

INVENTORY OF WELLS NEAR A FORMER WASTE-DISPOSAL SITE, NASHUA, NEW HAMPSHIRE, JUNE 1993

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CONVERSION FACTORS AND VERTICAL DATUM

	Multiply	By	To obtain
	foot (ft)	0.3048	meter
	gallon per minute (gal/min)	0.06308	liter per second
	inch (in.)	25.4	millimeter
	mile (mi)	1.609	kilometer
	square mile (mi ²)	2.59	square kilometer

Vertical Datum

Sea Level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Inventory Of Wells Near A Former Waste-Disposal Site, Nashua, New Hampshire, June 1993

By Sarah M. Flanagan

ABSTRACT

Domestic, public-supply, and observation wells near a former waste-disposal site along Gilson Road in Nashua, New Hampshire, were inventoried in June 1993. Data include hydrogeologic information on 13 domestic wells, 11 observation wells in an adjacent municipal landfill, 3 abandoned public-supply wells, 3 observation wells, and 1 test boring drilled by the U.S. Geological Survey.

INTRODUCTION

Domestic, public-supply, and observation wells near a former waste-disposal site along Gilson Road in Nashua, New Hampshire, were inventoried in June 1993. This inventory was done by the U.S. Geological Survey (USGS) in cooperation with the U.S. Environmental Protection Agency (USEPA), Region I.

During the 1960's and early 1970's, disposal of hazardous and nonhazardous liquid waste around a privately owned garage along Gilson Road caused local ground-water contamination (Weston, 1989). In 1981, chemical analyses of ground-water samples from domestic wells downgradient from the Gilson Road site indicated that the wells were contaminated with volatile organic compounds (VOC's) and other hazardous substances (Weston, 1989). The site is currently undergoing remediation under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.

The purpose of this report is to (1) inventory the location and status of existing domestic, land-fill, public-supply, and observation wells in the study area, and (2) list available hydrogeologic data associated with these wells. The area of the inventory was limited to

about 1.7 mi² near the Gilson Road waste-disposal site in a residential area in southwestern Nashua, New Hampshire (fig. 1). During the 1980's, the population expanded rapidly because of the increase in trailer parks and single-family homes. In addition, the municipal landfill north of, and adjacent to, the Gilson Road waste-disposal site is currently (1993) undergoing expansion (fig. 1).

