	600	150	Qsd	0-1 overburden 1-3 sandy clay, gravel 3-27 fine to medium sand 27-48 silt 48-83 fine to coarse sand 83-92 sand with varved clay 92-97 gray clay 97-144 sand, gravel, clay 114-126 sand, clay 126-127.6 decomposed rock
B 132	25 12046A	Boonton Twp. Water Dept.	Test Boring B-17	05/02/75		500	60	>60	42	5	NA	NA	NA	NA	Qsd	0-30 brown sand 30-60 fine sand, gray silt
B 133	25 21323	Morel Builders, Inc.		05/11/81	Ball	700	248	4	50	248	66	NA	15	NA	PC	0-4 stones, overburden 4-248 gneiss
B 134	25 21322	Morel Builders, Inc.		10/22/80		690	249	5	50	249	63	NA	18	NA	PC	0-5 stones, overburden 5-249 gneiss
B 135	25 12463	De Paolo, Joseph		11/03/64	DF Well Drilling	640	71	6	21	71	20	60	4	0.1	PC	0-6 fill 6-71 gneiss
B 136	25 07495	Boonton Twp. Water Dept.	Well 5	05/30/58	C.W. Lauman	500	106	500	74.8	106	13	30	300	17.6	Qsd	0-4 fill 4-7 sand, gravel 7-30 very fine sand 30-36 sandy gray clay 36-42 very fine sand with streaks of clay 42-50 fine sand, mica 50-65 very fine sand with sandy clay 65-68 very fine sand, sandy clay 68-70 hard gray clay 70-75 very fine sand, hard gray clay 75-87 very fine sand with hard gray clay 87-89 fine to coarse sand, gravel 89-91 fine sand with mica 91-93 very fine sand, mica 93-96 fine to coarse sand, gravel, boulders 96-101 coarse sand, gravel, boulders 101-103 coarse sand, gravel, stones 103-106 fine sand, mica 106-112 very fine sand, mica
B 137	25 20061	Zecca, Ed		07/21/78	Wm. Beatty	520	100	10	30	NA	5	42	NA	NA	PC	0-10 clay 10-100 gneiss
B 138	25 22820	Onorati, Peter		11/09/82	Pine Brook	500	99	19	32	99	33	41	15	1.9	PC	0-19 hardpan, stones, very large boulders 19-99 gneiss
B 139	25 16352	Pipitone Co.		05/02/72	DF Well Drilling	540	400	10	50	400	NA	NA	4	NA	PC	0-10 overburden with boulders 10-400 gneiss
B 140	25 17302	Boonton Twp. Water Dept.	Test Hole	--/--/74	Artesian	500	127	126	NA	127	NA	NA	NA	NA	Qsd	0-1 overburden 1-3 sandy clay, gravel 3-27 fine to medium sand 27-48 silty gray clay 48-83 fine to coarse sand 83-92 sand, varved clay 92-97 gray clay 97-115 sand, gravel, clay 114-126 sand with clay 126-127.5 decomposed rock
B 141	25 03074	Weiss, Frank K., Jr.		12/26/53	NA	610	88	40	40	NA	NA	0	0	NA	PC	0-22 hardpan, boulders 22-40 fine sand 40-88 hard gray gneiss
B 142	UN 00152	Boonton Twp. Water Dept.	Test Well 1	12/--/63	American Dewatering	500	25	>25	NA	NA	NA	NA	25	NA	Qsd	0-19 very fine brown sand 19-25 coarse brown sand with fine gravel

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B 143	UN 00153	Boonton Twp. Water Dept.	Test Well 1a	12/--/63	American Dewatering	500	49.5	>49	NA	NA	NA	NA	NA	Qsd	0-14 fine to medium brown sand 14-24 fine to medium brown sand 24-46 very fine to fine brown sand 46-49.5 sandy gray silt	
B 144	UN 00154	Boonton Twp. Water Dept.	Test Hole 2	12/--/63	American Dewatering	500	107	>107	NA	NA	NA	NA	NA	Qsd	0-16 fine brown sand 16-21 fine to medium brown sand, coarse brown sand 23-33 very fine brown to gray sand 33-50 very fine gray sand, trace silt 50-100 gray silt 100-107 coarse sand, fine gravel	
B 145	UN 00155	Boonton Twp. Water Dept.	Test Hole 3	12/--/63	American Dewatering	500	122	>122	122	122	NA	NA	30	NA	Qsd	0-40 fine brown sand 40-50 very fine sand, trace gray, brown silt 50-90 gray silt 90-110 sandy silt 110-115 fine sand, trace silt 115-122 coarse sand, fine gravel
B 146	UN 00159	Boonton Twp. Water Dept.	Test Hole 7	12/--/63	American Dewatering	500	132	>132	NA	NA	NA	NA	NA	Qsd	0-3 soil 3-9 coarse sand, gravel 9-22 fine to coarse sand 22-30 fine brown sand, trace gray gravel 30-100 fine sand, trace gray silt 100-122 fine gray-brown sand 122-132 coarse sand, fine gravel 132 refusal	
B 147	UN 00161	Boonton Twp. Water Dept.	Test Hole 9	12/--/63	American Dewatering	500	50	>50	50	50	NA	NA	60	NA	Qsd	0-3 soil 3-20 fine to coarse brown sand 20-25 medium to coarse sand with brown gravel 25-50 silty sand, gravel
B 148	25 12046A	Boonton Twp. Water Dept.	Test Boring B-6	03/21/75	NA	500.1	66	>66	66	NA	NA	NA	NA	Qsd	0-23 medium to coarse brown sand, fine gravel 25-32 fine to coarse gray sand with silt 35-40 fine gray sand with silt 40-45 fine silty gray sand 45-66 fine silty brown to gray sand	
B 149	25 12046A	Boonton Twp. Water Dept.	Test Boring B-17	05/02/75	NA		60	>60	42	47	NA	NA	NA	Qsd	0-30 brown sand 30-60 fine sand, gray silt	
B 150	UN 00162	Boonton Twp. Water Dept.	Test Hole 10	12/--/63	American Dewatering	500	40	>40	40	40	NA	50	60	NA	Qsd	0-3 soil 3-25 fine to medium brown sand 25-30 fine gray, brown sand 30-40 coarse sand, fine gravel 40 refusal
B 151	UN 00163	Boonton Twp. Water Dept.	Test Hole 11	12/--/63	American Dewatering	500		>40	40	40	NA	40	60	NA	Qsd	0-3 soil 3-40 medium to coarse sand, trace brown gravel 40 refusal
B 152	UN 00156	Boonton Twp. Water Dept.	Test Hole 4	12/--/63	American Dewatering	510	128	>128	NA	NA	20	NA	NA	Qsd	0-20 very fine to medium sand, trace gravel 20-35 very fine sand, trace brown gravel 35-45 fine sand, trace silt 45-70 gray silt 70-85 sandy gray silt 85-125 very fine sand, trace silt, trace gray gravel	
B 153	UN 00157	Boonton Twp. Water Dept.	Test Hole 5	12/--/63	American Dewatering	510	130	>130	NA	NA	NA	NA	NA	Qsd	0-3 soil 3-9 coarse sand, gravel 9-15 medium sand 15-60 fine brown sand, very fine sand, trace silt, trace gray clay 60-80 fine sand, varved clay 80-130 fine gray sand	
B 154	UN 00158	Boonton Twp. Water Dept.	Test Hole 6	12/--/63	American Dewatering	510	130	>130	NA	NA	NA	NA	NA	Qsd	0-35 medium to fine brown sand 35-95 very fine sand, trace brown silt 95-105 fine sand, trace gray silt 105-130 fine brown sand 130 refusal	

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BOONTON TOWN																
BB 1	UN 00143	N.J. Dept. of Transportation	M26	--/--/59	Warren George	397.2	20	>20	NA	NA	14	NA	NA	NA	Qsd	0-10 clayey brown sand, gravel 10-20 brown sand, gravel, trace clay
BB 2	UN 00257	E. F. Drew & Co		10/--/59	Parkhurst	400	402	104	NA	NA	NA	NA	NA	NA	PC	0-104 overburden, boulders 104-402 gneiss
BB 3	UN 00142	N.J. Dept. Of Transportation	M10	--/--/59	Warren George	387.2	40	>40	NA	NA	6.00	NA	NA	NA	Qsd	0-6 clayey sand with gravel 6-15 fine gray sand, gravel 15-37 clay, sand, gravel, boulders 37-40 fine to coarse sand, fine to medium gravel
BB 4	UN 00181	Weecoline		12/--/32	Stothoff	390	200	77	NA	NA	NA	NA	15	NA	PC	0-77 till, boulders 77 gneiss
BB 5	25 14959	Mechanical Institute		10/31/68	Wm. Beatty	450	300	>72	72	300	30	200	10	0.06	PC	No log
BB 6	25 21035	Stegman, Norman		11/09/79	Wm. Beatty	530	300	35	50	300	60	300	3	0.01	PC	6-35 clay, boulders 35-300 gray gneiss
BB 7	UN 00177	McDonough, James		04/24/39	Stothoff	410	111	66	NA	NA	13.5	60	21	0.5	PC	0-66 sand, boulders, hardpan 66-111 gneiss
BB 8	25 24883	NA		NA	NA	560		43	NA	NA	NA	NA	NA	NA	PC	No log
BB 9	UN 00141	N.J. Dept. of Transportation	M17	--/--/59	Warren George, Inc.	391.1	58	48	NA	NA	18.7	NA	NA	NA	JTrb	0-20.5 cinders, sand, gravel, glass 20.5-48 fine to medium brown sand, gravel, boulders trace clay 48-58 rock
BB10	UN 00140	N.J. Dept. of Transportation	M9	--/--/59	Warren George	409.8	50	40.5	NA	NA	18.2	NA	NA	NA	JTrb	0-15 fill, brown sand, gravel 15-30 brown sand, gravel, fractured rock, boulders 30-40.5 coarse gray sand, gravel 40.5-50 rock
BB11	25 24576	Russo, R.		01/13/84	Wm. Beatty	600	400	12	50	NA	55	380	1	0.003	PC	0-12 sand, boulders 12-400 gneiss
BB12	UN 00139	N.J. Dept. of Transportation	M53	--/--/59	Warren George	361	83	65	NA	NA	NA	NA	NA	NA	JTrb	0-14 gray sand, gravel 14-45 silty sand, gravel, boulders 45-49 coarse sand, gravel 49-65 silt, medium to coarse sand, boulders 65-78 soft rock 78-83 hard rock
BB13	25 11522	Van Arsdel, Fred K.		09/17/63	Bott Inc.	220	90	77	77	90	34	44	15	1.5	JTrb	No log
BB14	UN 00239	Boonton Exxon	OW-1	01/17/80	Handex	410	55	>55	14	34	18	NA	NA	NA	Qsd	0-5 fill, boulders 5-15 clay 15-52 stones, gravel 52-59 sand, gravel 59-61 stones 61-64 sand, gravel 64-68 sand, trace clay 68-88 coarse sand 88-94 sand, gravel 94-100 hard shale
BB15	25 16123	Douglass Scott Homes		10/09/71	Pine Brook	220	62	59	60	62	18	25	15	2.1	JTrb	0-18 sand, large stones 18-56 clay 56-59 water-bearing sand 59-62 sandstone
BB16	25 13969	Conklin, Nathan		09/26/66	Bott Inc.	215	103	49	53.5	NA	11	2	20	1.4	JTrb	0-8 hardpan, boulders 8-15 dirty, sand, gravel 15-45 hard sand 45-49 sand, gravel 49-75 red shale 75-103 gray shale

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BB17	UN 00137	N.J. Dept. of Transportation	M7	--/--/59	Warren George	403.1	41.5	>41.5	NA	NA	17	NA	NA	NA	Qsd	0-15.5 coarse brown sand, medium to coarse gravel, boulders 15.5-29 coarse silty brown sand, boulders 29-34 boulders 34-41.5 coarse brown sand, gravel, boulders
BB18	25 20908	Melgaard, Leif W.		11/21/79	Beatty, Wm.	470	265	30	50	NA	90	230	8	0.06	PC	0-30 clay 30-265 gneiss
BB19	UN 00138	N.J. Dept. of Transportation	M48	--/--/59	Warren George	371.5	30.5	>30.5	NA	NA	NA	NA	NA	NA	Qsd	0-4 silt, trace fine sand 4-6.5 fine sand, silt, gravel 6.5-7.5 boulder 7.5-11 fine sand, silt, trace gravel 11-12 boulders 12-22 fine sand, silt, boulders 22-30.5 fine sand with gravel
BB20	UN 00283	Jersey City	B4	10/13/81	Empire Soils	311.4	44.3	38.0	NA	NA	NA	NA	NA	NA	JTrb	0-2 medium-hard fine silty light-brown sand with gravel 5-7 loose silty fine to coarse light-brown sand, trace gravel 10-12 loose, silty clayey fine to coarse brown sand, gravel 15-17 very loose sandy, silty clay with gravel 17-19 soft, sandy, silty, brown clay 22-24 very loose fine to medium sandy brown clay, trace gravel 25-27 trace fine sand, gravel 30-32 very loose, coarse to fine sandy silty gray clay with gravel 33-35.5 silty green, brown clay 35.5-36 very hard silt
BB21	UN 00136	N.J. Dept. of Transportation	M6	--/--/59	Warren George	361	41	16	NA	NA	NA	NA	NA	NA	JTrb	0-16.2 silty sand, gravel, fractured rock 16.2-31.2 rock
BB22	UN 00284	Jersey City	B3	10/09/81	Empire Soils	268.7	29.1	9.9	NA	NA	NA	NA	NA	NA	JTrb	0-0.5 overburden 11 0.5-2 dry, fine to coarse sand, trace silt, gravel 5-6.5 dry coarse to fine brown sand with silt, trace gravel 6.5-9.5 sandy brown silt 9.5-12.5 fine brown sand with silt, cobbles, gravel 15-16.5 coarse to fine brown sand with silty clay, weathered shale 19.2-24.1 conglomerate 24.1-29.1 grey shale with conglomerate
BB23	UN 00285	Jersey City	B1	10/15/81	Empire Soils	310.3	138.3	98	NA	NA	NA	NA	NA	NA	JTrb	0-97.8 gneiss (?) 97.8-113.6 red shale 113.6-114.8 fractured green shale 114.8-121.2 gray sandstone, conglomerate with red shale 121.2-128.4 shale 128.4-132.4 red, brown-gray sand with sandstone, conglomerate 132.4-134.4 dark gray shale 134.4-138.3 sandstone, dark gray conglomerate
DENVILLE TWP.																
D 1	25 13970	Hawkes, Stuart Z.		12/22/66	Bott Inc.	600	148	10	21	148	10	NA	19	NA	PC	0-10 dirt, boulders 10-148 gneiss
D 2	25 01056	Raymond, Walter		07/28/51	James Jarvis	660	38	10	20	38	14	23	12	1.3	PC	0-10 gravel 10-38 gneiss
D 3	25 23981	Ivy Crest Homes, Inc.		08/31/83	Ballentine	660	190	11	50	NA	46	NA	20	NA	PC	0-11 sandy hardpan 11-190 gneiss
D 4	25 12215	Matchke, Robert		09/16/64	DF Well Drilling	650	140	4	22	140	88	100	23	1.9	PC	0-4 overburden 4-140 varicolored gneiss
D 5	25 13967	Autret, Germain		09/06/66	DF Well Drilling	660	167	15	30	167	NA	NA	50	NA	PC	0-15 overburden with boulders 15-167 varicolored gneiss

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D 6	25 24273	Diguiseppi, J.		02/15/84	DF Well Drilling	680	325	6	50	NA	NA	NA	8	NA	PC	0-6 overburden 6-325 gneiss
D 7	25 24347	Borlo, J.		11/09/83	DF Well Drilling	690	325	18	50	NA	NA	NA	20	NA	PC	0-18 overburden 18-325 gneiss
D 8	25 00996	Jones, Theodore E.		07/18/51	James Jarvis	700	56	6	18	56	20	27	8	1.1	PC	0-6 gravel 6-56 rock
D 9	25 23312	Cline, Robert		12/18/83	Empire Soils	680	175	12	50	NA	20	120	10	0.1	PC	0-12 overburden 12-175 gneiss
D 10	25 24455	Friggle, J.		11/30/83	DF Well Drilling	580	250	4	125	NA	NA	NA	8	NA	PC	0-4 overburden 4-250 gneiss
D 11	25 01936	Ivlaino, A.		09/04/52	Feakins	640	28	10	15	28	6	22	5	0.3	PC	0-10 harpan, boulders, 10-28 rock
D 12	25 08074	Rock Ridge Lake Club		12/28/58	C. W. Lauman	530	45	42	45	NA	2	20	20	1.1	Qsd	0-42 sand, gravel, boulders 42-45 rock
D 13	25 16170	Maitilasso, Anthony		12/15/71	Bott Inc.	540	340	12	21	340	20	200	6	0.03	PC	0-12 hardpan 12-340 gneiss
D 14	25 13119	Kajon Realty Co.		07/30/65	DF Well Drilling	600	325	5	23	325	NA	NA	NA	NA	PC	0-5 overburden 5-325 black, white gneiss
D 15	25 23594	NA		NA	NA	770	NA	20	NA	NA	NA	NA	NA	NA	PC	No log
D 16	25 20719	Cook, Alexander		09/22/79	DF Well Drilling	750	298	3	50	NA	NA	NA	6	NA	PC	0-3 overburden 3-298 gneiss
D 17	25 01531	Bemstore, Bernie		06/12/52	Smith's Well Drilling	530	92	>92	92	92	40	NA	12	NA	Qsd	0-87 clay, sand, very hard boulders 87-92 coarse water-bearing gravel
D 18	UN 00311	Reaction Motors		NA	NA	530	108	108	NA	NA	NA	NA	NA	NA	PC	0-108 till 108 rock
D 19	25 29339	N.J. Dept. of Env. Protection & Energy	Boring 12-D	10/08/87	W.C. Services	510	50	50	NA	NA	NA	NA	NA	NA	PC	0-10 boulders with cobbles, fine to medium sand, gravel 10-13 fine to medium sand with gravel, silt 13-20 cobbles with fine to coarse gravel, fine to coarse sand 20-30 fine to coarse sand with fine to coarse gravel, conglomerate 30-35 fine to coarse sand with cobble sand, fine to coarse gravel 35-42 fine sand with fine to coarse gravel, cobbles 42-50 fine to coarse sand with fine to coarse gravel, cobbles, boulders 50 gneiss
D 20	25 22142	W. P. Realty Co.		06/23/81	Moretrench	540	75	>74	74	75	NA	NA	NA	NA	Qsd	0-75 sand, gravel, boulders

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
D 21	25 29331	N.J. Dept. of Env. Protection & Energy	Monitor Well 17D	08/24/87	W.C. Services	520	210	200	180	198	NA	NA	NA	NA	Qsd	0-20 sand, cobbles, trace silt 20-30 cobbles, gravel 30-40 coarse sand, trace fine gravel 40-55 coarse brown sand with cobbles, silt 55-65 fine gray sand, trace clay 65-80 medium-grained brown sand, trace silt 80-90 medium to coarse brown sand, trace gravel 90-110 cobbles, trace fine to coarse brown sand with boulders 110-170 fine to coarse brown sand with cobbles, boulders 170-200 fine to coarse sand with cobbles 200-210 gneiss
D 22	25 29330	N.J. Dept. of Env. Protection & Energy	Monitor Well 16D	10/27/87	W.C. Services	520	110	100	75	95	NA	NA	NA	NA	Qsd	0-5 brown silt, fine to coarse sand, trace fine gravel 5-15 medium to fine dry sand, trace silt 15-25 boulders, cobbles, gravel 25-40 brown silt, trace fine sand 40-65 fine to medium gray sand, trace silt 65-72 fine to medium gravel, trace silt 72-85 medium to fine gray sand with silt 85-100 fine to coarse sand, trace gravel, trace cobbles 100-102 rock
D 23	25 11662	Chadwick, Loretta		11/13/63	Botl Inc.	500	119	>105	NA	NA	21	25	2	0.5	Qsd	0-80 sand 80-105 clay 105-119 sand, gravel
D 24	25 14914	Shauger, Herbert		09/06/68	DF Well Drilling	690	121	19	37	121	57	100	4	0.09	PC	0-10 overburden 10-17 boulders 17-19 decomposed seamy gneiss 19-37 gneiss 37-110 gray gneiss 110-112 soft seamy brown gneiss 112-121 gray gneiss
D 25	25 17848	Denville Water Dept.	TW R1	01/28/75	Rinbrand	520	140	137	138	140	NA	NA	NA	NA	PC	0-30 hardpan 30-35 clay 35-80 clay with fine sand 80-85 gravel 85-105 gravel, clay 105-112 fine sand 112-130 gravel, clay 130-135 gravel, yellow clay 135-137 gravel, rock 137-140 gneiss
D 26	25 21686	Kennedy, Dale		12/31/80	Wm. Beatty	520	100	70	70	100	30	70	15	0.4	PC	0-70 sandy clay 70-100 gneiss
D 27	25 17123	Gianola, Paul		09/14/73	Soren Nelson, Jr.	530	71	71	73	NA	29	40	15	1.4	Qsd	0-62 hardpan, stones, large boulders with sand, gravel 62-71 water-bearing silty sand, clay
D 28	UN 00190	Mountain Lakes Borough		08/15/27	American Dewatering	510	57.5	>57	NA	NA	8	44	232	6.4	Qsd	0-45 gravel 45-57 fine sand
D 29	25 05142	Denville Water Dept.	Well 4	01/13/58	Layne-New York	515	117	>190	96	116	10	84	500	6.8	Qsd	0-3 fill 3-8 coarse brown sand 8-21 medium-grained gray sand 21-44 gray clay 44-72 sand, gravel, boulders 72-79 sand, gravel 79-82 sand, gravel, streaks clay 82-88 fine sand with gravel 88-92 gray sand with gravel 92-101 sand, gravel with clay 101-104 clay, sand, gravel 104-108 sand, gravel 108-119 gravel, sand, boulders
D 30	UN 00171	Denville Water Dept.	Well 1	01/12/28	Layne-New York	510	150	>150	109	149	9	45.5	406	11.1	Qsd	0-10 sand, gravel 10-28 gravel 28-52 clay 52-62 medium to fine sand 62-81 coarse sand, gravel, boulders 81-92 coarse sand 92-102 coarse sand, gravel 102-108 very hard fine sand 108-122 coarse sand, gravel 122-130 medium to fine sand 130-150 coarse sand, gravel

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
D 31	25 05264	Denville Water Dept.	TW	01/06/56	Layne-New York	516.1	150	148	132	150	15	28	260	20.0	Qsd	0-73 gravel, sand, boulders, clay 73-88 gravel, sand 88-92 gravel, sand, clay streaks 92-99 sandy, clayey gravel 99-103 gravel, sand, streaks clay 103-108 gravel, sand 108-118 gravel, cobbles, sand, clay 118-122 clay, gravel 122-148 gravel, sand, clay 148-150 rock
D 32	25 09508	Denville Water Dept.	TW 6-60	08/02/60	Layne-New York	510	NA	200	NA	NA	NA	NA	NA	NA	Qsd	0-2 overburden 2-3 sandy clay 3-13 dirty sand, gravel, boulders 13-32 muddy sand with gravel 32-68 sandy clay 68-73 tough clay with sand, gravel, boulders 73-90 clay, sand, gravel, boulders 90-97 sand, gravel, boulders, hard clay 97-139 tough sandy clay 129-130 139-156 clay with sand, gravel, boulders 156-165 sandy clay 165-172 tough clay, sand, gravel, boulders 172-200 dirty sand, gravel, boulders 200-204 fractured rock
D 33	25 17849	Denville Water Dept.	TW R2	02/21/75	Rinbrand	500	180	168	NA	NA	NA	NA	NA	NA	PC	0-5 fill 5-20 yellow sand 20-35 gravel, boulders, clay 35-50 gravel, boulders 50-85 fine sand 85-105 fine gravel 105-135 fine sand 135-145 gravel, fine sand 145-148 boulders, hardpan 155-168 dirty gravel, clay 168-180 gneiss
D 34	25 17850	Denville Water Dept.	TW R3	03/05/75	Rinbrand	500	165	>212	145	165	15	36	235	11.2	Qsd	0-5 gravel 5-10 clay, boulders 10-20 sandy, gravel 20-60 sandy clay 60-75 clay 75-80 clay, gravel 80-90 sandy gravel 90-100 clay 100-135 fine gravel 135-142 clay 142-155 gravel 155-175 fine gravel 175-190 fine gravel 190-195 coarse gravel 195-200 fine gravel 200-212 fine sand
D 35	UN 00174	Arthur D. Crane Co.		NA	NA	530	202	202	NA	NA	NA	NA	NA	NA	Qsd	202 rock
D 36	UN 00170	St. Frances Sanatorium		11/23/27	Stothoff	520	306	220	NA	NA	44	NA	80	NA	PC	0-80 sand 80-90 sand, gravel 90-116 sand, stones, gravel 116-130 coarse sand, gravel 130-140 sand, clay 140-150 coarse gravel 150-180 sand, gravel 180-190 gravel, clay 190-195 clay, sand 195-200 sand 200-210 sand, gravel 210-220 sand, rock 220-306 gneiss
D 37	UN 00172	Rockaway River Club		efore 1925	NA	520	130	>130	70	NA	NA	NA	20	NA	Qsd	gravel strata at 70, quick sand and boulders at 130
D 38	25 21172	St. Clares Hospital	Geonics 2	09/27/79	D.F. Well Drilling	490	200	>200	NA	NA	NA	NA	20	NA	Qsd	0-2 overburden 2-80 water-bearing coarse sand, gravel 110-111 small boulder 111-150 fine sand, clay 150-175 coarse sand with gravel 175-200 coarse waterbearing sand, gravel
D 39	25 23539	Chevron		12/27/82	Handex	510	19	>19	4	14	7	NA	NA	NA	Qsd	0-5 fine to coarse brown sand, very fine gravel, trace sand 5-14 medium to very coarse brown sand with medium to fine gravel, trace silt
D 40	UN 00172	Ewald, Robert		12/--/25	J. J. Reilly	510	130	>130	NA	NA	20	26	60	10.0	Qsd	0-16 loose overburden 16-30 sand, gravel 30-40 clay 40-120 gravel 120-175 hardpan 175-185 sand

