HYDROGEOLOGY OF THE COCHECO RIVER BASIN, SOUTHEASTERN NEW HAMPSHIRE

By John E. Cotton

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CONVERSION FACTORS AND ABBREVIATIONS

For the convenience of readers who may prefer to use metric (International System) units rather than the inch-pound units used in this report, values may be converted by using the following factors.

Multiply inch-pound unit	By	To obtain metric unit
	Length	
inch (in.)	25.4	millimeter (mm)
	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	0.4047	hectare (ha)
square foot (ft^2)	0.0929	square meter (m^2)
square mile (mi^2)	2.59	square kilometer (km^2)
	Volume	
gallon (gal)	3.785	Liter (L)
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
cubic foot per second per square mile $(ft^3/s)/mi^2$	0.01093	cubic meter per second per square kilometer $(m^3/s)/km^2$
cubic foot per square mile (ft^3/mi^2)	0.01093	cubic meter per square kilometer (m^3/km^2)
gallon per minute (gal/min)	0.06309	Liter per second (L/s)
million gallons per day (Mgal/d)	0.04381	cubic meters per second (m^3/s)
million gallons per day per square mile [(Mgal/d)/mi^2]	0.0169	cubic meters per second per square kilometer [$(m^3/s)/km^2$]
	Temperature	
degree Fahrenheit (°F)	°C = 5/9 x (°F-32)	degree Celcius °C
	Hydraulic conductivity	
foot per day (ft/d)	0.3048	meter per day (m/d)
	Transmissivity	
foot squared per day (ft^2/d)	0.0929	meter squared per day (m^2/d)

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A Geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level."

Hydrogeology of the Cocheco River Basin, Southeastern New Hampshire

By John E. Cotton

ABSTRACT

The growing population in the Cocheco River basin of southeastern New Hampshire is likely to require additional sources of potable ground water. Glacial sand and gravel aquifers in the basin that contain significant and readily available quantities of ground water have been mapped. Total potential yield from these aquifers may exceed 15 million gallons per day. The underlying crystalline bedrock in the basin transmits and stores significant quantities of ground water only in fracture zones, which have not been mapped. Ground-water quality is generally suitable for most uses, although some areas have water with excessive iron concentrations. Other local water-quality problems such as elevated chloride concentrations, probably reflect land-use practices.

INTRODUCTION

This report is an assessment of the hydrogeology of the Cocheco River basin in southeastern New Hampshire (fig. 1). Demand for water in this 182 mi^2 (square mile) river basin has been increasing because of rapid population growth. This appraisal was done in cooperation with the State of New Hampshire Department of Environmental Services, Water Resources Division.

Purpose and Scope

This report describes the hydrogeology of the Cocheco River basin. Specifically, the report assesses the availability of ground water in the basin and focuses on the location and extent of stratified drift with the potential for ground-water development, including areas that could be recharged by induced infiltration of surface water. The report also provides estimates of potential ground-water yields and assesses ground-water quality.

Approach

Hydrogeologic data, were collected and used to produce a map of the Cocheco River basin, which identifies the most favorable areas for ground-water development. Streamflow measurements were made during periods of low flow at selected sites throughout the basin to help estimate ground-water discharge. Water levels were measured monthly in selected observation wells to ascertain natural patterns of ground-water recharge and discharge and to estimate saturated thickness of aquifers. Water samples from selected wells were analyzed for common dissolved constituents, pesticides, and PCBs (polychlorinated biphenyls) to assess the chemical quality of ground water in the basin. All basic data including well records, streamflow measurements, chemical analysis, and New Hampshire water-quality standards are located at the end of this report.

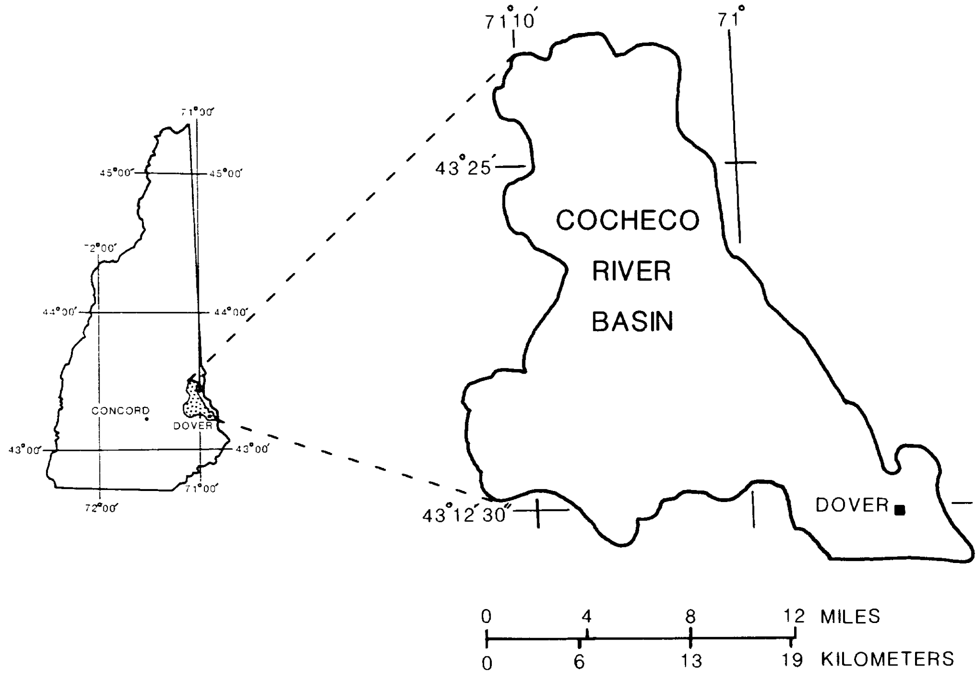

Figure 1.--Location of study area.

Population and Water Use

Population in southeastern New Hampshire doubled from 1940 to 1970. The population of 11 towns and cities entirely or partly within the Cocheco River basin increased from about 61,000 in 1970 to about 74,000 in 1980--an increase of 21 percent (U.S. Bureau of the Census, 1980). The eight towns and cities with population centers in the basin, or with more than 25 percent of their land in the basin, had a population of 68,400 in 1980; population increased by 20 percent during the 1970's. Population projections differ significantly, but continued rapid growth seems certain (Anderson-Nichols and Co., Inc., 1969; U.S. Army Corps of Engineers, 1976; New Hampshire Office of State Planning, 1985).

There are three cities within the basin; the municipal water system in Dover is supplied by ground water, the system in Rochester by surface water, and the system in Somersworth by combined sources. The towns of Farmington, Milton, and Rollinsford each have water systems that use ground water, although the wells for Milton and Rollinsford are located in the Salmon Falls River basin. All of these municipalities need to increase source capacity. The towns of Barrington, New Durham, and Strafford have no distribution systems. Very small areas of Middletown and Northwood are in the basin. Plate 1 shows locations of municipalities.

The average daily pumpage in 1969 in the basin was 3.3 Mgal/d (U.S. Army Corps of Engineers, 1976; New Hampshire Water Supply and Pollution Control Commission, 1970). Incomplete data for 1983 suggest that daily pumpage may have approached 3.6 Mgal/d (New Hampshire Water Supply and Pollution Control Commission, 1983.)

Per capita water use in 1969 for 48,100 people served by municipal systems ranged from 65 to 119 gal/d and averaged 91 gal/d. The average per capita use increased to about 118 gal/d in 1974 (U.S. Army Corps of Engineers, 1976). This value reflects industrial water demands, particularly in Farmington, Rochester, and Somersworth. Preliminary data suggest that per capita demand in 1983 has not changed significantly since 1974. Estimates of future water demand include a gradual increase in daily per capita use to the year 2020. For the five basin communities with existing municipal systems, the predicted per capita demands for 2020 range from 153 to 240 gal/d (U.S. Army Corps of Engineers, 1976). Other estimates that also include the five communities without existing municipal systems range from 60 to 204 gal/d (Anderson-Nichols and Co., Inc., 1969).

Water use from private wells (using 1969 data) was estimated to be about 0.6 Mgal/d, assuming that the 10,300 people not served by public supplies had per capita use of 60 gal/d. Therefore, assuming that the percentage of the population not served by public supply in 1969 remained unchanged throughout the decade, private pumpage may have reached more than 0.7 Mgal/d in 1980.

Calculations of future water demands of basin communities differ greatly, depending on projections of population and per capita use. In addition, estimates differ as to the percentage of the total population that will be served by public supplies, not only in the six towns with existing systems, but also in the five towns presently without municipal systems (Anderson-Nichols and Co., Inc., 1969; U.S. Army Corps of Engineers, 1976). To illustrate the range in projected water use for the 11 basin communities in 2020, a per capita use of 130 gal/d and a population range of 80,000 (U.S. Army Corps of Engineers, 1976) to 220,000 (Anderson-Nichols and Co., 1969) was assumed. Under these conditions, the total water demand would range from about 10 to 29 Mgal/d, or from 2.4 to almost 7 times the estimated pumpage in 1980.

Previous Studies

Previous descriptions of ground-water resources in this area by the Geological Survey include a reconnaissance map of southeastern New Hampshire (Cotton, 1977) and a study that included the lower part of the Cocheco River basin (Bradley and Petersen, 1962; Bradley, 1964). These reports indicated that the greatest potential for locating municipal wells was in coarse-grained, stratified glacial deposits in the valleys of the basin. Other studies on water resources in southeastern New Hampshire were done by Camp, Dresser and McKee (1960), Southeastern New Hampshire Regional Planning Commission (1972), the Strafford Regional Planning Commission (1975), the U.S. Army Corps of Engineers (1976), and Anderson-Nichols and Co., Inc. (1980).

Acknowledgments

The author appreciates the information and assistance received from State and municipal officials, residents of the area, well drillers, and consulting engineers. T. J. Fagan, R. B. Moore, S. E. Fisher, D. R. Elberfeld, and T. J. Mack helped compile data and prepare illustrations.

GEOLOGIC SETTING

Bedrock

Bedrock in the Cocheco River basin consists mainly of metamorphic rocks, including gneiss, slate, schist, quartzite, and metavolcanic rocks, which were intruded by granite throughout the basin and by granodiorite in the eastern part of the basin (Billings, 1956; Novotny, 1969). These rocks are part of the Avalonian structural stratigraphic province and were formed during the Caledonian-Hercynian orogeny of Middle Ordovician to Middle Devonian time. The rocks are present in northeasterly trending belts that parallel the region's structural grain, which is exemplified by the Massabesic anticlinorium in the northwestern part of the Cocheco River basin and by the Merrimack trough in the southeastern part of the basin (Lyons and others, 1982).

The metamorphic rocks are deformed and repeated at the surface by folding, and the metamorphic and intrusive rocks are dislocated by faults. The most extensive faults are oriented parallel to the regional structural trend. These nearly vertical faults are part of a system forming splayed or horsetail patterns and which link, along strike, the Clinton-Newbury fault system of Massachusetts with the Nonesuch River-Norumbega fault system of Maine (Lyons and others, 1982). These strike faults are characteristically defined by local zones of silicification or brecciation. Extensive fracturing within adjacent rock units occurred during movement along these faults.

Faults striking northwesterly cut across the regional structural grain. The expression of these nearly vertical faults is more subtle than the northeasterly striking faults, but many of them are traceable by topographic lineaments in which ponds and swamps are common. The northwesterly striking faults commonly are associated with relatively wide zones of fracturing and brecciation, but do not seem to dislocate rock units more than a few tens of feet.

Surficial Deposits

Bedrock is covered by unconsolidated deposits formed during the last period of glaciation. Till--generally an unsorted or poorly sorted mixture of rock material ranging in size from clay to boulders --was deposited directly by glacial ice during both the advancing and retreating stages of glaciation. Beneath active (moving) ice, compact basal till, generally less than 30 feet thick, was deposited discontinuously on the bedrock surface. In places, basal till was deposited on small bedrock highs that locally hindered the movement of the debris-laden ice (Tuttle, 1952). Till thickness in these places may exceed 100 feet (Bradley, 1964). Ablation till, which discontinuously overlies compact till or bedrock, formed as residual material on the melting (wasting) ice surface and gradually settled down on the underlying surface with the disappearance of melting ice. Ablation till is less compact than basal till and is faintly stratified in places. Till is the most common surficial deposit in the Cocheco River basin and is by far the dominant surficial material in all the upper basin and on the hills and many undulating surfaces of the lower basin.

Stratified-drift deposits within this basin were formed during the waning stages of glaciation by sediment-laden meltwater streams and by standing water (Tuttle, 1952; Bradley, 1964). Ice-contact deposits formed near the ice and range from predominantly sand to sandy gravel reflecting the variation of stream velocities (energy levels) of the depositional environments. Such variations occur within an individual deposit and among different deposits. Ice-contact deposits commonly form low topographic terraces within the valleys. In the Isinglass valley, these terraces are generally small, but they are extensive in the Ela and Cocheco valleys.

Outwash deposits were formed by meltwater streams beyond or away from the ice margin. The coarseness of these deposits ranges from sand to gravelly sand, and the sorting generally increases with distance of transport. Thus, outwash deposits generally are better sorted than ice-contact deposits. In this basin, outwash forms thick deposits in the Ela and Cocheco valleys. In the Isinglass valley, relatively thin outwash was deposited as sandy gravels which become finer grained and better sorted to the east.

Coarser sediment in meltwater streams that entered standing water formed deltaic deposits; whereas, finer sediment temporarily remained in suspension. The coarseness of deltaic sediment reflects the suspended load of the stream. Foreset beds of the deltas commonly are well-sorted sands, and, where the ice margin and standing water were in close proximity, sandy gravel may predominate. Several undulating hills in the lower basin are composed of ice-contact deltaic deposits.

Fine-grained sediment (very fine sands, silt, and clay) were deposited in lakes, ponds, estuaries, and marine embayments. In areas that were near the shore, deposits may also contain sandy lenses. Lowlands of the lower part of the basin contain extensive deposits formed in estuarine or marine environments.

OCCURRENCE OF GROUND WATER

Surficial Deposits

Till

The ability of unconsolidated deposits to yield water is partly dependent on the hydraulic conductivity, which in turn is dependent on the number and size of the pores and their degree of interconnection. In unsorted or poorly sorted deposits, finer and coarser particles are intermixed, with the net effect that pore size and degree of interconnection are relatively small. This results in relatively low hydraulic conductivity.

Till--an unsorted or poorly sorted deposit with a wide range in grain sizes--has a relatively low hydraulic conductivity. Accordingly, till is a minor aquifer and normally will not yield enough water to meet most municipal, industrial, or commercial needs. In some places, till yields enough water to large-diameter dug wells to supply single-family domestic needs, but this yield may not be dependable during droughts, when the water table declines and there is less water in storage.

Stratified Drift

Ground-water development in southeastern New Hampshire has been most successful in thick, saturated deposits of stratified drift composed of well-sorted sand and gravel. These deposits, which generally occur as ice-contact and outwash deposits, have relatively high hydraulic conductivity as well as high porosity, which allows water to move through them relatively rapidly. Finer grained lake, estuarine, and marine deposits have relatively low hydraulic conductivity because, despite high porosity, much of the water is retained in small pore spaces under capillary tension.