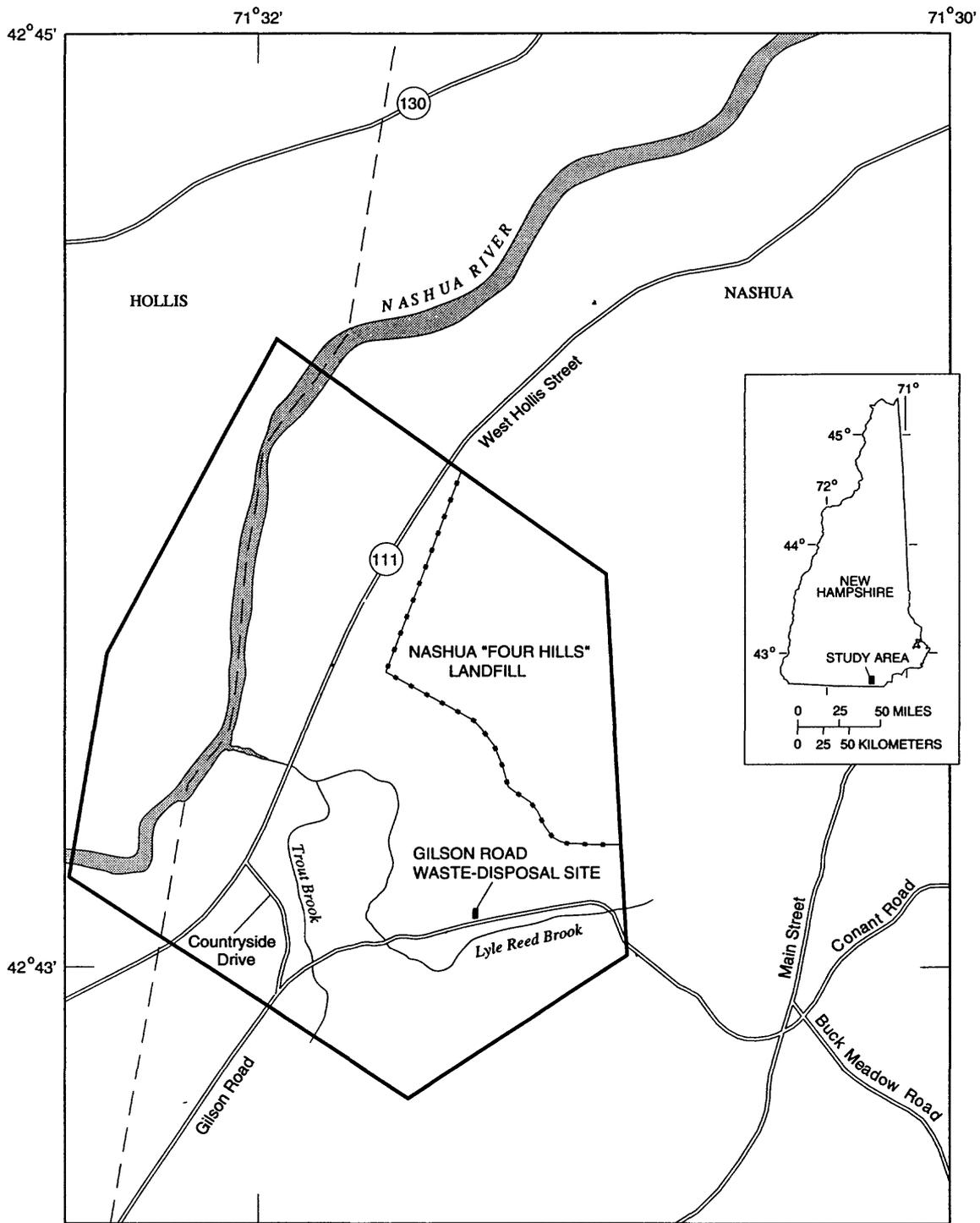
The major surface-water bodies in the study area include Lyle Reed and Trout Brooks, tributaries to the Nashua River. The Nashua River is a major tributary to the Merrimack River. The town of Hollis is just west of the study area across the Nashua River (fig. 1). The State and town boundaries between Nashua, New Hampshire, and Pepperell, Massachusetts, are less than 1 mi to the south of the study area.

The surficial geology of the Pepperell Quadrangle in which the study area is located, was mapped at a scale of 1:24,000 by Koteff and Volkmann (1973). The hydrogeology of the Nashua area was studied by Toppin (1987) as part of a regional study to map the stratified-drift aquifers and determine their basic hydraulic properties.

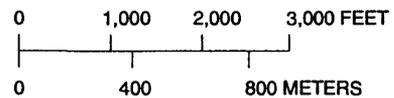
The authors thank the personnel from the Nashua Public Works Department for assisting in the location of observation wells in the "Four Hills" landfill, and a private drilling company for providing aquifer-test data.

DATA-COLLECTION METHODS

Private homes were surveyed door-to-door in the study area, and resident responses from 13 homes are compiled in table 1 (at back of report). Observation wells in the Nashua "Four Hills" Landfill, which were



Base modified from U.S. Geological Survey
 Pepperell, Mass.-N.H. 1:25,000,
 1965, photorevised 1979
 Polyconic projection, Zone 19



EXPLANATION

- STUDY AREA BOUNDARY
- - - LANDFILL BOUNDARY

Figure 1. Location of the well-inventory study area, the Gilson Road waste-disposal site, and the Nashua "Four Hills" Landfill, in Hollis and Nashua, New Hampshire.

within the boundary of the study area (fig. 1), also were inventoried and field checked during the survey. In addition, original well-log, construction, and aquifer-test data were obtained for an abandoned public-supply well once owned by a private water company in the study area.