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
D 41	25 09184	Denville Water Dept.	TW 3-60	06/03/60	Layne-New York	500	104	99	NA	NA	NA	NA	NA	NA	Qsd	0-2 overburden 2-4 sandy clay 4-14 dirty sand, gravel, boulders 14-20 muddy sand with gravel 20-36 sandy clay 36-42 water-bearing muddy sand 42-99 sandy clay 99-104 rock
D 42	UN 00172	Ewald, Robert		NA	NA	500	185	>185	NA	NA	NA	NA	NA	NA	Qsd	No log
D 43	UN 00172	Ewald, Robert		NA	NA	500	130	>130	NA	NA	NA	NA	NA	NA	Qsd	No log
D 44	25 09120	Denville Water Dept.	TW 1-60	03/05/60	Layne-New York	500	82	79	NA	NA	NA	NA	NA	NA	Qsd	0-2 fill 2-4 overburden 4-23 mud with sand, gravel 23-34 muddy sand with gravel, 34-65 sandy clay 65-79 sand, gravel, boulders, clay 79-82 rock
D 45	UN 00173	Arthur D. Crane Co.		--/--/25	NA	620	207	60	NA	NA	15	NA	20	NA	PC	No log
D 46	UN 00096	N.J. Dept. of Transportation		NA	Fay	521.3	51.5	>51.5	NA	NA	6.5	NA	NA	NA	Qsd	0-2 loose boulders, dry 2-12 fine to medium brown sand, gravel, trace clay 12-21 brown silt, clay, trace sand, gravel 21-39 fine to medium brown sand, gravel, clay 39-51.5 fine to medium gray sand, gravel, trace clay
D 47	UN 00175	Arthur D. Crane Co.		12/17/25	NA	540	95	20	NA	NA	NA	NA	NA	NA	PC	No log
D 48	25 08879	Advance Castings		11/19/59	Stothoff, Wm.	530	87	>87	78	87	11	65	78	1.4	Qsd	0-41 clay 41-78 sticky clay 78-87 coarse sand, gravel
D 49	25 14219	Denville Water Dept.	TW 1-67	05/25/67	Layne-New York	620	72	69	48	72	1	NA	NA	NA	Qsd	0-5 brown sand, clay 5-17 muddy brown sand 17-25 sand, clay 25-35 sand, gravel 35-48 sand, hard gravel 48-58 sand, gravel 58-65 sandy brown clay 65-69 hard clay, gravel 69-72 decomposed rock
D 50	25 03993	N.J. Power & Light		04/15/55	Stothoff, Wm.	520	75	>80	55	75	4	36	225	7.0	Qsd	0-5 fill 5-24 clay 24-40 sand, gravel 40-53 very fine yellow sand with gravel 53-80 coarse gravel
D 51	25 09389	Denville Water Dept.	TW 5-60	07/15/60	Layne-New York	510	124	>120	NA	124	NA	NA	NA	NA	Qsd	0-2 overburden, sand, clay 2-4 sandy clay with gravel 4-36 clay 36-61 tough clay with sand, gravel, boulders 61-124 clay with sand, gravel, boulders, decomposed rock
D 52	25 09388	Denville Water Dept.	TW 4-60	06/29/60	Layne-New York	520	97	92	NA	97	NA	NA	NA	NA	Qsd	0-2 overburden, peat, sand, clay 2-9 clay, sand, gravel 9-16 clay 16-26 sand, gravel, clay, boulders 26-43 broken rock 43-44 brown sand, gravel, clay 44-46 fractured rock 46-92 clay, sand, gravel, boulders, decomposed rock
D 53	25 06359	Butcher, Carl E.		02/22/57	Bott Inc.	615	210	8	21	210	40	120	2	0.03	PC	0-8 overburden 8-210 gneiss
D 54	25 14258	Denville Water Dept.	TW 2-67	06/14/67	Layne-New York	580	73	70	NA	73	NA	NA	NA	NA	Qsd	0-15 sand, gravel, clay 15-40 brown clay, gravel 40-50 hard clay, gravel 50-55 tan clay 55-63 hard clay, gravel 63-70 brown clay 70-73 rock
D 55	25 10589	Sims, E.		05/12/62	Smith's Well Drilling	630	108	57	60	108	20	NA	15	NA	PC	0-57 clay, hardpan 57-108 very seamy gneiss

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D 56	25 24111	Fire Ftrs. Equip. Co.		09/13/83	DF Well Drilling	680	173	34	54	NA	NA	NA	15	NA	PC	0-34 overburden with clay, gravel, boulders 34-173 gneiss
D 57	25 01670	Behrens, H.		06/07/52	Feakins	530	126	>126	121	131	45	85	75	1.9	Qsd	0-40 hardpan with boulders 40-65 sand 65-120 hardpan, clay, boulders 120-126 sand, gravel
DOVER TOWN																
DT 1	UN 00262	NA		--/--1900	Caufield, F. A.	630	228	212	NA	NA	NA	NA	NA	NA	PC	212 rock
DT 2	25 24895	U. S. Geological Survey		05/16/84	U.S. Geological Survey	587	22.9	>23	17.9	22.9	5.2	NA	9	NA	Qsd	0-3 large boulders, gravel 3-14 very coarse gravel, brown sand 14-23 medium to fine sand, gravel
DT 3	UN 00196	Dover Water Department	Test Well	09/16/1925	Layne-New York	510	80	>80	NA	NA	8.5	16.5	1000	NA	Qsd	0-15 sand, clay, boulders 15-68 coarse sand, gravel, boulders 68-80 hardpan
DT 4	25 24890	U. S. Geological Survey	USGS S10	05/15/84	U.S. Geological Survey	591	28.8	>28	18.8	28.8	10.4	NA	4.5	NA	Qsd	0-1 sandy overburden 1-3 silty clay, sand 3-9 silty sandy gravel with cobbles 9-11 silty sand, gravel 11-15 silty sandy brown gravel 15-21 brown sand, water-bearing gravel 21-28 brown sand, gravel
DT 5	25 13542	Dover Water Dept.	PW-1	03/28/66	Burrows	591.	65	>68	45	65	11.3	24.6	1711	127.8	Qsd	0-25 hardpan, boulders 25-35 dirty sand 35-45 sand, gravel 45-55 coarse sand, gravel 55-60 very coarse sand, gravel 60-64 fine sand with clay 64-68 sandy clay, hardpan 163 soft rock 198 hard rock
DT 6	UN 00195	Dover Water Dept.	Well 2	08/--/1940	Artesian	590	70	>70	50	70	22	40	1000	55.6	Qsd	No log
DT 7	UN 00267	Dover Water Dept.	Well 2	--/--/1902	NA	580	230	163	NA	NA	NA	NA	NA	NA	PC	No log
DT 8	25 24889	U. S. Geological Survey	USGS S9	05/14/84	U.S. Geological Survey	586.5	27.4	>28	17.4	27.4	8.2	NA	6	NA	Qsd	0-1 overburden 1-7 gravel, cobbles with sand 7-11 boulders 11-16 silty sand, gravel 16-26 sand 26-28 sand, gravel 149 soft rock 199 hard rock
DT 9	UN 00268	Dover Water Dept.	Well 3	--/--/1902	NA	180	209	149	NA	NA	NA	NA	NA	NA	PC	No log
DT10	25 24893	U. S. Geological Survey	USGS S8	05/16/84	U.S. Geological Survey	584.1	18.8	>19	13.8	18.8	5.8	NA	6	NA	Qsd	0-1 overburden 1-4 coarse gravel, sand 4-16 medium to fine sand, gravel 16-19 gravel, boulders
DT11	25 24891	U. S. Geological Survey	USGS S7	05/15/84	U.S. Geological Survey	586	18.6	>19	13.6	18.6	7.7	NA	4	NA	Qsd	0-2 fill, gravel 2-6 brown fine to coarse sand 6-11 brown sand, gravel 11-13 gravel 13-17 sand, gravel 17-19 coarse gravel 19 boulders 135 soft rock 200 hard rock
DT12	UN 00266	Dover Water Dept.	Well 1	--/--/1902	NA	580	210	135	NA	NA	NA	NA	NA	NA	PC	No log

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DT 13		Dover Water Dept.	PW-3	09/06/1940	NA	590	74	74	52	74	8.4	25	16.3	NA	Qsd	No log
DT 14	25 24887	U. S. Geological Survey	USGS S4	05/10/84	U.S. Geological Survey	588.6	28.6	>28	18.6	28.6	10.7	NA	6	NA	Qsd	0-6 overburden 7-16 coarse sand, gravel, boulders 16-28 coarse black sand, silt
DT 15	25 09215	Dover Water Dept.	T4	07/01/60	Burrows	570	85	79	80	85	NA	NA	NA	NA	Qsd	0-25 yellow hardpan, sand 25-40 silty gray clay 40-45 yellow hardpan, yellow clay 45-65 fine sand, yellow clay 65-70 fine sand, silty yellow clay 79-85 rock
DT 16	25 16024	Dover Water Dept.	Well 5	09/10/71	Layne-New York	590	64	>73	44	64	14	29	1529	101.9	Qsd	0-15 fill, silt 15-25 small cobbles, brown sand, silt 25-40 small cobbles, gravel 40-65 large cobbles, gravel 65-66 large boulders 66-67 fine sand, silt 67-73 green clay
DT 17	UN 00999	Dover Water Dept.	Test Well 5	08/11/71	NA	589.6	68	98	48	68	13.03	19	525	NA	Qsd	No log
DT 18	25 24892	U. S. Geological Survey	USGS S1	05/15/84	U.S. Geological Survey	581.2	17.7	>18	12.7	17.7	4.3	NA	6	NA	Qsd	0-3 brown sand 3-8 boulders 8-17 sand, gravel 17-18 boulders
DT 19	25 24884	U. S. Geological Survey	USGS S2	05/08/84	U.S. Geological Survey	586.1	28.5	>18	18.5	28.5	8.6	NA	4	NA	Qsd	0-4 overburden 4-11 medium sand, gravel with cobbles 11-16 medium sand, gravel 16-18 medium to fine sand, fine gravel
DT 20	2 24885	U. S. Geological Survey	USGS S3	05/09/84	U.S. Geological Survey	589.7	28.4	>28	18.4	28.4	11.1	NA	6	NA	Qsd	0-10 fill 10-12 sand 12-16 large gravel, coarse brown sand 16-28 light yellow, brown sand
DT 21	25 25321	U. S. Geological Survey	Dover OBS D1	08/13/84	S. Stothoff	581.8	59.5	>50.5	50.5	59.5	6.2	NA	NA	NA	Qsd	No log
DT 22	25 25322	U. S. Geological Survey	Dover OBS D6	08/14/84	S. Stothoff	590.9	59.5	>50.5	50.5	59.5	13	NA	NA	NA	Qsd	No log
DT 23	25 24897	U. S. Geological Survey	USGS S6	05/10/84	U.S. Geological Survey	591.4	28.4	>28	18.4	28.4	11.4	NA	6	NA	Qsd	0-16 fill 16-28 black sand, silt
DT 24	25 01435	Dover Water Dept.	Test 2	08/09/60	NA	550	62	135	47	62	2.8	46	383	NA	Qsd	No log
DT 25	UN 00263	Smith, S. T.		--/--/1886	G. Jenkins	630	135	135	NA	NA	60	NA	NA	NA	Qsd	0-45 sand, cobbles, boulders 4-45 gravel 45-125 heaving sand 125-133 black clay 133-135 gravel 135 rock
DT 26	25 10565	Dover Water Dept.	4 Hooley	07/19/62	Burrows	555	138	>138	118	138	5.50	42	1455	39.9	Qsd	0-12 large stones 12-30 very fine silt 30-53 fine sand 53-58 fine sand with water 58-95 fine sand 95-103 coarse sand 103-138 sand with coarse gravel 138 coarse gravel
DT 27	25 05545	Ehrlich, Milton	Bldg 18	08/22/56	Garden State	570	97	>97	82	96	17	54	144	3.9	Qsd	0-22 boulders, sand 22-40 fine dry sand gravel 40-72 clay, sand, gravel 72-95 coarse gravel 95-97 fine gravel

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DT 28	25 24401	N.J. Natural Gas Co.	Well 105	11/03/83	Fritts & Assoc.	550	34	>61	33	34	NA	NA	NA	NA	Qsd	0-7 sand, gravel, cobbles 7-13 medium to coarse sand, gravel with cobbles 13-22 fine gray sand 22-33 fine sand, trace silt 33-37 silt, trace fine sand 37-42 fine to medium sand 42 fine sand, medium sand
DT 29	25 06309	Food Fair		02/12/57	Burrows	577	72	>70	60	72	15	69	400	7.4	Qsd	0-70 boulders, gravel
DT 30	25 09494	Dover Water Dept.	TW 3	08/30/60	Burrows	530	81	530	65	81	3.80	60	100	1.8	Qsd	0-10 sand, silty clay 10-15 sand with gravel, clay 15-20 sand 20-25 fine sand 25-30 sand, fine gravel 30-35 coarse sand 35-45 sand, fine gravel 45-80 sand, medium gravel
DT 31	UN 00264	DL & W Railroad	RR Station	--/--1890	D. Salkind	570	153	145	NA	NA	NA	NA	NA	NA	PC	
DT 32	25 10564	Dover Water Dept.	T5	08/15/62	Burrows	555	86	85	85	86	NA	NA	NA	NA	Qsd	0-45 hardpan, stones 45-66 sand 66-85 sand with decomposed rock
DT 33	UN 00270	DL & W Railroad		--/--1890	D. Salkind	560	214	>214	NA	NA	NA	NA	NA	NA	Qsd	0-50 hardpan 50-110 quick sand 110-116 boulders 116-214 gravel
EAST HANOVER TWP.																
EH 1	25 13510	Meta Corporation		01/13/66	Pine Brook	190	67	62	65	67	9	27	8	0.4	Jbs	1-24 clay 24-31 silty sand with shale 31-57 hardpan with sand 57-62 water-bearing silty sand, gravel 62-67 trap rock
HANOVER TWP.																
H 1	25 01340	Thompkins, Kenneth		10/31/52	Beatty Bros	280	60	>60	60	NA	21	8	20	NA	Qsd	0-55 boulders, clay 55-60 sand
H 2	25 13419	U. S. Geological Survey	OEP TH-2,A-2	02/08/66	Kaye Well Drilling	315	82	>60	NA	82	NA	NA	NA	NA	Qsd	0-1 gray clay 1-3 clay, sand 3-9 rock, boulders 9-22 fine sand, trace clay 22-35 clean sand 35-50 coarse sand, trace clay 50-60 coarse sand, sticky clay 60-63 fine sand 63-70 fine to coarse silty sand 70-95 brown till 93-110 brown shale
H 3	25 22919	Birchwood Manor		08/12/82	Wm. Beatty	320	240	100	100	240	16	120	25	0.2	JTrb	0-100 clay 100-240 red shale
H 4	25 13420	USGS & NJ DEPE	OEP TH-3,A-2	02/10/66	Kaye Well Drilling	280	110	95	NA	NA	NA	NA	NA	NA	JTrb	0-50 yellow clay 50-68 sand, yellow clay 68-95 yellow clay 95-110 clay, red stones
H 5	25 13904	Fello, Anna		07/20/66	Algier Bros	290	247	80	80	247	35	100	15	0.2	JTrb	0-30 open well 30-80 sand 80-100 red sandstone 100-247 very soft gray rock
JERFFERSON TWP.																
J 1	22 21874	Gibbs, Gary	NA	___/___/83	DF Well Drilling		200		60	200	NA	NA	NA	NA	PC	0-60 sand, gravel 60-200 gneiss

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Table 2. Records of wells (cont.)

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
J 2	22 13964	Fenwick Machinery		01/09/75	DF Well Drilling	740	250	94	NA	NA	NA	NA	NA	NA	PC	0-40 sand, gravel 40-45 boulders 45-70 large gravel 70-94 sand, gravel 94-250 black, green gneiss
J 3	22 18382	Fichter, Isabelle		12/14/78	B.C. Well Drilling	727	297	23	72	297	NA	NA	1.5	NA	PC	No log
J 4	22 26196	Rockaway Twp. Water Dept.	Berkshire Valley Test	03/11/88	Wm. Stothoff		115	124	85	115	0	38.5	350	0.09	Qsd	0-5 gray clay 5-35 fine sand, clay, gravel 35-55 dirty fine sand 55-65 sand 65-95 sand, gravel 95-115 gravel, large stones 115-124 dirty gravel, large stones 124-124.5 rock
J 5	25 22133	NA		NA	NA	715		>71	NA	NA	NA	NA	NA	NA	Qsd	0-108 sand 108-115 gray shale 115 weathered till 115-120 shale
J 6	25 20672	Losey, H.		07/18/79	DF Well Drilling	700	197	10	NA	NA	NA	NA	20	NA	PC	0-5 overburden 5-10 clay, gravel 10-197 gneiss
J 7	22 14233	Weaver, Jacob		09/19/74	DF Well Drilling	710	120	115	NA	NA	NA	NA	6	NA	JTrb	0-108 sand 108-115 gray shale 115 water 115-120 shale
J 8	22 13184	Westerkamp, William		10/26/73	DF Well Drilling	710	100	>100	NA	NA	NA	NA	40	NA	Qsd	0-60 sand, gravel 60-80 gray sand 80-95 gravel 95-100 water-bearing gravel
J 9	22 17901	Collara, Stephen		08/28/78	DF Well Drilling	720	273	10	NA	NA	NA	NA	1	NA	PC	No log
J 10	25 21787	NA		NA	NA	720		25	NA	NA	NA	NA	NA	NA	PC	No log
J 11	21 00800	NA		NA	NA	730		>42	NA	NA	NA	NA	NA	NA	Qsd	No log
MONTVILLE TWP.																
M 1	25 19976	Morel, Charles		05/12/78	Betz Well Co.	440	103	17	NA	NA	NA	103	10	0.1	PC	0-8 hardpan, sand, gravel, boulders 8-17 conglomerate 17-103 gneiss
M 2	22 01387	Hadlen Corp.		08/19/54	Louis Gari	780	93	93	NA	NA	12	25	20	1.5	PC	0-26 overburden 26-93 rotten rock
M 3	22 11585	Neville, Steven		09/14/72	DF Well Drilling	480	147	134	NA	NA	NA	NA	NA	NA	PC	0-18 weathered water-bearing overburden, boulders 18-75 brown, gray gneiss 75-87 water-bearing gneiss 87-147 gray gneiss
M 4	25 22968	Devos, J.		07/28/82	Ballentine	400	273	>273	50	NA	69	NA	6	NA	Qsd	0-10 hardpan 10-273 gravel
M 5	25 15831	Morel, Charles		03/26/71	Soren Nelson Jr.	290	131	14	NA	NA	8	100	10	0.1	PC	0-14 hardpan, stones 14-131 limestone, conglomerate
M 6	26 03474	Montville Twp. MUA		11/16/65	Pine Brook	390	121	31	31	121	8	8	60	NA	JTrb	No log
M 7	25 13301	C J. Morel Jr., Inc.		10/01/65	David Nelson	340	112	19	36	NA	25	98	36	0.5	PC	0-19 clay, stones, boulders, hardpan 19-36 soft conglomerate, limestone 36-112 hard limestone
M 8	25 15099	Wenske, Carl		02/28/69	Pine Brook	370	102	51	62	102	10	70	15	0.3	Sgp	0-51 hardpan, stones, large boulders 51-102 conglomerate rock

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M 9	25 23060	NA		NA	NA	370		40	NA	NA	NA	NA	NA	NA	PC	No log
M 10	25 00399	S.B. Penick, & Co.		02/15/49	Parkhurst	310	153	40	54	153	1	110	70	0.6	JTrb	0-40 boulders, dirt 40-153 rock
M 11	25 07092	Benson, Robert		09/26/57	Bott Inc.	210	70	45	47	70	10	25	25	1.7	Sgp	0-15 hardpan 15-30 sand 30-45 clay 45-70 pink gneiss
M 12	UN 00149	N.J. Dept. of Transportation	M79	--/--/61	Warren George	213.6	67	62	NA	NA	12	NA	NA	NA	JTrb	0-2 overburden 2-4 brown sand 4-7 sand, gravel, red, brown clay 7-36 fine brown silt 36-45 fine to medium brown sand 45-56 fine brown sand with silt 56-62 brown sand with gravel 62-67 rock
M 13	UN 00150	N.J. Dept. of Transportation	M82	--/--/61	Warren George	223.2	65	65	NA	NA	14.3	NA	NA	NA	JTrb	0-3 fine dark brown sand with gravel, silt 3-14 fine brown sand 14-49 fine silty brown sand 49-65 red to brown sand, gravel, clay, boulders 65-79 rock
M 14	UN 00151	N.J. Dept. of Transportation	M78	--/--/61	Warren George	205.5	67.5	56.5	NA	NA	NA	NA	NA	NA	JTrb	0-3 fine brown sand 3-10 brown sand, gravel 10-13 fine brown sand 13-27 fine silty gray sand 27-40 fine, silty sand 40-45 silty brown, gray sand, trace clay 45-53.5 fine to medium gray sand, trace silt, gravel 53.5-56.5 sand, gravel, boulders
M 15	25 01037	Hermann, Michael		08/09/51	Bott Inc.	340	146	50	59	146	19	31	15	1.3	Sgp	0-50 hardpan 50-146 pink gneiss
M 16	25 14589	Montville Twp., B.O.E.		09/21/67	Somerville	310	400	2	51	400	35	300	NA	NA	PC	0-2 overburden 2-400 gneiss
M 17	25 19798	Odas & Moorer Inc.		03/23/78	Pine Brook	320	125	31	48	125	10	40	15	0.5	Sgp	0-31 hardpan, boulders with sand, gravel 31-125 conglomerate
M 18	25 13446	Brady, John		11/10/65	DF Well Drilling	280	146	25	42	146	NA	NA	10	NA	JTrb	0-25 clay 25-145 sandstone
M 19	26 03443	Stuermer, Alfred		09/21/65	J. Lauritsen	270	90	47	47	90	17	50	10	0.3	JTrb	0-47 hardpan 47-90 decomposed rock
M 20	25 22670	Ravi Atlantic, Inc.	Well 4	03/15/82	Warren George	240	104	>102	35	45	NA	NA	NA	NA	Qsd	0-8 silt, sand, gravel, fill 8-17 fine brown sand 17-28 silty fine brown sand 28-64 silt, sand, brown gravel 64-102 coarse gravel, sand, silt with cobbles, boulders
M 21	25 22675	Ravi Atlantic, Inc.	Well 9	03/20/82	Warren George	220	33	>33	20	33	NA	NA	NA	NA	Qsd	No log
M 22	25 22671	Ravi Atlantic Corp.	Well 5	03/12/82	Warren George	360	60	54	20	30	NA	NA	NA	NA	Qsd	No log

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Table 2. Records of wells (cont.)

Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
M 23	25 22667	Ravi Atlantic Corp.	Well 1	03/07/82	Warren George	260	95	>95	62	72	47	NA	NA	NA	Qsd	0-47 medium grained brown sand, trace gravel, silt 47-54 medium to coarse brown sand, gravel 54-60 brown silt with sand 60-95 fine to medium brown sand with gravel, silt, cobbles
M 24	25 22672	Ravi Atlantic Corp.	Well 6	03/15/82	Warren George	320	115	112	66	76	NA	NA	NA	NA	Qsd	0-58 fine to medium brown sand with gravel, silt 58-112 fine to medium brown sand, gravel, cobbles 112 rock(?)
M 25	25 21888	Cook, Robert		11/03/81	Pine Brook	350	135	31	93	135	41	52	15	1.4	Sgp	0-31 hardpan, gravel, boulders 31-135 conglomerate, shale, light brown sandstone
M 26	25 11726	Millinger, Allen		12/07/63	Pine Brook	360	83	43	82	83	49	75	8	0.3	Sgp	0-22 hand dug well 22-43 hardpan, stones 43-83 soft conglomerate
M 27	25 16658	Kretschmar, Robert		01/17/73	Pine Brook	280	90	18	27	90	12	60	15	0.3	Sgp	0-18 hardpan, sand, gravel 18-90 conglomerate
M 28	25 22845	W. Orange Contractors		08/18/82	Pine Brook	210	73	72	64	73	4	11	40	5.7	Qsd	0-8 sand, gravel with large stones 8-17 water-bearing silty sand with gravel 17-52 very fine water-bearing silty sand with varved clay 52-72 water-bearing sand, gravel 72-73 gray conglomerate
M 29	UN 00148	N.J. Dept. of Transportation	M109	--/--/61	Warren George	275.8	11	9	NA	NA	NA	NA	NA	NA	JTrb	0-1 overburden 1-9 medium to fine sand, gravel with boulders 9-11 decomposed rock
M 30	25 16657	Kretschmar, Robert		01/12/73	Pine Brook	290	180	32	42	180	8	175	6	0.04	Sgp	0-32 clay, gravel, hardpan 32-180 conglomerate
M 31	25 21836	Janowitz, Ethan		02/18/81	Pine Brook	270	80	24	36	80	32	40	15	1.9	Sgp	0-21 well 21-24 hardpan, stones 24-80 conglomerate
M 32	25 18881	Progressive Building		12/31/76	Pine Brook	380	62	41	NA	NA	41	55	15	1.1	Sgp	0-41 hardpan, gravel, boulders 41-62 conglomerate
M 33	25 21688	Annette Kurz		11/10/80	Ballentine	400	58	>58	58	58	13	NA	25	NA	Qsd	No log
M 34	25 22673	Ravi Atlantic Corp.	Well 7	03/17/82	Warren George	350	90	81.5	71	81	NA	NA	NA	NA	Qsd	0-28 medium to coarse brown sand, gravel with cobbles, silt 28-62 fine brown sand with silt 62-81.5 fine to medium brown sand, gravel with cobbles, silt 81.5-90 rock
M 35	25 16532	Corso, Leonard		09/07/72	Pine Brook	210	62	>62	NA	47	8	20	30	2.5	Qsd	0-47 sand, gravel 47-62 water-bearing sand, gravel
M 36	25 10051	Hala, Anna		07/14/61	Bott Inc.	270	253	28	33	253	21	90	3	0.04	Sgp	0-7 clay, cobbles 7-28 hardpan 28-253 pink gneiss
M 37	25 23335	Mudrock, John		12/11/82	Pine Brook	390	158	54	101	158	21	145	5.00	0.04	Sgp	0-54 hardpan, stones with large boulders, sand, gravel 54-92 weathered conglomerate 92-158 conglomerate
M 38	25 16920	Tedesco, Dominick		05/15/73	Pine Brook	400	135	44	121	135	34	80	12	0.3	Sgp	0-44 sand, gravel, stones 44-65 conglomerate 65-135 limestone
M 39	UN 00145	N.J. Dept. of Transportation	M70	--/--/61	Warren George	348.3	30	5	NA	NA	26.7	NA	NA	NA	Qsd	0-2 overburden 2-5 medium-grained brown sand, gravel 5-30 rock

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M 40	UN 00146	N.J. Dept. of Transportation	M71	--/--/61	Warren George	336.8	20	8	NA	NA	12	NA	NA	NA	JTrb	0-2 overburden 2-8 hard sand, gravel 8-20 rock
M 41	25 11547	Tirpak, Michael		09/26/63	Bott Inc.	390	143	47.5	49	143	25	60	8	0.2	Sgp	0-18 open well 18-34 clay 34-47.5 hardpan 47.5-143 pink gneiss
M 42	25 21108	Scott, Gerald		11/15/79	Pine Brook	270	95	8	21	95	9	80	8	0.1	Sgp	0-8 hardpan, stones, small gravel lenses 8-95 conglomerate
M 43	25 03108	Kereluk, Anthony		01/08/53	Bott Inc.	270	151	35	43	151	20	28	10	1.3	Sgp	0-35 sand clay 35-151 pink gneiss
M 44	25 24013	Krause, Henry		09/20/83	Soren Nelson Jr.	400	170	54	117	NA	34	120	5	0.06	JTrb	0-22 sand, gravel with large stones, boulders 22-41 fine sand with gravel 41-54 water-bearing silty sand with gravel with large stones 54-113 weathered conglomerate, red shale 113-170 hard conglomerate
M 45	25 10425	Drexel, George E.		02/01/62	Pine Brook	270	133	19	25	133	22	95	3	0.04	Sgp	0-19 sand, gravel 19-133 conglomerate
M 46	25 14518	Zartman, Robert		09/06/67	Pine Brook	250	80	42	46	80	22	60	10	0.3	Sgp	0-36 sand, gravel 36-42 hardpan, stones 42-80 conglomerate
M 47	UN 00192	Hammond, Lewis		08/29/46	Parkhurst	310	515	33	NA	NA	106	238	4	0.03	JTrb	0-32 overburden 33-230 trap rock 230-515 red shale
M 48	25 22054	Bonforte, Denis		06/08/81	Ball	190	148	62	63	148	23	NA	15	NA	Jbs	0-62 gray sand, clay, gravel 62-148 trap rock
M 49	25 00622	Feyl, William		01/19/50	Ackerman	200	175	18	18	175	30	100	2	0.03	Jbs	0-18 sand, 41 18-175 hard trap rock
M 50	25 22468	Maglione, Theodore		12/05/81	Pine Brook	240	160	71	78	160	65	75	15	1.5	Sgp	0-71 sand, gravel with very fine sand, varved clay 71-160 conglomerate
M 51	25 22032	NA		NA	NA	240		57	NA	NA	NA	NA	NA	NA	JTrb	No log
M 52	25 16765	DeTerrice, Dominico		02/10/73	Soren Nelson Jr.	190	52	>52	53	53	4	25	15	NA	Qsd	0-24 sand 24-41 silty fine sand 41-52 water-bearing sand, gravel
M 53	25 22617	Laird Construction		03/18/82	Pine Brook	260	140	19	37	140	38	67	15	0.5	Sgp	0-19 brown sand, gravel with layers of very fine sand 19-128 red, brown conglomerate 128-140 gray, brown conglomerate
M 54	25 23235	Laird Construction		01/31/83	Soren Nelson Jr.	225	80	>80	80	NA	31	50	15	NA	Qsd	0-14 sand, gravel 14-19 loose stones, sand, gravel 19-51 very fine sand with gravel 51-66 hardpan, clay 66-77 water-bearing silty fine sand, gravel 77-80 water-bearing sand, gravel
M 55	25 23288	A. Franklin Co.		10/18/82	Soren Nelson Jr.	210	110	41	49.50	110	24	85	12	NA	Jrcg	0-13 sand, gravel with clay 13-32 clean sand, gravel 32-38 fine sand 38-41 hardpan, stones 41-110 conglomerate

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M 56	25 20489	Gibbs, Richard		01/11/79	Pine Brook	220	155	47	51	155	8	100	8	0.09	JTrb	0-47 hardpan, stones, sand, gravel 47-141 conglomerate 141-155 trap rock
M 57	25 23800	Laird Construction		05/19/83	Pine Brook	230	155	67	75	155	21	145	4	NA	Jrcg	0-9 hardpan with loose stones 9-16 fine sand 16-27 sand, gravel 27-150 conglomerate
M 58	25 25028	Tedesco, Chayka		06/03/84	Soren Nelson Jr.	235	150		33.01	150	35	105	10	NA	Jrcg	0-2 sand gravel with loose stones 20-38 fine sand 38-62 water-bearing silty sand, gravel 62-67 hardpan, stones 67-155 conglomerate
M 59	25 23350	Woodfield		11/30/82	Soren Nelson Jr.	220	120	43	50	120	14	100	10	NA	Jrcg	0-43 sand, gravel with very fine sand 43-120 conglomerate
M 60	25 10405	De Mouthe, Hattie		01/25/62	Pine Brook	240	70	>70	NA	NA	13	65	11	0.2	Qsd	0-27 dug well 27-43 hardpan with large stones 43-70 water-bearing sand, gravel
M 61	25 15302	Chayka, Robert		08/23/69	Pine Brook	300	150	42	49	150	39	120	4	0.05	Sgp	0-14 sand 14-42 hardpan, stones 42-150 conglomerate
M 62	25 11015	Di Chiara Bros.		05/13/63	Pine Brook	260	63	>63	NA	NA	41	52	15	1.4	Qsd	0-29 sand, gravel 29-37 clay 37-46 hardpan with large boulders 46-63 water-bearing sand, gravel
M 63	25 11767	Nelson, David		02/01/64	Pine Brook	300	103	87	90	103	39	85	15	0.3	JTrb	0-43 sand, gravel with boulders 43-48 clay 48-67 hardpan 67-87 water-bearing sand, gravel 87-103 red shale
M 64	25 11016	Di Chiara Bros.		05/21/63	Pine Brook	580	64	>64	NA	NA	38	55	12	0.7	Qsd	0-28 sand, gravel 28-39 clay 39-47 hardpan, large stones 47-64 water-bearing sand, gravel
M 65	25 15304	Venezia, Charles		08/18/69	Pine Brook	310	165	72	76	165	49	150	3	0.03	Sgp	0-31 clay with silty fine sand 31-43 coarse sand 43-72 hardpan, stones 72-165 conglomerate
M 66	25 10009	Di Chiara Bros.		06/30/61	Pine Brook	240	95	88	92	95	36	55	15	0.8	JTrb	0-13 sand 13-29 clay 29-58 hardpan 58-77 water-bearing silty sand, gravel 77-88 hardpan 88-95 sandstone
M 67	25 15563	Lutheran Church		08/10/70	NA	210	146	107	112	146	11	100	20	0.2	JTrb	0-6 fill 6-31 hardpan, stones 31-69 clay 69-107 silty sand, gravel 107-146 red, gray shale
M 68	25 15303	Hryczk, Frank		09/02/69	Pine Brook	300	136	87	94	136	50	100	11	0.2	Sgp	0-8 sand 8-27 clay 27-49 sand, gravel 49-87 hardpan, stones 87-136 conglomerate
M 69	25 12990	Scott, Benjamin		08/01/65	Lauritsen, J.	210	60	>60	NA	NA	10	24	50	3.6	Qsd	0-50 clay 50-55 harpan 55-60 gravel
M 70	25 10010	Di Chiara Bros.		07/03/61	Pine Brook	250	78	>78	NA	NA	37	55	16	0.9	Qsd	0-19 sand 19-57 hardpan 57-78 water-bearing sand, gravel
M 71	25 25074	Tedesco Chayka, Inc.		06/29/84	Soren Nelson Jr.	260	260	71	77.3	NA	53	160	12	0.1	JTrb	0-9 sand, gravel 9-13 clay 13-17 fine sand, gravel with large stones 17-31 sand, gravel 31-61 hardpan with varved sand, gravel, large stones 61-71 silty sand, gravel 71-126 shale, red sandstone 126-139 gray shale 139-187 conglomerate 187-213 red shale 213-226 gray shale 226-245 conglomerate 245-260 gray shale with sandstone
M 72	21 00791	NA		NA	NA	200		>85	NA	NA	NA	NA	NA	NA	Qsd	No log

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M 73	25 19901	Recchia, Victor		05/01/78	Pine Brook	300	166	31	31	166	96	140	15	0.3	JTrb	No log
M 74	25 11808	Conklin, Nathan		02/28/64	Bott Inc.	210	202	84	61	202	19	60	12	0.3	JTrb	0-15 sand, cobbles 15-33 fine sand 33-36 sand, gravel 36-50 dirty sand 50-55 hardpan, shale 55-72 red shale 72-84 gray shale 84-202 red shale
M 75	25 16956	Laird, Robert		06/28/73	Pine Brook	210	140	114	102	140	41	80	15	0.4	JTrb	0-90 sand, gravel 90-114 conglomerate 114-140 sandstone, red shale
M 76	25 12991	Dunne, Gloria T.		06/20/65	Lauritsen, J.	190	115	90	90	115	10	35	35	1.4	JTrb	0-20 boulders 20-60 clay 60-90 red shale
M 77	25 10668	Montville Twp. MUA	Municipal Bldg.	07/10/62	Pine Brook	190	205	87	91	205	4	95	20	0.2	JTrb 11	0-6 gravel 6-54 clay 54-87 hardpan with large boulders 87-159 red shale 159-205 conglomerate
M 78	25 15430	Ferraro, Sal		12/18/69	Pine Brook	220	121	61	67	121	16	115	5	0.05	Jbs	0-8 sand 8-61 clay 61-121 trap rock
M 79	25 16649	Cibro Construction		11/08/72	Mabey Bros.	210	125	48	54	125	16	40	15	0.6	Jbs	0-10 sand 10-40 clay 40-48 sand 48-125 trap rock
M 80	25 21677	River Front Farms		11/19/80	Pine Brook	180	200	81	92	200	4.50	150	60	0.4	JTrb	0-13 sand, gravel with boulders 13-21 hardpan with clay 21-44 gray clay 44-54 hardpan, stones 54-61 water-bearing sand, gravel with large boulders 61-70 silty fine water-bearing sand with stones 70-81 hardpan, stones 81-99 gray shale 99-147 red shale 147-169 gray shale 169-200 red sandstone
M 81	25 15803	Pellock, John		03/10/71	Mabey Bros.	350	170	4	20	170	100	150	4	0.08	JTrb	0-4 dirt 4-120 trap rock 120-170 shale
M 82	25 10618	Tani, Stephen		05/15/62	Pine Brook	300	230	7	29	230	137	155	6	0.3	JTrb	0-7 overburden 7-230 red, gray shale with sandstone
M 83	25 11376	Van Dunk, Paul		07/19/63	Bott Inc.	340	176	16	22	176	128	150	25	1.1	JTrb	0-16 open well 16-78 trap rock 78-176 red shale
M 84	25 16549	Oakley, Henry		11/02/72	Mabey Bros.	200	150	42	56	150	4	80	30	0.4	Jbs	0-15 sand 15-42 clay 42-150 trap rock
M 85	25 11626	Kovacs, Steve		11/06/63	J. Lauritsen	190	65	>65	NA	NA	5	24	10	0.5	Qsd	0-65 sand, gravel
M 86	25 00766	Conlin, Howard J.		08/11/50	J. Lauritsen	210	130	85	80	130	18	47	6	0.2	JTrb	0-55 clay 55-85 hardpan 85-130 red shale
M 87	25 13895	Montville Twp.	MTMUA 3	07/13/66	DF Well Drilling	300	293	0	19	293	NA	225	106	0.5	JTrb	0-117 gray trap rock 117-232 red shale 232-268 gray shale 268-293 red shale
M 88	25 00768	Churchwell, Edwin		08/18/50	J. Lauritsen	180	165	85	109	165	15	47	7	0.2	JTrb	0-60 clay 60-85 hardpan 85-165 red shale

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Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
M 89	25 13900	Montville Twp.	MTMUA 2	07/26/66	Wm. Stothoff	180	210	52	55	210	9	160	70	0.5	JTrb	0-30 clay 30-52 clay, gravel 52-65 red rock 65-156 baked shale 156-210 trap rock
M 90	25 05499	Pine Brook	PBWC 1	08/30/56	J. Lauritsen	290	300	190	15	300	16	150	190	1.4	JTrb	0-190 trap rock 190-300 red shale
M 91	26 01710	Bader, Barney		09/20/57	Pine Brook	180	203	114	118	203	19	65	25	0.5	JTrb	0-14 sand 14-70 clay 70-90 hardpan 90-109 water-bearing sand 109-114 gravel 114-196 shale, red sandstone 196-203 gray shale
M 92	25 11619	Pine Brook Park		09/04/65	J. Lauritsen	175	120	100	100	120	15	60	20	0.4	JTrb	0-70 clay 70-100 hardpan 100-120 red shale
M 93	25 13302	Schneider, S.		10/11/65	Soren Nelson Jr.	170	148	111	117	NA	26	NA	10	NA	JTrb	0-16 sand 16-86 clay 86-104 hardpan, stones 104-111 silty water-bearing sand 111-148 red shale
M 94	25 13808	Montville Twp. MUA	MTMUA 3	07/01/66	Wm. Stothoff	175	176	27	34	176	5	140	87	0.6	JTrb	0-8 clay 8-27 boulders, gravel 27-35 gray rock 35-75 red rock 75-97 red shale 97-164 gray rock 164-175 trap rock
M 95	25 14517	Billing & Sons		09/19/67	Pine Brook	175	125	107	111	125	14	20	25	4.2	JTrb	0-5 fill 5-18 silty sand 18-54 clay 54-88 hardpan, stones 88-107 silty sand, water-bearing gravel 107-125 red shale
M 96	25 12953	Humphrey, W. M.		06/11/65	Soren Nelson Jr.	185	99	41	45	NA	8	25	20	1.2	JTrb	0-11 sand 11-33 clay 33-41 hardpan, stones 41-99 shale with red sandstone
M 97	25 11532	Boss Glass Dist., Inc.		09/13/63	Soren Nelson Jr.	180	88	44	54	NA	7	15	20	NA	Jbs	0-6 fill 6-37 clay 37-44 hardpan, stones 44-77 red shale 77-88 trap rock
M 98	25 11345	Reinhardt, Leo R.		06/21/63	Pine Brook	180	130	88	54	130	14	20	50	8.3	Jbs	0-4 fill 4-18 sand 18-33 clay 33-41 water-bearing silty sand 41-54 fractured rock 54-130 trap rock
M 99	25 10170	Pine Brook Meth. Church		08/23/61	Soren Nelson Jr.	180	47	40	43	NA	9	25	12	NA	Jbs	No log
M 100	25 22195	Helme, James		10/02/81	Pine Brook	180	125	74	83	125	4	50	8	0.2	JTrb	0-29 sand with gravel 29-54 gray clay 54-74 hardpan, stones 74-89 brown sandstone 89-101 black shale 101-110 gray shale 110-125 red shale with red sandstone
M 101	25 10127	NA		NA	NA	190		39	NA	NA	NA	NA	NA	NA	JTrb	No log
M 102	25 04973	Eckholt, Karl		09/20/55	Mabey Bros.	240	170	4	10	170	40	80	10	0.3	Jbs	0-4 dirt 4-170 trap rock
M 103	UN 00111	N.J. Dept. of Transportation	HM-1	--/--/61	Fay	201.7	12	8	NA	NA	NA	NA	NA	NA	JTrb	0-1.5 overburden 1.5-5 silty brown sand 5-6 silty brown sand, gravel 6-8 trap rock, boulders 8-12 trap rock
M 104	UN 00112	N.J. Dept. of Transportation	HM-4	--/--/61	Fay	196.8	32	27	NA	NA	25.4	NA	NA	NA	JTrb	1-10 fine to medium brown sand 10-18 fine to medium brown sand, gravel, silt 18-27 sand, gravel, silt, boulders 27-32 fractured trap
M 105	UN 00109	NA		NA	NA	230		8	NA	NA	NA	NA	NA	NA	JTrb	No log
M 106	UN 00110	NA		NA	NA	230		2	NA	NA	NA	NA	NA	NA	JTrb	No log

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M 107	25 16366	NA		NA	NA	200		215	NA	NA	NA	NA	NA	NA	JTrb	No log
M 108	25 20553	Michaels, John E.		03/28/79	Pine Brook	210	127	3.5	20	127	32	127	12	0.1	JTrb	0-3.5 clay, fill 3.5-75 gray trap rock 75-86 shale, red, brown sandstone 86-127 gray trap rock
M 109	UN 00188	O'Dowd Dairies		12/--/33	J.J. Reilly	180	530	224	NA	NA	11	180	77	0.5	Qsd	0-11 yellow clay 11-16 sand 16-20 clay 20-32 sand 30-75 black clay 75-160 gray clay 160-177 gray clay, small cobbles 177-197 sand, gravel 197-206 black clay 206-224 sand, gravel 224-390 brown shale 390-396 streak blue rock 396-487 brown shale 487-519 blue rock 519-530 brown shale
M 110	25 17473	Pine Brook Car Wash		05/21/74	Wm. Stothoff	200	189	0	41	189	6	NA	60	NA	Jbs	0-189 trap rock
M 111	25 15683	Tenaglia, Benito		11/24/70	Pine Brook	270	207	44	47	207	37	195	8	0.05	JTrb	0-44 sand, gravel with large boulders 44-207 conglomerate
M 112	UN 00189	Klisiewecs		10/01/48	Parkhurst	200	80	9	NA	NA	26	47	7	0.3	JTrb	0-9 overburden, sand 9-80 sandstone
M 113	25 14782	Phillips Petroleum		05/23/68	Pine Brook	185	192	85	94	192	9	100	20	0.2	JTrb	0-7 fill 7-23 sand 23-85 clay, hardpan, stones 85-192 red shale, sandstone layers
M 114	25 22518	Ecology Lake Club		12/21/81	Warren George	180	43	>43	14	43	NA	NA	NA	NA	Qsd	0-43 sand, gravel
M 115	25 13057	Maier Bros. Farms		07/15/65	Pine Brook	170	372	169	176	372	18	105	50	0.6	JTrb	0-42 fine sand 42-158 clay, silty sand 158-169 water-bearing silty sand, gravel 169-354 gray, red shale 354-372 red sandstone
M 116	25 22669	Ravi Atlantic Corp.		03/11/82	Warren George	240	60	58	32	42	NA	NA	NA	NA	Qsd	0-24 medium to coarse sand, stones, gravel 24-45 fine to medium brown sand, trace silt, trace gravel 45-58 medium to coarse sand, coarse gravel with silt 58-60 rock
MINE HILL TWP.																
MH 1	25 17378	Alpine Valley Estates		08/27/74	DF Well Drilling	730	98	43	53	98	NA	NA	20	NA	PC	0-43 overburden with clay, water-bearing gravel 43-70 brown gneiss 70-98 green, black gneiss
MH 2	25 17380	Alpine Valley Estates		08/25/75	DF Well Drilling	740	223	30	50	223	NA	NA	5	NA	PC	0-30 overburden 30-223 gneiss (various colors)
MH 3	25 17383	Alpine Valley Estates		08/26/74	DF Well Drilling	750	95	40	50	95	NA	NA	10	NA	PC	0-40 overburden with clay, sand 40-95 gneiss (various colors) 71-73 2 gpm
MH 4	25 15019	FHA		11/01/68	DF Well Drilling	680	223	3	20	223	57	150	7	0.08	PC	0-3 overburden 3-30 black, white gneiss 30-31 brown gneiss 31-91 green, white gneiss 91-100 black gneiss 100-223 white, green gneiss

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MH 5	25 21621	Burton, Jack		09/21/80	DF Well Drilling	700	198	11	50	198	NA	NA	20	NA	PC	0-11 overburden with boulders 11-198 gneiss (various colors) 140-141 1 gpm
MH 6	22 13177	NA		NA	NA	855		5	NA	NA	NA	NA	NA	NA	PC	No log
MH 7	25 22529	Miller, Otto		03/09/82	DF Well Drilling	870	98	9	56	98	NA	NA	8	NA	PC	0-9 overburden 9-75 gneiss 75-92 brown gneiss 92-98 gray gneiss
MH 8	25 19010	Hellegers, Edward		03/25/77	DF Well Drilling	860	123	23	60	NA	NA	NA	15	NA	PC	0-23 overburden 23-123 alternating green, white, brown gneiss
MH 9	25 20766	Philco, Inc.		12/07/79	DF Well Drilling	860	98	8	50	NA	NA	NA	10	NA	PC	0-8 overburden 8-10 soft gneiss 10-50 gneiss 50-95 hard gneiss 95-98 water-bearing gneiss
MOUNTAIN LAKES BORO.																
ML 1	UN 00272			NA	D. Salkind	545	443	79.5	NA	NA	NA	NA	NA	NA	PC	0-79.5 rock
ML 2	UN 00273	Mountain Lakes Borough		--/29	NA		540	>257	NA	NA	NA	NA	NA	NA	Qsd	No log
ML 3	UN 00260	Mountain Lakes Borough		11/--/64	Wm. Stothoff	400	112	90	NA	NA	NA	NA	NA	NA	PC	0-70 sand with boulders 70-80 sand, gravel 90-97 fractured gneiss 107-112 rock
ML 4	25 14698	Mountain Lakes Borough	Well 5	01/08/69	C.W. Lauman	520	332	363	235	332	NA	NA	NA	NA	Qsd	0-21 fill 21-28 gravel 28-40 soft gray clay, sandy clay 40-49 sandy brown clay 49-162 fine to coarse gray sand with clay, gravel, boulders 162-175 sandy gray clay, gravel with stones 175-181 gray clay with gravel 181-195 gray clay with fine to medium gray sand 195-221 coarse brown sand 221-229 silty gray clay 229-235 fine to medium brown sand 235-242 hard sand, gravel 242-302 sand, cobbles 302-363 sand, clay 363-366 rock
ML 5	25 13697	Mountain Lakes Borough	Test Well	10/28/66	Wm. Stothoff	510	345	73.7	300	345	125	246	437	3.6	Qsd	0-5 fill 5-10 mud 10-20 mud, gray clay 20-30 gray clay 30-60 dirty gravel 60-80 medium gravel with clay 80-95 coarse sand, gravel 95-130 medium gravel, clay 130-150 clay, gravel, sand 150-190 clay with coarse sand, gravel 190-195 medium gravel 195-200 medium to fine sand 200-213 clay, very fine sand 213-215 medium gravel with clay 215-225 sand, clay 225-230 clay, gravel 230-240 medium gravel with clay 240-250 clay, fine sand 250-255 medium gravel 255-265 fine to coarse sand with clay 265-270 fine red sand 270-280 sand, gravel 280-290 sand with clay 290-300 clay, coarse sand, gravel 300-350 medium sand 350-351 gneiss? 351-355 coarse sand, medium gravel 355-366 very coarse sand, clay
ML 6	25 14302	Mountain Lakes Borough	Test Well	06/22/67	Wm. Stothoff	510	137	95	102	137	NA	NA	NA	NA	PC	0-30 sand, clay, gravel, boulders 30-95 sand, clay, gravel, boulders 95-137 rock