In the study basin, some thick sand and gravel deposits have substantial capacity to store ground water. In other aquifers where the saturated thicknesses and storage capacities are small, continual recharge is needed to sustain large-yield wells. In general, the saturated thickness of deposits in the Isinglass River valley are significantly less than those in the Ela and Cocheco River valleys.

Bedrock

The metamorphic rocks are hard and compact; they contain recoverable water only in open fractures (secondary porosity). The size, distribution, and degree of interconnection of these fractures are highly variable and the number generally decreases with depth. Thus, the capacity of bedrock to store water is variable, but relatively small and generally decreases with depth. Although wells penetrating bedrock commonly yield dependable supplies of good quality water for single family domestic needs, they do not yield enough water for municipal or industrial needs. There have been instances where bedrock wells could not supply domestic needs.

Studies indicate that there are no significant differences in the water-yielding characteristics of the various bedrock types in the basin (Bradley, 1964; Stewart, 1968). However, Stewart found that average well yield in metamorphic rocks in New Hampshire is slightly higher (13.4 gal/min) than in igneous rocks (10.3 gal/min). Systematic exploration may allow location of wells with relatively high yields (Cotton and Hammond, 1985). Zones where bedrock is extensively fractured may yield larger quantities of water. These zones are related to the geologic structure, such as the northeast- and northwest-trending faults. Published bedrock geology maps show some of the northeast-trending faults (Freedman, 1950; Billings, 1956; Novotny, 1969). Wells drilled in the brecciated zones may have above average yields, whereas wells drilled in silicified fault zones may have below-average yields.

Extension fractures occur within and adjacent to the fault zones and also aid in providing higher yields to wells. The northwest-trending faults have not been mapped systematically and no information has been published. Because brecciation is common, the delineation of these features may prove to be important in prospecting for water in the bedrock aquifer. Areas where faults intersect may prove to be the most productive zones.

GROUND-WATER RECHARGE AND DISCHARGE

All water in the study basin is derived from precipitation. Water leaves the basin by returning to the atmosphere through evapotranspiration or by surface flow in the Cocheco River, a tributary of the Piscataqua River. Water from precipitation may enter the Cocheco River and its tributaries by flowing over the land surface directly into streams, or indirectly by infiltrating the soil. Some of the water is retained as soil moisture and the rest percolates downward to the water table and becomes ground water. Ground water naturally moves through the pores of sediments and the fractures in bedrock to discharge into lakes, ponds, and streams. Downstream from Dover, ground-water discharge in the main valley is within the tidewater reach of the Cocheco River.

Hydrographs of water levels from observation wells illustrate the natural patterns of ground-water recharge and discharge (figs. 2, 3, and 4). A rising water table shows recharge to be greater than discharge during the nongrowing season. During the growing season, discharge exceeds recharge because most of the precipitation does not reach the water table, but is returned to the atmosphere through evapotranspiration.

Ground-water discharge is a substantial component of total streamflow and may be the only source of streamflow during dry periods. Measurements of streamflow during dry periods aid in assessing the ground-water resources of upstream drainage areas. Low-flow measurements were made in the basin in September 1982 (table 2; Blackey, Cotton, and Toppin, 1983). At this time, flow duration of the Oyster River (station 01073000), the nearest gaging station on an unregulated stream, varied from 84 to 88 percent. Measurements of the Ela River and the Cocheco River above Rochester were useful in estimating ground-water discharge. Regulation of streamflow affected the use of discharge measurements for evaluating ground-water resources at several sites. Release from surface storage in Bow Lake to the Isinglass River masked ground-water discharge to the upper part of the Isinglass River. Release from Ayers Pond restricted the usefulness of all measurements downstream, including the lower Cocheco River. The

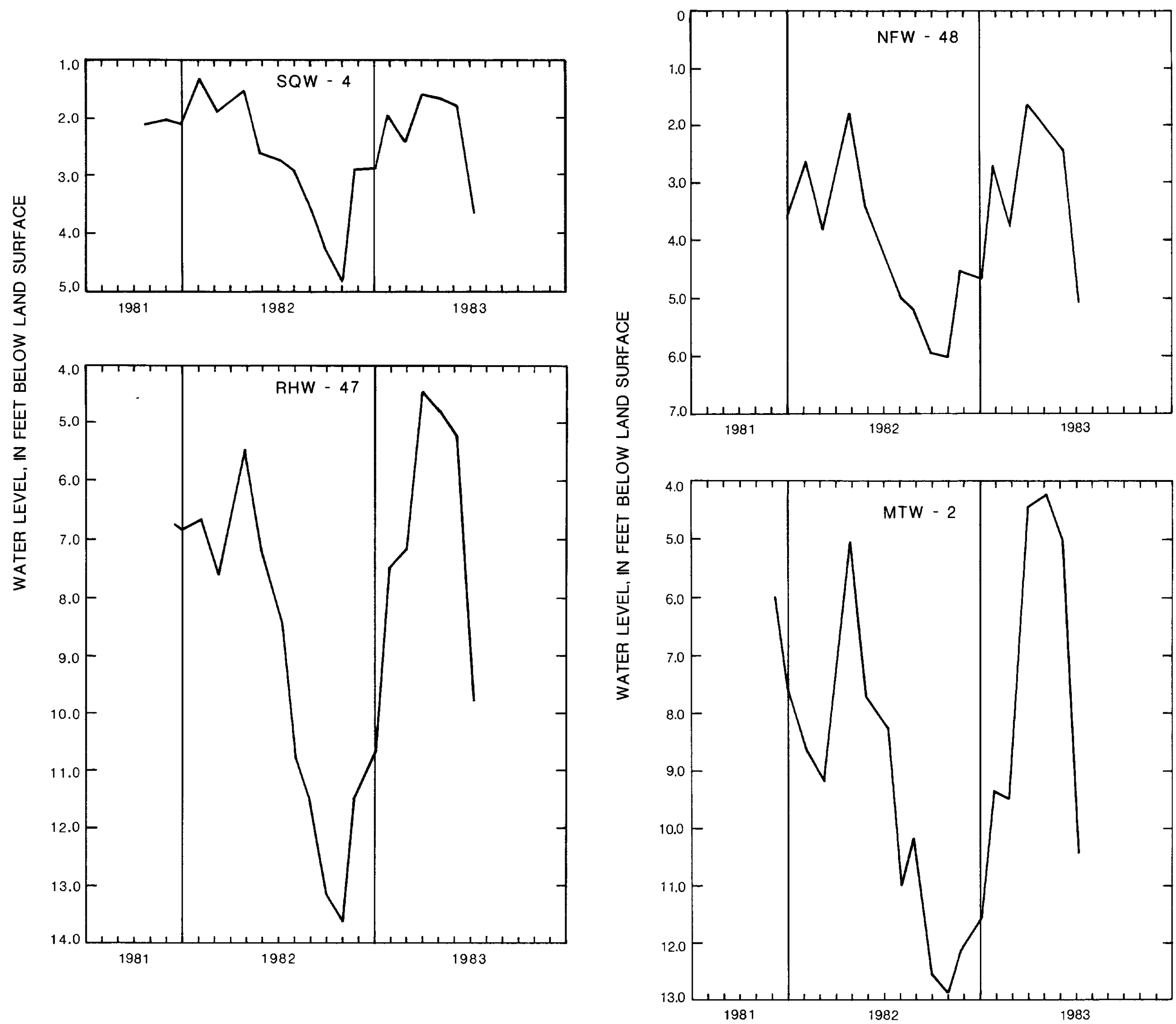

Figure 2.--Wells developed in till.

significance of low flows to each of the aquifer areas investigated is included in the description of the aquifers in the next section of this report.

DESCRIPTION AND WATER-YIELDING CHARACTERISTICS OF SELECTED STRATIFIED-DRIFT AQUIFERS

Stratified-drift aquifers are shown on plate 1. Water-yielding characteristics of these aquifers are expressed by ranges of estimated transmissivity--the rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient (Heath, 1983). Transmissivity is equal to the hydraulic conductivity of the aquifer multiplied by its saturated thickness. Judgements of both variations of hydraulic conductivity and saturated thickness result in broad ranges of generalized estimates of transmissivity.

Brief descriptions are given of selected stratified-drift aquifers in the main valleys of the Ela and Cocheco Rivers in the towns of New Durham and Farmington and in the cities of Rochester and Dover (pl. 1). Thin stratified-drift aquifers are described in the Isinglass River valley.

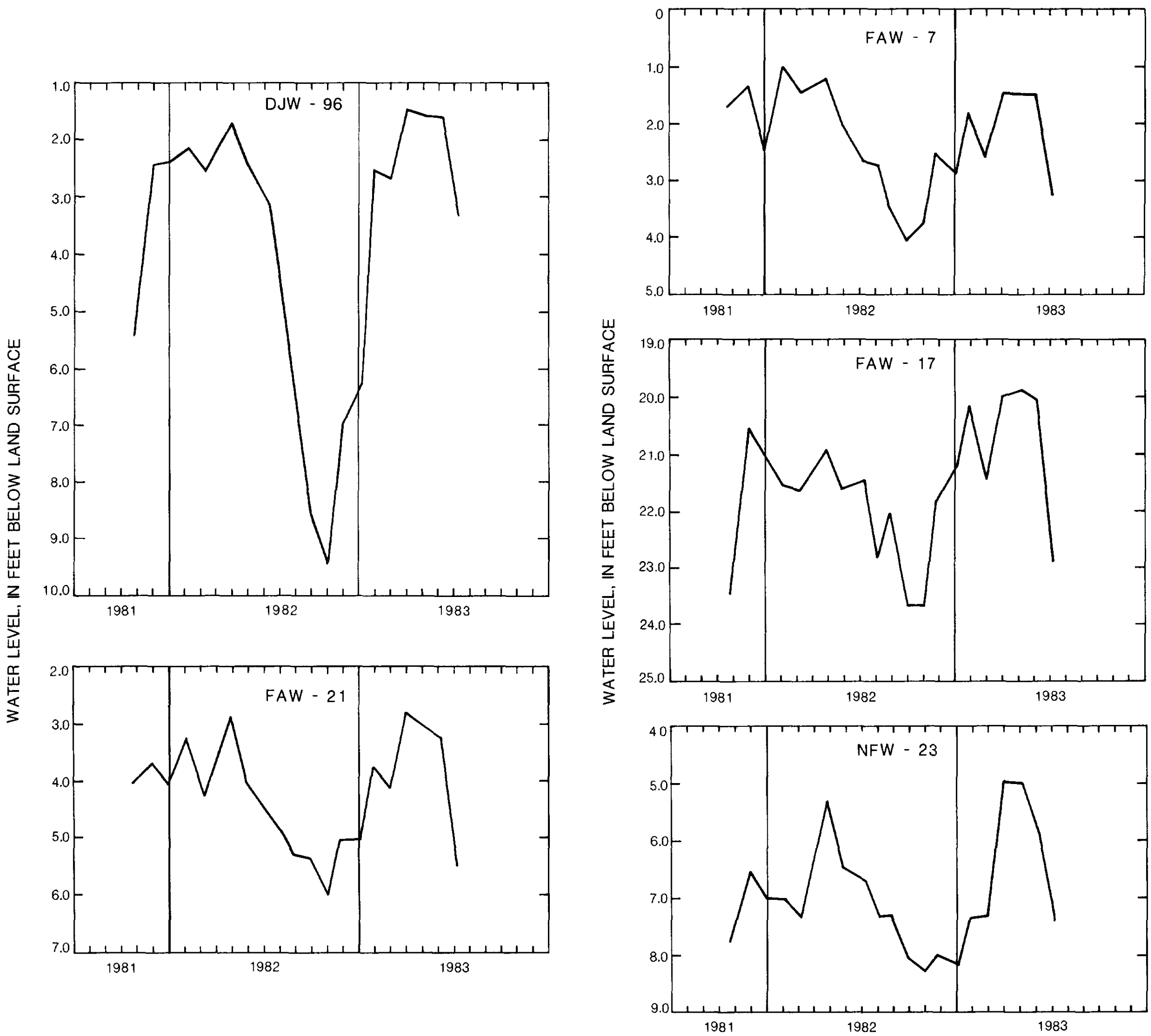

Figure 3.--Wells developed in sand and gravel.

Preliminary estimates of the total amount of water potentially available from stratified aquifers include that part of precipitation that falls directly on the aquifer and becomes ground water, water from adjacent areas of till and bedrock that enters the sand and gravel aquifer, and streamflow through the aquifer that might be induced to infiltrate the sand and gravel.

It has been estimated that nearly all of the precipitation that falls directly on a sand and gravel aquifer infiltrates the ground (Cervione, Mazzaferro and Melvin, 1972). Infiltrated water not needed to satisfy soil moisture requirements, that reaches the water table, is called direct recharge. Water lost through evapotranspiration comes from both soil moisture and ground water. Therefore, the amount of ground water potentially available for pumpage is less than the total direct recharge; this is called effective direct recharge. A summary of several studies in southern New England and New York (MacNish and Randall, 1982) indicates that about 50 percent of the average annual precipitation directly on a stratified-drift aquifer becomes effective recharge. Using this estimate and the fact that the average annual precipitation in the Cocheco River basin is about 43 inches or 2 (Mgal/d)/mi^2, effective recharge is estimated to be 1 (Mgal/d)/mi^2.