WELL-NUMBERING SYSTEM

Local numbers assigned to wells and test borings consist of a two-letter town designation—"HS" for Hollis and "NA" for Nashua; a supplemental letter designation ("A", borings for hydrogeologic purposes with no casing set and "W", for all wells in which a casing was set); and a sequential number in each town. For example, the 220th well inventoried in Nashua is designated NAW-220.

WELL-INVENTORY RESULTS

The hydrogeologic data presented in this section include site records, well-construction records, exploration-borehole logs, and aquifer-test field data. A summary of the well inventory is presented in the following sections for domestic, landfill, public-supply, and observations wells (table 2, at back of report). Locations of inventoried wells and borings were plotted on the 1:25,000-scale Pepperell, Massachusetts-New Hampshire USGS topographic map and are shown in figure 2. Lithologic logs for 18 wells and 1 exploration borehole are summarized in table 2.

Domestic Wells

Of the 25 private homes surveyed, 9 are still connected to domestic wells, 3 switched to a private water-supply company but still have existing domestic wells in place, 12 switched to a private water-supply company and removed their domestic wells, and 1, across the Nashua River in Hollis (HSW-70), has a bedrock well that is used exclusively for restroom facilities (for a private hunting club).

Attempts to obtain hydrogeologic data for domestic wells from the 25 homeowners were mostly unsuccessful. Residents who still used their own wells knew the

well depth but not the depth to bedrock or depth of casing, with the exception of the homeowner for well NAW-227.

Landfill Wells

About 35 observation wells were installed in the Nashua "Four Hills" Landfill from 1983 to 1992. Eleven of these wells were within the boundary of the study area and were inventoried as part of this study (fig. 2). The well in the landfill that is closest to and downgradient from the Gilson Road waste-disposal site is well NAW-237 (also known as MW-5).

Public-Supply Wells

During the 1960's, three public-supply wells were in use in the inventory area and downgradient from the Gilson Road waste-disposal facility (fig. 2). All three wells have since been removed from service, and their well casings were removed during the early 1970's. Two of the three wells (NAW-157 and NAW-158) were owned by a local trailer park and installed in 1959. Attempts to obtain hydrogeologic data for these two wells were unsuccessful.

A third, public-supply well (NAW-220) was owned and operated by a private water-supply company on land owned by a local trailer park. This 24-inch-diameter gravel-packed well was drilled in November 1969. A 192-hour aquifer test, using five observation wells, was done from December 1-9, 1969, and a 3-day recovery test was done after the pump was shut off. A constant volume of 1,210 gal/min of ground water was pumped from well NAW-220 for the duration of the aquifer test resulting in a total drawdown at the well of 29.29 ft (unpublished data on file with the Bow, New Hampshire office of the U.S. Geological Survey). In 1976 or 1977, the decision was made to abandon the well (Bernard Rousseau, Pennichuck Water Works, oral commun., 1993). Written documentation is not available about the conditions around the well at the time the decision was made to abandon the well and remove the casing.