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ML 7	25 21173	Mountain Lakes Borough	Geonics 1	09/11/79	DF Well Drilling	510	250	>250	NA	NA	NA	NA	20	NA	Qsd	0-5 overburden 5-35 sand, gravel 35-38 boulders 38-66 sand, gravel 66-68 boulders 68-105 sand, gravel 105-140 fine sand, clay 140-170 fine to coarse sand, gravel 170-237 fine sand, gravel 237-250 sand, gravel
ML 8	UN 00191	Craven, Edgar		02/--/77	NA	370	320	112	NA	NA	25	NA	6	NA	JTrb	0-112 sand, gravel, boulders, hardpan 112-287 conglomerate 287-292 gray shale 292-320 conglomerate
ML 9	25 12508	Mountain Lakes Borough		12/22/64	Wm. Stothoff	350	207	58	NA	NA	54	95	128	3.1	PC	0-12 fine sand 12-18 hardpan 18-56 cobbles, boulders 56-58 boulders 58-207 rock
ML 10	25 35203	Mountain Lakes Borough	Test Well	05/18/90	S. Stothoff	550	200	187	155	185	12.5	62.5	235	4.7	Qsd	No log
MORRIS PLAINS																
MP 1	25 24496	Cortese, J.		12/02/83	Somerville	540	95	>95	88	NA	40	80	25	0.6	Qsd	0-4 overburden 4-95 sand, gravel
MP 2	25 24168	R. Farley & Sons		09/23/83	Ballentine	600	399	37	50	NA	NA	NA	0.75	NA	PC	0-37 clay, sand, gravel 37-399 gneiss
PARSIPPANY - TROY HILLS TWP.																
P 1	UN 00258	Norda		12/--/46	Parkhurst	410		168	NA	NA	NA	NA	NA	NA	PC	0-168 sand, gravel 168-822 gneiss
P 2	UN 00237	Norda	Abandoned Well 1	NA	NA	410	290	140	150	230	7	NA	NA	NA	JTrb	0-135 sand 135-145 shale
P 3	UN 00238	Norda	Well 3	NA	NA	410	135	>135	NA	NA	7	NA	NA	NA	Qsd	0-40 coarse sand, gravel 40-135 fine sand
P 4	UN 00133	N.J. Dept. of Transportation	M5	--/--/59	Warren George	391.7	71.5	>71.5	NA	NA	21.5	NA	NA	NA	Qsd	0-17 fine to medium brown sand with fine to medium gravel 17-71.5 fine to coarse sand, fine to medium gravel
P 5	UN 00134	N.J. Dept. of Transportation		--/--/59	Warren George	389	62	>62	NA	NA	21.5	NA	NA	NA	Qsd	0-10 medium-grained brown sand, gravel, trace silt 10-14 fine silty sand with gravel 14-39 coarse brown sand, trace gravel 39-45 fine to medium brown sand, gravel, trace clay 45-62 fine to medium gray gravel, trace silt
P 6	U 00236	Jersey City	B2B	10/20/81	Empire Soils	270.3	36.5	25	NA	NA	NA	NA	NA	NA	JTrb	0-20 boulders to cobbles 20-21 clayey fine to coarse sand, gravel 21-22 fine to coarse gray sand, silty clay, shale 24-25 fractured gray shale, silty clay with fine to coarse sand 25-26 weathered green-grey shale 27-31.5 soft green-grey shale 32-36.5 soft green-grey shale

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P 7	UN 00288	Jersey City	B2A	10/19/81	Empire Soils	270.3	17.8	>18	NA	NA	NA	NA	NA	NA	Qsd	0-1.8 weathered silty coarse to fine dark brown sand with gravel 1.8-2 weathered clayey silty coarse to fine yellow and brownish-tan sand with gravel 5-10 weathered silty fine brown sand, silty fine to coarse sand with gravel 10-15 weathered silty brown clay with fine to coarse sand, trace gravel 15-17 very hard silty brown sand with clay, gravel, trace boulders, cobbles
P 8	UN 00287	Jersey City	B5	10/14/81	Empire Soils	311.7	55	>51.5	NA	NA	NA	NA	NA	NA	Qsd	0-2 medium-hard sandy fine light brown silt with gravel 5-10 very hard silty fine to coarse brown sand, gravel 10-15 medium-hard silty fine to coarse red to brown sand, trace gravel 15-20 medium hard silty fine to medium red to brown sand, trace gravel 20-22 medium to hard red to brown sandy silt, trace clay, gravel 25-30 very hard sandy very fine red to brown silt with gravel, trace clay 30-35 very hard sandy fine red, brown silt with gravel 35-40 very hard silty fine to coarse brown sand with gravel 40-50 very hard very silty fine to coarse brownish-red to brown sand, decomposed rock 50-51.5 very hard silty, fine to coarse brown sand, trace gravel
P 9	UN 00131	N.J. Dept. of Transportation	M4	--/--/59	Warren George	353.2	36.5	>36.5	NA	NA	NA	NA	NA	NA	Qsd	0-15 light brown sand, medium to coarse gravel 15-28 brown sand, medium to coarse gravel, boulders 28-35.5 light brown sand, gravel, rock
P 10	UN 00132	N.J. Dept. of Transportation	M100	--/--/61	Warren George	348.5	69.3	>69.3	NA	NA	11.2	NA	NA	NA	Qsd	0-18.5 silty fine brown sand, gravel 18.5-21 brown silt with gravel 21-27 coarse to medium brown sand 27-33 silty brown sand, gravel, boulders 33-69.3 brown sand, silt, gravel
P 11	UN 00130	N.J. Dept. of Transportation	M133	--/--/61	Warren George	336.5	5	5	NA	NA	NA	NA	NA	NA	Qsd	0-2 brown clay 2-5 fine sand
P 12	UN 00259	Parsippany-Troy Hills Water Dept.		10/--/24	NA	400	150	150	NA	NA	NA	NA	NA	NA	JTrb	0-150 sand, gravel 150 red shale
P 13	UN 00129	N.J. Dept. of Transportation	M120	--/--/61	Warren George	351	26.5	>26.5	NA	NA	NA	NA	NA	NA	Qsd	0-11 fine to coarse sand with gravel 11-14 fine to medium sand with gravel 14-17 fine sand 17-26.5 fine to medium sand with gravel
P 14	UN 00104	N.J. Dept. of Transportation	L-6	--/--/63	Fay	591	31	28	NA	NA	NA	NA	NA	NA	PC	0-0.5 overburden 0.5-15 water-bearing medium to coarse brown sand, trace silt, gravel 15-25 water-bearing fine brown sand with silt, boulders 25-28 water-bearing coarse brown sand, silt, boulders 28-31 hard gray rock
P 15	UN 00097	N.J. Dept. of Transportation	Boring L-2	--/--/63	Fay	582.2	21.5	>21.5	NA	NA	10.4	NA	NA	NA	Qsd	0-0.5 overburden 0.5-21.5 water-bearing medium-grained brown sand, gravel, trace silt, boulders
P 16	25 13052	Rainbow Lakes	Test Well	07/02/65	Arnold Saft	520	150	>150	150	NA	NA	NA	NA	NA	Qsd	0-150 sand, gravel, clay, boulders

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 17	UN 00127	N.J. Dept. of Transportation	M131	--/--/61	Warren George	361	15	>15	NA	NA	NA	NA	NA	NA	Qsd	0-2 brown clay 2-6 brown sand 6-15 brown sand, gravel
P 18	UN 00101	N.J. Dept. of Transportation	Boring L-8	--/--/63	Fay	581.8	27.5	20	NA	NA	NA	NA	NA	NA	Qsd	0-20 gravel, brown sand, trace silt, clay, boulders 20-22 decomposed rock 22-26.5 fractured gray rock 26.5-27.5 sandy brown gravel, trace clay
P 19	UN 00126	N.J. Dept. of Transportation	M129	--/--/61	Warren George	355	15	>15	NA	NA	NA	NA	NA	NA	Qsd	0-1 brown clay 1-9 fine brown sand 9-13 fine to medium brown sand 13-15 brown sand, gravel with boulders
P 20	UN 00100	N.J. Dept. of Transportation	Boring L-10	--/--/63	Fay	579	2.5	>25	NA	NA	2.75	NA	NA	NA	Qsd	0-2.8 brown gravel, coarse sand, trace silt 2.8-5.8 boulders 5.8-25 gravelly brown sand, trace silt, boulders
P 21	25 09230	Lake Hiawatha Swim Club		04/10/60	E. Richardson	250	325	78	78	325	1.50	50	50	1.0	JTrb	0-10 stones, fill 10-38 coarse gravel, sand 38-65 red clay 65-78 stones, red hardpan 78-110 red shale 110-200 soft red sandstone 200-295 red shale 295-325 red sandstone
P 22	UN 00125	N.J. Dept. of Transportation	M128	--/--/61	Warren George	342.5	13	>13	NA	NA	NA	NA	NA	NA	Qsd	0-4 brown sand, gravel, trace clay 4-9 fine brown sand 9-13 fine to medium brown sand
P 23	25 14171	Mount Tabor C.C.		02/29/68	DF Well Drilling	510	123	>123	NA	NA	NA	110	34	0.3	Qsd	0-40 fine silt 41-116 gray clay 116-118 boulders 118-123 large gravel
P 24	25 03664	Parsippany-Troy Hills Water Dept.	Vail Rd	09/01/54	Burrows	300	85	>85	NA	NA	NA	NA	NA	NA	Qsd	0-10 clean yellow clay 10-15 hard gravelly clay, boulders 15-20 sand 20-25 sand, overburden 25-35 sand, fine gravel 35-40 sand, fine gravel 40-50 sand with coarse water-bearing gravel 50-55 clean water-bearing sand 55-60 clean water-bearing sand 60-65 sand, gravel, less water 65-70 water-bearing sand (less flow) 70-75 streaks of yellow clay trace sand 75-80 sticky yellow clay, water-bearing gravel, 80-85 sticky red hardpan
P 25	UN 00098	N.J. Dept. of Transportation	Boring L-15	--/--/63	Fay	590.5	17.5	7.5	NA	NA	12	NA	NA	NA	PC	0-0.3 overburden 0.3-7.5 gravelly brown sand, trace clay with boulders 7.5-17.5 fractured soft dark gray rock
P 26	UN 00099	N.J. Dept. of Transportation	Boring L-17	--/--/63	Fay	622.2	44	1	NA	NA	12.2	NA	NA	NA	PC	0-0.7 peat 0.7-10 gray rock 10-44 hard gray rock
P 27	25 06004	Parsippany-Troy Hills Water Dept.	TW 1	12/04/56	Wm. Stothoff	330	107	106	105	107	NA	NA	NA	NA	Qsd	0-5 clay 5-68 very tough sand, gravel 68-71 boulders 71-78 loose sand 78-80 coarse sand, very clean fine gravel 80-100 water-bearing sand 100-106 dirty gravel 106-107 red rock
P 28	25 17118	Parsippany-Troy Hills Water Dept.	Well 16	11/07/73	C.W. Lauman	300	85	94	60.5	85	33.3	58	1100	44.6	Qsd	0-11 overburden 11-68 clay, boulders 68-77 very fine to coarse sand, gravel, stones, boulders 77-80 clay, boulders 80-89 fine to coarse sand, gravel, boulders, clay 89-94 sandy clay, gravel, large stones 94-96 shale
P 29	UN 00032	Parsippany-Troy Hills Water Dept.	Well 3	11/--/44	Twp. Crew	299.8	80	93	54	80	30	49	600	31.6	Qsd	0-1 overburden 1-20 clay, boulders 20-49 hardpan 49-52 coarse sand 52-58 sand, gravel with red clay 58-72 sand, gravel 72-77 red clay, sand, gravel 77-93 red clay 93-98 rock

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8) Gallons per minute per foot of drawdown.
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Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 30	UN 00124	N.J. Dept. of Transportation	M126	--/-/61	Warren George	339.5	10	>10	NA	NA	NA	NA	NA	NA	Qsd	0-2 brown clay, gravel 2-10 brown sand, gravel, clay
P 31	25 21744	Shell Oil Co.	OW8	10/28/80	Handex	230	34	>45	14	34	28	NA	NA	NA	Qsd	0-19 loose clay (9-12 boulder) 19-21 large boulders 21-34 sand, silt 34-45 sand, silt
P 32	25 21737	Shell Oil Co.		10/19/80	Sipple & D'Amiano	230	34	>34	9.5	29.5	26	NA	NA	NA	Qsd	0-9 loose clay 9-34 sand, silt, boulders
P 33	25 21745	Shell Oil Co.	RW2	11/01/80	Handex	230	31	31	19	31	27	31	2	0.5	Qsd	0-18 loose clay, boulders 18-21 boulders 21-31 silty rock
P 34	UN 00230	Parsippany-Troy Hills Water Dept.	Well 2	--/-/37	NA	310	190	>190	187	217	9	51	600	11.7	Qsd	0-3 clay 3-5 gravel 5-8 sand, gravel 8-34 blue clay 34-44 sand, gravel, clay, boulders 44-50 blue clay 50-89 sand, gravel, boulders 89-102 blue clay, boulders 102-136 yellow clay, boulders 136-139 red clay, boulders 139-145 sand, gravel 145-190 red clay
P 35	UN 00199	Parsippany-Troy Hills Water Dept.	Reilly, TW	01/30/32	J.J. Reilly	315	151	179	118	131	7.5	16.5	250	27.8	Qsd	2-8 sandy clay 8-12 clay 12-28 clay 28-35 gravel, hardpan 35-42 sandy clay 42-60 sand 60-77 sandy clay 77-90 sand 90-104.3 gravel, hardpan 104.3-133 sand, water-bearing gravel 133-140 fine sand 140-145 clay 145-148 hardpan, boulders
P 36	25 03129	Sanderson, George		12/30/53	Gould	550	100	>100	46	100	NA	NA	NA	NA	Qsd	No log
P 37	UN 00122	N.J. Dept. of Transportation	M110	--/-/61	Warren George	300	45	>45	NA	NA	NA	NA	NA	NA	Qsd	0-1 overburden 1-7 fine silty brown sand, trace clay 7-27 fine brown sand, gravel with small boulders 27-32 fine silty brown sand 32-35 coarse brown sand, gravel 35-43 boulders 43-45 fine brown sand, gravel
P 38	UN 00123	N.J. Dept. of Transportation	M3	--/-/59	Warren George	300	81.5	>81.5	NA	NA	23	NA	NA	NA	Qsd	0-0.5 overburden 0.5-8 brown silt, trace clay, sand 8-15.5 brown silt 15.5-17 medium-grained brown sand 17-34 fine to coarse brown sand, fine to medium gravel with silt 34-45 fine to medium gravel with fine to medium brown sand 45-65 fine to medium brown sand 65-69 fine to medium brown sand with fine gravel 69-81.5 fine to medium brown sand
P 39	25 18849	Parsippany-Troy Hills Water Dept.	Well 17	12/11/75	Artesian	300	139	>113	115.3	135.3	22	70.5	900	18.6	Qsd	0-18 sandy brown clay 18-25 brown clay with sand 25-34 gray sand, clay 34-36 gray hardpan, boulders 36-86 grey hardpan with streaks sand 86-92 coarse sand 92-95 hardpan 95-98 coarse sand with clay 98-104 hardpan with sand, clay 104-110 hardpan with sand, clay, gravel 110-113 clay
P 40	UN 00232	Parsippany-Troy Hills Water Dept.	W10	--/-/64	NA	310	155	>155	NA	NA	30	NA	500	NA	Qsd	0-53 streaks of sticky clay 53-120 sand, water-bearing gravel 120-124 gray clay 124-155 sand, water-bearing gravel
P 41	UN 00234	Parsippany-Troy Hills Water Dept.	Well 9	--/-/64	NA	310	80	>80	60	80	30	NA	750	NA	Qsd	0-30 gray clay, sand 30-42 brown clay, sand 42-80 water-bearing sand, gravel with boulders

Table 2. Records of wells (cont.)

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 42	UN 00105	N.J. Dept. of Transportation	L-26	--/--/63	Fay	553.5	78.5	>78.5	NA	NA	12.4	NA	NA	NA	Qsd	0-1 overburden 1-12 compact fine to coarse brown sand, gravel, cobbles, boulders 12-30 loose fine to coarse brown sand, gravel, cobbles, boulders 30-35 compact fine to coarse brown sand, gravel, cobbles, boulders 35-40 gneiss, sandstone, boulders 40-56.5 compact fine to coarse brown sand, gravel, cobbles, boulders 56.5-58.5 gneiss, boulders 58.5-60 compact fine to coarse brown sand, gravel, cobbles, boulders 60-65 gneiss, sandstone, boulders 65-72 fine to medium grey, brown sand with gravel 72-77.5 fractured gray rock, boulders 77.5-78.5 sand, decomposed rock
P 43	25 11377	Intl. Pipe & Cer. Co.	Well 1	07/26/63	Stothoff	360	200	196	161	171	76	81	350	70.0	Qsd	0-43 sand, gravel, small boulders 43-75 fine sand, silt with clay 75-79 coarse sand 79-90 fine sand, silt 90-96 coarse sand 96-110 sand, fine gravel 110-125 coarse sand, gravel 125-155 11 clean sand, gravel 155-188 sand, dirty gravel 188-196 sandy clay 196-200 gneiss
P 44	25 13422	U.S. Geological Survey		04/21/66	Kaye Well Drilling	390	81	>81	NA	81	NA	NA	NA	NA	Qsd	0-2 fine sand 2-8 clean sand 8-67 muddy sand, clay 67-69 coarse sand 69-70 silty sand, clay 70-80 clean sand 81 boulders
P 45	25 11750	Intl. Pipe & Ceramics Co.	Diffusion 2	01/10/64	Wm. Stothoff	540	178	>178	158	178	NA	NA	NA	NA	Qsd	0-150 sand, gravel, boulders 150-178 sand, very coarse gravel
P 46	25 17228	Parsippany-Troy Hills Water Dept.	Well 9A	06/--/73	Layne-New York	310	100	101	80	100	18	40	602	27.4	JTrb	0-2 overburden 2-5 sandy gray clay 5-10 brown sand, streaks gray clay 10-30 brown sand, boulders 30-70 boulders, brown sand, gravel, streaks clay 70-94 boulders, sand, gravel 94-101 boulders, sand, large gravel 101-104 weathered rock 104-107 rock
P 47	25 18850	Parsippany-Troy Hills Water Dept.	Well 18	12/16/76	Artesian	310	127	>127	105	127	24.5	35	910	86.7	Qsd	0-1 soil 1-18 fine silty sand 18-34 clay, sand, gravel 34-59 sand, gravel, hardpan, boulders 59-70 sandy clay, sand 70-80 sandy clay, hardpan 80-90 sandy clay 90-116 sandy clay, sand 116-119 sand, gravel 119-127 sand, gravel with clay
P 48	25 11584	Intl. Pipe & Cer. Co.	Diffusion 1	11/22/63	Stothoff, Wm.	350	160	>160	143	160	60	NA	NA	NA	Qsd	0-160 sand, gravel
P 49	UN 00290	Jersey City	P2	10/01/81	Empire Soils	309.8	52.9	>53	NA	NA	NA	NA	NA	NA	Qsd	0-2 light brown silt, gravel, trace fine sand 2-4 fine sandy gray silt 4-7 gray silt, fine to coarse sand, trace gravel 9.5-11 very silty fine to medium gray, green sand 11.5-13 clayey grey, green silt, trace fine sand 15 gravel, trace fine to medium sand 20.5-21.5 silty fine to medium gray sand, gravel 21.5-25.5 sandy fine gray, brown silt, gravel, trace clay 24 very clayey 25.5-31 sandy yellow-brown silt, clay, trace gravel 31-32 silty fine to coarse gray sand, gravel 35-36.5 silty gray, brown clay, clayey silt, trace gravel

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Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Form-ation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pump-ing level ⁷				
P 50	UN 00033	Parsippany-Troy Hills Water Dept.	Well 4	03/--/51	Twp. Crew	300	82	>143	52	79	13	72	500	8.4	Qsd	0-19 yellow clay 19-23 fine gravel, clay 23-27 water-bearing coarse gravel, sand, clay 27-43 clay 43-52 coarse sand 52-65 soft red, sand 65-82 soft rock 82-98 hard traprock 98-99 weathered rock 99-102 light gray rock 102-123 hard rock 123-150 weathered rock
P 51	25 11585	Intl. Pipe & Cer. Co.		09/30/63	Stothoff	350	160	>160	141	161	64	100	831	23.1	Qsd	0-50 gravel with sand 50-90 sand, gravel 90-105 clean coarse sand 105-160 sand, gravel
P 52	UN 00231	NA		NA	NA	300		150	NA	NA	NA	NA	NA	NA	JTrb	
P 53	25 13421	U. S. Geological Survey	OEP TW-1.A-4	04/13/66	Kaye Well Drilling	280	213	>213	213	223	31	90	272	5.0	Qsd	0-2 fill 2-6 sand 6-16 silty clay 16-19 streaks clay, boulders 19-37 muddy silt 37-50 streaks sand 50-52 sand with clay 52-65 sand, clay 65-69 red clay 69-72 streaks coarse sand 72-86 fine sand, clay, gravel 86-96 coarse sand 96-106 fine sand 106-120 coarse sand 120-125 coarse sand, gravel 125-135 streaks sand 135-140 sand, trace clay 140-155 coarse clean sand 155-162 cobbles, fine sand 162-175 coarse clean sand 175-192 clay, coarse sand 192-210 coarse sand 210-213 sand, trace clay
P 54	25 07381	Parsippany-Troy Hills Water Dept.	Well 1A	03/31/58	Artesian	300	138	>144	102	138.3	26.3	62	600	16.8	Qsd	0-37 sandy clay 37-50 hardpan 50-58 gravel with sand, clay 58-63 hardpan, gravel with sand, gray clay 63-144 sandy gray clay with gravel
P 55	UN 00119	N.J. Dept. of Transportation	M-123	--/--/61	Warren George	287.5	27	>27	NA	NA	1.70	NA	NA	NA	Qsd	0-4 brown clay with gravel 4-8 brown sand, gravel 8-27 sand, gravel with clay, boulders
P 56	UN 00121	N.J. Dept. of Transportation	M-2	--/--/59	Warren George	309.8	26	>26	NA	NA	NA	NA	NA	NA	Qsd	0-3 brown silt, sand, gravel, trace clay 3-6 fine to medium brown sand with gravel 6-10 fine to medium brown sand, trace sand 10-26 brown silt, sand, gravel
P 57	UN 00200	Parsippany-Troy Hills Water Dept.	Parsippany School	11/--/28	Stothoff	310	118	>118	NA	NA	43	NA	60	NA	Qsd	0-75 hardpan, boulders 75-81 sand, gravel 81-85 hard-packed stones 85-103 sand, gravel 103-105 hardpan 108-118 hardpan, rock
P 58	25 15809	Parsippany-Troy Hills Water Dept.	Well 15	01/01/70	NA	215	76	76	55	70	25	46	263	12.5	Qsd	No log
P 59	25 22542	Texaco, Inc.		01/26/82	Handex	320	53	>53	13	53	NA	NA	NA	NA	Qsd	No log
P 60	UN 00180	Boonton Molding Co.		--/--/42	Parkhurst	390	158	>158	NA	NA	NA	NA	100	NA	Qsd	0-136 no log 136-158 water-bearing sand (flows at 12 gpm)
P 61	UN 00120	N.J. Dept. of Transportation	M-1	11 --/--/59	Warren George	316.8	20	>20	NA	NA	4.5	NA	NA	NA	Qsd	0-4 silty brown clay with gravel 4-13 brown silt with gravel, trace clay 13-20 silty brown clay, fine to medium gravel, trace sand
P 62	UN 00107	N.J. Dept. of Transportation	L-37	01/21/63	Fay	323.2	41.5	>41.5	NA	NA	22	NA	NA	NA	Qsd	0-1 overburden 1-4 compact clayey silty brown sand with gravel 4-41.5 very compact clayey silty medium to coarse sand with gravel, cobbles, boulders

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 63	25 00618	Parsippany-Troy Hills Water Dept.		01/15/50	R&T Foley	340	169	73	74	NA	15	125	100	NA	JTrb	0-70 clay 70-73 sand 73-169 conglomerate
P 64	UN 00102	N.J. Dept. of Transportation	SR-1	--/--/61	Fay	297.5	25.5	>25.5	NA	NA	24	NA	NA	NA	Qsd	0-1 overburden 1-25.5 fine to medium red, brown sand, gravel, boulders, trace silt
P 65	UN 00117	N.J. Dept. of Transportation	RR-2	--/--/61	Fay	169.7	4	35	NA	NA	4	NA	NA	NA	JTrb	0-1 overburden 1-6 silt, sand 6-10 medium-grained gray sand, trace gravel 10-18 silt, varved clay 18-21 silt, clay, gravel, trace sand 21-35 compact silt, trace sand, gravel 35-40 trap rock
P 66	UN 00114	N.J. Dept. of Transportation	L-18	--/--/61	Fay	180.7	77	>77	NA	NA	12	NA	NA	NA	Qsd	0-8 medium-grained brown sand 8-15 silt, trace fine sand 15-18 gray clay 18-47 silty gray clay 47-68 light brown, gray clay 68-77 sand, gravel
P 67	UN 00118	N.J. Dept. of Transportation	RR-7	--/--/61	Fay	173.4	35	35	NA	NA	9.5	NA	NA	NA	Qsd	0-3 loose sand 3-7 fine to coarse sand, gravel, clay 7-17 silt, trace clay 17-31 gray, brown silt with gravel, trace sand, clay 31-35 compact silt, sand, gravel, boulders 35 rock
P 68	UN 00092	N.J. Dept. of Transportation	22-2	NA	Fay	175.5	114.3	>114.3	NA	NA	2.3	NA	NA	NA	Qsd	0-3 overburden, fine to coarse sand 3-11 fine to medium to coarse brown sand, gravel, trace silt 11-15 clayey gray silt, trace fine sand 15-29 clayey gray silt 29-37 silty gray clay 37-56 gray clay, trace varved silt 56-65 red, gray clay with fine gravel 65-75 red, gray clay, gravel 75-87 gray, brown clay, gravel 87-98 clayey brown, gray silt with fine gravel 98-108 brown gray silt, trace sand, gravel 108-114.3 brown-gray silt, sand, gravel, till
P 69	25 23153	Boonton Electronics Corp.	Obs. Well 1	09/03/82	Somerville	238	72	>72	72	72	NA	NA	NA	NA	Qsd	0-40 fine sand 40-72 sand, gravel
P 70	25 03935	Parsippany-Troy Hills Water Dept.	Test Well 6	10/--/54	Burrows	180	86	86	75	85	NA	NA	NA	NA	Qsd	0-10 yellow clay 10-22 gray clay 22-30 water-bearing coarse sand 30-35 sand with gravel 35-40 red clay with dry sand 50-55 very fine water-bearing sand 60-65 very coarse, water-bearing sand with gravel 65-75 coarse sand, gravel (flows) 75-80 very coarse water-bearing sand with gravel 80-85 water-bearing red to brown sand 86 red rock
P 71	UN 00089	N.J. Dept. of Transportation	Boring L-17	--/--/61	Fay	173.8	106.5	106	NA	NA	NA	NA	NA	NA	Qsd	0-8.5 fine brown sand 8.5-44 soft gray clay 44-55 gray clay 55-65.5 dark brown clay, gravel 65.5-79 brown clay, gravel 79-100 sandy brown clay, trace silt 100-105 coarse brown sand, gravel 105-106 sand, gravel, trace shale 106-106.5 shale
P 72	UN 00106	N.J. Dept. of Transportation	TR-6	03/14/63	Fay	268	26.5	>26.5	NA	NA	27.5	NA	NA	NA	Qsd	0-1 overburden 1-26.5 fine to medium brown sand, gravel, boulders, trace clay