Indirect recharge to the stratified-drift aquifer is that water from till and bedrock areas that enters sand and gravel either as surface flow that infiltrates the sand and gravel or as lateral ground-water flow into the sand and gravel. A conservative estimate of indirect

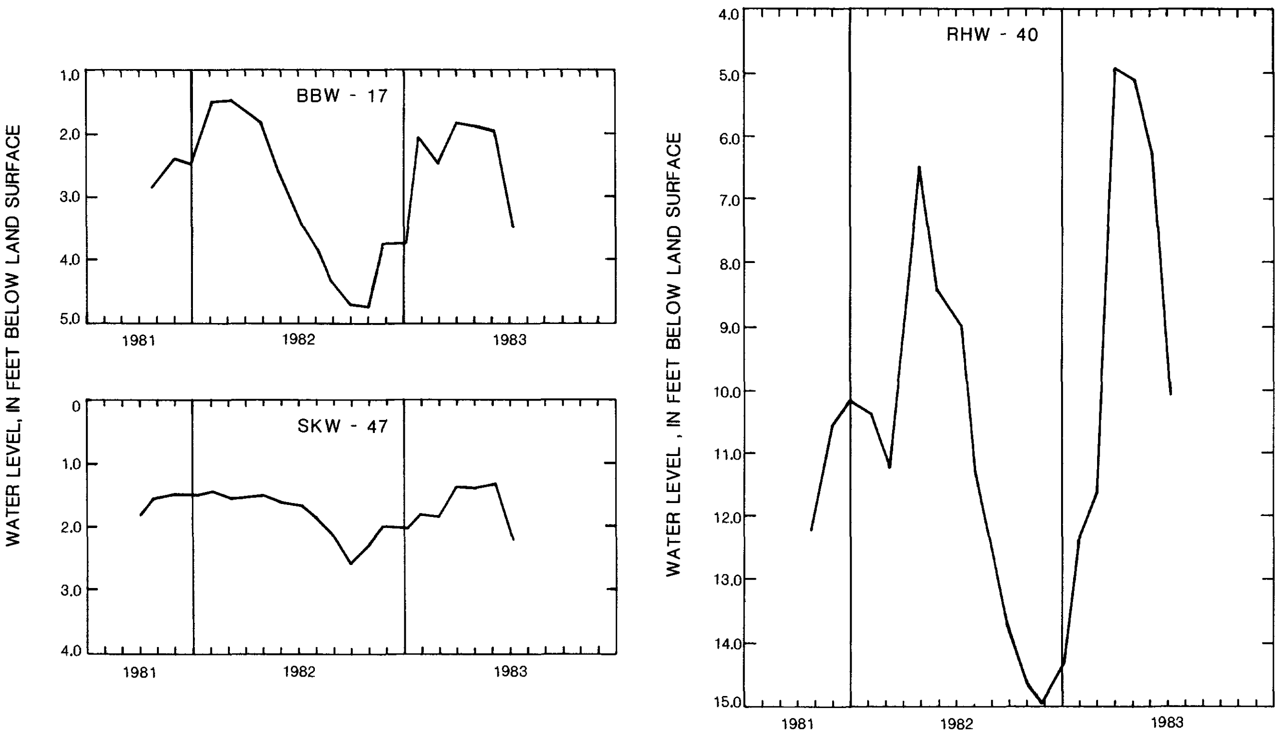

Figure 4.--Wells developed in fine sand, silt and clay.

recharge can be derived from ground-water discharge to a stream when the amount of streamflow is equaled or exceeded 85 percent of the time (85 percent flow duration). In September 1982, streamflow was measured in two drainage areas of predominantly till and bedrock. A flow of 0.06 $(ft^3/s)/mi^2$ (cubic feet per second per square mile) was measured at Mad River (table 2, informal site 15, station 01072730) which enters the Cocheco River just to the southeast of this area. A flow of 0.06 $(ft^3/s)/mi^2$ was also measured at Mohawk Brook (table 2, informal site 33, station 01072849). This value also equals the 84 percent flow duration of Mohawk Brook as determined from records at a discontinued gaging station (01072850). Indirect recharge within the study area is estimated to be 0.06 $(ft^3/s)/mi^2$ or 0.04 $(Mgal/d)/mi^2$.

Pumping wells located near streams can reverse the natural ground-water gradient and cause surface water to infiltrate the aquifer and flow toward the wells. This effect, known as induced recharge, can be used to increase well yields. To the extent that induced recharge occurs, streamflow is reduced. If all the streamflow at 85-percent duration became induced recharge then the stream would be dry 15 percent of the time under conditions of normal precipitation. However, during times of greater streamflow there could be a potential for larger amounts of induced recharge.

New Durham

A pronounced southeast-trending valley extends about 22 miles from Lake Winnipesaukee to Rochester. This valley drained meltwater from residual ice that occupied the Lake Winnipesaukee basin in late glacial times (Chapman, 1974, Cotton, unpublished paper, 1953). Since glaciation, a drainage divide within this valley at New Durham separates drainage into two basins. The Merrymeeting River drains northerly into Alton Bay, which is a drowned segment of the old glacial valley (pl. 1).

The southern 11 miles of the valley is within the present study area. The drainage divide between Merrymeeting and Ela Rivers is an undulating plain at the center of New Durham (pl. 1). Ice-contact sand and gravel is present in the southwestern third of the valley and outwash sand is present in the rest of the valley. The location of the ground-water drainage divide is not precisely known, but is probably close to the surface-water drainage divide. The water table is generally less than 10 feet below land surface. Near the divide, depth to bedrock is unknown, but is greater than 30 feet at well NFW-7 (table 6). Thus, the saturated thickness of the sand is at least 20 feet near the center of the present valley, and may be as much as 90 feet to the northeast where bedrock is reported to be 96 feet below the surface at the fire station, which is about 300 feet outside the valley.

About 1 mile to the southeast ice-contact gravels extend nearly across the valley (fig. 5) and saturated thickness may reach 120 feet at well NFW-10. Upstream and downstream from this section wetlands exist on outwash that is topographically lower than the ice-contact deposits.

The quantity of ground water potentially available from this aquifer is a function of the recharge from precipitation and the amount of streamflow in the Ela River that could be induced to infiltrate the aquifer. Both recharge from precipitation and induced infiltration are estimated using information from previous studies and assumptions regarding streamflow depletion. The sand and gravel aquifer in this part of the Ela River drainage occupies about 1.5 mi^2. Therefore, the average annual direct recharge for precipitation is estimated to be 1.5 Mgal/d [1 (Mgal/d)/mi^2 x 1.5 mi^2]. Indirect recharge to the sand and gravel aquifer from 3 mi^2 of adjacent till areas is estimated to be 0.12 Mgal/d. The basis for these estimates has been explained in the introductory statements of this section of the report.

The amount of water available as induced recharge from the Ela River was estimated from low streamflow measurements in September 1982. At this time the flow duration of the Oyster River was about 85 percent. Discharge measurements made at the Ela River below Club Pond (informal site 1, station 01072713) and at the downstream end of this aquifer (informal site 5, station 01072720) indicated a flow of about 1.0 ft^3/s (0.6 Mgal/d). High evapotranspiration loss from the wetlands within the aquifer was apparently equivalent to the ground-water discharge to this reach of the Ela River.

The water potentially available for withdrawal during years of normal precipitation equals the average annual recharge (1.6 Mgal/d) and the low flow of the Ela River (0.6 Mgal/d) or 2.2 Mgal/d. This estimate assumes that all the recharge from precipitation could be captured by wells and that the flow of the Ela River would be completely depleted within this area about 15 percent of the time. However, it is likely that more than 0.6 Mgal/d could be induced to infiltrate the aquifer during periods of higher streamflow.

Farmington

Where the Ela River enters the northwestern corner of Farmington it has a relatively steep gradient, and its channel is cut in till and bedrock along a 1.6-mile reach downstream from the aquifer in New Durham. About 0.5 mile southeast of the New Durham/Farmington town line the valley widens and thin outwash sands overlie till (fig. 6). The amount of sand and gravel increases an unknown amount southeast of this section.

The junction of the Ela and Cocheco Rivers is just upstream from the center of Farmington. The stratified drift is as much as 1.3 miles wide within the urban area, and there is a small till-covered hill in the middle of the valley (pl. 1). Ice-contact sands and gravels within this section of the stratified-drift aquifer are probably less than 50 feet thick west of the till-covered hill and may be greater than 60 feet thick to the north and east of the hill. Southeast of the hill the thickness exceeds 100 feet (fig. 7).

The aquifer narrows to about 0.6 mile about 1 mile southeast of the center of Farmington with till uplands 1 mile or more in width on either side. The thickness of the aquifer in the central part of the valley within this 3-mile reach of the river is unknown (fig. 8) except near the Rochester town line, where till is exposed beneath thin gravels in a gravel pit.

At present, Farmington withdraws about 0.3 Mgal/d from two wells in the northeastern part of the aquifer. Most of this water eventually returns to the Cocheco River. The estimated direct annual recharge to the sand and gravel aquifer in Farmington is 5.4 Mgal/d [1.0 (Mgal/d)/mi^2 x 5.4 mi^2] and indirect annual recharge from adjacent till areas is about 0.6 Mgal/d [0.04 (Mgal/d)/mi^2 x 13.9 mi^2]. The total annual recharge from both sources is 6.0 Mgal/d. If it is assumed that all surface water upstream from the aquifer is consumptively used, and therefore, not available for induced recharge and that all annual recharge could be captured by wells then 6.0 Mgal/d of water is available. This estimate is conservative because surface water in the Cocheco River could be induced to infiltrate the aquifer by properly placed wells.

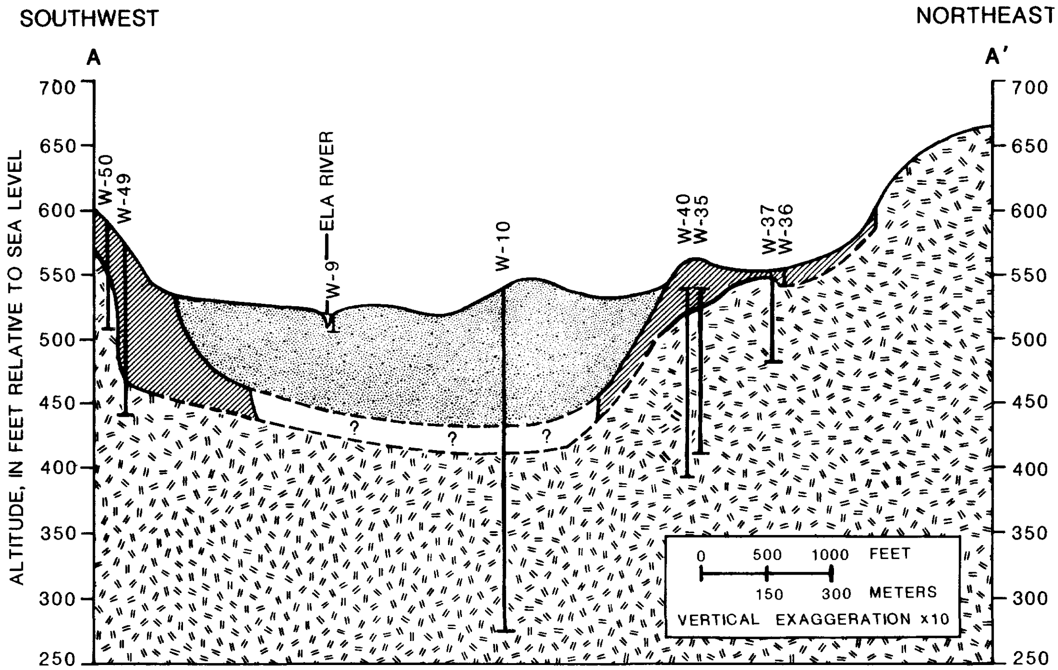

Figure 5.--Hydrogeologic section of the Ela River valley at New Durham.

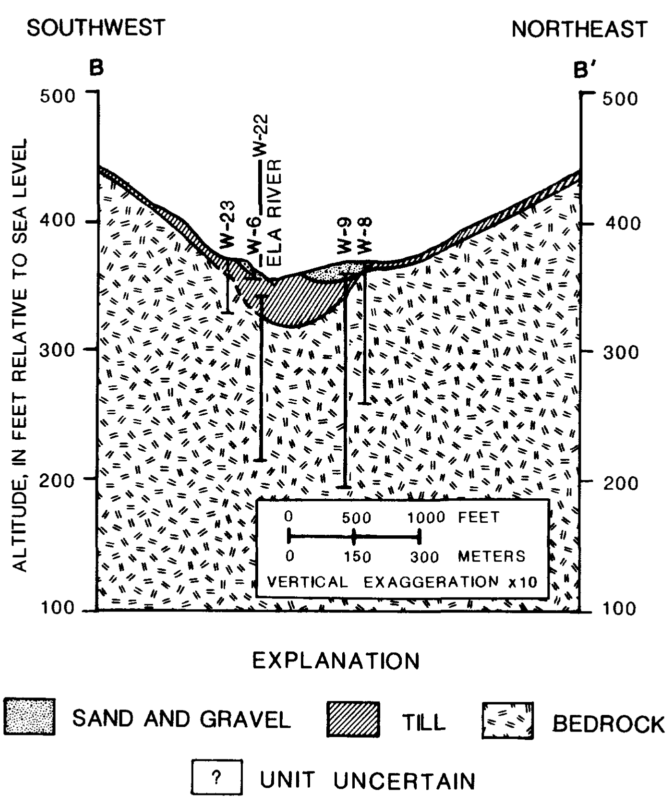

Figure 6.--Hydrogeologic section of the Ela River valley in northwest Farmington.

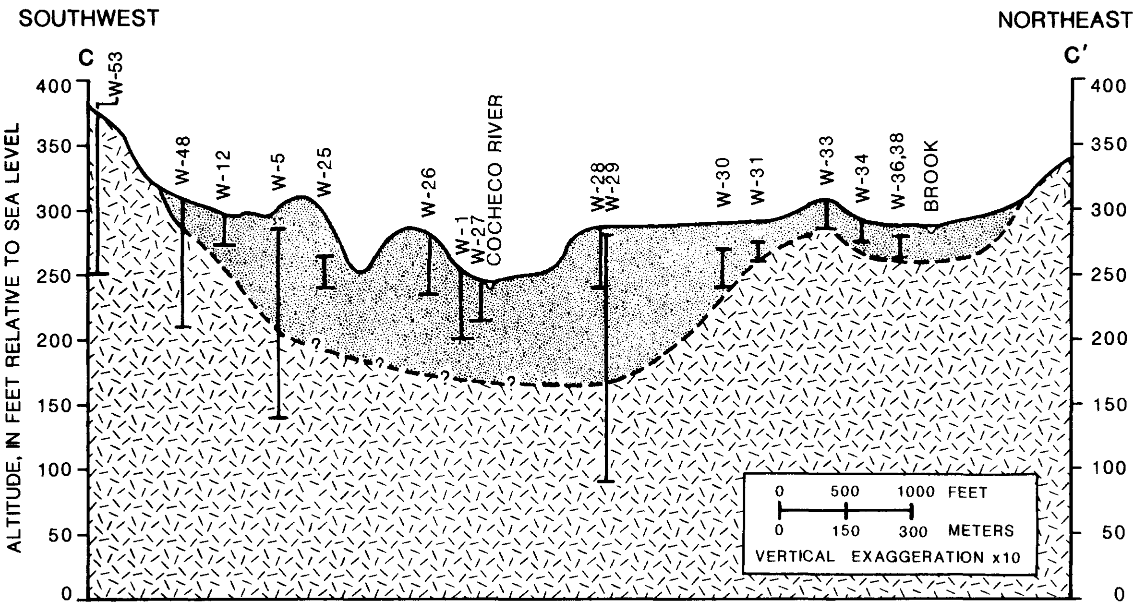

Figure 7.--Hydrogeologic section of the Cocheco River valley in Farmington.