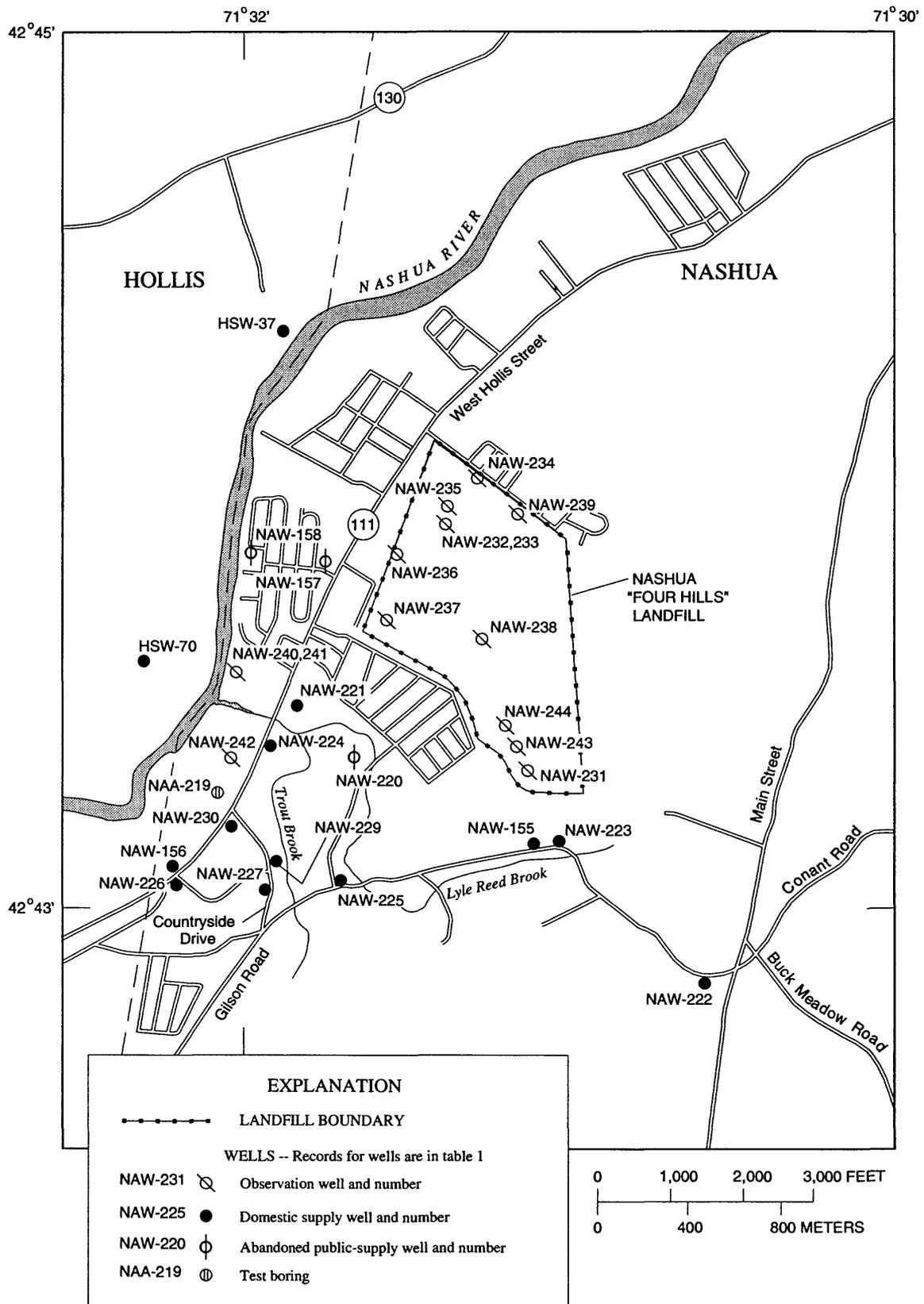


Figure 2. Location of domestic, public-supply, and observation wells in and near the study area in Hollis and Nashua, New Hampshire.

Observation Wells

On July 12-13, 1993, test-well drilling was done by the U.S. Geological Survey on private property west of West Hollis Street near the present-day storage facilities (J.D. Ayotte, U.S. Geological Survey, written commun., 1993). Three test sites were selected for drilling—wells NAW-240 (29 ft) and NAW-241 (14 ft) nested together at one site, well NAW-242 at another site, and boring NAA-219 at the third site (fig. 2).

SUMMARY

An inventory of 13 domestic, 3 abandoned public-supply, and 14 observation wells, and 1 boring was completed in June 1993 near a former waste-disposal site along Gilson Road in Nashua, New Hampshire. Hydrogeologic data, including aquifer-test data, were obtained for one of the former public-supply wells

(NAW-220). Lithologic, ground-water level, well-construction, and other data were collected and tabulated.

REFERENCES CITED

- Koteff, Carl and Volkmann, R.P., 1973, Surficial geologic map of the Pepperell Quadrangle, Middlesex County, Massachusetts and Hillsborough County, New Hampshire: U.S. Geological Survey, Geologic Quadrangle Map GQ-1118, scale 1:24,000.
- Toppin, K.W., 1987, Hydrogeology of stratified-drift aquifers and water quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire: U.S. Geological Survey Water-Resources Investigations Report 86-4358, 45 p., 6 pl.
- Weston, Roy F., Inc., 1989, Remedial program evaluation, Gilson Road site, Nashua, New Hampshire: Concord, N.H.