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 73	25 23151	Boonton Electronics Corp.		09/01/82	Somerville	300	60	>60	56	NA	34	NA	NA	NA	Qsd	0-5 soil, boulders 5-15 clay 15-25 fine sand 25-60 sand, gravel
P 74	25 04596	Parsippany-Troy Hills Water Dept.	Well 6	12/03/56	Artesian	180	93	90	57	93	4	119	140	3.3	Qsd	0-23 clay, boulders 23-33 clay, sand, boulders 33-70 sand, gravel 70-75 clay 75-90 sand, gravel, seamy clay 90 red shale
P 75	25 23152	Boonton Electronics Corp.		09/02/82	Somerville	310	60	>60	56	60	NA	NA	NA	NA	Qsd	0-60 sand, gravel
P 76	UN 00116	N.J. Dept. of Transportation	BR-8	--/--/61	Fay	202.2	26.5	>26.5	NA	NA	5.1	NA	NA	NA	Qsd	0-1 fill 1-11 brown silt, clay with boulders, trace gravel 11-26.5 medium to coarse brown sand, silt, gravel, boulders
P 77	UN 00090	N.J. Dept. of Transportation	32-3	NA	Fay	176	40	>40	NA	NA	3	NA	NA	NA	Qsd	0-7 sand, silt, gravel, fill 7-14 brown clay, silt 14-20 gray clay with silt 20-36 brown sand, silt, gravel 36-40 very tough till
P 78	UN 00086	N.J. Dept. of Transportation	Boring L-14	--/--/61	Fay	167.8	52.5	>52.5	NA	NA	NA	NA	NA	NA	Qsd	0-6 muck 6-38 varved silty gray clay 38-52.5 medium to coarse brown sand, gravel, silty clay
P 79	25 19937	Parsippany-Troy Hills Water Dept.	TW 77-1	08/08/78	Burrows	172	62	42	42	62	NA	NA	NA	NA	JTrb	0-4 fill, sandy brown clay 4-38 gray clay 38-41 silty red sand, 41-42 red hardpan 42-62 hard red shale
P 80	UN 00088	N.J. Dept. of Transportation	Boring L-16	--/--/61	Fay	171.5	100	>100	NA	NA	NA	NA	NA	NA	Qsd	0-9 sand, gravel 9-16.5 gray clay 16.5-64 brown clay 64-92 brown clay, gravel 92-100 fine sand, trace silt with gravel
P 81	UN 00087	N.J. Dept. of Transportation	Boring 41 L-15	--/--/61	Fay	169.8	76.5	>76.5	NA	NA	NA	NA	NA	NA	Qsd	0-3 muck 3-8 organic silt with wood 8-18 silty gray clay with wood 18-60 gray clay with silt 60-63 sand, silt, clay, trace gravel 63-71 compact fine to medium sand, silt, gravel, trace clay 71-76.5 compact fine to medium sand, silt, gravel
P 82	UN 00115	N.J. Dept. of Transportation	BR-1	--/--/61	Fay	201.5	26.5	>26.5	NA	NA	4.6	NA	NA	NA	Qsd	0-1 loose overburden 1-5 silty brown clay with gravel 5-26.5 medium to coarse brown sand, silt, gravel, boulders
P 83	UN 00091	N.J. Dept. of Transportation	19-8	NA	Fay	171.8	85	>85	NA	NA	15	NA	NA	NA	Qsd	0-10 fine brown sand 10-23 gray clay, silt 23-50 gray silt, varved clay 50-57 gray silt, clay, trace gravel 57-71 brown, gray silt, clay, trace sand, gravel 71-80 clayey gray silt 80-85 gray silt, trace clay, sand 85 rock
P 84	25 12718	Parsippany-Troy Hills Water Dept.	Well 12	01/10/66	Wm. Beatty	300	100	100	70	100	30	70	525	13.1	Qsd	0-20 clay with large stones 20-65 clay with small stones 65-80 clay with sand, gravel 80-100 water-bearing sand, gravel 100 red shale
P 85	UN 00094	N.J. Dept. of Transportation	18-1	NA	Fay	172.7	94.5	>94.5	NA	NA	2.20	NA	NA	NA	Qsd	0-1.5 overburden, gravel 1.5-3 brown clay 3-4 brown clay, trace sand 4-9 brown peat 9-35 clayey gray silt, trace gravel 35-54 silty gray, brown clay 54-64 silty gray, brown clay, trace gravel 64-70 brown, gray sand, silt, gravel 70-89 brown, gray clay, trace silt, coarse sand, gravel 89-94.5 red, brown silt, varved sand

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
9 86	UN 00093	NA		NA	NA	180		>95	NA	NA	NA	NA	NA	NA	Qsd	No log
P 87	25 22543	Martin, Walter J.		03/10/82	Pine Brook	190	125	61	78	125	15	25	20	2.0	JTrb	0-22 brown sand, gravel 22-38 silty fine brown sand with varved clays 38-44 gray trap rock 44-61 water-bearing silty light brown sand, gravel 61-125 shale with sandstone beds
P 88	25 01234	Marchere, M.		10/15/51	Wm. Beatty	330	42.5	>42.5	42.5	NA	6	NA	10	NA	Qsd	0-22.5 clay 22.5-32.5 boulders 32.5-42.5 sand
P 89	25 03167	Parsippany-Troy Hills Water Dept.	Well 5-4	04/10/54	Wm. Stothoff	560	150	30	32.3	150	10	105	195	2.1	PC	0-9 overburden, clay 9-30 sand, gravel 30-150 gneiss
P 90	25 22472	DeFuria, Alfonse		03/02/82	DF Well Drilling	330	98	>98	NA	NA	NA	NA	7	NA	Qsd	0-50 sand, gravel 50-93 fine sand 93-98 gravel
P 91	25 03169	Parsippany-Troy Hills Water Dept.	Well 5-2	03/24/54	Stothoff	520	195	36	38	195	NA	98	263	2.7	PC	0-8 clay 8-36 sand, gravel 36-195 gneiss
P 92	25 01126	Duferino, Alfonso		09/01/51	Beatty Bros.	325	40	>40	40	NA	10	12	10	5.0	Qsd	0-30 hardpan 30-40 sand
P 93	25 01080	Okstel, Helen		08/20/51	Wm. Beatty	290	55	>55	55	55	1	5	10	2.5	Qsd	0-2 overburden 2-10 gravel 10-40 clay, boulders 40-43 gravel
P 94	25 18318	Parsippany-Troy Hills Water Dept.	Test Well	07/14/76	W. Denure	260	100	150	78	103	7	29.5	1002	44.5	Qsd	0-12 silty brown sand with boulders 12-28 hardpan with small cobbles 28-34 sandy hardpan 34-37 water-bearing coarse gravel 37-42 small boulders with loose sand, small cobbles 42-66 soft silty sand with small cobbles 66-84 silty sand, gravel 84-88 water-bearing sand, gravel 88-103 water-bearing silty sand
P 95	25 03093	Lake Parsippany Prop. Assoc.		02/05/54	Wm. Beatty	290	50	>50	10	15	NA	10	50	5.0	Qsd	0-45 clay, small stones 45-50 sand
P 96	25 11876	Leeming-Pacquin Co.		05/20/64	Wm. Beatty	300	80	80	60	80	10	40	430	14.3	Qsd	0-58 clay 58-80 coarse sand 80 red shale
P 97	25 19609	Kerwin, Robert		11/03/77	Pine Brook	190	71	>71	NA	NA	39	60	12	0.6	Qsd	0-41 old well 41-67 water-bearing silty sand 67-71 water-bearing sand, gravel
P 98	25 13417	U. S. Geological Survey	USGS TW 5	01/18/66	Kaye Well Drilling	200	52	47	NA	52	NA	NA	NA	NA	Qsd	0-2 fine sand 2-26 gray clay 26-30 small stones, trace clay 30-40 red clay, sand, stones, trace yellow sand 40-47 red clay 47-52 red rock
P 99	UN 00291	Parsippany-Troy Hills Water Dept.	TW-13	NA	NA	175	84	84	NA	NA	10	NA	NA	NA	JTrb	0-23 clay, sand 23-50 water-bearing gravel, sand 50-84 clay, hardpan 84 red shale

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Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 100	25 11106	Parsippany-Troy Hills Water Dept.	Well 13	06/--/66	Arnold Saft	178	47	178	36	53	NA	28	455	45.5	Qsd	0-23 clay, fine sand 23-25 water-bearing sand, gravel 25-30 water-bearing sand, clay 30-47 water-bearing fine to medium sand, gravel 47 clay, hardpan
P 101	25 01219	Kraut, Joseph		09/21/51	Wm. Beatty	300	50	>50	50	50	10	12	10	500	Qsd	0-40 clay, boulders 40-50 sand
P 102	25 07034	Sunran Corp.		09/28/57	Wm. Stothoff	280	81	>96	52	81	NA	55	300	5.5	Qsd	0-5 clay 5-50 clay, boulders 50-58 dirty sand 58-81 sand, gravel 81-96 clay, gravel
P 103	25 06488	Sunran Corp.		08/26/57	Rinbrand	280	95	99	76	95	10	70	100	1.7	Qsd	0-4 fill 4-38 boulders 38-77 hardpan 77-95 water-bearing coarse sand 95-99 clay 99 red rock
P 104	25 14192	Leeming-Pacquin Co.		03/20/67	Wm. Beatty	270	80	>80	65	80	20	70	430	8.6	Qsd	0-18 gray clay 18-60 clay 60-80 sand, gravel
P 105	25 07620	Parsippany-Troy Hills Water Dept.	Well 7	12/18/58	Artesian	270	66	>66	55	10	7	51	715	16.3	Qsd	0-6 fill 6-46 yellow clay, boulders 46-49 gray clay 49-66 sand, gravel
P 106	25 07589	Parsippany-Troy Hills Water Dept.		04/28/58	Artesian	270	92	73	NA	NA	NA	NA	NA	NA	Qsd	0-2 fill 2-4 yellow clay, boulders 4-43 gray clay, boulders 43-60 medium gravel, coarse sand 60-73 yellow clay 73-92 red shale
P 107	25 12635	Parsippany-Troy Hills Water Dept.	Well 11	03/03/65	Wm. Beatty	178	80	80	55	80	10	26	327	20.0	Qsd	0-22 clay 22-50 clay with stones 50-61 water-bearing sand 61-80 water-bearing coarse sand, gravel 80 red shale
P 108	25 01081	Develsdorf, Dudrich		07/31/51	Wm. Beatty	280	45	>45	45	45	NA	4	10	2.5	Qsd	0-5 clay 5-40 clay, boulders 40-45 gravel
P 109	25 15238	Bankers Insurance		08/07/69	Wm. Stothoff	330	500	70	86	500	50	345	15	0.05	JTrb	0-70 sandy overburden 70-500 sandstone
P 110	25 01109	Larson, Edwin A.		08/24/51	Wm. Beatty	270	47	>47	47	0	NA	5	12	2.4	Qsd	0-10 clay 10-40 clay, boulders 40-47 sand, gravel
P 111	25 07902	Whippany Paper Board		10/27/60	NA	170		154	NA	NA	NA	NA	NA	NA	Qsd	0-12 sand, gravel 12-154 dry, gray clay 154 rock
P 112	25 12151	NA		NA	NA	280		53	NA	NA	NA	NA	NA	NA	JTrb	No log
P 113	25 13418	U. S. Geological Survey	OEP TH-1,A-2	41 01/31/66	Kaye Well Drilling	280	109	103	NA	109	NA	NA	NA	NA	Jbs	0-10 yellow clay 10-20 yellow clay, trace sand 20-45 yellow clay 45-46 boulders 46-72 yellow clay 72-76 boulders 76-100 yellow clay 100-103 gray clay 103-109 hard rock
P 114	UN 00293	Parsippany-Troy Hills Water Dept.	AR 2 - TH 2	NA	NA	175	80	80	NA	NA	NA	NA	NA	NA	JTrb	0-50 ? 50-80 sand 80 rock
P 115	25 13416	USGS		01/10/66	Kaye Well Drilling	190	64	64	NA	NA	NA	NA	175	NA	Qsd	0-4 silt 4-8 sandy clay 8-30 gray clay 30-59 gray clay with fine sand 59-64 rock

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P 116	25 15804	Parsippany-Troy Hills Water Dept.	Test Well 71-1	02/19/71	Rinbrand	200	120	105	112	NA	NA	NA	NA	NA	JTrb	0-30 hardpan, boulders 30-43 hardpan 43-45 gravel 45-55 water-bearing gravel 55-73 fine gravel with weathered rock 73-75 sand 75-85 light gray clay 85-105 brown sand 105-112 red sand, soft red shale 112-120 red shale
P 117	25 13259	Parsippany-Troy Hills Water Dept.	Well 14	--/--/69	NA	270	114	114	68	86.5	15	45	920	30.7	Qsd	0-48 clay 48-63 fine sand, silt 63-65 clay 65-92 sand, gravel 92-112 fine brown sand with clay 112-114 red silt, soft red shale
P 118	25 07953	Shepard, Dennis		09/30/58	Pine Brook	240	140	91	101	140	38	70	20	0.6	JTrb	0-30 hardpan, boulders 30-91 hardpan 91-101 soft to hard red shale 101-140 red shale
P 119	UN 00034	Parsippany-Troy Hills Water Dept.	Well 8-1	--/--/61	NA	190	65	65	45	65	NA	NA	250	8.1	Qsd	0-45 clay 45-60 water-bearing sand, gravel 60-65 fine sand 65 red shale
P 120	25 21288	Muscarelle, Joseph L.		09/27/80	Rinbrand	340	165	>165	160	165	82	100	40	2.2	Qsd	0-55 hardpan, boulders 55-165 sand, gravel
P 121	UN 00035	Parsippany-Troy Hills Water Dept.	Well 8-2	--/--/61	NA	185	65	65	45	65	NA	NA	370	14.0	Qsd	0-45 clay 45-60 water-bearing sand, gravel 60-65 fine sand 65 red shale
P 122	25 15805	Parsippany-Troy Hills Water Dept.	Test Well 71-2	05/14/71	Rinbrand	195	76	68	127	71	16	NA	NA	76.0	JTrb	0-30 sand, clay 30-38 fine sand 38-65 fine sand, gravel, 65-68 sand with red shale 68-76 hard red shale
P 123	25 17949	Parsippany-Troy Hills Water Dept.	TW R-3	05/01/75	Rinbrand	280	75	61	66	75	NA	NA	NA	NA	JTrb	0-35 hardpan 35-40 gravel 40-61 clay 61-75 red rock
P 124	25 15036	Navitsky, Dominek		11/26/68	Algier Bros	195	120	80	80	120	17	70	15	0.3	JTrb	0-30 hardpan, boulders 30-60 yellow clay 60-80 red clay 80-120 red sandstone
P 125	25 15806	Parsippany-Troy Hills Water Dept.	TW 4	07/12/71	Rinbrand	280	175	120	NA	NA	NA	NA	NA	NA	JTrb	0-5 overburden 5-30 gray clay 30-35 brown gravel 35-40 coarse brown sand 40-45 very fine brown sand 45-50 fine sand 50-55 coarse sand 55-60 sand, brown gravel 60-69 coarse brown sand 69-74 water-bearing coarse gravel 74-80 yellow sand 80-85 boulders, brown sand 85-90 hardpan 90-97 yellow clay, weathered rock 97-101 gray clay, slate 101-120 gray slate 120-155 red shale
P 126	25 10864	Paradise, Vito A.		09/22/62	Pine Brook	200	40	>40	NA	NA	NA	25	15	0.6	Qsd	0-33 hardpan, clay 33-40 water-bearing sand, gravel

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
P 127	25 13413	U.S. Geological Survey & N.J. Dept. of Env. Protection & Energy	USGS Well 1	12/18/65	Kaye Well Drilling	200	132	126	80	90	9	35	255	9.8	Qsd	0-15 yellow sand 15-33 sand, gravel, large stones 35-55 coarse gravel, stones 55-75 sand, coarse gravel, trace clay 75-85 clean sand 85-89 fine sand 89-106 brown clay, stones 106-126 yellow sand, clay 126-132 red clay, weathered rock
P 128	UN 00328	Parsippany-Troy Hills Water Dept.	Test Well 3	NA	NA	290	198	198	NA	NA	NA	NA	NA	NA	JTrb	0-1 fill 1-3 muck 3-15 clay 15-17 sand, gravel 17-50 sand, brown gravel 50-170 hardpan with boulders 170-196 tan clay, sand 196-198 red rock
P 129	25 21431	Parsippany-Troy Hills Water Dept.	Well 19	09/27/80	Denure W.	290	134	>134	106	134	31.3	45	948	69.2	Qsd	0-3 fill 3-20 gray clay 20-40 gray clay with sand 40-45 gray clay with sand, gravel 45-55 gray clay, gravel 55-65 gravel 65-70 fine sand 70-80 gravel 80-85 coarse gravel, sand 85-105 coarse gravel 105-115 sand 115-125 coarse gravel, sand 125-134 coarse gravel
P 130	UN 00197	NA		NA	NA	320		>62	NA	NA	NA	NA	NA	NA	Qsd	No log
P 131	25 13414	U. S. Geological Survey	USGS TW 2	01/10/66	Kaye Well Drilling	200	105	99	84	94	Flowing	28	500	17.9	Qsd	0-5 fine sand 5-20 clay 20-27 hard clay 27-30 gray shale 30-33 hard gray clay 33-49 sand, clay 49-72 sand with varved clay 72-85 sand, stones (water-bearing) 85-99 sand, varved clay 99-105 rock
P 132	UN 00198	Parsippany-Troy Hills Water Dept.	Well 1	11/02/31	Layne-New York	310	151	>150	110	140	16	36	745	37.3	Qsd	0-4 yellow clay 4-6 fine brown sand 6-10 sandy brown clay 10-20 sandy brown clay, gravel 20-30 clay, boulders 30-37 brown sand 37-41 clay, boulders 42-94 hardpan, boulders, clay 94-99 coarse sand 99-105 clay, boulders 105-127.3 coarse gray sand, gravel 127.3-129 hardpan 129-137 coarse gray sand 137-138 hardpan 138-141 boulders 141-151 brown clay
P 133	25 27260	Parsippany-Troy Hills Water Dept.	Test Well 22	11/10/86	Stothoff	370	168	163	NA	NA	101	NA	NA	NA	Jbs	
P 134	25 19938	Parsippany-Troy Hills Water Dept.	TW 2	07/19/78	Burrows	210	508	12	16	508	24.3	80.3	167	3.0	JTrb	0-10 sandy yellow hardpan 10-12 red hardpan 12-95 soft red shale 95-508 red and gray shale

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P 135	25 27258	Parsippany-Troy Hills Water Dept.	Test W-21	07/07/86	NA	200	145	140	85	NA	5.5	NA	890	NA	Qsd	0-1 dirt 1-5 brown clay 5-10 sand, brown cobbles 10-15 sandy brown clay, small cobbles 15-20 brown sand, coarse gravel 20-25 brown sand, boulders 25-30 brown sand, medium to coarse gray gravel 30-35 sandy brown gravel 35-40 medium to coarse brown gravel 40-45 brown sand, medium to coarse gravel 45-60 coarse brown sand 60-65 medium to coarse brown gravel 65-70 brown sand, coarse gravel 70-75 brown sandy silt, coarse gravel 75-85 sand, medium to coarse gravel 85-90 brown sand 90-100 sandy brown clay 100-105 fine brown sand with clay 105-110 fine brown sand, yellow clay
P 136	UN 00329	Parsippany-Troy Hills Water Dept.	TW 73-1 Lyons	03/--/73	NA	200	100	94	75	85	NA	NA	NA	NA	JTrb	0-5 fill, boulders 5-15 clay 15-52 stones, gravel 52-59 sand, gravel 59-61 stones 61-64 sand, gravel 64-68 sand, trace clay 68-88 coarse sand 88-94 sand, gravel 94-100 hard shale
P 137	25 27259	Parsippany-Troy Hills Water Dept.	Well 20	02/12/86	Rinbrand	280	100	>100	NA	NA	15	NA	1400	NA	Qsd	0-5 brown sand 5-10 brown sand, gravel, stones 10-20 brown sand, stones 25-30 boulders 30-50 sandy brown gravel 50-55 brown sand, gravel, clay 55-60 brown sand, gravel 60-65 brown sand, medium to coarse gravel 65-70 medium-grained brown sand 70-95 medium to coarse brown sand, gravel 95-100 medium-grained brown sand
P 138	25 09131	Parsippany-Troy Hills Water Dept.	Well 8-3	--/--/61	Wm. Beatty	180	70	70	40	70	1	16	650	41.0	Qsd	0-5 clay 5-15 clay, sand 15-20 gravel, sand, clay 20-70 water-bearing sand, gravel 70 red shale
ROCKAWAY TWP.																
R 1	25 22392	Picatinny Arsenal	Well M	01/27/82	New Jersey Drilling	810	40	>40	3	40	7	NA	NA	NA	Qsd	0-3 overburden 3-40 sand, gravel
R 2	25 22393	Picatinny Arsenal	Well N	01/28/82	NA	850	27	>22	22	27	8	NA	NA	NA	Qsd	No log
R 3	25 22391	Picatinny Arsenal	Well L	01/21/82	New Jersey Drilling	850	40	5	20	40	9	NA	NA	NA	PC	0-5 overburden 5-10 sand, stones 10-40 gneiss
R 4	25 22394	Picatinny Arsenal	Well O	NA	New Jersey Drilling	890	29	29	9	29	9	26	NA	NA	Qsd	0-5 overburden 5-29 sand, gravel
R 5	UN 00276	NA	6-1B-3	04/13/82	NA	755	25	23	NA	NA	NA	NA	NA	NA	Qsd	0-3 sandy brown silt with gravel, cobbles, boulders, fine to medium organic sand, trace clay 3-15 sandy gravel, brown gravel with cobbles, boulders, trace silt 15-20 gravel, brown sand, with boulders, cobbles, trace silt 20-23 sandy brown silt with gravel 23-25 hard weathered gneiss

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R 6	UN 00274	NA	6-1B-1	04/12/82	NA	671	37	30	NA	NA	NA	NA	NA	NA	PC	0-10 sandy brown silt, trace clay, gravel, cobbles, boulders 10-20 silty brown sand, trace clay, gravel, cobbles, boulders 20-23 sandy brown, gray gravel, trace silt, cobbles, weathered rock 23-30 sandy silt, decomposed brown, orange rock, trace gravel, very fine to coarse sand 30-37 weathered gneiss
R 7	UN 00295	Morris County Landfill	6-1B-13S	02/25/85	Warren George	720	50	45	43.8	47.8	NA	NA	NA	NA	PC	5-7 medium to coarse brown sand, trace silt, dry gravel 10-12 fine to medium brown, gray sand with silt, trace fine to medium silty brown sand 12-15 fine gravel 15-17 fine to medium brown, gray silty sand with clay, trace fine to medium water-bearing gravel 20-22 fine to medium silty brown sand, trace fine gravel, varved clayey silty sand 25-27 water-bearing fine to coarse brown sand with gravel, silt 35-37 fine to medium brown sand, trace fine water-bearing, very hard gravel, 45-47 decomposed gneiss 50 gneiss
R 8	UN 00296	NA		NA	NA	720		50	NA	NA	NA	NA	NA	NA	PC	No log
R 9	25 21666	Lindstedt, Harold M.		10/29/80	Wm. Beatty	670	140	12	50	140	22	100	8	0.1	PC	0-12 clay 12-140 gray gneiss
R 10	22 20054	Picatinny Arsenal	Well 8	02/11/81	R. Sipple	720	15.3	>15.3	5.3	15.3	NA	NA	2	NA	Qsd	0-1 overburden 1-15 sand
R 11	25 21055	NA		NA	NA	630		19	NA	NA	NA	NA	NA	NA	PC	No log
R 12	22 20301	NA		NA	NA	660		12	NA	NA	NA	NA	NA	NA	PC	No log
R 13	25 20367	NA		NA	NA	670		30	NA	NA	NA	NA	NA	NA	PC	No log
R 14	UN 00301	Morris Co. Landfill	6-1B-12	03/11/85	Warren George	755	72	60	50	70	NA	NA	NA	NA	PC	0-7 silty fine to medium sand with fine dry gravel 10-12 silty fine to medium sand, trace fine gravel, clay 20-21 sand with silt, trace clay 30-30.5 silty sand with clay 40-41 clayey sand with dry silt 41-51.5 medium to fine sand with dry clay 60-60.5 decomposed gneiss
R 15	UN 00275	NA	6-1B-2	04/09/82	Warren George	815	48	45	NA	NA	NA	NA	NA	NA	PC	0-3 sandy brown silt with gravel, cobbles, boulders, organic materials, trace clay 3-10 gravelly brown sand with silt, cobbles, boulders 10-20 silty brown sand with gravel, cobbles, boulders 20-25 brown gravelly sand with cobbles 25-30 sandy brown silt with cobbles, trace gravel, medium to fine sand 30-35 gravelly brown sand with silt, cobbles 35-36 silty brown sand, gravel with cobbles 36-44.5 varved silt, decomposed rock 44.5-48 weathered white gneiss
R 16	22 20053	Picatinny Arsenal	Well 5	02/16/81	R. Sipple	820	20.5	>20.5	10	20.5	8.3	NA	2	NA	Qsd	0-3 overburden 3-12 clay 12-20 gravel