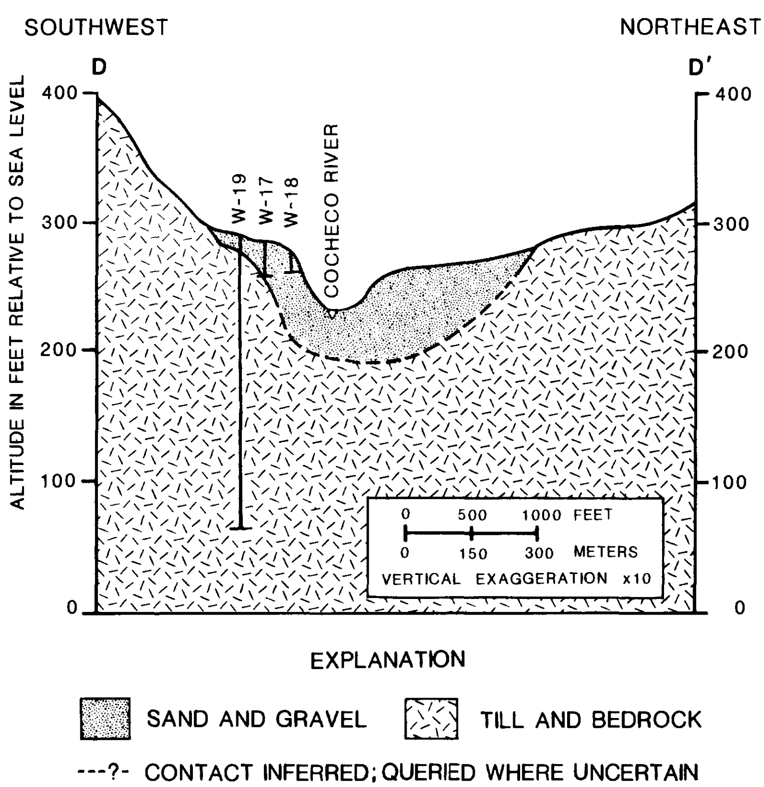

Figure 8.--Hydrogeologic section of the Cocheco River valley in southeast Farmington.

The amount of ground water available for withdrawal can also be estimated by measuring the gain in streamflow during lowflow periods when all water in the river is derived from ground-water discharge. Low-flow measurements were made during September 1982 when streams in the area were at the 85 percent flow duration. At that time the total gain in streamflow along the Cocheco River, where it crosses the sand and gravel aquifer in Farmington, was 9.1 ft^3/s or 5.9 Mgal/d.

Although the two different estimates of ground-water availability are similar [6.0 Mgal/d annual recharge vs. 5.9 Mgal/d (low flow)], both ignore short term depletion of storage in the aquifer, and therefore, are considered to be estimates of sustained yield.

Northern Rochester

About 1 mile southeast of the Rochester town line, the Cocheco River valley widens and a broad sand plain east of the river extends across the low topographic divide into the Salmon Falls River basin. Depth to bedrock beneath this plain is probably less than 40 feet (fig. 9).

Within the western part of the valley, sand and gravel may be more than 80 feet deep with a saturated thickness of more than 60 feet (fig. 9). The stratified-drift aquifer downstream of measurement site 26 (station 01072780) extends south into the urban part of Rochester. Although this part of the aquifer is about 5 mi^2 in area, only the western part (about 2 mi^2) has significant potential for production. Direct recharge to this portion of the aquifer is estimated at 2 Mgal/d [1 (Mgal/d)/mi^2 x 2 mi^2] and indirect recharge from bordering till areas to the west is estimated at 0.12 Mgal/d [0.04 (Mgal/d)/mi x 3 mi]. The flow of the Cocheco River at measurement site 26 near this section (pl. 1) in September 1982 was 13.7 ft^3/s, when the Oyster River was at about 85 percent flow duration. More than 5 Mgal/d of ground water might be withdrawn within a 1.5-mile reach of the river valley because of the area's large capacity to store water and the potential for induced recharge.

Southern Rochester

In southern Rochester, ice-contact sand and gravel forms terraces on the northern side of Rochester Neck. These deposits are flanked on the northeast by fine-grained marine deposits (fig. 10). Because a gravel pit near this site is currently the location of a sanitary landfill, it is unlikely that any ground-water withdrawal will be allowed. However, the relation of the ice-contact delta and marine deposits illustrated and documented here is believed to hold true elsewhere in the basin.

Deltas most likely formed contemporaneously with the early deposition of marine and estuarine silts and clays (Moore, 1978; 1982). This reduces the probability that extensive sand and gravel underlie the fine-grained deposits. Potential yield from this kind of aquifer is limited to direct recharge, indirect recharge from adjacent till areas, and induced recharge from streams that have eroded into the coarse-grained marginal areas of the deposit.

Southern Rochester and Western Dover

Sand and gravel form a water-table aquifer adjacent to the Cocheco River within The Hoppers area of east Barrington, western Dover and southern Rochester (fig. 11). This area consists predominantly of an ice-contact deposit that is part of a delta, which probably formed at the same time as adjacent marine deposits (Moore, 1978). In places, the sand and gravel is more than 100 feet thick and the saturated thickness may exceed 60 feet (fig. 11).

Dover has three municipal wells that withdraw about 1.8 Mgal/d from this 0.9 mi^2 area. There seems to be a hydraulic connection between this aquifer and the Cocheco River along a reach of about 1,500 feet where the river channel is adjacent to coarse-grained materials in the delta. However, fine materials in the river channel probably limits the amount of induced infiltration that can occur. This area is under full production; there is some consideration of pumping water from the Isinglass River to artifically recharge the aquifer so that withdrawal rates may be increased. (Dover Water Department, oral commun., 1983).

Dover

The broad valley of the Cocheco River and surrounding lowlands in the Dover area is underlain by very fine sand, silt, and clay of marine origin (fig. 12). These sediments overlie till and bedrock. Low till-covered hills rise above the plains. In places, as much

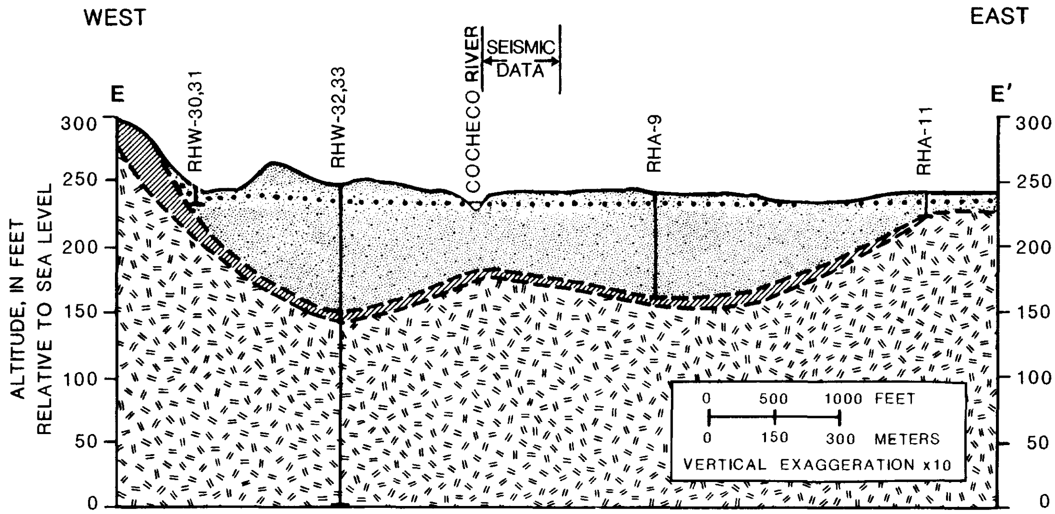

Figure 9.--Cocheco River valley in north Rochester.

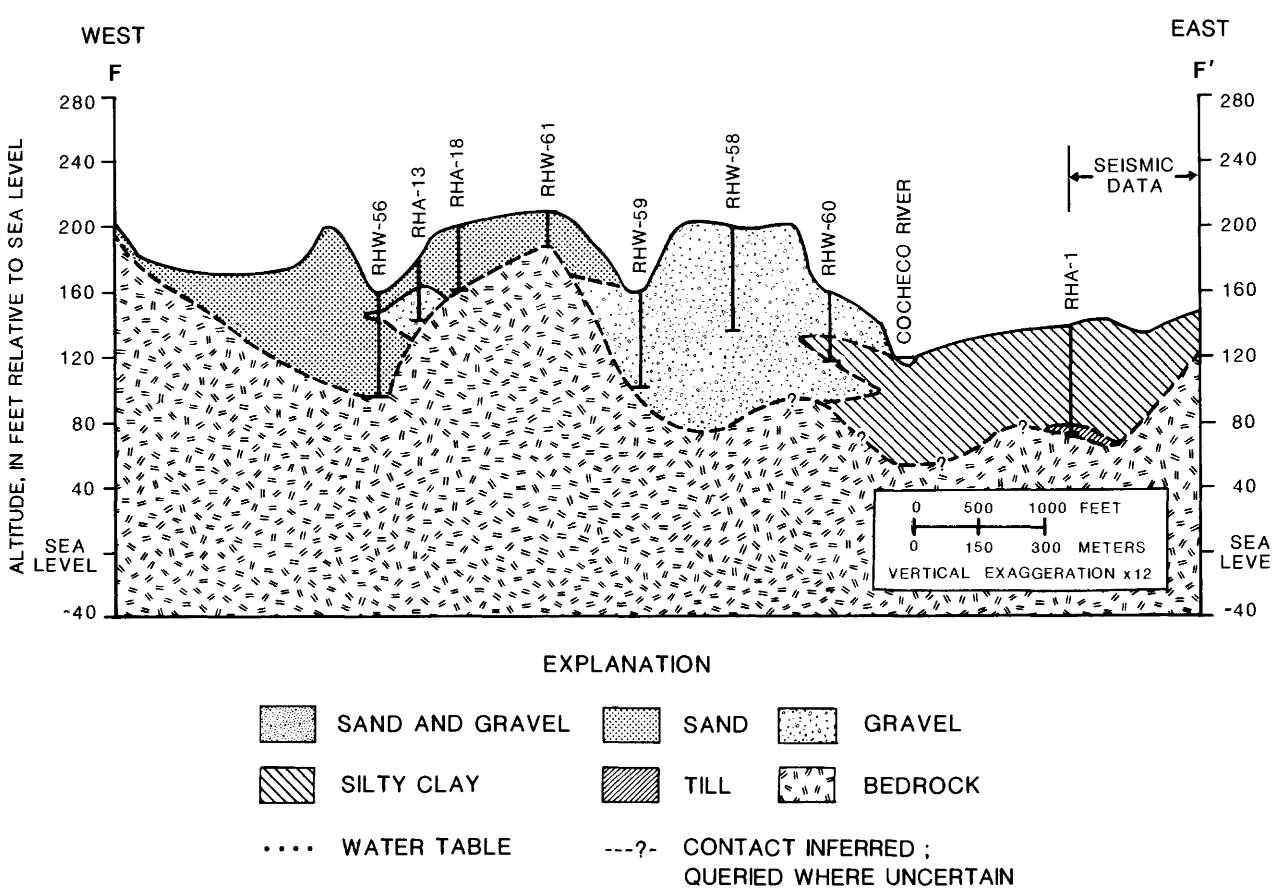

Figure 10.--Hydrogeologic section of the Cocheco River valley in south Rochester.

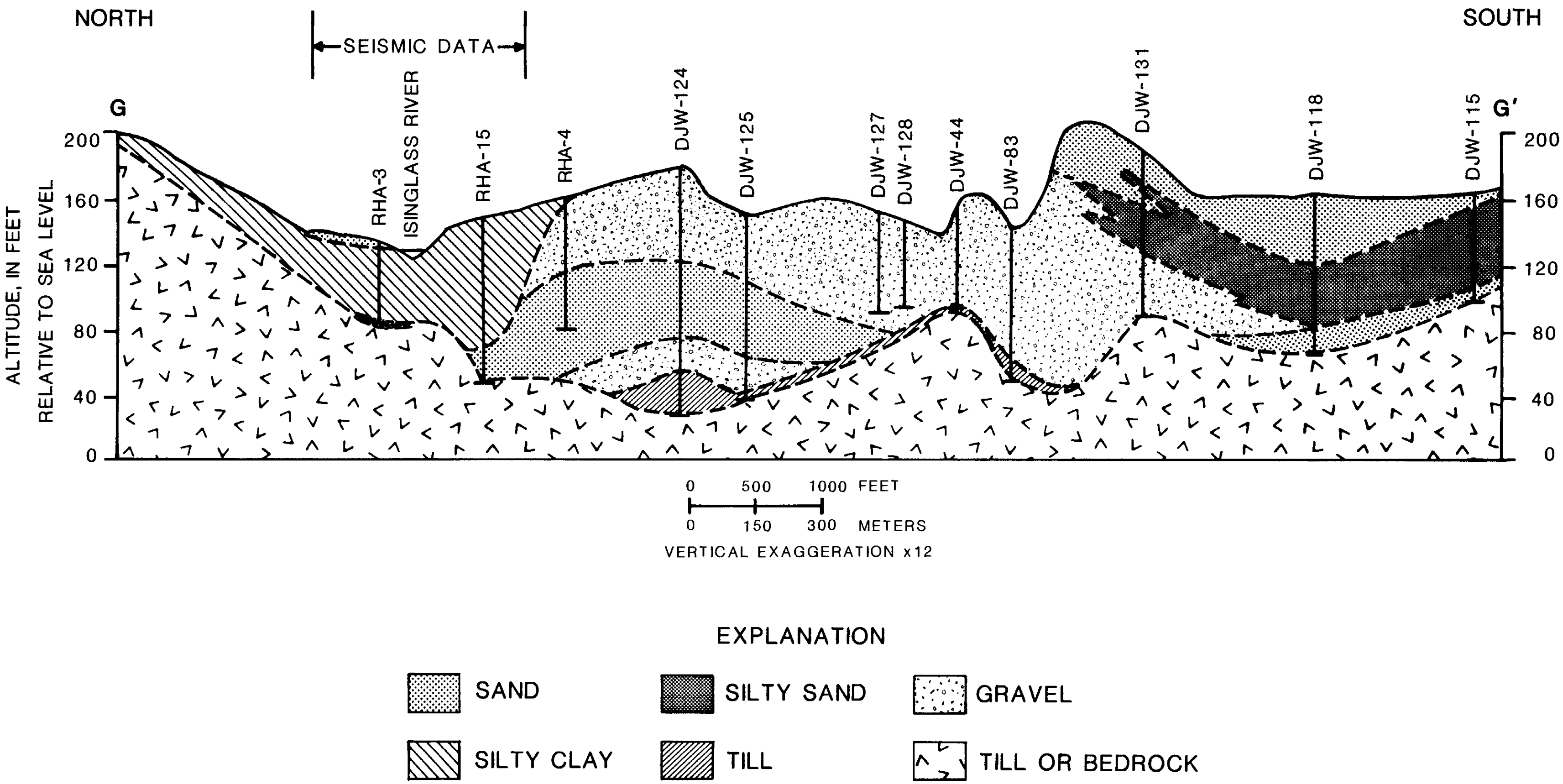

Figure 11.--Hydrogeologic section of the Isinglass River valley in south Rochester and west Dover.