Table 1. Records of selected wells and one boring in Hollis and Nashua, New Hampshire

[Site No.: First two characters are the town code (HS for Hollis, New Hampshire; NA for Nashua, New Hampshire). Third Latitude, Longitude: Accurate to 5 seconds. Type of well: Bor, test boring; BrW, bedrock well; Dug, dug well; Dvn, driven unused. Water level: reported as feet below land surface; gal/min, gallon per minute]

Site No.	Latitude " " "	Longitude " " "	Owner's name	Other identification	Year completed	Type of well	Use of water	Depth of well
Hollis								
HSW-37	424419	713152	Gagnon	--	1955	Dug	H	14.1
HSW-70	424334	713218	Lone Pine Hunting Club	--	--	BrW	H	--
Nashua								
NAA-219	424315	713205	Dobbens, John	--	1993	Bor	U	--
NAW-155	424307	713107	Poirier, Camil	--	--	Dug	U	20.3
NAW-156	424306	713213	Lagios	--	1936	Dug	H	53.1
NAW-157	424347	713144	Jensen's Trailer Park	--	1959	GPW	U	45
NAW-158	424349	713158	do.	--	1959	GPW	U	80
NAW-220	424321	713139	Pennichuck Water Works	Jensen W-1	1969	GPW	U	67.5
NAW-221	424327	713151	Morey, Mary	--	1943	BrW	H	300
NAW-222	424250	713035	Kane, Maryanne	165.0023	1987	BrW	H	200
NAW-223	424308	713102	Taylor, Richard	--	1957	Dug	H	20
NAW-224	424325	713156	Shaw, Steven	6	--	Dug	U	--
NAW-225	424308	713142	Lambert, Romeo	7	1970	Dvn	H	15
NAW-226	424303	713213	Humphry, Lawrence & Ellen	19	1972	BrW	H	150
NAW-227	424305	713156	Benson, Alfred	B-3S	1964	BrW	H	200
NAW-229	424307	713155	Whynott, Bob (renter)	MW-1	--	Dug	H	--
NAW-230	424314	713202	Fortier, William J.	MW-1S	1963	BrW	H	150
NAW-231	424319	713106	Nashua "Four Hills" Landfill	MW-3	1990	Obs	U	30
NAW-232	424352	713122	do.	MW-4	1983	Obs	U	93.5
NAW-233	424352	713122	do.	MW-5	1990	Obs	U	49.5
NAW-234	424358	713116	do.	MW-7	1983	Obs	U	45
NAW-235	424355	713122	do.		1983	Obs	U	85
NAW-236	424349	713131	do.	MW-8	1983	Obs	U	33
NAW-237	424340	713134	do.	--	1983	Obs	U	76
NAW-238	424337	713115	do.	--	1983	Obs	U	14
NAW-239	424354	713109	do.	--	1992	Obs	U	28
NAW-240	424333	713200	Dobbens, Don	B-4	1993	Obs	U	29
NAW-241	424333	713200	do.	B-15-T	1993	Obs	U	14
NAW-242	424322	713203	do.	--	1993	Obs	U	30
NAW-243	424322	713110	Nashua "Four Hills" Landfill	--	1993	Obs	U	84.5
NAW-244	424326	713112	do.	--	1993	Obs	U	132

character—W, indicates well; A, indicates boring. The numbers are sequential in the order the wells were inventoried. well; GPW, gravel packed well; Obs; observation well. USGS: U.S. Geological Survey. Use of water: H, domestic use; U,