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R 17	UN 00299	Morris Co. Landfill	6-1B-11S	02/28/84	Warren George	790	25	23	20	23	NA	NA	NA	NA	PC	5-5.5 gray, orange-brown, varved sandy clay, sandy silt, trace fine dry gravel 5.5-7 sandy tan silt, trace fine dry gravel 7-10 fine to medium sandy silt, trace fine dry gravel 10-12 fine to medium water-bearing gray sand 15-17 fine to coarse sand, trace water-bearing silt 20-22 fine to medium gray, brown sand, trace fine water-bearing gravel 23 decomposed rock
R 18	UN 00300	Morris Co. Landfill	6-1B-11D	03/21/85	Warren George	790	130	78	102.2	110	NA	NA	NA	NA	PC	0-31 no samples 31-32.5 fine to coarse brown sand with varved water-bearing brown silt, clay 40-41 gray clay trace, water-bearing silt 65-65.5 silty orange, brown sand with varved white sand, trace fine water-bearing gravel 75-78 decomposed gneiss 78-130 gneiss
R 19	22 00389	NA		NA	NA	720		74	NA	NA	NA	NA	NA	NA	CI	No log
R 20	22 20052	Picatiny Arsenal	Well 3	02/09/81	R. Sipple	980	42	14	18	NA	NA	NA	2	NA	PC	0-6 overburden 6-11 clay 11-40 rock
R 21	UN 00304	U. S. Geological Survey	176 Shallow	01/24/84	NA	689.3	60	60	50	60	2.5	0.9	50	NA	Qsd	0-10 fill 10-34 muck 40-50 sand, gravel 50-75 gravel with cobbles 75-85 medium sand 85-95 fine sand 95-100 medium sand 100-115 tough clay 115-120 no samples 120-172 weathered rock 172-309 weathered limestone (voids)
R 22	UN 00310	U. S. Geological Survey	176 Deep	04/03/84	NA	689.4	304.2	130	275	305	2.6	12.5	10	1.0	CI	0-12 fill 12-20 coarse sand, gravel 20-40 mud 40-100 gravel, sand 100-115 fine sand, silt with medium sand 115-130 till 130-250 weathered rock 255-260 void 260 limestone
R 23	22 20058	Picatiny Arsenal	Well 10	01/23/81	R. Sipple	700	22.3	>22.3	10	22.3	NA	NA	2	NA	Qsd	0-5 overburden 5-14 clay 14-22 gravel
R 24	UN 00307	U. S. Geological Survey	268 (151)	12/01/83	NA	694.4	137	128	25	30	3.30	NA	9	NA	Qsd	0-10 medium to coarse sand 10-20 fine sand, gravel 20-25 medium sand 25-42 fine sand 42-53 silt 53-93 medium to coarse gray sand 93-104 sand, gravel with silt 104-119 gravel with cobbles 120-128 medium to coarse sand 128-137 fractured rock
R 25	22 20055	Picatiny Arsenal	Well 9A	01/30/81	R. Sipple	700	30	>30	10	30	NA	NA	2	NA	Qsd	0-5 overburden 5-15 clay 15-30 gravel
R 26	22 20056	Picatiny Arsenal	Well 9B	02/02/81	R. Sipple	700	30	>30	10	30	NA	NA	2	NA	Qsd	0-6 overburden 6-14 clay 14-30 gravel
R 27	22 20057	Picatiny Arsenal	Well 9C	01/27/81	R. Sipple	700	20.3	>20	10	20.3	NA	NA	2	NA	Qsd	0-5 overburden 5-15 clay 15-20 gravel

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 7) To water (pumping test) or end of drill stem (air-lift test).

8) Gallons per minute per foot of drawdown.
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Table 2. Records of wells (cont.)

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pump-ing level ⁷				
R 28	UN 00305	U. S. Geological Survey	276 (178)	01/28/84	NA	698.9	98	98	64	74	10.1	11.3	43	35.8	Cl	0-13 silty sand 13-60 coarse sand with gravel 60-63 fine sand 63-84 sand, gravel 84-98 limestone
R 29	22 00390	NA		NA	NA	710		>28	NA	NA	NA	NA	NA	NA	Qsd	No log
R 30	UN 00297	NA		NA	NA	840		8	NA	NA	NA	NA	NA	NA	PC	No log
R 31	UN 00298	NA		NA	NA	840		9	NA	NA	NA	NA	NA	NA	PC	No log
R 32	UN 00277	NA	6-1B-4	04/05/82	NA	840	40	30	NA	NA	22	NA	NA	NA	PC	0-5 sandy brown silt with cobbles, boulders, trace organic clay, gravel, fine to medium sand 5-15 gravelly brown sand with cobbles, micaceous boulders, trace silt 15-40 weathered brown gneiss
R 33	UN 00269	U.S. Army Corps of Engineers	Test Well 8	05/05/47	NA	710	203	>203	NA	NA	NA	NA	NA	NA	Qsd	9-75 very fine to medium varved sand (various colors) 78-80 silty gray clay 84-86 gray clay, trace sand 89-134 varved clay, silt 144-171 very fine to coarse sand 175-176 brown clay with fine to coarse sand, gravel 180-181 coarse sand, gravel with clay, sand, gravel 185-203.5 quartzite with clay
R 34	23 00211	U.S. Army Arradcom	Cafeteria 1	11/12/82	U.S. Army Corps	702.7	268.5	186	253	268	21.4	38.2	7	0.2	Cl	No log
R 35	23 00212	U.S. Army Arradcom	Cafeteria 2	11/12/82	U.S. Army Corps	702.7	36	>36	31	36	11.7	12.2	4	8	Qsd	No log
R 36	23 00213	U.S. Army Arradcom	Cafeteria 3	12/16/82	U.S. Army Corps	699.9		206	267	287	18.1	47	5.5	0.2	Cl	No log
R 37	23 00214	U.S. Army Arradcom	Building 65 #2	12/09/82	U.S. Army Corps	699.9	206	206	201	206	20.8	26.3	5	0.9	Qsd	No log
R 38	23 00215	U.S. Army Arradcom	Building 65 #3	12/15/82	U.S. Army Corps	700	142	>142	135	140	14.3	NA	4	NA	Qsd	No log
R 39	23 00216	U.S. Army Arradcom	Building 65 #4	12/15/82	U.S. Army Corps	699.9		>35	30	35	9	12.2	0.30	NA	Qsd	No log
R 40	UN 00303	U.S. Army Arradcom	280 (H-Deep)	04/18/84	U.S. Army Corps	699.2	223	178	203	223	14	NA	NA	NA	Cl	0-2 overburden 2-29 coarse sand, gravel 30-145 fine sand, silt with coarse sand 145-153 silty sand with gravel 153-165 sand, gravel, boulders 165-178 no samples 178-193 weathered rock with clay 193-197 void 197-223 limestone
R 41	22 00387	NA		NA	NA	700		>32	NA	NA	NA	NA	NA	NA	Qsd	No log
R 42	UN 00278	NA	6-1B-6	04/02/82	NA	857	16	8	NA	NA	5	NA	NA	NA	PC	0-8 brown sand, trace silt with gravel 8-16 hard red, brown gneiss
R 43	22 00388	NA		NA	NA	700		>33	NA	NA	NA	NA	NA	NA	Qsd	No log

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
R 44	22 20059	NA		NA	NA	700		>21	NA	NA	NA	NA	NA	NA	Qsd	No log
R 45	22 20060	Picatinny Arsenal	Well 12A	01/05/81	R. Sipple	690	19	>19	10	19	NA	NA	2	NA	Qsd	0-3 overburden 3-9 fine sand 9-18 fine sand, silt
R 46	22 20061	Picatinny Arsenal	Well 12B	01/09/81	R. Sipple	690	20.5	>20	10	20.5	NA	NA	2	NA	Qsd	0-3 overburden 3-11 fine sand 11-20 fine sand, silt
R 47	22 20062	Picatinny Arsenal	Well 12C	01/05/81	R. Sipple	690	20	>19	10	20	NA	NA	2	NA	Qsd	0-3 overburden 3-11 fine sand 11-19 fine sand, silt
R 48	22 18563	Cunningham, G.		08/30/79	R. Sipple	570	323	15	50	NA	NA	NA	7	NA	Pc	0-15 overburden 15-323 gneiss
R 49	22 00380	NA		NA	NA	720		>42	NA	NA	NA	NA	NA	NA	Qsd	No log
R 50	22 15418	Tedesco, Dominick		03/05/76	Soren Nelson Jr.	560	45	>45	NA	NA	9	25	20	1.3	Qsd	0-39 hardpan, boulders, sand, gravel 39-45 water-bearing sand, gravel
R 51	25 13968	Flynn, John E.		08/30/66	DF Well Drilling	520	74	>74	72	74	NA	NA	12	NA	Qsd	0-12 overburden 12-14 boulders 14-40 sand, gravel 40-44 gravel 44-50 sand, gravel 50-53 boulders 53-74 sand, gravel
R 52	UN 00309	U.S. Army Arradcom	270 (12E)	12/06/83	NA	690	35	>35	15	20	1.70	NA	NA	NA	Qsd	0-2 overburden 2-15 coarse to fine sand with silt 15-35 fine sand with silt, clay
R 53	22 00386	NA		NA	NA	700		>32	NA	NA	NA	NA	NA	NA	Qsd	No log
R 54	22 00384	NA		NA	NA	700		>32	NA	NA	NA	NA	NA	NA	Qsd	No log
R 55	22 00385	Winer, Samuel		12/22/51	Bott Inc.	710	211	40	40	NA	10	60	30	0.6	PC	0-40 hardpan 40 pink gneiss
R 56	22 20063	Picatinny Arsenal	Well 13	01/09/81	R. Sipple	690	20.5	>20.5	10	20.5	NA	NA	2	NA	Qsd	0-4 overburden 4-14 fine sand 14-20 fine sand, silt
R 57	22 00383	NA		NA	NA	710		>32	NA	NA	NA	NA	NA	NA	Qsd	No log
R 58	25 09396	Boonton Radio Corp.		09/15/60	Stothoff	510	105	>105	92	102	16	89	NA	NA	Qsd	0-92 fine dry sand 92-105 very coarse sand, gravel
R 59	25 09587	Boonton Radio Corp.	Boonton 2	10/05/60	Wm. Stothoff	520	98	70	70	98	NA	NA	NA	NA	PC	0-52 dirty fine sand 52-62 sand, boulders 62-70 dry sand, gravel 70-98 gneiss
R 60	25 09626	Boonton Radio Corp.	Radio 3	11/22/60	Wm. Stothoff	510	125	119	94	125	0.20	92	548	6.0	Qsd	0-55 fine dirty sand 55-80 fine dry sand 80-119 coarse sand, gravel 119-125 gneiss
R 61	22 00382	NA		NA	NA	710		>33	NA	NA	NA	NA	NA	NA	Qsd	No log

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pump-ing level ⁷				
R 62	22 00381	NA		NA	NA	710		>33	NA	NA	NA	NA	NA	NA	Qsd	No log
R 63	22 20068	Picatinny Arsenal	Well 18	01/20/81	R. Sipple	690	20.2	>20.2	10	20.2	3.5	NA	2	NA	Qsd	0-2 overburden 2-9 fine sand 9-20 fine sand, silt
R 64	UN 00279	NA	6-1A-2	04/19/82	NA	942	52	>52	NA	NA	NA	NA	NA	NA	Qsd	0-5 sandy black to brown silt, gravel, cobbles, boulders 5-10 brown sand with silt, gravel, cobbles, boulders 10-15 silty brown sand with gravel, cobbles, boulders 15-30 gravelly silty brown sand, with cobbles, boulders 30-40 sandy light brown gravel, cobbles, trace silt 40-52 gravelly brown sand with silt, cobbles, boulders
R 65	22 20065	Picatinny Arsenal	Well 15	01/17/81	R. Sipple	690	20	>20	8	20	3.10	NA	2	NA	Qsd	0-2 overburden 2-8 fine sand 8-19 fine sand, silt
R 66	UN 00280	NA	6-1A-3	04/01/82	Warren George	920	27.6	22	NA	NA	NA	NA	NA	NA	PC	0-15 silty brown to tan sand, gravel, cobbles, boulders 15-20 sandy brown silt, gravel, cobbles, boulders, very fine sand 20-22.6 silty brown gravel, silt, cobbles, weathered rock 22.6-27.6 very hard gneiss
R 67	25 08364	George, G., Jr.		03/24/59	Smith's Well Drilling	820	120	>120	120	120	20	NA	15	NA	Qsd	0-110 sandy yellow silt, clay 110-120 coarse gravel
R 68	25 04292	Gianinni, Frank		03/11/55	Louis Gari	830	100	>100	100	100	25	80	6	0.1	Qsd	0-30 dug well 30-70 clay 70-95 hardpan, boulders 95-100 water-bearing sand, gravel
R 69	22 20066	Picatinny Arsenal	Well 16	01/15/81	R. Sipple	690	20.5	>20.5	10	20.5	9.2	NA	2	NA	Qsd	0-5 overburden 5-12 fine sand 12-17 clay 17-20 gravel
R 70	23 00208	NA		NA	NA	690		173	NA	NA	NA	NA	NA	NA	PC	No log
R 71	23 00209	NA		NA	NA	690		>71	NA	NA	NA	NA	NA	NA	Qsd	No log
R 72	23 00210	NA		NA	NA	690		>157.8	NA	NA	NA	NA	NA	NA	Qsd	No log
R 73	22 20064	Picatinny Arsenal	Well 14	02/20/81	R. Sipple	870	32.5	>32.5	12.5	32.5	NA	NA	2	NA	Qsd	0-5 overburden 5-17 clay 17-32 gravel
R 74	25 03009	White Meadow WC		12/30/53	Layne-New York	775	88	87	88	88	NA	NA	NA	NA	Qsd	0-9 coarse brown sand 9-18 coarse brown sand, gravel 18-57 soft gray clay, fine sand 57-60 coarse brown sand, gravel 60-62 hard clay, gravel 62-77 tough clay with gravel 77-81 coarse sand, gravel 81-87 soft sandy clay 87-88 rock
R 75	UN 00281	NA	6-1A-5	04/14/82	NA	900	40	38	NA	NA	NA	NA	NA	NA	PC	0-3 sandy brown, black silt, trace gravel 3-10 light brown silty gravel, sand, cobbles with boulders 10-29 silty sand, brown gravel, cobbles, with boulders 29-38 weathered rock 38-40 weathered gneiss
R 76	25 28609	Highlands of Morris		11/24/86	DF Well Drilling		700	>80	77	77	45	NA	180	NA	Qsd	0-16 boulders, gravel 16-50 sand 50-60 sand, gravel 60-80 water-bearing gravel

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R 77	25 29036	Highlands of Morris		08/21/87	DF Well Drilling		700	>92	81	81	26	NA	NA	NA	Qsd	0-91 gravel
R 78	22 20067	Picatinny Arsenal	Well 17	01/13/81	R. Sipple	700	21.5	>21	10	21.5	10.6	NA	2	NA	Qsd	0-5.5 overburden 5.5-14 fine sand 14-17 clay 17-21 gravel
R 79	UN 00282	NA	6-1A-6	04/15/82	Warren George	880	27.6	24	NA	NA	NA	NA	NA	NA	PC	0-2 sandy silt, gravel, cobbles, boulders, trace clay 2-15 brown sand with silt, gravel, cobbles, boulders 15-19 silty brown sand, trace gravel with cobbles, boulders, very fine sand 19-24 sand, decomposed brown rock with silt, trace gravel 24-27.6 weathered gneiss
R 80	25 10531	Goldsworthy, W.		03/30/62	Smith's Well Drilling	720	95	66	68	95	15	NA	15	NA	PC	0-66 clay, hardpan, boulders 66-95 gneiss
R 81	25 13412	Ledgewood Plumbing		11/08/65	DF Well Drilling	710	119	>119	NA	NA	NA	NA	10	NA	Qsd	0-15 sand 15-60 gray clay, silt, sand, gravel 60-116 gray clay, gravel with sand 116-119 gravel with clay, silt
R 82	UN 00204	Rockaway Twp. Water Dept.	Test Well 102	--/--/67	A.C. Schultes	510	138	136	NA	NA	NA	NA	NA	NA	Qsd	0-8 fill, boulders 8-27 brown sand, clay 27-39 silty sandy clay 39-52 sand, stones with clay 52-64 clay 64-70 sandy gray clay 70-100 brown clay 100-108 sandy clay 108-130 gray sand 130-132 hardpan 132-136 clay 136-138 rock or large boulder
R 83	UN 00205	Rockaway Twp. Water Dept.	Test Well 103	--/--/67	A.C. Schultes	510	122	>122	NA	NA	NA	NA	NA	NA	Qsd	0-8 fill 8-38 fine brown sand 38-47 gray, brown clay 47-52 sand, gravel 52-100 clay 100-114 sandy clay 114-118 fine brown sand 118-122 very hard fine silt
R 84	UN 00206	Rockaway Twp. Water Dept.	Test Well 104	--/--/67	A.C. Schultes	510	122	>122	NA	NA	NA	NA	NA	NA	Qsd	0-8 fill 8-38 fine brown sand 38-47 brown, gray clay 47-52 sand, gravel 52-100 clay 100-114 sandy clay 114-118 fine brown sand 118-122 clay, very hard silt
R 85	25 15364	Rockaway Twp. Water Dept.	Well 7	11/24/69	A.C. Schultes	510	143	>149	88	143	21.5	48.3	708	26.5	Qsd	0-9 loose rock fill 9-20 dark gray clay 20-29 gray clay, gravel 29-63 gray clay, cobbles 63-73 brown clay 73-85 coarse sand, gravel, cobbles 85-93 large boulders 93-152 sand, gravel, cobbles 133-134 streaks gray clay 143-149 streaks brown clay
R 86	25 07556	Central Morris Indus. Park		05/09/58	Stothoff	510	153	>115	142	11	3	130	NA	NA	Qsd	0-10 clay, boulders 10-76 clay 76-153 water-bearing sand, gravel
R 87	25 14324	Rockaway Twp. Water Dept.	Well 6	07/21/67	A.C. Schultes	540	163	173	100	163.2	20	110	538	6.0	Qsd	0-7 brown sand, cobbles 7-19 cobbles, clay 19-96 clay 96-122 gravel, cobbles, rock 122-126 gravel 126-127 sand 127-141 cobbles, gravel 141-147 white sand 147-173 sand, gravel, rock 173 rock
R 88	UN 00045	Rockaway Twp. Water Dept.		--/--/67	A.C. Shuites	510	105	>105	NA	NA	NA	NA	NA	NA	Qsd	0-2 fill 2-40 sandy gray clay 40-92 clay 92-101 sand, gravel 101-105 fine hard sand

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R 89	UN 00043	Rockaway Twp. Water Dept.		--/--/67	A.C. Shultes	510	115	>115	NA	NA	NA	NA	NA		Qsd	0-4 fill, boulders 4-12 silty gray clay 12-47 gray clay 47-72 sandy gray clay 72-94 brown clay 94-95 hardpan 95-110 coarse sand, gravel 110-115 very fine hard silt
R 90	25 13440	Foley, Raymond		11/12/65	Pine Brook	800	91	91	NA	NA	45	50	10	2.0	Qsd	0-40 dry well 40-60 hardpan, cobbles 60-88 silty water-bearing sand, gravel 88-91 sand, gravel 91 rock
R 91	25 13765	Rockaway Twp. Water Dept.	TW 7	11/28/66	Rinbrand	510	196	100	96	196	30	180	75	0.5	Qsd	0-10 overburden 10-86 sand 86-100 hardpan, boulders 100 hard rock
R 92	25 29351	N.J. Dept. of Env. Protection & Energy	Boring 4-D	09/21/87	W.C. Services	510	146	128	NA	NA	NA	NA	NA	NA	PC	0-11 fine to coarse brown sand, trace silt, gravel 11-13 boulders cobbles, sand 13-24 fine to medium brown sand, trace silt, gravel 24-25 boulders, cobbles 25-40 fine to medium brown sand, trace gravel, silt 40-56 boulders with coarse to medium to fine grey-brown sand 56-84 fine gray-brown sand with silt, boulders, cobbles, gravel 84-94 fine gray sand with silt 94-128 boulders, cobbles, gravel, sand 128 rock
R 93	UN 00252	Rockaway Twp. Water Dept.	Test Well 106	--/--/67	A.C. Schultes	510	120	>120	101	106	NA	NA	NA	NA	Qsd	0-8 fill 8-18 sandy gray clay 18-43 gray clay 43-81 sandy gray clay 81-93 clay 93-102 sand, gravel 102-118 hard sand 118-120 hard fine sand
R 94	25 21467	Keuffel & Esser Co.		08/19/80	DF Well Drilling	488.1	121	>121	101	121	NA	NA	25	NA	Qsd	0-60 sand, clay 60-98 sand, gravel 98-101 advanced casing 101-121 gravel
R 95	25 06938	Polka, Charles		08/22/57	Algier Bros	710	100	85	75	100	12	80	15	0.2	PC	0-65 hardpan, boulders 65-80 dirty sand 80-85 yellow clay 85-100 medium hard gray rock 100 water
R 96	25 29340	N.J. Dept. of Env. Protection & Energy	Boring 7-D	09/28/87	W.C. Services	510	110	105	NA	NA	NA	NA	NA	NA	PC	5-10 fine to medium gray sand, trace silt, clay 10-20 fine to medium gray sand, trace varved organic silt 20-40 gray silt with clay, trace fine sand 40-45 medium gray sand 45-50 fine to medium-grained gray to brown sand, trace silt 50-60 cobbles, boulders with gravel 60-65 sand, silt 65-70 boulders with cobbles, sand, gravel 70-75 cobbles, boulders 75-85 boulders, cobbles with sand, gravel 85-90 cobbles with boulders, sand, gravel 90-100 boulders with cobbles, sand, gravel 105-110 gneiss
R 97	25 21465	Keuffel & Esser Co.	K & E 21	07/14/80	DF Well Drilling	508.2	50	>50	NA	NA	NA	NA	NA	NA	Qsd	0-30 sand, gravel, boulders 30-50 sand, gravel
R 98	25 21464	Keuffel & Esser Co.		08/15/80	DF Well Drilling	493.1	55	>55	NA	NA	NA	NA	NA	NA	Qsd	0-20 gravel 20-55 clay
R 99	25 21466	Keuffel & Esser Co.	K & E 3	08/15/80	DF Well Drilling	493	90	73	73	90	NA	NA	25	NA	PC	0-20 overburden with gravel 20-73 sand, gravel 73-75 brown, white gneiss 75-90 black, green gneiss
R 100	25 21940	NA		NA	NA	510		>64	NA	NA	NA	NA	NA	NA	Qsd	No log

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R 101	25 29353	NJ DEPE	Boring 6-D	10/26/87	W. C. Services	510	81	81	NA	NA	NA	NA	NA	NA	PC	0-15 fill 15-24 gray silt with clay 24-35 gray silt with clay, trace fine varved sand 35-50 gray silt, trace fine sand, varved clay 50-62 fine gravel with fine to coarse sand, trace gray silt 62-81 fine to coarse sand, gravel, trace cobbles, sand, silt 81 biotite gneiss
R 102	21 00934	NA		NA	NA	510		>75	NA	NA	NA	NA	NA	NA	Qsd	No log
R 103	25 29332	NJ DEPE	Boring 18-D	10/29/87	W. C. Services	510	135	132	NA	NA	NA	NA	NA	NA	PC	0-8 medium to coarse brown sand with silt, boulders cobbles 8-12 boulders 12-18 medium to coarse brown sand 18-30 fine to coarse sand with boulders 30-33 medium to fine brown sand, trace silt, clay 33-52 boulders, coarse to fine brown sand 52-59 boulders, fine to coarse brown sand 59-85 fine to medium gray-brown sand 85-97 fine to medium brown sand with silt 97-102 medium to coarse grey-brown sand 97-102 medium to coarse grey-brown sand 102-132 fine to medium brown sand with silt 132-135 gneiss
R 104	25 20544	Rockaway Shop. Center		03/01/79	DF Well Drilling	715	171	130	132	171	NA	NA	20	NA	PC	0-25 overburden 25-130 clay, gravel, sand 130-160 soft brown gneiss 160-171 green, white gneiss
R 105	25 12319	Hoffman Homes		09/30/64	DF Well Drilling	760	82	80	71	82	5	70	4	0.06	Qsd	0-80 sand gravel, trace clay 80-82 clay, rock
R 106	25 24993	Townsq. Nursery & Landscp.		05/21/85	G. Lillman		620	115	NA	NA	NA	NA	NA	NA	PC	0-16 fill with dirt, boulders 16-90 dirty sand, silt 90-110 fine heaving sand 110-115 coarse gravel 115 gneiss
R 107	22 00091	NA		NA	NA	680		>30	NA	NA	NA	NA	NA	NA	Qsd	No log
R 108	24 00048	NA		NA	NA	680		>23	NA	NA	NA	NA	NA	NA	Qsd	No log
R 109	24 00446	NA		NA	NA	680		>45	NA	NA	NA	NA	NA	NA	Qsd	No log
R 110	22 00502	NA		NA	NA	720		85	NA	NA	NA	NA	NA	NA	PC	No log
R 111	24 00374	NA		NA	NA	735		60	NA	NA	NA	NA	NA	NA	PC	No log
R 112	25 14153	St. Clement Church		12/02/66	DF Well Drilling	680	100	>100	NA	NA	8	48	22	0.6	Qsd	0-20 overburden 20-23 boulders 23-42 gravel, clay 42-45 boulders 45-60 gravel, clay 60-62 gravel, clay (25 gpm) 62-80 gravel, clay 80-100 gravel (20 gpm)
R 113	25 01454	Brown, Harry A.		12/11/51	Bott Inc.	630	87	>87	87	87	10	40	10	0.3	Qsd	0-84 hardpan 84-87 sand, gravel