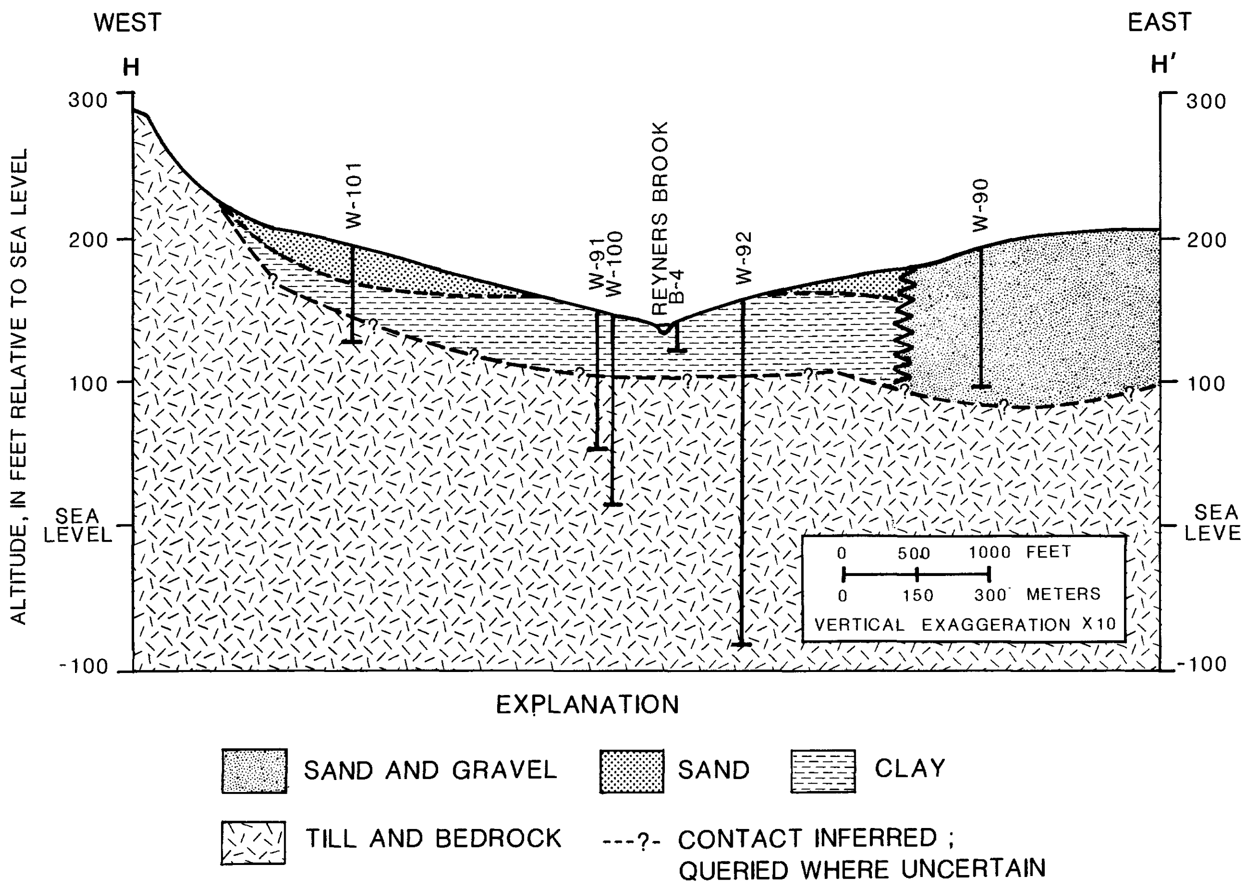

Figure 12.--Hydrologic section of the Reyners Brook valley in Dover.

as 30 feet of sand overlies the marine deposits. The saturated thickness of this water-table sand aquifer is apparently limited to a few feet, and only small water supplies can be developed. Domestic supplies from shallow dug or driven wells may not prove adequate during dry times.

Isinglass River Valley

In the Isinglass River valley, generally thin, stratified sand and gravel deposits form small water-table aquifers. Storage in some of these aquifers may be adequate to sustain short-term depletion, but storage may not be adequate in smaller aquifers. Low flow in the Isinglass River at State Highway 202 in Barrington was about 5.5 ft^3/s in September 1982 (table 2). This gain in flow of about 3.8 ft^3/s (2.5 Mgal/d) below the outlet of Bow Lake, is the maximum that could be potentially withdrawn from wells in these aquifers during years of normal precipitation.

GROUND-WATER QUALITY

General Description

Ground water in sand and gravel aquifers and bedrock aquifers in the Cocheco River basin generally is suitable for domestic uses. Most of it is clear and colorless, contains no suspended matter and few bacteria, and is low in dissolved-solids concentration. Ground-water samples from 24 sites were collected and analyzed for common constituents (table 3), trace elements, and some minor constituents (table 4). At six of these sites ground-water samples were analyzed for pesticides and organic substances (table 3). None of the six samples had concentrations above the detection limits given in table 3.

The common constituents and properties listed in table 3 are found in most natural sources of water. Few constituents have specific limits set in the national primary drinking water regulations by the U.S.

Environmental Protection Agency (1976). Fluoride has a maximum concentration limit of 2.4 mg/L; none of the samples were found to exceed that value. Individuals who are on very restricted sodium diets are cautioned to drink water with sodium concentrations less than 20 mg/L. The water samples from shallow dug wells RHW-47 and SQW-05 had sodium concentrations of 290 mg/L and 150 mg/L, respectively. Chloride concentrations in the samples from these two wells exceed the maximum recommended limit of 250 mg/L as set in the national secondary drinking water regulations (U.S. Environmental Protection Agency, 1979). These high levels of sodium and chloride are most likely the result of road deicing operations.

Water in unconsolidated deposits is generally weakly acidic and may be sufficiently acidic enough locally to be slightly corrosive to metal plumbing. The pH in 19 water samples from these deposits range from 4.8 to 7.0 and have a mean of 5.6.

Hardness of water caused by the presence of metallic ions causes a residue to form in containers in which water has been allowed to evaporate, and leaves an insoluble residue when used with soap. Although this is partly caused by the presence of calcium and magnesium ions, other metallic ions produce the same results. Total hardness is defined in terms of an equivalent amount of calcium carbonate. Most of the samples listed in table 3 are soft (less than or equal to 60 mg/L calcium carbonate) or moderately hard (60 to 120 mg/L calcium carbonate).

Nitrogen and phosphorous are nutrients that can stimulate growth of bacteria in surface waters. Unusually high concentrations of these nutrients in ground water may be caused by the use of fertilizers; or when coupled with high chloride levels may indicate pollution from septic systems or farm animals. No samples analyzed have concentrations above the nitrogen limit of 10 mg/L (U.S. Environmental Protection Agency, 1976).

The trace elements in table 4 are primarily metals that are rarely present in quantities greater than a few micrograms per liter in ground water. Maximum health standards established for some of these elements by the U.S. Environmental Protection Agency (1976, 1979) are listed in table 4. The analyses shows that most of the concentrations are below the maximum limits set by health standards and that most are also below the sampling detection limit. Notable exceptions are an arsenic concentration in well RHW-43 (43 µg/L-micrograms per liter) that approaches the maximum limit and a lead concentration in well RLW-24 (50 µg/L) that is at the maximum limit.

The U.S. Environmental Protection Agency standards for iron and manganese, 0.3 and 0.05 mg/L respectively, represent recommended maximum concentrations and not health standards (U.S. Environmental Protection Agency, 1979). Excessive amounts of iron and manganese may restrict the domestic usefulness of the water and render it aesthetically unappealing. Analysis of ground water by the New Hampshire Water Testing Laboratory and analyses listed in table 4 indicate that iron and manganese are often present in elevated concentrations.

Effect of Induced Recharge

The physical quality of water pumped from an aquifer that is partly recharged by surface water is not greatly affected by the physical quality of the surface water, with the exception of temperature. Suspended sediment, organic matter, turbidity, taste, and odor associated with the surface water are removed during its movement through bottom sediments and aquifer materials (Johnston and Dickerman, 1974). Color, if present in the surface water, may not be entirely removed. The temperature of the pumped water may vary according to seasonal fluctuations of the surface-water temperature and the time it takes the infiltrated water to reach the pumping well. Temperature of the pumped water will vary less than that of the surface water because of mixing with the ground water, which maintains a relatively constant temperature.

The chemical quality of withdrawn ground water commonly reflects the chemistry of both the infiltrated surface water and the ground water. Some dissolved chemical constituents in the infiltrated water may be altered or removed from solution by precipitation, absorption, exchange, or other processes as it migrates through the aquifer, but many chemical constituents retain their identity (Johnston and Dickerman, 1974). Concentrations of these constituents will change as a result of the mixing of the infiltrated water with ground water.

Infiltration of class A or B surface water does not adversely affect the quality of ground water withdrawn from production wells. New Hampshire's adopted-use classification for surface water in the basin is B, with the exception that Berry's River basin and Round Pond drainage are classified as A (table 5).

Waters do not always meet the quality standards associated with these classifications, but quality is improving. In 1975, the Cocheco River downstream from Farmington was below Class C standards, primarily due to the presence of untreated municipal wastes. The Isinglass River at Bow Lake and its lower reaches was tentatively classified C (New Hampshire Water Supply and Pollution Control Commission, 1975). By 1979, the Cocheco River from Farmington to northern Rochester had improved to Class C following the construction of a secondary sewage treatment facility in Farmington (New England River Basins Commission, 1979; New Hampshire Water Supply and Pollution Control Commission, 1979). In Rochester the river was classified C because of sewage discharge, and from Gonic downstream the river was still below Class C standards. The Isinglass River met Class B standards. By early 1986 the Cocheco River north of Rochester probably met Class B standards and the new secondary sewage treatment facility in Rochester was operating (Richard Flanders, New Hampshire Department of Environmental Services, Water Supply and Pollution Control Division, oral comm.). Because of this facility, water quality from Rochester to Dover may improve in the near future. The primary sewage treatment facility at Dover discharges to tidewater downstream from State Routes 9 and 16, but some combined stormwater/sewage outflow occurs to the Cocheco River above tidewater. Potential water-quality problems associated with discharges of industrial wastes are monitored by the New Hampshire Water Supply and Pollution Control Commission.

Ground-water withdrawal from areas near tidewater may cause reversal of the normal hydraulic gradient resulting in saltwater encroachment. However, small withdrawals from the till and bedrock aquifers in the area apparently have not resulted in any problems.

SUMMARY AND CONCLUSIONS

Communities in the Cocheco River basin are undergoing rapid population growth that is common to all communities in southeastern New Hampshire. The population of 11 cities and towns in the basin increased about 21 percent from 1970 to 1980. This growth is expected to continue. By 2020, municipal and private water demand may be 2 to 6 times greater than the present estimated 3.6 Mgal/d.

Saturated sand and gravel deposits in the Ela, Cocheco, and Isinglass River valleys are the most productive or potentially productive stratified-drift aquifers in the basin. Aquifers that underlie the Ela River valley may yield 2.5 Mgal/d, within the Cocheco River valley more than 10 Mgal/d, and within the Isinglass River valley 2.5 Mgal/d. Induced infiltration of stream water could increase sustained yields to properly placed wells. Wells with relatively high yields could be developed in highly fractured zones in bedrock.

The quality of ground water generally is suitable for most uses. Recent and anticipated continued improvement in surface-water quality should improve the water quality in those aquifers where pumpage causes induced recharge.

Chemical quality of ground water may reflect land-use practices. Judicious land-use planning could offer protection to the sand and gravel aquifers that occur within this basin.

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GLOSSARY

Aquifer: A formation, group of formations, or part of a formation that contains enough saturated permeable material to yield significant quantities of water to wells and springs. The unsaturated part of the permeable unit is part of the aquifer.

Anticlinorium: a composite regional structure composed of folded rocks, the center of which contains the older rocks.

Brecciated: A rock structure marked by the presence of angular fragments.

Deltaic deposit: A deposit of unconsolidated sediment which is sorted and stratified during the formation of the three components of a delta: bottomset beds, foreset beds, and topset beds. The bottomset beds are flat-lying and are, generally, the finest grained of the three. The foreset beds are well-sorted, cross-bedded, and make up the bulk of the delta. The flat-lying topset beds consist of channel and over-bank flood deposits.

Drawdown: The difference between nonpumping and pumping water level in a well.

Extension fracture: A fracture that develops perpendicular to the direction of greatest tension and parallel to the direction of compression.

Evapotranspiration: Loss of water from a land area through transpiration of plants and evaporation from the soil.

Flow duration: The time distribution of streamflow expressed as the frequency that a particular stream discharge is equaled or exceeded.

Hydraulic conductivity: The volume of water (at the existing kinematic viscosity) that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow. Expressed herein as cubic foot of water per square foot of cross-sectional area per day. These values may be converted to gallons per day per square foot by multiplying by 7.48.

Hydraulic gradient: The change in static head per unit of distance in a given direction. It is the slope of the water table.

Low flow: Sustained or fair-weather flow. In unregulated streams, this flow is composed largely of ground-water discharge.

Metavolcanic rock: A volcanic rock that has undergone mineralogical, chemical, and physical changes in response to marked changes in temperature, pressure, shearing stress and chemical environment at depth in the Earth's crust.

National geodetic vertical datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level."

Orogeny: The process by which the structures within mountain areas were formed, including thrusting, folding, and faulting in the outer and higher layers, and plastic folding, metamorphism, and plutonism in the inner and deeper layers.

Primary porosity: As used in this report, porosity that developed during the final stages of formation of surficial deposits.

Saturated thickness: The thickness of the saturated zone within an aquifer. In a sand and gravel aquifer it is the distance from the water table to the bottom of the sand and gravel.

Saturated zone: The subsurface zone in which all openings are full of water. In an unconfined aquifer the water table approximates the upper limit of this zone.

Secondary porosity: Porosity which may be due to such phenomena as secondary solution or structurally controlled regional fracturing.

Silicification: The introduction of, or replacement by, silica, generally resulting in the formation of fine-grained quartz, chalcedony, or opal, which may both fill pores and replace existing minerals.

Specific yield: The ratio of the volume of water that rock or soil, after being saturated, will yield by gravity drainage to the volume of the rock or soil; commonly expressed as a percentage.

Static water level: With respect to wells, the level of water maintained by natural pressure unaffected by pumping.

Stratified drift: Sorted and layered unconsolidated material deposited in meltwater streams flowing from glaciers or settled from suspension in quiet-water bodies fed by meltwater streams.

Strike: The direction or trend of a structural surface; for example, a bedding or fault plane, as it intersects the horizontal.

Suspended load: The part of the total sediment load in a stream that is carried in suspension, free from contact with the streambed; it consists mainly of mud, silt, and sand.

Sustained yield: The amount of water that can be withdrawn from an aquifer without producing an undesired result.

Transmissivity: The rate at which water (at the existing kinematic viscosity) is transmitted through a unit width of aquifer under a unit hydraulic gradient. It is equal to the product of hydraulic conductivity and saturated thickness. Expressed herein in cubic feet per day per foot or, more simply, feet squared per day. These values may be converted to gallons per day per foot by multiplying them by 7.48.