Site No.	Casing			Screened interval (ft)			Water level		Remarks
	Height above ground (ft)	Depth to bottom (ft)	Dia-meter (in.)	Top of opening	Bottom to opening	Altitude above sea level	Date	Depth (ft)	
Hollis									
HSW-37	--	--	12	--	--	175	6-20-63	8.5	--
HSW-70	--	--	--	--	--	185	--	--	Not used for drinking water
Nashua									
NAA-219	--	--	--	--	--	185	7-13-93	14	Boring; drilled by USGS
NAW-155	--	--	36	--	--	193	7-16-93	15.8	Not in use
NAW-156	--	--	8	--	--	197	7-31-62	21.4	Destroyed in 1992.
NAW-157	--	--	36	--	--	195	--	--	Not in use, casing removed
NAW-158	--	--	8	--	--	170	--	--	Not in use, casing removed
NAW-220	2.5	52	24	52	67.5	170	11-01-69	8	Originally used for public supply. During aquifer test, well was pumped 1,210 gal/min for 192 hours from Dec. 1-9, 1969. Casing was removed in 1976-77 because of ground-water contamination. Drilled by R.E. Chapman
NAW-221	--	--	6	--	--	180	10-08-87	--	In use
NAW-222	1.0	60	6	--	--	210	--	25	Owner reports "hard water" from well. Drilled by Skillings
NAW-223	--	--	--	--	--	190	6-08-93	--	Dug well in cellar of house. Owner also uses a driven point well about 300 ft from house. Water from this well is used for the garden and lawn
NAW-224	3.0	--	36	--	--	185	--	10.3	Not in use
NAW-225	--	--	--	--	--	190	--	--	In use
NAW-226	--	--	--	--	--	210	--	--	Do.
NAW-227	--	35	6	--	--	190	--	--	Do.
NAW-229	--	--	--	--	--	180	--	--	In use; in cellar of house
NAW-230	--	--	--	--	--	195	--	--	In use
NAW-231	3.29	10	1.5	10	30	199.37	12-19-90	12.5	A bedrock well also is nested here. Drilled by All Terrain Drilling
NAW-232	.54	90	1.5	90	93.5	187.67	12-19-90	22.8	Drilled by Soils Exploration
NAW-233	3.29	39.5	1.5	39.5	49.5	188.53	2-11-92	20.9	Shallow well nested with NAW-232 (MW-1) Drilled by All Terrain Drilling
NAW-234	.65	5	2	5	45	173.6	12-19-90	4.3	Drilled by Soils Exploration
NAW-235	1.24	15	2	15	85	185.3	12-19-83	18.1	Do.
NAW-236	2.41	13	2	13	33	178.3	12-19-90	10.5	Do.
NAW-237	1.95	6	2	6	76	177.9	12-19-90	10.1	Do.
NAW-238	4.22	4.5	2	4.5	14	184.6	1-09-91	8.77	Do.
NAW-239	3.24	20	1.5	20	28	177.14	2-11-92	.9	Do.
NAW-240	--	26.5	2	26.5	29	165	7-13-93	11	Drilled by USGS
NAW-241	--	11.5	2	11.5	14	165	7-13-93	11	Do.
NAW-242	--	27.5	2	27.5	30	185	7-13-93	21	Do.
NAW-243	--	--	1.5	--	84.5	235	--	--	Drilled by Soils Exploration
NAW-244	3.0	117	1.5	117	132	305	--	--	Do.

Table 2. Lithologic logs of selected wells and one boring in Nashua, New Hampshire