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R 114	22 11495	Iwaszczuk, Thomas J.		08/16/72	DF Well Drilling	820	123	50	50	123	NA	NA	NA	NA	PC	0-50 overburden, gneiss 50-76 water 76-123 gray gneiss
R 115	25 02906	Werner, Eric		09/14/53	Smith's Well Drilling	650	58	16	18	58	8	NA	12	NA	PC	0-16 clay, hardpan 16-58 gneiss
R 116	25 24403	N.J. Natural Gas Co.	Well 107	11/07/83	Fritts & Assoc.	550	31	>61	30	31	NA	NA	NA	NA	Qsd	0-18 sand, gravel, cobbles 18-22 coarse sand, trace fine sand 22-28.5 fine sand 28.5-35 gray silt, trace fine sand 35-43.5 fine sand 43.5-52 fine to medium sand 52-61 fine sand
R 117	25 23068	Howmet Turbine	101A-S	08/16/82	Warren George	543.4	18	>20	8	18	NA	NA	NA	NA	Qsd	0-3 brown silt with sand 3-6 brown silt with clay 6-15 coarse to fine brown sand with gravel 15-20 fine to medium brown sand with gravel, trace silt
R 118	25 23069	Howmet Turbine	101A-M	08/16/82	Warren George	543.5	40	>52	20	40	NA	NA	NA	NA	Qsd	0-5 silt, brown clay, fine to medium sand 5-6.5 coarse to fine brown sand, gravel 6.5-11 coarse to fine brown sand with gravel 11-20 fine to coarse brown sand 20-39 fine brown sand, trace silt 39-52 fine gray sand with clay
R 119	25 23078	Howmet Turbine	101D	09/16/82	Warren George	544	129	>119	119	129	NA	NA	NA	NA	Qsd	No log
R 120	25 13963	Austenal Microcast	Well 2	05/11/67	Layne-New York	550	134	>134	124	134	15	26.5	412	35.8	Qsd	0-4 overburden 4-5 clay, boulders 5-16 sand, gravel, boulders 16-31 coarse gray sand 31-51 streaks gray silt 51-68 silt with sand 68-73 silty gray clay 73-119 gray silt, streaks clay 119-125 clay, gravel 125-134 brown sand, gravel
R 121	25 22639	Howmet Turbine		03/23/82	Warren George	567	37	17	17	37	8.5	NA	NA	NA	PC	No log
R 122	25 23070	Howmet Turbine	102 M	08/18/82	Warren George	541.5	75	>79	55	75	NA	NA	NA	NA	Qsd	0-1 fill 1-2 black silt 2-8 fine to coarse brown sand with clay 8-15 fine to coarse sand, coarse gravel with cobbles 15-41 fine to medium brown sand 41-73 fine silty gray sand 73-79 fine gray sand, clay
R 123	25 23071	Howmet Turbine	102S	08/18/82	Warren George	541.2	18	>20	8	18	NA	NA	NA	NA	Qsd	0-20 no samples
R 124	25 13983	Howmet Turbine	Howmet TW 1	11/12/66	Layne-New York	550	136	136	126	136	6	28	221	10.0	Qsd	0-1 overburden 1-8 clay 8-19 sand, gravel 19-20 brown clay 20-37 green sand 37-45 coarse sand, gravel 45-54 fine silty sand 54-64 brown clay, silty sand 64-116 fine silty sand, streaks clay 116-125 hard clay, gravel 125-136 sand, gravel, streaks clay 136-138 hard rock
R 125	25 22776	Howmet Turbine	B3	05/11/82	Warren George	564	21	15	6	21	NA	NA	NA	NA	PC	0-5 fill 5-15 decomposed gneiss 15-21 gneiss
R 126	25 23074	Howmet Turbine	104S	08/20/82	Warren George	542.6	13	>15	NA	13	NA	NA	NA	NA	Qsd	0-15 no samples
R 127	25 23075	Howmet Turbine	104M	08/24/82	Warren George	542.3	71	>72	51	71	NA	NA	NA	NA	Qsd	0-3 fill 3-14 fine to coarse brown sand, gravel, cobbles 14-20 fine to medium gray sand 20-69 fine gray sand with silt 69-72 fine silty gray sand with clay

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R 128	25 23076	Howmet Turbine	104D	08/27/82	Warren George	542.2	140	>140	120	140	NA	NA	NA	NA	Qsd	0-75 no samples 75-89 clayey gray silt 89-118 gray clay with silt 118-140 fine to coarse gray sand with gravel, silt
R 129	25 23072	Howmet Turbine	105M	08/19/82	Warren George	542	77	>77	57	77	NA	NA	NA	NA	Qsd	0-3 fill 3-5 fine to medium brown sand with gravel, silt 5-16 fine to coarse brown sand with silt 16-27 fine to medium gray sand with silt 27-68 fine gray sand with silt 68-77 fine gray sand, clay
R 130	25 23073	Howmet Turbine	105S	08/20/82	Warren George	542	15	>15	5	15	NA	NA	NA	NA	Qsd	0-15 no samples
ROCKAWAY BOROUGH																
RB 1	25 18231	Rockaway Boro. Water Dept.	Well 6	02/09/76	Layne-New York	540	83	>85	54.17	83	5	25	768	38.4	Qsd	0-3 fill 3-36 sand, streaks silt, clay 36-50 fine muddy sand, silt 50-60 sand, gravel, boulders 60-73 fine to coarse sand, streaks of silt 73-85 sand with coarse brown gravel
RB 2	UN 00082	Rockaway Boro. Water Dept.	Boring B-3	03/09/81	Tech Testing	530	25	>25	NA	NA	6.5	NA	NA	NA	Qsd	0-2 fine to medium brown sand, silt with gravel 2-3 coarse to medium brown sand with gravel 3-4 black silt with hardpan, trace gravel 4-6 black silt, trace gravel 6-12 medium to coarse sand with gravel 12-13.5 brown silt with fine sand, trace organic clay 13.5-23 coarse to medium gray sand, trace gravel 23-25 coarse to fine gray sand with gravel
RB 3	25 17456	Rockaway Boro. Water Dept.		06/06/74	Rinbrand	540	93	>93	78	93	12	54	455	10.8	Qsd	0-5 overburden 5-45 fill 45-93 clay 93 gravel
RB 4	25 10403	Rockaway Boro. Water Dept.	Well 5	11/30/62	Layne-New York	530	80.3	>84	65.3	80.3	NA	50	517	10.3	Qsd	0-3 overburden 3-12 clay 12-18 hardpan 18-33 coarse gravel 33-34 coarse sand, gravel 34-37 tough sand, clay 37-48 gravel, hard clay 48-53 boulders, gravel, clay 53-58 fine gravel with coarse silty sand 58-66 coarse gravel, cobbles, clay 66-76 coarse sand, streaks clay 76-84 medium to fine muddy sand with mica
RB 5	UN 00168	Rockaway Boro. Water Dept.	Well 1	03/31/23	Layne-New York	510	53	>53	39	49	4	29	346	13.8	Qsd	0-12 sand, boulders 12-15 sand, gravel 15-24 sand, boulders 24-49 sand gravel
RB 6	UN 00169	Rockaway Boro. Water Dept.		10/--/22	Layne-New York	510	48	>48	NA	NA	4.5	25.5	390	18.6	Qsd	0-4 overburden 4-26 dirty gravel 24-28.5 sand 28.5-48 gravel 48 rock?
RB 7	25 05419	Rockaway Boro. Water Dept.		04/30/56	Layne-New York	525	72	>85	61	72	4	59	210	3.8	Qsd	0-9 fill 9-17 boulders, gravel 17-24 gravel, sand 24-41 gravel, sand, streaks clay 41-53 sand, gravel 53-56 sand, gravel 56-67 gravel, sand 67-70 sand, gravel 70-72 fractured rock 72-85.2 sand, gravel

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							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
RB 8	25 17097	Rockaway Boro. Water Dept.	TW 3	01/11/73	Layne-New York	540	145	>145	55	65	5.83	8.42	51	19.6	Qsd	0-8 fill 8-10 soil 10-35 silty brown sand 35-45 gray sand, coarse gravel 45-50 silty brown sand, gravel 50-66 brown sand, medium to coarse gravel 66-144 silty brown sand 145 refusal
RB 9	UN 00167	Rockaway Boro. Water Dept.	Well 3	02/20/43	Layne-New York	550	140	>142	100	140	2.5	93	800	8.8	Qsd	0-4 yellow clay, boulders 4-16 sand, gravel 16-44 sand, blue clay, boulders 44-47 coarse gravel 47-99 sandy blue clay 99-140 sand, gravel, boulders
RB 10	25 09669	Rockaway Boro. Water Dept.	Well 3R	07/27/61	Layne-New York	550	139	>140	103	133	4	30	NA	NA	Qsd	0-5 yellow clay, boulders 5-17 sand, gravel, boulders 17-48 sandy clay, boulders 48-102 sandy blue clay 102-105 hard blue sandy clay (dry) 105-124 sand, gravel, boulders 124-129 fine sand, boulders 129-140 sand, gravel, boulders, rock
RB 11	25 05315	Rockaway Boro. Water Dept.		02/09/56	Layne-New York	550	51	40	NA	51	NA	NA	NA	NA	Qsd	0-5 fill 5-15 soft blue clay 15-21 brown clay, trace gravel 21-27 gravel, sand 27-31 clay 31-38 gravel, boulders, clay 38-40 clay, gravel 40-51 soft micaceous rock
RB 12	25 23855	Shell Oil Co.		05/23/83	Handex	600	14	>17	2	14	5	NA	NA	NA	Qsd	0-0.5 concrete fill, sand, silt, gravel 2-5 gray silt, coarse to fine sand, trace fine gravel 5-17 fine to coarse sand with gravel
RB 13	23 07097	Rockaway Boro. BOE		03/15/82	DF Well Drilling	680	360	46	56	NA	NA	NA	25	NA	PC	0-11 overburden with clay 11-46 clay 46-360 gneiss
RB 14	25 05413	RCA	RCA 3	06/14/56	Wm. Stothoff	550	543	51	63	543	21	200	219	1.2	PC	0-4 sandy yellow overburden 4-6 boulders 6-41 hardpan, stones 41-51 sand, gravel 51-543 gray gneiss
RB 15	25 23743	McWilliams Forge	Relief Well	05/10/83	Moretrench	550	134	132	114	134	82	101	500	26.3	Qsd	0-20 fill, sand, gravel 20-50 fine gray to brown sand 50-94 fine silty brown sand 94-119 silty clay 119-132 coarse sand with cobbles, boulders 132-143 weathered rock, gneiss 143-153 hard gneiss
RB 16	25 23747	McWilliams Forge		03/04/83	Moretrench	550	140	132	134	139	NA	NA	NA	NA	Qsd	0-6 fill 6-16 sand, brown gravel 16-75 silty gray sand 75-118 silty gray clay with sand 118-132 fine to coarse gray to brown sand 132-140 weathered gneiss
RB 17	25 04935	Rockaway Boro. Water Dept.		11/03/55	Layne-New York	510	81	>83	70	81	0.70	66	50	0.8	Qsd	0-8 boulders with clay 8-13 sand, gravel 13-17 gray clay, gravel 17-27 sand, gravel, boulders 27-40 muddy sand, gravel 40-64 boulders, gravel, sand 64-83 coarse sand, gravel, boulders
RB 18	25 03585	Bryant Oak Realty		10/12/54	Stothoff	610	400	82	NA	NA	40	145	100	1.0	PC	0-20 fill 20-82 clay, boulders 82-120 weathered gneiss 120-400 hard gneiss
RANDOLPH TWP.																
RD 1	UN 00271	D.L. & W. RR Car Shop		NA	D. Salkind	560	224	>224	NA	NA	NA	NA	NA	NA	Qsd	No log
RD 2	UN 00219	Randolph Twp. Water Dept.	Well 3	10/28/46	Layne-New York	550	136	>136	117	132	NA	NA	700	NA	Qsd	0-17 boulders, clay, sand 17-26 coarse sand, gravel 26-46 medium to coarse sand 46-110 sandy blue clay 110-122 coarse gray sand 122-136 coarse gray sand, very hard boulders 136 clay, boulders

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RD 3	UN 00218	Denville Water Dept.	Well 6	09/--/77	Artesian	550	140	>140	124	139	14.75	37	900	40.4	Qsd	0-2 fill 2-3 loose silt 3-6 yellow clay, rock 6-14 sand, gravel, rock, trace clay 14-20 fine to coarse sand, stones 20-39 fine brown sand, varved clay 39-53 fine brown sand 53-74 fine silty gray sand, varved clay 74-125 gray clay, fine varved sand 125-138 fine to coarse sand, fine gravel 138-140 gravel, coarse sand, clay, boulders
RD 4	UN 00198	Randolph Twp. Water Dept.	Well 2	10/10/31	Layne-New York	550	147	>147	126	136	11	30	760	40.0	Qsd	0-2 loose black mud 2-6 yellow clay 6-12 fine sand, large gravel 12-17 coarse sand, fine gravel 17-50 fine brown sand 50-59 fine gray sand 59-80 loose sandy clay 80-124 hard blue clay 124-136 gravel, boulders 136-147 clay, boulders
RD 5	25 18073	Park Union Co.		09/12/75	DF Well Drilling	550	122	115	95	122	NA	NA	25	NA	PC	0-20 sand 20-50 silt 50-71 silt, gravel 71-80 silt 80-90 clay 90-95 decomposed gneiss 95-115 decomposed water-bearing gneiss 115-122 gneiss
RD 6	25 02238	Betcher, William		12/27/52	Wm. Beatty	550	152	>152	152	152	12	32	20	1.00	Qsd	0-5 fill 5-30 sand 30-40 hardpan 40-140 sand 140-152 gravel
RD 7	25 15074	Tungsten Contact Mfg.		01/03/69	Wm. Stothoff	550	200	88	117	200	13	NA	125	NA	PC	0-30 sand, gravel, dirt 30-88 fine sand 88-116 rotten rock 116-200 gneiss
RD 8	25 16362	Campo Const., Inc.		05/17/72	DF Well Drilling	550	186	183	183	186	NA	NA	30	NA	PC	0-183 brown sand, clay 183-186 weathered gneiss
RD 9	25 05596	Talacre Estates, Inc.		08/22/56	Wm. Stothoff	1110	377	14.5	21	377	27	200	37	0.2	PC	0-14.5 clay, boulders 14.5-377 hard gneiss
RD10	25 07924	Thomas Wilton Corp.		10/31/58	Wm. Stothoff	870	191	8	32	191	14	158	60	0.4	PC	0-8 sandy clay 8-30 hard boulders 30-191 very hard gneiss
RD11	25 03824	Speaker, William, Jr.		11/04/54	Louis Gari	970	65	50	50	65	20	50	15	0.5	PC	0-50 clay 50-65 rotten rock
RD12	25 16604	Stimton, Gerard		10/28/72	Wm. Stothoff	580	189	140	140	189	60	NA	7	NA	PC	0-140 boulders 140-189 gneiss
RD13	25 14610	Randolph Twp. Water Dept.		10/23/69	Rinbrand	930	250	36	58	250	NA	145	108	0.7	PC	0-36 hardpan, boulders 36-250 gneiss
RD14	25 15248	Randolph Diner		07/02/69	Algier Bros	860	170	75	75	NA	40	147	12	NA	PC	0-75 yellow hardpan 75-170 soft tan rock
RD15	25 12481	Keyes, Howard		12/08/64	DF Well Drilling	910	124	18	60	NA	61	110	6	0.1	PC	0-18 overburden 18-124 gneiss
RD16	25 24249	Szatkowski, G. R., Jr.		10/07/83	DF Well Drilling	860	225	30	100	NA	NA	NA	NA	NA	PC	1-2 overburden 2-30 clay 30-225 gneiss

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RD17	25 22834	Johnson, B.		11/15/82	DF Well Drilling	980		80	NA	NA	NA	NA	10	NA	Qsd	0-61 clay 61-147 gravel
RD18	25 25186	Western Term. & Pest Contol		09/14/84	Somerville	1010	300	30	50	NA	35	250	10	0.05	PC	0-30 clay 30-300 gneiss
RD19	25 17771	DiMarco Construction		10/24/75	DF Well Drilling	840	173	50	NA	NA	NA	NA	13	NA	PC	0-25 clay 25-50 gravel, hard clay 50-173 gneiss
RD20	25 18704	Fiscus, John		09/14/76	DF Well Drilling	760	148	108	NA	NA	NA	NA	10	NA	PC	0-20 gravel, sand 20-50 clay, boulders 50-60 clay with gravel 60-70 red clay 70-90 clay, boulders 90-108 soft gneiss 108-149 gneiss
RD21	25 16750	L.T. Associates		01/17/73	DF Well Drilling	830	147	68	NA	NA	NA	NA	1.5	NA	PC	0-40 sand, gravel 40-43 sand 43-60 hardpan 60-68 hard gray, brown gneiss 68-147 gneiss
RD22	25 20945	Bohrer, Barry		06/13/80	BC Well Drilling	910	277	35	NA	NA	NA	NA	6	NA	PC	0-35 sand, clay, boulders 35-277 gneiss
RD23	25 13623	Kolessar, John		04/21/66	DF Well Drilling	975	80	65	NA	NA	NA	NA	7	NA	PC	0-58 sand, gravel, clay 58-65 very soft gneiss 65-80 soft gneiss
RD24	25 10298	Stites, Russell		11/10/66	Howard Smith	730	135	95	NA	NA	NA	NA	10	NA	PC	0-95 clay, hardpan 95-135 gneiss
RD25	25 17772	Cortese, John		02/20/75	DF Well Drilling	750	147	80	NA	NA	NA	NA	10	NA	PC	0-30 sand, clay 30-70 hardpan 70-80 sand 80-147 gneiss
RD26	25 20594	NA		NA	NA	770		150	NA	NA	NA	NA	NA	NA	PC	No log
RD27	25 15276	Schoerer, Eugene		07/22/69	DF Well Drilling	750	58	>58	NA	NA	NA	NA	20	NA	Qsd	0-50 sand, gravel, boulders 50-55 sand, gravel 55-58 gravel
RD28	25 19285	Luedtke & FMF, Inc.		07/07/77	DF Well Drilling	725	298	135	NA	NA	NA	NA	4	NA	PC	0-136 fine sand 136-298 gneiss
RD29	25 19809	Seals, Dennis		01/19/79	DF Well Drilling	735	173	6	NA	NA	NA	NA	10	NA	PC	0-6 hardpan, stones 6-166 shale with red, gray sandstone
RD30	25 20423	Giannini, Walter		12/01/78	DF Well Drilling	730	273	85	NA	NA	NA	NA	NA	NA	PC	0-20 boulders, sand 20-45 sand 45-85 clay 85-273 gneiss
RD31	25 20349	Catlow Irving		11/23/79	DF Well Drilling	840	123	94	NA	NA	NA	NA	7	NA	PC	0-65 overburden, clay 65-67 boulders 67-80 clay, sand 80-92 sand 92-94 boulders 94-123 gneiss
RD32	25 13830	Shurgum Estates		07/12/66	DF Well Drilling	735	110	81	NA	NA	NA	NA	20	NA	PC	0-81 sand, clay, brown gravel 81-110 gneiss
RD33	25 10327	Van His, Sealy		11/22/61	Algier Bros	1000	67	60	NA	NA	25	35	20	NA	PC	0-60 yellow hardpan 60-67 gneiss
RD34	25 06168	King, W.		11/10/56	Howard Smith	860	96	44	NA	NA	18	NA	12	NA	PC	0-44 clay, hardpan 44-96 gneiss

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RD35	25 16565	Combes, William		10/23/87	DF Well Drilling	825	90	50	NA	NA	NA	NA	20	NA	PC	0-45 soft rotten brown rock 45-50 hard rotten brown rock 50-90 soft brown rock
RD36	25 21154	Johnson, Bruce		12/21/79	DF Well Drilling	980	98	56	NA	NA	NA	NA	17.5	NA	PC	0-56 overburden with coarse gravel 56-98 gneiss
RD37	25 20375	Spino, Emil		10/27/78	DF Well Drilling	725	123	24	65	123	NA	NA	10	NA	PC	0-24 overburden 24-123 trap rock
WHARTON BOROUGH																
W 1	UN 00332	Wharton Boro. Water Dept.	Test Well 1	06/15/70	Layne-New York	640	157	>157	NA	NA	NA	NA	NA	NA	Qsd	0-3 dirt 3-10 fine to medium silty gray sand 10-15 fine to medium silty sand, gravel 15-20 fine to medium silty sand, gravel, pebbles 20-30 fine to coarse gravel, trace sand, gray silt 30-41 fine to medium sand, trace gravel, brown to gray silt 41-45 coarse sand, fine gravel 45-52 coarse sand, gravel, pebbles, trace brown to grey clay, 52-53 tan clayey sandy silt 53-56 coarse sand, trace gravel 60-70 compact fine gravel, trace clay, pebbles 70-80 sand, gravel, trace silt, gray-brown clay 80-100 medium sand, trace clay, gray-brown pebbles 100-106 fine sand, trace silt, brown compact clay 106-121 silty sand, trace brown clay 121-130 hard clay, trace silt, brown sand 130-135 fine to medium sand, trace clay, pebbles 135-157 sand, silt till
W 2	UN 00333	Wharton Boro. Water Dept.	Test Well 2	6/17/70	Layne-New York	660	39	38	NA	NA	NA	NA	NA	NA	PC	0-5 medium sand to fine gravel, trace clay and boulders 5-15 fine sand to fine gravel, trace clay to cobbles 15-32 fine to very coarse sand with clay, trace boulders 32-33 gravel, trace sand and clay 33-38 sand to pebbles, trace silt and clay 38-39 bedrock, granitic rock
W 3	25 22539	NA		NA	NA	640	36	>36	NA	NA	NA	NA	NA	NA	Qsd	No log
W 4	25 21326	NA		NA	NA	640	42	>42	NA	NA	NA	NA	NA	NA	Qsd	0-32 medium to coarse hard wet sand, fine to coarse gravel with cobbles 32-42 fine to coarse gray sand, fine to coarse gravel with silt, cobbles, boulders
W 5	25 02171	Wharton Boro. Water Dept.	Test Well 1	12/05/52	Layne-New York	640	43	3	33	43	4	NA	178	NA	Qsd	0-6 clay, boulders 6-14 gravel, clay, boulders 14-24 coarse hardpan, gravel 24-30 gravel, clay 30-38 loose gravel, sand 38-44 hardpan, gravel, sand, clay
W 6	25 08544	Wharton Boro Water Dept.		NA	NA	640		87	NA	NA	NA	NA	NA	NA	PC	0-7 fill 7-17 sandy clay, gravel 17-33 sandy gravel, boulders 33-36 hardpan 36-40 brown sand, gravel with clay 40-51 fine muddy sand 51-63 muddy brown sand 63-71 soft sandy clay 71-79 hard sand with clay 79-84 muddy brown sand, streaks clay 84-87 sandy clay, gravel 87-104 decomposed rock 104-114 hard rock

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 9) PC = Precambrian gneiss, related rock; Qsd = Pleistocene glacial sediment (unit not specified); JTrb = Brunswick Group (Jurassic in study area); Jbs = Jurassic basalt; Sgp = Silurian Green Pond Conglomerate; Cl = Cambrian Leithsville Formation.

Table 2. Records of wells (cont.)

Well number	DEPE permit number ¹	Owner	Local name	Date drilled	Driller	Elev. (ft.)	Depths (ft.)						Yield (gpm)	Specific capacity (gpm/ft.) ⁸	Formation ⁹	Lithologic log
							Total ²	Top of bed-rock ³	Top of open interval ⁴	Bottom of open interval ⁵	Static water level ⁶	Pumping level ⁷				
W 7	25 08675	Wharton Boro Water Dept.	Well 2	12/21/60	Layne-New York	650	32	>33	24	32	14	24.9	500	45.9	Qsd	0-5 fill 5-21 sandy clay, boulders 21-26 hardpan 26-33 sand, gravel, boulders
W 8	UN 00334	Wharton Boro. Water Dept.	Test Well 3	06/25/70	Layne-New York	600	72	65	40	65	5.8	10	495	NA	Qsd	0-20 fine to coarse sand, gray gravel 20-30 coarse to very coarse gray sand, gravel 30-40 coarse to very coarse gray sand, trace pebbles, gravel 40-60 fine to very coarse sand with gravel, gray cobbles 45-50 coarse sand with pebbles, cobbles 50-60 fine to very coarse sand with gravel, cobbles 60-65 fine to very coarse sand with gravel, cobbles, boulders 65-72 gneiss
W 9	25 08798	NA		NA	NA	650	40	>40	NA	NA	NA	NA	NA	NA	Qsd	No log
W 10	25 15799	Wharton Boro. Water Dept.	Well 3	04/16/71	Burrows	600	65	65	40	65	NA	17.5	1500	85.7	Qsd	0-20 gray sand, fine to coarse gravel 20-30 very coarse gray sand, gravel 30-40 very coarse gray sand with pebbles, gravel 40-45 fine to coarse sand with gravel, cobbles 45-50 coarse sand with pebbles, cobbles 50-60 very coarse to fine sand with coarse gravel 60-65 very coarse to fine gray sand with gravel, cobbles, small boulders 65-75 gneiss
W 11	25 14172	Perez, Enrique		12/19/66	DF Well Drilling	670	51	>51	NA	51	27	54	20	NA	Qsd	0-8 overburden 8-9.5 boulders 9.5-20 sand, small gravel 20-23 boulders 23-46 sand, gravel 46-51 large gravel
W 12	25 16185	Bird, John C.		11/29/71	DF Well Drilling	670	134	>134	NA	134	NA	NA	20	NA	Qsd	0-46 sand, gravel 46-134 clay
W 13	25 16470	Casey, Julia		07/03/72	DF Well Drilling	670	100	>100	NA	NA	NA	NA	NA	NA	Qsd	0-45 coarse gravel 45-100 sand, gray clay
W 14	25 34668	State of New Jersey	Morris Co. Maintenance Yard, (OB-13)	10/10/89	Wm. Stothoff	669.1	191	167	80	100	22.7	50.5	15.5	0.6	PC	0-45 cobbles, boulders 45-70 fine sand with gravel 70-72 gray clay 72-76 sand and gravel 76-110 gravel and clay 110-118 fine sand with clay 118-167 gravel with clay 167-191 gneiss

Table 3. - Seismic refraction data and interpretation

[Location of lines shown on plate 1; elevation (feet above sea level) interpolated from U.S.G.S. 7.5-minute quadrangle maps; > means indicates that depth to bedrock based on the slope-intercept method is beyond the reach of the farthest geophone.]