Table 1.--*Water levels in selected wells*

[Water levels are given in feet below land-surface datum]

STRAFFORD COUNTY

Barrington 17 (BBW-17)

Date	Water Level	Date	Water Level
1981		1982	
Oct. 21	2.84	Apr. 27	1.82
Nov. 30	2.39	May 26	2.59
Dec. 30	2.46	July 7	3.43
1982		Aug. 3	3.83
Feb. 4	1.50	Aug. 26	4.33
Mar. 8	1.48	Sept. 30	4.70

Dover 96 (DJW-96)

Date	Water Level	Date	Water Level
1981		1982	
Aug. 21	5.92	Apr. 27	1.71
Oct. 20	5.41	May 26	2.42
Nov. 30	2.43	July 7	3.13
Dec. 30	2.40	Aug. 2	4.75
1982		Aug. 26	6.23
Feb. 4	2.14	Sept. 30	8.92
Mar. 8	2.54		

Farmington 7 (FAW-7)

Date	Water Level	Date	Water Level
1981		1982	
Oct. 20	1.70	Apr. 27	1.21
Nov. 30	1.35	May 26	2.00
Dec. 30	2.49	July 7	2.65
1982		Aug. 3	2.71
Feb. 4	1.00	Aug. 26	3.47
Mar. 8	1.45	Sept. 30	4.06

Farmington 17 (FAW-17)

Date	Water Level	Date	Water Level
1981		1982	
Aug. 10	23.42	Mar. 8	21.62
Oct. 20	23.45	Apr. 27	20.93
Nov. 30	20.54	May 26	21.60
Dec. 30	20.96	July 7	21.46
1982		Aug. 3	22.81
Feb. 4	21.54	Aug. 26	22.02
		Sept. 30	23.66

Rochester 40 (RHW-40)

Date	Water Level	Date	Water Level
1981		1982	
Oct. 20	12.23	Apr. 27	6.49
Nov. 30	10.57	May 26	8.46
Dec. 30	10.18	July 7	8.99
1982		Aug. 2	11.28
Feb. 4	10.38	Aug. 26	12.27
Mar. 8	11.23	Sept. 30	13.75

Rochester 47 (RHW-47)

Date	Water Level	Date	Water Level
1981		1982	
Dec. 14	6.73	Apr. 27	5.48
Dec. 30	6.83	May 26	7.19
1982		July 7	8.44
Feb. 4	6.68	Aug. 3	10.81
Mar. 8	7.60	Aug. 26	11.45
		Sept. 30	13.15

STRAFFORD COUNTY

Farmington 21 (FAW-21)

Date	Water Level	Date	Water Level
1981		1982	
Oct. 20	4.02	Apr. 27	2.88
Nov. 30	3.68	May 26	3.99
Dec. 30	4.02	July 7	4.55
1982		Aug. 3	4.87
Feb. 4	3.25	Aug. 26	5.28
Mar. 8	4.24	Sept. 30	5.35

Milton 2 (MTW-2)

Date	Water Level	Date	Water Level
1981		1982	
Dec. 10	6.1	May 26	7.70
Dec. 30	7.62	July 7	8.27
1982		Aug. 3	11.01
Feb. 4	8.63	Aug. 26	10.18
Mar. 8	9.17	Sept. 30	12.53
Apr. 27	5.06		

New Durham 23 (NFW-23)

Date	Water Level	Date	Water Level
1981		1982	
Jan. 2	7.99	Apr. 27	5.32
Oct. 20	7.75	May 26	6.46
Nov. 30	6.53	July 7	6.68
Dec. 30	6.98	Aug. 3	7.30
1982		Aug. 26	7.28
Feb. 4	7.00	Sept. 30	8.04
Mar. 8			

New Durham 48 (NFW-48)

Date	Water Level	Date	Water Level
1981		1982	
Dec. 10	2.92	May 26	3.38
Dec. 30	3.62	July 7	4.41
Feb. 4	2.63	Aug. 3	4.99
Mar. 8	3.83	Aug. 26	5.17
Apr. 27	1.80	Sept. 30	5.94

Somersworth 47 (SKW-47)

Date	Water Level	Date	Water Level
1981		1982	
Sept. 30	1.81	Apr. 27	1.49
Oct. 30	1.57	May 26	1.59
Nov. 30	1.49	July 7	1.67
Dec. 30	1.50	Aug. 3	1.86
1982		Aug. 26	2.09
Feb. 4	1.44	Sept. 30	2.57
Mar. 8	1.53		

Strafford 4 (SQW-4)

Date	Water Level	Date	Water Level
1981		1982	
Oct. 21	2.11	Apr. 27	1.52
Nov. 30	2.03	May 26	2.60
Dec. 30	2.10	July 7	2.74
1982		Aug. 3	2.92
Feb. 4	1.32	Aug. 26	3.42
Mar. 8	1.88	Sept. 30	4.23

Table 2.–*Miscellaneous low-flow discharge measurements*

[A dash indicates no calculation]

Informal Site No. on plate 1 (t denotes tributary to the stream or river named above)	U.S.G.S. Station Number	Drainage area (square miles)	September 9-14, 1982 Discharge (cubic feet per second)	Discharge (cubic feet per second per square mile)	Date
Nippo Brook 36	01072846	–	0.16	–	9-14-82
Mohawk Brook 33	01072849	8.67	.52	0.06	9-14-82
Ayers Pond Brook 35	01072860	4.23	*22.4	*5.30	9-14-82
Islinglass River					
32	01072840	14.27	1.66	.12	9-14-82
34	01072858	48.67	5.54	.11	9-14-82
29	01072870	63.30	*22.9	*.36	9-13-82
Ela River					
1	01072713	2.72	1.02	.37	9-09-82
2 t	01072715	–	.05	–	9-09-82
3 t	01072718	–	.01	–	9-09-82
4 t	01072717	–	0	–	9-09-82
5	01072720	7.44	.81	.11	9-09-82
Dames Brook					
7 t	01072739	–	.06	–	9-09-82
9 t	01072745	–	ponded	–	9-09-82
8	01072740	6.60	.18	.03	9-09-82
Hightana Brook					
12 t	01072758	–	.02	–	9-09-82
13	01072757	–	.01	–	9-09-82
Mad River 15	01072730	10.22	.59	.06	9-10-82
Pokamoonshine Brook					
16 t	01072750	–	0	–	9-10-82
18 t	01072752	–	.03	–	9-10-82
19 t	01072754	–	.02	–	9-10-82
20 t	01072755	–	0	–	9-10-82
17	01072751	–	.03	–	9-10-82
Cocheco River					
6	01072710	21.30	2.88	.14	9-09-82
10 t	01072747	-	0	–	9-09-82
11 t	01072748	–	0	–	9-09-82
14	01072760	47.61	6.39	.13	9-09-82
21 t	01072766	–	.01	–	9-10-82
22 t	01072768	–	0	–	9-10-82
23 t	01072770	–	0	–	9-10-82
24 t	01072774	–	0	–	9-10-82
25 t	01072776	–	0	–	9-10-82
26	01072780	57.13	13.7	.24	9-10-82
27 t	01072783	–	.02	–	9-10-82
31	01072800	87.35	38.9	.45	9-13-82
30 t	01072810	–	.08	–	9-13-82
28	01072880	169.42	*56.2	*.33	9-13-82

* -Values reflect releases from Ayers Pond.

Table 3.--*Chemical analyses for common constituents of water samples from selected wells*

[mg/L is milligrams per liter; a dash indicates no analysis; Six samples analyzed for certain pesticides and organic substances did not have concentrations above the detection limits given at the bottom of the table]

Local Well Number (Locations are shown on plate 1)	Site identification number	Depth, in feet below land surface	Asterisk denotes samples analyzed for certain pesticides and organics	Specific Conductance in microsiemens per centimeter (μS/cm)	pH field (units)	pH Lab (units)	Calcium dissolved (mg/L) as Ca	Chloride dissolved (mg/L) as Cl	Fluoride dissolved (mg/L) as F	Sodium dissolved (mg/L) as Na	Magnesium dissolved (mg/L) as Mg	Hardness (mg/L) as $CaCO_3$	Nitrate, Nitrogen dissolved (mg/L) as N	Phosphorus total (mg/L) as P	Phosphorus total (mg/L) as PO_4	Sulfate dissolved (mg/L) as SO_4
Bedrock																
BBW-16	431439071003101	180		260	6.5	7.1	29	6.4	0.1	5.6	9.0	110	--	<0.01	--	16
DJW-91	431355070545301	101		276	5.8	6.7	19	55	<.1	27	4.2	65	--	.01	0.03	10
FAW- 8	432351071055101	112		26	5.6	6.2	5.0	1.5	<.1	2.1	0.8	16	--	.02	.06	2.2
NFW-26	432525071084801	250		390	7.8	7.8	43	61	.5	26	11	150	0.04	.01	.03	7.3
RHW-32	432010071001401	280		190	6.3	6.4	15	37	<.1	15	3.0	50	.03	.01	.03	10
Sand and gravel																
BBW-15	431500071051801	13	*	38	4.8	5.7	3.2	8.1	<.1	6.5	0.7	11	1.69	.02	.06	1.7
BBW-22	431406070584901	7		34	5.7	6.8	5.2	2.0	<.1	1.9	.4	15	--	.01	.03	7.1
DJW-94	431111070500501	14	*	46	5.0	6.6	8.7	6.0	.1	5.4	1.0	26	.11	<.01	--	11
FAW-18	432138071020001	12		84	5.8	6.3	9.0	17	<.1	11	.5	25	.43	.03	.09	7.5
FAW-25	432222071024501	23		37	4.9	6.4	2.6	7.1	<.1	5.4	.65	9	--	<.01	--	5.0
NFW-22	432557071091401	15	*	175	5.1	6.2	8.0	33	.1	22	1.6	27	--	<.01	--	4.6
RHW-33	432010071001402	28		34	5.4	6.1	1.7	8.5	<.1	6.5	.4	6	1.2	<.01	--	1.3
RHW-43	431704071004301	33		77	6.0	7.2	5.0	2.1	.2	5.4	1.9	21	--	.29	.89	15
RLW-24	431351070503701	10.6		139	7.0	7.9	22	7.5	.1	5.0	2.2	64	<.01	.04	.12	8.0
SKW-44	431437070535901	24	*	295	5.4	6.6	11	65	<.1	45	1.3	33	--	.02	.06	13
SQW- 7	431517071113801	6.4		190	6.7	7.8	35	4.1	.1	3.0	1.6	94	--	.03	.09	10
Till																
BBW-35	431212071061101	7.5		63	6.1	7.4	18	1.6	<.1	2.1	1.7	52	--	.04	.12	26
FAW-45	431923071041601	11.2		254	5.1	6.3	23	17	<.1	7.9	7.1	87	--	.01	.03	11
MLW- 3	432723071052701	14		285	5.6	6.9	24	59	.1	29	1.6	67	--	.01	.03	11
MTW- 2	432558071025001	13		55	5.0	5.9	4.9	10	<.1	6.2	.78	16	--	--	--	7.0
NFW-36	432533071081601	17	*	174	5.7	6.8	13	26	<.1	19	1.0	37	--	<.01	--	9.0
RHW-47	431736070572301	18		[1]1,770	5.4	6.0	39	[1]490	<.1	[1]290	7.4	130	--	<.01	--	<1.0
SQW- 5	431621071074801	17	*	[1]990	6.1	6.3	39	[1]260	.1	[1]150	8.1	130	--	--	--	22
Clay																
DJW-103	431352070561501	20		144	5.5	6.6	8.0	8.3	<.1	5.9	1.6	27	--	.04	.12	15
Mean[2]				251	5.7	6.6	16.3	49.7	.07	29.3	2.9	53	.50	.03	.12	9.69
Maximum				1,770	7.8	7.9	43	490	.5	290	11	150	1.69	.29	.89	26
Minimum				26	4.8	5.7	1.7	1.5	<.1	1.9	.4	6	<.01	<.01	.02	<1.0
Constituent				Aldrin	Chlorodene	DDD	DDE DDT	Dieldrin	Endosulfan	Endrin	PCB's PCN's	Heptachlor Epoxide	Hepta chlor	Methoxychlor	Mirex	Perthane
Detection Limit (μg/L) (PPB)				.01	.1	.01	.01 .01	.01	.01	.01	.1 .1	.01	.01	.01	.01	0

1 - Values exceed the national secondary drinking water regulations.
2 - Statistical means for data including "less than" values were computed following Gilliom and Helsel, 1984.

Table 4.--*Chemical analyses for trace elements of water samples from selected wells*

[μg/L is micrograms per liter; a dash indicates no analysis]

Well Number	Site identification	Silver[1] (μg/L)	Arsenic[1] (μg/L)	Barium[1] (μg/L)	Beryllium (μg/L)	Cadmium[1] (μg/L)	Cobalt (μg/L)	Chromium[1] (μg/L)	Copper[2] (μg/L)	Iron[2] (μg/L)	Manganese[2] (μg/L)	Molybdenum (μg/L)	Nickel (μg/L)	Lead[1] (μg/L)	Antimony (μg/L)	Selenium[1] (μg/L)	Strontium (μg/L)	Uranium (μg/L)	Zinc[2] (μg/L)
Bedrock																			
BBW-16	431439071003101	<1	1	8	1	1	1	10	7	10	10	<1	3	1	<1	<1	200	15.9	4
DJW-91	431355070545301	<1	1	10	1	1	3	<10	13	20	40	<1	3	2	<1	<1	120	0.06	10
FAW- 8	432351071055101	<1	6	4	1	1	2	10	27	10	2	<1	3	1	<1	<1	30	15.0	130
NFW-26	432525071084801	<1	0	40	1	1	3	10	1	180	50	5	3	2	<1	<1	1,500	1.2	4
RHW-32	432010071001401	<1	0	7	1	1	3	<10	1	7,100	230	<1	4	1	<1	<1	100	0.04	4
Sand and Gravel																			
BBW-15	431500071051801	<1	1	20	1	1	2	<10	3	60	10	<1	3	1	<1	<1	40	0.03	5
BBW-22	431406070584901	1	1	100	<10	<1	1	10	<1	210	30	<1	<1	1	<1	<1	100	.01	10
DJW-94	431111070500501	<1	1	20	1	1	5	<10	1	10	250	<1	6	1	1	<1	120	.11	9
FAW-18	432138071020001	<1	1	20	1	2	3	<10	9	10	40	<1	4	1	<1	<1	30	.06	8
FAW-25	432222071024501	<1	2	10	<1	<1	<1	10	3	<3	52	<1	1	1	1	<1	31	---	6
NFW-22	432557071091401	<1	2	100	<10	<1	2	10	10	20	20	<1	1	2	<1	<1	160	.08	20
RHW-33	432010071001402	1	1	4	1	2	4	<10	11	250	10	<1	3	2	<1	<1	30	.20	490
RHW-43	431704071004301	2	43	100	10	<1	2	10	1	1,900	330	<1	2	5	<1	<1	130	.01	20
RLW-24	431351070503701	<1	2	59	<1	<1	<1	10	14	5	3	1	2	50	<1	<1	40	---	200
SKW-44	431437070535901	<1	1	10	1	1	3	<10	14	10	1	<1	3	1	1	<1	80	.03	4
SQW- 7	431517071113801	<1	2	38	<1	<1	<1	10	1	<3	58	<1	1	1	<1	<1	190	---	<4
Till																			
BBW-35	431212071061101	<1	2	18	<1	<1	<1	<10	1	1,100	80	1	1	1	<1	<1	96	---	7
FAW-45	431923071041601	<1	1	21	<1	<1	<1	10	6	<3	11	2	13	2	1	<1	190	---	25
MLW- 3	432723071052701	<1	1	64	<1	<1	<1	10	4	<3	32	2	2	<1	<1	<1	130	---	12
MTW- 2	432558071025001	<1	1	19	<1	<1	<1	10	2	20	14	<1	1	1	1	<1	34	---	14
NFW-36	432533071081601	<1	2	[3]<50	<10	<1	<1	10	2	<10	10	<1	<1	1	<1	<1	210	.39	<10
RHW-47	431736070572301	<1	1	71	<1	<1	<1	10	4	60	92	<1	15	2	1	<1	370	---	130
SQW- 5	431621071074801	<1	1	50	1	2	3	10	2	10	130	<1	8	1	<1	<1	340	---	6
Clay																			
DJW-103	431352070561501	2	3	100	<10	<1	2	10	1	10	<10	<1	2	1	<1	<1	180	.13	10
	Mean[4]	([5])	3.2	39	([5])	.8	2.1	([5])	5.7	459	63	.6	3.7	3.5	([5])	([5])	185	2.22	48
	Maximum	2	43	100	([5])	2	5	([5])	27	7,100	330	5	15	50	([5])	([5])	1,500	15.9	490
	Minimum	<1	0	4	([5])	<1	<1	([5])	<1	<3	1	<1	<1	<1	([5])	([5])	30	.01	<4

[1]-Maximum concentration levels (in μg/L) listed in primary drinking-water regulations (U.S. Environmental Protection Agency, 1976): arsenic (50); barium (1,000); cadmium (10); chromium (50); lead (50); selenium (10); and silver (50).