Description of material	Depth (ft)		Description of material	Depth (ft)	
	From	To		From	To
NAA-219			NAW-234		
Sand, fine to very fine; few pebble	0	7	Top soil, reddish-brown, fine sand and pebbles	0	2
Silt and sand till; few pebbles and cored cobbles	7	16	Sand, fine, light brown; little silt	2	8
Refusal, firm; probably bedrock.....	16		Silt, light brown; little fine sand	8	24
NAW-155			Sand, fine to medium, light brown; little silt; trace of gravel.....	24	30
Sand and gravel	0	20	Sand, fine to medium, and silt, light brown.....	30	33.5
Bedrock	20		Sand, medium to coarse, light brown; few gravel	33.5	36
NAW-220			Sand, fine, light brown; few gravel.....	36	40
Sand, fine, brown	0	30	Sand, fine to medium, light brown	40	50
Sand, fine to medium	30	48	Till, silt and gray fine sand, some pebbles; trace of clay	50	56
Sand, coarse and medium gravel.....	48	50	Bottom of hole	56	
Gravel, coarse.....	50	67.5			
Bottom of hole.....	67.5		NAW-235		
NAW-222			Fill, fine sand and silt, dark brown; pebbles	0	2
Sand and gravel	0	9	Sand, fine to coarse, brown; trace of silt.....	2	10
Bedrock	50	200	Sand, fine, light brown.....	10	45
NAW-223			Sand, fine to medium, light brown	45	75
Sand and gravel	0	20	Sand, fine, light brown.....	75	83
Bottom of hole.....	20		Till; silt, brown-gray; fine sand; little clay; pebbles.....	83	85
NAW-224			Bottom of hole	85	
Sand and gravel	0		NAW-236		
NAW-225			Top soil, silt and fine sand, dark brown.....	0	1
Sand	0	15	Sand, fine to medium, light brown	1	25
Bottom of hole.....	15		Sand, fine to coarse, light brown; few gravel ...	25	33
NAW-231			Till, silt, gray fine sand, pebbles; very compact	33	37.5
Sand, brown, organic.....	0	0.5	Bottom of hole	37.5	
Sand, fine to medium, brown; trace of silt	0.5	3	NAW-237		
Sand, fine to coarse, brown	3	15.7	Sand, medium to coarse, light brown	0	8.5
Silt, brown, and fine sand.....	15.7	24	Sand and gravel, medium to coarse, light brown.....	8.5	14
Sand, fine, brown	24	28	Sand and gravel, medium to coarse, light brown; some rock fragments.....	14	19
Silt, brown, and fine sand.....	28	32.3	Sand and gravel, coarse, brown	19	24
Till, sandy, gravelly; some silt and cobbles	32.3	36.6	Sand, coarse, brown	24	29
Bedrock (cored 6 in.).....	36.6		Sand, medium to coarse, brown.....	29	49
NAW-232			Sand, medium to coarse, brown; trace of silt....	49	60
Sand, fine to medium, dark brown; some silt....	0	5.5	Sand and gravel, medium to coarse, brown; trace of silt	60	67
Sand, fine to medium, light brown	5.5	41	Sand, fine to medium, brown; trace of silt.....	67	74
Sand, fine, brown	41	87	Sand, fine to coarse, brown; little silt	74	75.5
Till (possible, no recovery)	87	90	Till, silt to fine sand and pebbles, gray-brown	75.5	76
Bedrock (cored 5 ft)	90		Bottom of hole	76	

Table 2. Lithologic logs of selected wells and one boring in Nashua, New Hampshire--*Continued*

Description of material	Depth (ft)		Description of material	Depth (ft)	
	From	To		From	To
NAW-238			NAW-242		
Till, silt, sand, and pebbles	0	7.5	Sand and silt, very fine	0	12
Bedrock (possible); cored 6.5 ft.....	7.5		Till, sandy	12	15
NAW-239			Sand, very fine and silt	15	24
Sand, brown, and organic silt.....	0	0.7	Till; loosely compacted; more compact with depth.....	24	33.5
Sand, fine to medium, brown; some coarse sand; little silt	0.7	2	NAW-243		
Gravel, brown, and fine to coarse sand; some cobbles; little silt.....	2	8	Tree stump.....	0	1.4
Sand, fine to medium, brown; trace of silt and coarse sand.....	8	18.4	Sand, gravel, clay, silt	1.49	
Gravel, and fine to medium sand, brown; little silt and coarse sand.....	18.4	29.3	Till, sandy, gravelly, clayey, silty	9	84.5
Bedrock (cored 5 ft).....	29.3	35	Bottom of hole.....	84.5	
NAW-240			NAW-244		
Sand, very fine to fine, tan; coarser with depth	0	10	Till; fine-medium silty sand; gravel and cobbles	0	100
Sand, medium to coarse, tan; moderately to well sorted	10	21	Till; same as above, but more cobbles	100	125
Sand, fine with some coarser layers.....	21	31	Boulder	125	126
Till; loosely compacted, mostly coarse sand	31	40	Till, many cobbles; weathered bedrock.....	126	137
Refusal, firm; probably bedrock	40		Bedrock (cored 3 ft)	137	140