Line	Location (lat./long., deg./min./sec.)	Elevation (ft.)	Layer Velocity (ft./sec.)	Depth (top of layer, ft.)			Interpretation
				G1	G6	12	
RV-1	40 54 14 73 35 06	670	1. 1393	13		15	Unsaturated sediments
			2. 6885	83		41	Saturated sediments
			3. 15900				Bedrock
RV-2	40 54 13 73 35 08	670	1. 1290				Unsaturated sediments
			2. 4213	14		6	Saturated sediments
			3. 11188	61		60	Bedrock
RV-3	40 54 12 73 35 23	660	1. 1098				Unsaturated sediments
			2. 5105	10		8	Saturated sediments
				>90		>89	Bedrock
RV-4	40 54 08 73 35 20	660	1. 853				Unsaturated sediments
			2. 2086	2		6	Unsaturated sediments
			3. 6383	14		23	Saturated sediments
			4. 13036	46		65	Bedrock
RV-5	40 53 09 73 34 19	580	1. 1268				Unsaturated sediments
			2. 6635	16		4	Saturated sediments
			3. 15224	97		64	Bedrock
RV-6	40 52 48 73 31 56	550	1. 1024				Unsaturated sediments
			2. 5275	10		9	Saturated sediments
				>88		>100	Bedrock
RV-7	40 52 40 73 31 39	550	1. 910				Unsaturated sediments
			2. 4055	6		5	Saturated sediments
				>116		>116	Bedrock
RV-8	40 52 38 73 31 34	550	1. 967				Unsaturated sediments
			2. 5130	8		8	Saturated sediments
				88		86	Bedrock
RV-9	40 52 36 73 31 29	550	1. 745				Unsaturated sediments
			2. 3868	4		3	Saturated sediments
			3. 13700	41		22	Bedrock
RV-10	40 53 45 73 31 02	550	1. 1100	8			Unsaturated sediments
			2. 5200	18			Saturated sediments
				>108			Bedrock
RV-11	40 54 04 73 30 38	520	1. 1025				Unsaturated sediments
			2. 4633	7		4	Saturated sediments, sand and gravel
			3. 6168	49		49	Saturated sediments, clayey sand
					>173	Bedrock	
RV-12	40 54 05 74 29 42	520	1. 875				Unsaturated sediments
			2. 2979	4		5	Unsaturated sediments, clayey sand
			3. 5340	38		40	Saturated sediments
			>140		>153	Bedrock	
RV-13	40 53 57 74 27 39	510	1. 1128				Unsaturated sediments
			2. 2349	2		5	Unsaturated sediments, clayey sand
			3. 4855	23		36	Saturated sediments
			>113			Bedrock	
RV-14	40 53 51 74 27 32	515	1. 1230				Unsaturated sediments
			2. 5555	16			Saturated sediments
			3. 7352	33			Saturated sediments, weathered shale or clay
			>145			Bedrock	

Table 3 (cont.)

Line	Location (lat./long., deg./min./sec.)	Elevation (ft.)	Layer Velocity (ft./sec.)	Depth (top of layer, ft.)			Interpretation
				G1	G6	12	
RV-15	40 53 54 74 27 52	500	1. 800 2. 5720	9 >124			Unsaturated sediments Saturated sediments Bedrock
RV-16	40 53 54 74 27 58	490	1. 1020 2. 4780 3. 13125	9 86	7 66		Unsaturated sediments Saturated sediments Bedrock
RV-17	40 53 54 74 28 05	500	1. 931 2. 6268 3. 10922	7 101	6 45		Unsaturated sediments Saturated sediments Bedrock
RV-18	40 53 33 74 29 01	520	1. 996 2. 5362	11 >139			Unsaturated sediments Saturated sediments Bedrock
RV-19	40 53 24 74 28 52	510	1. 875 2. 3053 3. 5555 4. 10000	9 32 132			Unsaturated sediments Unsaturated sediments, clayey sand Saturated sediments Bedrock
RV-20	40 54 13 74 28 57	540	1. 1080 2. 4310 3. 15555		8 60		Unsaturated sediments Saturated sediments Bedrock
RV-21	40 54 30 74 26 59	510	1. 1550 2. 3486 3. 18345	9 80	14 122		Unsaturated sediments Saturated sediments Bedrock, crystalline
RV-22	40 54 33 74 27 06	510	1. 1100 2. 2130 3. 4995 4. 16295	9 30 140	4 30 177		Unsaturated sediments Unsaturated sediments, clayey sand Saturated sediments Bedrock, crystalline
RV-23	40 54 46 74 29 29	530	1. 1150 2. 5715 3. 19408	8 63	7 39		Unsaturated sediments Saturated sediments Bedrock, crystalline
RV-24	40 54 17 74 27 48	550	1. 610 2. 2038 3. 5605 4. 23106	2 22 81	3 29 84		Unsaturated sediments Unsaturated sediments Saturated sediments Bedrock, crystalline
RV-25	40 54 15 74 28 17	540	1. 1425 2. 4943 3. 7350	19 59 >140	8 50 >190		Unsaturated sediments Saturated sediments Saturated sediments, weathered shale or clay Bedrock
RV-26	40 54 08 74 28 22	520	1. 1247 2. 3278 3. 5785 4. 10344	3 25 67			Unsaturated sediments Unsaturated sediments, clayey sand Saturated sediments Bedrock
RV-27	40 55 13 74 21 51	300	1. 1105 2. 3465 3. 8405 4. 15000	4 21 90	12 38 41		Unsaturated sediments Unsaturated sediments, clayey sand Saturated sediments Bedrock
RV-28	40 53 33 74 21 48	210	1. 1267 2. 5240 3. 23350	7 69	9 42		Unsaturated sediments Saturated sediments Bedrock
RV-29	40 53 30 74 22 17	200	1. 651 2. 4695 3. 8870	6 >90	5 54		Unsaturated sediments Saturated sediments Bedrock, shale

Table 3 (cont.)

Line	Location (lat./long., deg./min./sec.)	Elevation (ft.)	Layer Velocity (ft./sec.)	Depth (top of layer, ft.)			Interpretation
				G1	G6	12	
RV-30	40 53 27 74 22 31	160	1. 1063				Unsaturated sediments
			2. 6425	5		10	Saturated sediments
			3. 14715	47		79	Bedrock
RV-31	40 51 10 74 24 32	290	1. 1386				Unsaturated sediments
			2. 7543	12	18	12	Saturated sediments
			3. 15687	122	135	157	Bedrock
RV-32	40 51 26 74 24 28	270	1. 3078				Unsaturated sediments, clayey sand
			2. 7686	26	27	26	Saturated sediments, weathered shale or clay
			3. 11438	129	157	128	Bedrock
RV-33	40 51 34 74 24 34	270	1. 3078				Unsaturated sediments, clayey sand
			2. 7686	27	26	16	Saturated sediments, weathered shale or clay
			3. 11438	116	181	183	Bedrock
RV-34	40 50 50 74 24 22	240	1. 1183				Unsaturated sediments
			2. 7859	7	4	4	Saturated sediments, weathered shale or clay
RV-35	40 51 23 74 23 36	250	1. 3618				Unsaturated sediments
			2. 8006	21	25	14	Saturated sediments, dense till or clay
			3. 16298	178	171	126	Bedrock, crystalline bedrock
RV-36	40 50 44 74 26 32	270	1. 1405				Unsaturated sediments
			2. 6066	11	13	15	Saturated sediments
			3. 10078	63	86	92	Bedrock
RV-37	40 50 39 74 26 21	270	1. 1405				Unsaturated sediments
			2. 6066	6	11	13	Saturated sediments
			3. 10078	78	95	52	Bedrock
RV-38	40 51 27 74 23 14	200	1. 2795				Unsaturated sediments
			2. 6524	20	24	16	Saturated sediments
			3. 14442	129	114	104	Bedrock
RV-39	40 51 27 74 23 27	190	1. 2745				Unsaturated sediments
			2. 6524	40	16	3	Saturated sediments
			3. 14442	115	95	72	Bedrock
RV-40	40 50 37 74 20 52	160	1. 2633				Unsaturated sediments
			2. 4807	7	49	49	Saturated sediments
			3. 11873	123	155	146	Bedrock
RV-41	40 50 25 74 20 49	170	1. 1554				Unsaturated sediments
			2. 6873	16	13	16	Saturated sediments
			3. 11663	126	99	73	Bedrock
RV-42	40 50 22 74 20 44	170	1. 2414				Unsaturated sediments
			2. 6184	11	26	19	Saturated sediments
			3. 11800	103	132	86	Bedrock
RV-43	40 51 19 74 23 44	220	1. 4610				Saturated sediments
			2. 7507	24	18	10	Saturated sediments, weathered shale or clay
			3. 12359	93	155	149	Bedrock
RV-44	40 50 27 74 23 15	200	1. 3166				Unsaturated sediments
			2. 7417	7	13	9	Saturated sediments, dense till
			3. 14255	181	147	105	Bedrock, crystalline
RV-45	40 50 09 74 25 06	280	1. 1214				Unsaturated sediments
			2. 5571	6	6	8	Saturated sediments
			3. 10463	61	70	54	Bedrock, shale

Table 3 (cont.)

Line	Location (lat./long., deg. /min. /sec.)	Elevation (ft.)	Layer Velocity (ft./sec.)	Depth (top of layer, ft.)			Interpretation
				G1	G6	12	
RV-46	40 51 08 74 20 09	170	1. 1590				Unsaturated sediments
			2. 4891	9	10	4	Saturated sediments
			3. 16701	177	190	200	Bedrock
RV-47	40 50 47 74 20 55	180	1. 2355				Unsaturated sediments
			2. 4909	28	26	18	Saturated sediments
			3. 13851	149	148	137	Bedrock
RV-48	40 51 59 74 22 15	180	1. 1654				Unsaturated sediments
			2. 6161	10	16	16	Saturated sediments
			3. 13855	67	50	42	Bedrock
RV-49	40 54 50 74 21 55	220	1. 1982				Unsaturated sediments
			2. 5697	9	6	6	Saturated sediments
			3. 16959	53	69	90	Bedrock, crystalline?
RV-50	40 54 20 74 22 19	200	1. 1590				Unsaturated sediments
			2. 4887	7	5	9	Saturated sediments
			3. 12747	58	63	52	Bedrock
RV-51	40 54 17 74 35 24	670	1.				Unsaturated sediments
			2. 6557	44	42	37	Saturated sediments
			3. 18041	87	179	181	Bedrock, crystalline
RV-52	40 54 12 74 35 06	650	1. 2043				Unsaturated sediments
			2. 7145	9	12	13	Saturated sediments
			3. 18401	80	87	96	Bedrock, crystalline

HYDROGEOLOGIC FRAMEWORK OF THE MIDDLE AND LOWER ROCKAWAY RIVER BASIN, MORRIS COUNTY, NEW JERSEY
(New Jersey Geological Survey Report GSR 33)

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Base from U.S. Geological Survey
Boonton, 1954, photorevision as of 1970
Caldwell, 1954, photorevision as of 1970
Dover, 1954, photorevision as of 1981
Mendham, 1954, photorevision as of 1970
Morristown, 1954, photorevision as of 1981
Pompton Plains, 1954, photorevision as of 1981

EXPLANATION

Slashes indicate that materials on left overlie materials on right. For example, l/vg = silt, fine sand, and clay overlie till, which in turn overlies gravel and sand.

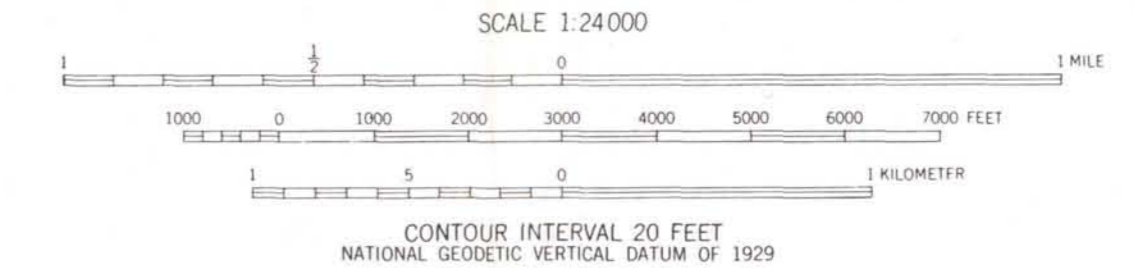
Commas indicate that associated materials are interbedded or occur alternately. For example, lt = silt, fine sand and clay are interbedded with till or occur alternately with till.

Where slashes and commas occur together, slashes separate groups of interbedded or alternating materials. For example, l/vg,lt = till overlies interbedded or alternating silt, fine sand, clay and gravel and sand, which in turn overlies interbedded or alternating till and gravel and sand.

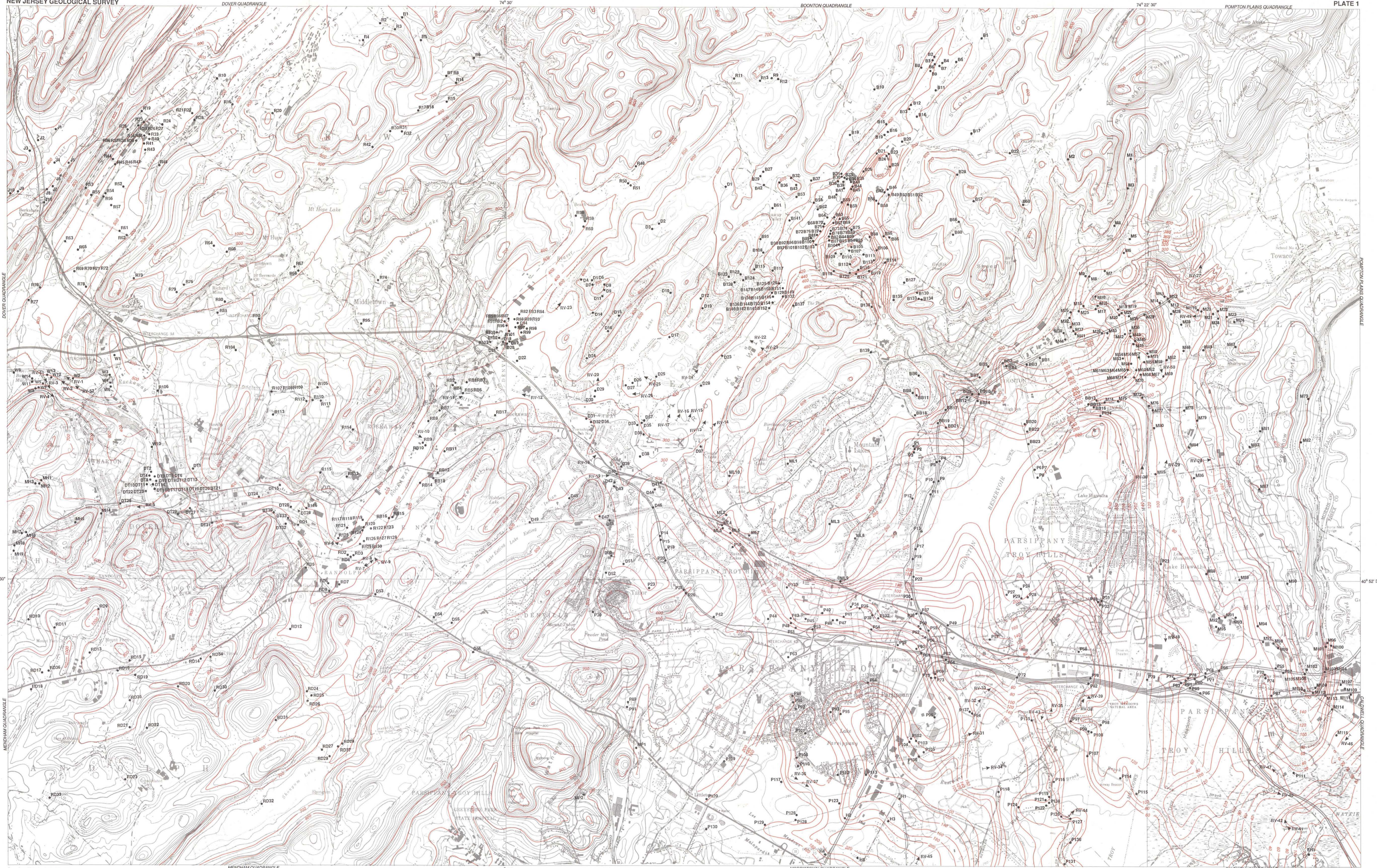
l - silt, fine sand, clay
lt - till - generally less than 20 feet thick, over bedrock
tt - thick till - generally more than 20 feet thick, over bedrock. May include sand and gravel.
g - gravel and sand

s - sand and pebbly sand
r - exposed bedrock - surficial materials less than 10 feet thick
cw - colluvium and weathered bedrock, undifferentiated - generally more than 10 feet thick

Plate 2. Surficial materials map showing location of geologic sections.



Materials compiled 1989 and 1991 from
Bayley and others, 1914; Darton and others, 1908,
Salisbury, 1895; Sims, 1956; Stanford, 1989a, and Stanford 1989b

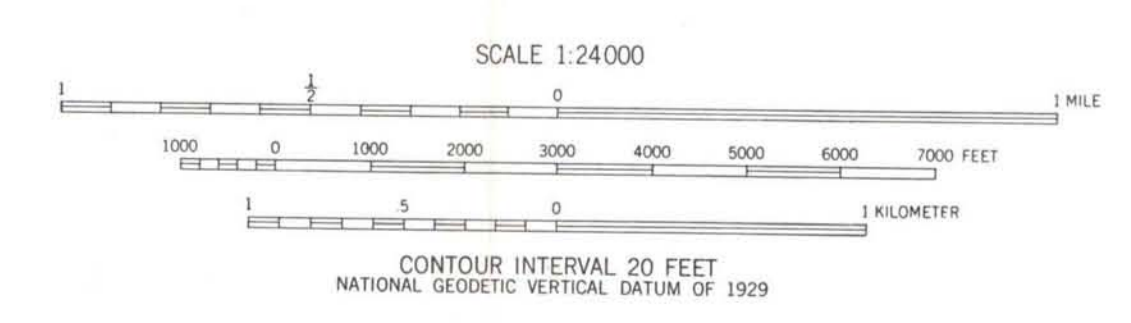


Base from U.S. Geological Survey
 Boonton, 1954, photorevision as of 1970
 Caldwell, 1954, photorevision as of 1970
 Dover, 1954, photorevision as of 1981
 Mendham, 1954, photorevision as of 1970
 Morristown, 1954, photorevision as of 1981
 Pompton Plains, 1954, photorevision as of 1981

EXPLANATION

- Bedrock contour—contour interval 100 feet; supplementary interval 20 feet in places
- Well or boring—refer to Table 2
- Seismic refraction line—arrow indicates direction of forward traverse; refer to Table 3

Plate 1. Bedrock topography map showing location of wells, borings and geophysical lines.



Bedrock topography mapped 1987

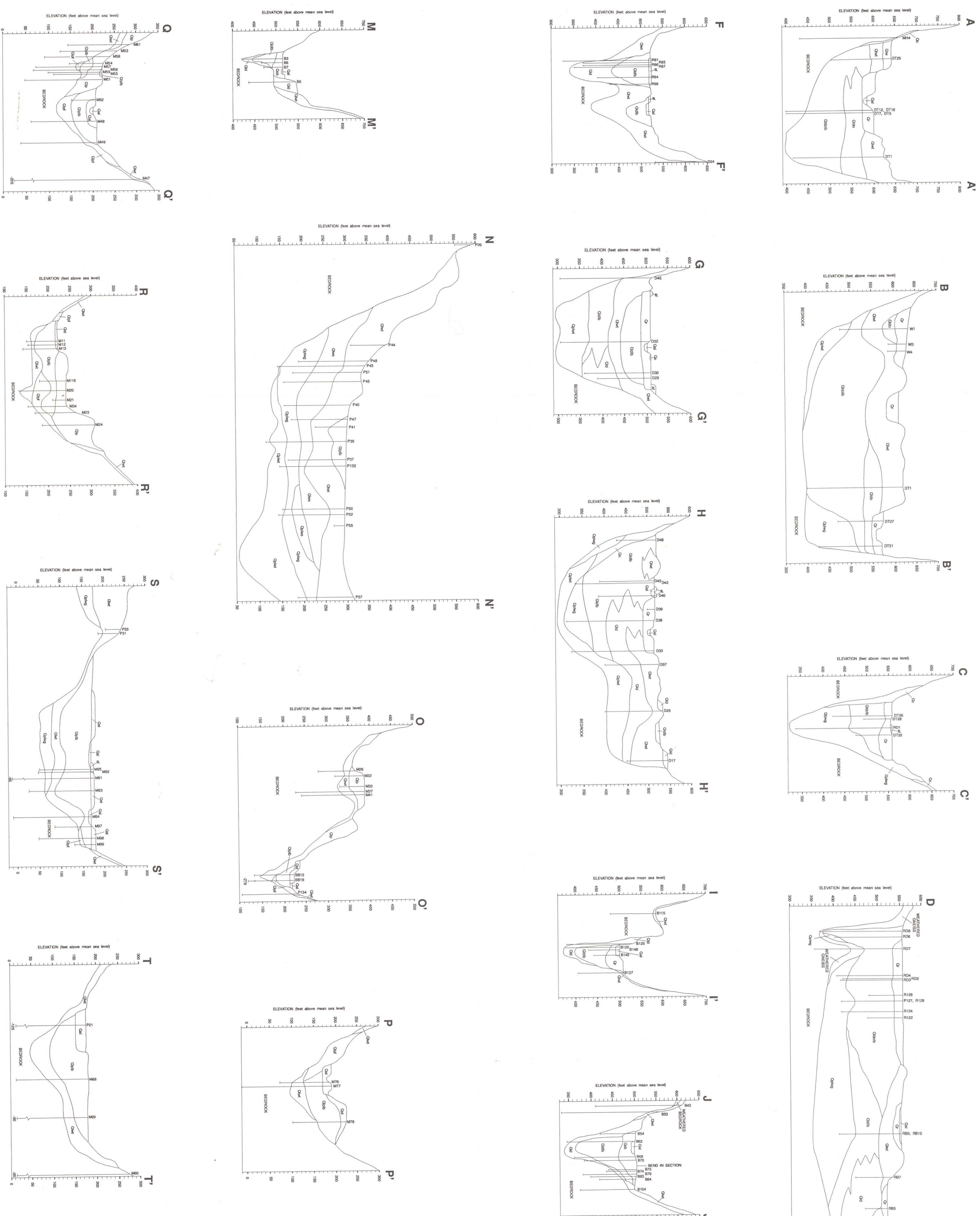


Plate 3. Geologic sections through the valley-fill deposits.

Correlation of Surficial Material Units (Plate 2) with Units on Geologic Sections (Plate 3)

Surficial Material Unit	Material	Geologic Unit	Description	Hydrogeologic Characteristics
1	fine sand, silty clay	Qa1	lake-bottom deposits of glacial Lake Devils	confined beds
2	lake-bottom deposits of glacial Lake Dover	Qa2	lake-bottom deposits of glacial Lake Dover	confined beds
3	unconsolidated late Wisconsinan lake-bottom deposits	Qa3	unconsolidated late Wisconsinan lake-bottom deposits	confined beds
4	pre-late Wisconsinan lake-bottom and fluvial deposits	Qa4	pre-late Wisconsinan lake-bottom and fluvial deposits	confined beds
5	postglacial alluvium	Qa5	postglacial alluvium	not an aquifer (too thin)
6	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa6	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
7	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa7	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
8	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa8	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
9	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa9	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
10	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa10	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
11	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa11	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
12	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa12	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
13	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa13	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
14	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa14	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
15	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa15	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
16	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa16	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
17	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa17	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
18	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa18	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
19	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa19	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
20	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa20	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	unconfined aquifer
21	bedrock, weathered bedrock, and colluvium	Qa21	bedrock, weathered bedrock, and colluvium	not an aquifer (too thin)
22	artificial fill	Qa22	artificial fill	not an aquifer
23	swamp deposits	Qa23	swamp deposits	not an aquifer
24	colluvium	Qa24	colluvium	not an aquifer
25	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa25	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
26	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa26	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
27	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa27	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
28	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa28	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
29	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa29	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer
30	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	Qa30	lacustrine fine sand and gravel deposited in glacial Lake Wisconsin	generally a confined aquifer

HORIZONTAL SCALE: 1 inch equals 2,000 feet
VERTICAL SCALE: 1 inch equals 200 feet

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