[2]-Maximum concentration levels (in μg/L) listed in secondary drinking-water regulations (U.S. Environmental Protection Agency, 1979): copper (1,000); iron (300); manganese (50); and zinc (5,000).

[3]-This value was not used in calculations.

[4]-Statistical means for data including "less than" values were computed following Gilliom and Helsel, 1984.

[5]-Amounts found were not significant.

Table 5.--*Recommended-use classifications and water-quality standards for New Hampshire surface water*[1]

Class A: Potentially acceptable for water supply uses after disinfection. No discharge of sewage, wastes, or other polluting substances into waters of this classification. (Quality uniformly excellent.)

Class B: Acceptable for swimming and other recreation, fish habitat, and after adequate treatment, for use as water supplies. No disposal of sewage or wastes unless adequately treated. (High asthetic value.)

Class C: Acceptable for recreational boating, fishing, and industrial water supply with or without treatment, depending on individual requirements. (Third highest quality.)

	Class A	Class B	Class C
Dissolved oxygen	Not less than 75 percent of saturation, nor less than 6 ppm[2] in cold water fisheries.	Not less than 75 percent of saturation, nor less than 6 ppm[2] in cold water fisheries unless naturally occurring.	Not less than 5 ppm[2] in warm water fisheries, nor less than 6 ppm[2] in cold water fisheries unless naturally occurring.
Coliform bacteria	Not more than 50 coliforms per 100 ml unless naturally occurring.	Not more than 240 coliforms per 100 ml in fresh water, unless naturally occurring. Not morethan 70 coliforms per 100 ml in waters used for growing or taking of shellfish for human consumption.	Not to exceed an average value of 1,000 coliforms per 100 ml in any group of samples, nor shall any single sample exceed 2,500 coliforms per 100 ml except when such waters are subject to over flow from a combined sewer system or as naturally occurs.
pH (acidity-alkalinity)	As naturally occurs.	6.5-6.8 or as naturally occurs.	6.0-8.5 or as naturally occurs.
Substances potentially toxic	None unless naturally occurring.	Not in toxic concentrations or combinations.	Not in toxic concentration or combinations.
Sludge deposits	None.	No unreasonable kinds or quantities, unless naturally occurring.	No unreasonable kinds or quantities, unless naturally occurring.
Oil and grease	None.	No unreasonable kinds or quantity.	No unreasonable kinds or quantity.
Color	Not in unreasonable quantities, unless naturally occurring.	Not in unreasonable quantities, unless naturally occurring.	Not in unreasonable quantities, unless naturally occurring.
Turbidity	Not to exceed 5 standard units unless, naturally occurring.	Not to exceed 10 standard turbidity units in cold water fisheries. Not to exceed 25 standard turbidity units in warm water fisheries unless naturally occurring.	Not to exceed 10 standard turbidity units in cold water fisheries. Not to exceed 25 standard turbidity units in warm water fisheries unless naturally occurring.

Table 5.--*Recommended-use classifications and water-quality standards for New Hampshire surface water*[1]--Continued

	Class A	Class B	Class C
Slicks, odors, and surface-floating solids	None unless naturally occurring.	No unreasonable kinds, quantities, or duration unless naturally occurring.	No unreasonable kinds, quantities, or duration unless naturally occurring.
Temperature	No artificial rise.	NHF&GD, NEIWPCC, or NTAC-DI[3] requirements-whichever provides most effective control.	NHF&GD, NEIWPCC, or NTAC-DI[3] requirements-whichever provides most effective control.
Phosphorus	None, except as naturally occurs.	None in such concentrations[4] that would impair any usages assigned to this class, unless naturally occurring.	None in such concentrations[4] that would impair any usages to this class unless naturally occurring.
Gross Beta Radio-activity	Not greater than 1,000 picocuries[5] per liter.	Not greater than 1,000 picocuries[5] per liter.	Not greater than 1,000 picocuries[5] per liter.
Strontium-90	Not greater than 10 picocuries[5] per liter.	Not greater than 10 picocuries[5] per liter.	Not greater than 10 picocuries[5] per liter.
Radium-226	Not greater than 3 picocuries[5] per liter.	Not greater than 3 picocuries[5] per liter.	Not greater than 3 picocuries[5] per liter.
Phenol	Not to exceed .001 ppm[2]	Not to exceed .001 ppm[2]	Not to exceed .002 ppm[2]

[1]New Hampshire Water Supply and Pollution Control Commission, 1979. The waters in each classification shall satisfy all provisions of all lower classifications. These standards shall apply to all times except during periods when the receiving stream flows are less than the minimum average ten-day flow which occurs once in twenty years.

[2]ppm = parts per million

[3]NHF&GD - New Hampshire Fish and Game Department
NEIWPCC - New England Interstate Water Pollution Control Commission
NTAC-DI - National Technical Advisory Committee, Department of Interior

[4]Generally less than 0.015 ppm

[5]One picocurie is one trillionth of a currie, which is a standard measure of radioactivity.

Table 6.--*Records of selected wells and test wells*

[A dash indicates no data available; gal/min is gallons per minute]

Type of well: Dg, dug; Dn, driven or washed; Dr, drilled;
Use: D, domestic; I, industrial or commerical; O, observation; PS, public supply; T, test; U, unused
Remarks: B, reported in Bradley and Petersen, 1962; CA, chemical analysis (tables 3 and 4);
O, observation well, water levels in table 1; L, log (table 7); DD, drawdown; > = greater than

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					STRAFFORD COUNTY									
					Barrington									
BBW- 2	431347071000301	Taylor	1900	205	18.0	36	--	Dg	Sand, gravel	7.11	09-23-54	D	--	
BBW- 3	431421070592501	Pervis, E.L.	1900	195	13.8	36	--	Dg	Sand	5.56	09-23-54	--	--	
BBW- 5	431323070592401	Studley Estate	1900	260	17.3	36	--	Dg	Till	--	--	U	--	
BBW- 15	431500071051801	Fernald, Paul	--	270	12.8	36	--	Dg	Sand	11.45	08-18-81	D	--	CA
BBW- 16	431439071003101	Barr, John	1944	245	180	--	--	Dr	Bedrock	--	--	D	--	CA
BBW- 17	431422070591901	Landry, James	--	195	9.5	24	--	Dg	Sand	3.8	08-13-81	U	--	O
BBW- 18	431422070592401	Landry, James	--	190	7.3	--	--	Dg	Sand	3.6	08-13-81	U	--	
BBW- 19	431426070593701	Catlin, John	1972	205	125	--	--	Dr	Bedrock	--	--	D	5	
BBW- 20	431437070595301	Enderson, George	1965	195	13.1	30	--	Dg	Sand	7.81	08-13-81	D	--	
BBW- 21	431432070594801	Mears, Dorothy	1969	205	13.05	--	--	Dg	Sand	9.78	08-13-81	D	--	
BBW- 22	431406070584901	Greco, Thomas	--	145	7.3	36	--	Dg	Sand	4.78	09-01-81	D	--	CA
BBW- 23	431412070585101	Olsen, Bjorn	--	185	244	--	--	Dr	Bedrock	--	--	D	--	
BBW- 24	431433071010801	Whitney, James	1976	200	175	--	--	Dr	Bedrock	--	--	D	10	
BBW- 25	431433071010802	Whitney, James	1974	200	7.78	36	--	Dg	Sand	4.45	08-17-81	I	--	
BBW- 26	431412071024301	Andrews, Benjamin	1980	220	40	--	--	--	Bedrock	--	--	D	15	
BBW- 27	431414071024301	Power, James	--	220	19.1	--	--	Dg	Sand	17.08	08-14-81	D	--	
BBW- 28	431409071001201	Anderson, Phillip	--	210	11.3	--	--	Dg	Sand	10.25	08-14-81	U	--	
BBW- 29	431506071052101	Felker, Elliot	--	260	15	--	--	Dg	Sand	13.85	08-18-81	D	--	
BBW- 30	431202071064801	West, Ann	--	470	10.8	36	--	Dg	Till	5.68	08-27-82	U	--	
BBW- 31	431212071061701	Ferrara, Salvator	--	400	95	6	--	Dr	Bedrock	--	--	D	--	
BBW- 32	431201071065601	Scheu, Louise	1982	480	300	6	--	Dr	Bedrock	--	--	D	--	
BBW- 33	431201071065701	Scheu, Louise	1942	480	16.9	48	--	Dg	Till	7.79	08-31-82	U	--	
BBW- 34	431210071061001	Harty, Marty	--	418	8.75	31.2	--	Dg	Till	6.64	08-31-82	U	--	
BBW- 35	431212071061101	Harty, Marty	--	397	7.5	48	--	Dg	Till	4.73	08-31-82	D	--	CA
BBW- 36	431213071061101	Harty, Marty	--	400	8.05	36	--	Dg	Till	2.43	08-31-82	U	--	
BBW- 37	431213071061001	Harty, Marty	--	400	6.7	24	--	Dg	Till	2.14	08-31-82	U	--	
BBW- 38	431432071011401	Plummet, Sousie	--	200	26	--	--	Dn	Sand	--	--	D	--	
BBW- 39	431425071014801	Grossman, Kenneth	--	215	9.45	36	--	Dg	Till	7.34	11-10-82	D	--	
BBW- 40	431418071043701	Michael, Robert, Jr.	1971	230	7.05	--	--	Dg	Till	5.30	11-10-82	D	--	
BBW- 41	431410071051301	Ford, Daryl	1977	285	125	6	9	Dr	Bedrock	--	--	D	10	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					Barrington--Continued									
BBW- 42	431426071051101	Downs, William	1982	250	6	--	--	Dn	Sand, gravel	--	--	D	--	
BBW- 43	431355071052201	MacDougal, Edward	1972	315	10	--	--	Dg	Till	--	--	D	--	
BBW- 44	431429071023601	Siddal, David	--	250	14	36	--	Dg	Till	--	--	D	--	
BBW- 45	431428071030401	Hamlin, Dwight	--	215	10.75	36	--	Dg	Sand, gravel	7.43	12-08-82	D	--	
BBW- 46	431428071030402	Hamlin, Dwight	1980	215	12.5	42	--	Dg	Sand, gravel	7.92	12-08-82	D	--	
BBW- 47	431436071024701	Paradis, Richard	1980	250	125	6	12	Dr	Bedrock	--	--	D	--	
						Dover								
DJW- 1	431357070561001	Poulin, A.	--	165	17.7	42	--	Dg	Till	17.06	09-30-53	U	--	
DJW- 6	431305070532501	Dover, City of	1940	180	85	18	--	Dr	Sand, gravel	26.04	03-04-54	PS	630	L, B, Smith Well
DJW- 17	431323070572002	U.S.Corps of Engineers	1952	150	29.1	2	--	Dn	Sand, gravel	6.67	01-28-54	O	--	
DJW- 24	431345070535401	Strafford Farms Dairy	1953	203	30	--	--	Dr	Sand, gravel	16	00-00-54	I	--	
DJW- 26	431339070543701	McCarthy, J. V.	1900	183	25	36	--	Dg	Till	14.3	08-15-54	U	--	
DJW- 27	431118070501501	Three Rivers Farm	1905	15	10.5	60	--	Dg	Sand	3.12	03-09-54	D	--	
DJW- 28	431240070552701	Tebbetts, Parker	1900	165	13.5	36	--	Dg	Sand	7.27	09-27-54	D	--	
DJW- 29	431231070563101	Stanley, Walter	1900	145	12.5	36	--	Dg	Sand	7.55	09-27-54	D	--	
DJW- 30	431208070522901	General Ice-Cream Corp	1930	68	400	8	140	Dr	Bedrock	--	--	U	20	
DJW- 31	431303070532101	Dover, City of	1931	180	85	18	--	Dr	Sand, gravel	25	00-00-54	PS	610	Cummings Well
DJW- 32	431234070560801	U.S.Corps of Engineers	1952	125	--	2.5	37	Dn	Clay, sand	--	--	O	--	L, B
DJW- 42	431315070564301	U.S.Corps of Engineers	1952	120	31	8	31	Dr	Sand, gravel	--	--	O	--	L, B
DJW- 44	431324070571301	U.S.Corps of Engineers	1952	160	64	8	64	Dr	Sand, gravel	17.1	00-00-52	O	--	L, B
DJW- 66	431211070540001	Taylor, Obed	1931	105	181	--	20	Dr	Bedrock	--	--	D	3.5	B
DJW- 67	431122070512701	Rousseau, John	1936	130	129	--	46	Dr	Bedrock	--	--	D	7	B
DJW- 71	431135070523601	Hayden, W.F.D.	1931	55	223	--	25	Dr	Bedrock	--	--	D	--	
DJW- 72	431325070572001	U.S.Corps of Engineers	1952	150	61	8	61	Dr	Sand, clay	2.9	00-00-52	O	--	L, B
DJW- 80	431343070535301	Strafford Farms Dairy	1948	203	595	--	90	Dr	Bedrock	--	--	U	5	L, B
DJW- 83	431321070570701	U.S.Corps of Engineers	1952	135	91	8	91	Dr	Sand, gravel	15.4	00-00-52	O	--	L, B
DJW- 90	431352070541801	Hatch, Charley	1964	185	96	6	--	Dr	Bedrock	--	--	D	--	
DJW- 91	431355070545301	Smith, Barbara	1974	170	101	--	--	Dr	Bedrock	--	--	D	--	CA
DJW- 92	431401070544101	Staples, William	1959	160	240	--	--	Dr	Bedrock	--	--	D	--	
DJW- 93	431121070500601	Davis, John	1978	50	16.65	36	--	Dg	Sand	7.05	08-19-81	D	--	
DJW- 94	431111070500501	Hallett, Ashton	1977	42	14.4	36	--	Dg	Sand	7.24	08-19-81	D	--	CA
DJW- 95	431441070545301	Noel, Joseph	1965	170	4.8	24	--	Dg	Sand	3.11	08-21-81	D	--	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					Dover--Continued									
DJW- 96	431419070545801	Colby, Ester	1964	180	12.2	42	--	Dg	Sand	5.92	08-21-81	U	--	O
DJW- 97	431405070555501	Smith, Ray	1956	180	9.85	--	--	Dg	Sand	2.43	08-21-81	D	--	
DJW- 98	431421070545601	Graves, Elmore	1963	175	176	--	--	Dr	Bedrock	--	--	D	--	
DJW-100	431359070545201	Hale Jr., Ralph	1978	158	150	--	--	Dr	Bedrock	--	--	D	--	
DJW-101	431355070551701	Cawley, Harvey	--	200	90	--	--	Dr	Bedrock	--	--	D	--	
DJW-102	431404070560401	Day, George	1971	185	192	--	--	Dr	Bedrock	--	--	D	7	
DJW-103	431352070561501	Cate, Herbert	--	165	19.6	--	--	Dg	Clay	15.4	08-26-81	D	--	CA
DJW-104	431335070562901	Namnoun, John	--	155	14	30	--	Dg	Till	--	--	D	--	
DJW-105	431329070563101	Smith, James	--	150	17.1	--	--	Dg	Sandy silt	--	--	D	--	
DJW-106	431109070510001	Thurston	--	50	110	6	30	Dr	Bedrock	--	--	D	--	
DJW-107	431116070504601	McManus, Pat	--	35	120	--	5	Dr	Bedrock	--	--	D	--	
DJW-108	431056070503601	Wyndham, Charles	1962	70	157	6	27	Dr	Bedrock	--	--	D	15	
DJW-109	431056070503301	Hodgeton	--	80	28	30	--	Dg	Till	5.38	12-17-81	D	--	
DJW-110	431054070502801	Merrill, Richard	1977	80	125	--	70	Dr	Bedrock	--	--	D	25	
DJW-111	431050070501901	Merrill	--	65	18.3	24	--	Dg	Till	1.84	12-17-81	D	--	
DJW-112	431048070502201	Hunt, William	--	85	23.4	--	--	Dg	Till	9.42	12-17-81	D	--	
DJW-113	431333070570201	Robidas, Joseph	1980	160	130	6	--	Dr	Bedrock	--	--	D	--	
DJW-114	431353070552101	Poulin, Alfred	--	200	16	48	--	Dg	Sand	--	--	D	--	
DJW-115	431243070571201	Dover, City of	1981	145	62	1.5	68	Dn	Sand	16	07-29-81	O	--	L
DJW-116	431243070571202	Dover, City of	1981	145	15	1.5	--	Dn	Sand	--	--	O	--	
DJW-117	431257070570401	Dover, City of	1981	150	25	1.5	--	Dn	Sand	5.9	08-03-81	O	--	
DJW-118	431257070570402	Dover, City of	1981	150	94.5	--	96.2	--	Sand	26	09-02-81	O	--	L
DJW-119	431248070565301	Dover, City of	1981	140	100	--	101.2	--	Sand	20	09-03-81	O	--	L
DJW-120	431248070565302	Dover, City of	1981	140	36	--	--	--	Sand	27	09-03-81	O	--	
DJW-121	431240070565601	Dover, City of	1981	145	35	--	116.5	--	Sand	6	09-04-81	O	--	L
DJW-122	431237070570801	Dover, City of	1981	150	55	--	--	--	Sand	8	09-08-81	O	--	L
DJW-123	431342070570201	Dover, City of	1976	120	45	--	115	Dr	Sand	10	11-23-76	O	--	L
DJW-124	431338070570601	Dover, City of	1976	180	141	--	156	Dr	Sand,silt,clay	61	11-24-76	O	--	L
DJW-125	431333070571001	Dover, City of	1976	160	87	--	114	Dr	Sand	37	12-01-76	O	--	L
DJW-126	431328070571501	Dover, City of	1976	175	59.8	--	62.5	Dr	Sand	13.8	12-07-76	O	--	
DJW-127	431329070571401	Dover, City of	1976	175	60	--	--	Dr	Sand	13.8	12-07-76	O	--	L
DJW-128	431327070571401	Dover, City of	1977	175	59	--	--	Dr	Sand, gravel	13.5	03-03-77	O	--	L
DJW-129	431326070571501	Dover, City of	1977	175	50	--	--	Dr	Sand, gravel	10.5	03-04-77	O	--	
DJW-130	431325070571401	Dover, City of	1977	175	90	8	97	Dr	Sand	39.2	03-29-77	T	322	L, PS
DJW-131	431312070570601	Dover, City of	1970	180	74	--	102	Dr	Sand, gravel	36	00-00-70	PS	--	L, Calderwood Well
DJW-132	431320070565101	Dover, City of	1970	150	74	--	--	--	Sand, gravel, clay	34.5	00-00-70	T	--	L

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
Farmington														
FAW- 1	432237071024501	Farmington, Town of	1944	255	55	24	--	Dr	Sand, gravel	12	00-00-44	PS	315	L, B
FAW- 2	432247071025601	Farmington, Town of	1938	257	15	240	15	Dg	Sand	9	00-00-38	PS	250	L, B
FAW- 3	432303071031601	Lefours Estate	--	314	14	42	--	Dg	Sand, gravel	4.05	04-05-54	U	--	
FAW- 4	432128071015001	Hooper, Ted	1825	285	25.7	36	--	Dg	Sand, gravel	23.77	04-05-54	D	--	L, B
FAW- 5	432213071023601	American Oil Company	1955	285	223	8	78	Dr	Bedrock	40	00-00-55	D	8	L, B
FAW- 6	432353071061001	Woods, Kenneth	--	370	12	--	--	--	Sand	3.75	08-07-81	D	--	
FAW- 7	432353071061002	Woods, Kenneth	--	375	7	24	--	Dg	Sand	3.34	08-07-81	U	--	O
FAW- 8	432351071055101	Cameron, James	1971	375	112	6	10	Dr	Bedrock	--	--	D	--	CA
FAW- 9	432346071054301	Welch, Richard	--	360	165	6	19	Dr	Bedrock	30	11-00-79	D	5	
FAW- 11	432216071023501	Cardinal	--	260	--	--	--	Dn	Sand, gravel	--	--	D	--	
FAW- 12	432216071025001	Goodwin, Eugene	--	290	16.5	36	--	Dg	Sand	13.66	08-10-81	D	--	
FAW- 13	432215071025701	Hazeltine, June	--	290	--	6	--	Dr	Sand, gravel	--	--	D	--	
FAW- 14	432317071025501	Urquhart, Andrew	--	300	--	--	--	Dr	Bedrock	--	--	D	--	
FAW- 15	432145071020901	Johnson	--	290	260	6	--	Dr	Bedrock	--	--	D	--	
FAW- 16	432138071020401	Snyder, Warren	1974	290	190	6	--	Dr	Bedrock	--	--	D	8	
FAW- 17	432135071020101	Dureault, Charles	--	285	27	55	--	--	Sand, gravel	23.12	08-10-81	U	--	O
FAW- 18	432138071020001	Dureault, Charles	1955	270	12.1	55	--	Dg	Sand, gravel	4.6	08-21-81	D	--	CA
FAW- 19	432128071015601	Moores, Sterling	--	290	225	6	12	Dr	Bedrock	--	--	D	--	
FAW- 20	432150071021501	Goslin	1971	300	165	--	--	Dr	Bedrock	--	--	D	--	
FAW- 21	432300071031401	Mabey, James	--	315	9.7	24	--	Dg	Sand, gravel	4.02	10-20-81	U	--	O
FAW- 22	432340071054701	Shaw, Albert	1972	340	125	6	16	Dr	Bedrock	16	00-00-72	D	7	
FAW- 23	432344071060001	Tarrants, Simone	1969	370	40	--	--	Dr	Bedrock	--	--	D	--	
FAW- 24	432232071024201	Staples, Wayne	--	250	14	1.25	--	Dn	Sand, gravel	--	--	D	--	
FAW- 25	432222071024501	Tanner, Floyd	--	265	23	--	--	--	Sand, gravel	--	--	D	--	CA
FAW- 26	432232071024501	Cardinal, Leo	--	255	17.5	1.25	--	Dn	Sand, gravel	--	--	D	--	
FAW- 27	432235071024001	Brooks, Kenneth	1980	250	35	--	--	--	Sand, gravel	--	--	D	--	
FAW- 28	432236071022301	Robinson, Donald	1956	285	45	--	--	--	Sand, gravel	--	--	--	--	
FAW- 29	432239071022601	Pitre, Germaine	1966	280	187	6	--	Dr	Bedrock	--	--	D	--	
FAW- 30	432246071021901	Cardinal, John H.	--	270	28.3	60	--	Dg	Sand, gravel	--	--	I	--	
FAW- 31	432248071021601	Pike, Alvah	1979	275	16	1.25	--	Dn	Sand, gravel	--	--	D	--	
FAW- 32	432251071021401	Dube, Peter	1980	285	300	6	--	Dr	Bedrock	--	--	D	--	
FAW- 33	432250071020901	Gaskell, George	1922	305	18.6	36	18.6	Dg	Sand, gravel	10.05	05-12-82	U	--	
FAW- 34	432251071020501	Gaskell, George	1977	290	9.35	36	--	Dg	Sand, gravel	3.84	05-12-82	D	--	
FAW- 35	432257071020901	Perkins, Mark	--	285	12	42	--	Dg	Sand, gravel	1.31	05-12-82	D	--	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					Farmington--Continued									
FAW-36	432256071020801	Brown, Walter	1962	282	7.2	48	--	Dg	Sand, gravel	--	--	D	--	
FAW-37	432255071020701	Glover, William	1975	280	151	6	--	--	Sand, gravel	--	--	D	--	
FAW-38	432254071020501	Buttrick, Lewis	--	285	9.7	36	--	Dg	Sand, gravel	4.15	05-12-82	D	--	
FAW-39	432248071015901	Lapierre, Victor	1977	305	10.4	36	--	Dg	Sand, gravel	5.05	05-12-82	D	--	
FAW-40	432247071020001	Lapierre, Victor	1977	290	10.1	36	--	Dg	Sand, gravel	1.8	05-12-82	PS	--	
FAW-41	432247071015801	Lapierre, Victor	1977	300	22.3	42	--	Dg	Sand, gravel	7.88	05-12-82	PS	--	
FAW-42	432246071015701	Lapierre, Victor	1977	302	19.7	60	--	Dg	Sand, gravel	4.52	05-12-82	PS	--	
FAW-43	431944071040801	Covey, Debra	1962	707	265	--	--	Dr	Bedrock	--	--	D	--	
FAW-44	431945071040901	Covey, Debra	--	710	26.7	36	--	Dg	Till	24.10	08-31-82	U	--	
FAW-45	431923071041601	Mazza, Ethyl	1949	665	11.2	84	8	Dg	Till	4.33	08-31-82	D	--	CA
FAW-46	432220071025601	--	1957	290	54	--	10	Dr	Bedrock	6	--	D	>40	
FAW-47	432216071025002	--	1958	290	180	--	10	Dr	Bedrock	4	--	D	8	
FAW-48	432213071025201	--	1963	310	100	--	20	Dr	Bedrock	10	00-00-63	D	14	
FAW-49	432213071023602	--	1953	285	42	--	42	--	Sand, gravel	4	00-00-53	D	10	
FAW-50	432202071022501	--	1953	300	16	--	16	--	Sand, gravel	2	00-00-53	D	4	
FAW-51	432138071020402	--	1952	290	71	--	71	--	Sand, gravel	65	00-00-52	D	--	
FAW-53	432205071025401	--	1961	380	132	--	30	Dr	Bedrock	--	--	D	7	
FAW-54	432053071035601	--	1959	660	105	--	14	Dr	Bedrock	--	--	--	7.5	
FAW-55	432013071053301	--	1959	730	100	--	15	Dr	Bedrock	8	00-00-59	D	30	
FAW-56	432309071055501	--	1959	420	85	--	4	Dr	Bedrock	3	00-00-59	D	10	
FAW-57	432316071054501	--	1959	430	90	--	10	Dr	Bedrock	--	--	D	10	
FAW-58	432322071052001	--	1958	360	79	--	2	Dr	Bedrock	5	00-00-58	D	>40	
FAW-59	432301071043001	--	1958	360	130	--	8	Dr	Bedrock	10	00-00-58	D	7	
FAW-60	430415071040001	--	1958	460	80	--	2	Dr	Bedrock	15	00-00-58	D	2	
FAW-61	430410071035301	--	--	440	282	--	36	Dr	Bedrock	--	--	D	30	
FAW-62	432449071040401	--	--	520	148	--	36	Dr	Bedrock	10	--	D	6	
FAW-63	431917071035501	--	--	620	152	--	34	Dr	Bedrock	20	--	D	>90	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					Farmington--Continued									
FAW-65	432309071042301	Farmington, Town of	1981	320	28	2.5	--	--	Gravel	2.8	09-02-81	O	75	
FAW-66	432309071042302	Farmington, Town of	1981	320	36	2.5	--	--	Gravel	2.8	09-03-81	O	340	
FAW-69	432247071030201	Farmington, Town of	1980	370	20	2.5	--	--	Sand,gravel,silt	4	11-26-80	O	35	
FAW-71	432236071025101	Farmington, Town of	1980	380	52	2.5	--	--	Gravel	6	12-10-80	O	50	
FAW-72	432323071030601	Farmington, Town of	1973	260	39	2.5	--	--	Sand,gravel,silt	2	09-07-73	O	--	
FAW-73	432323071030602	Farmington, Town of	1973	260	47	2.5	--	--	Sand,silt,gravel	1	09-10-73	O	--	
FAW-74	432323071030603	Farmington, Town of	1973	260	40	2.5	--	--	Sand, gravel	2	09-27-73	O	--	
FAW-75	432323071030604	Farmington, Town of	1973	260	42	2.5	--	--	Sand, gravel	2.4	09-28-73	O	30	L
					Middleton									
MLW- 1	432641071051501	Nicola, Harold	--	705	98	--	--	Dr	Bedrock	--	--	D	30	
MLW- 2	432641071051502	Nicola, Harold	--	710	20	36	--	Dg	Till	11.9	12-03-81	U	--	
MLW- 3	432723071052701	Lapierre, Frank	--	740	14	36	--	Dg	Till	5.01	10-21-81	D	--	CA
					Milton									
MTW- 1	432556071024701	Dunton, Charles	--	795	275	--	0.5	Dr	Bedrock	--	--	D	12	
MTW- 2	432558071025001	Dunton, Charles	--	790	13	--	--	Dg	Till	6.1	12-10-81	U	--	CA, O
MTW- 3	432553071024301	Taffe, J.	--	815	110	--	0	Dr	Bedrock	--	--	D	--	
MTW- 4	432529071022401	Burrows	--	840	137	--	--	Dr	Bedrock	--	--	D	15.5	
MTW- 5	432527071022101	Howland, Karen	--	845	485	--	--	Dr	Bedrock	--	--	D	1	
MTW- 6	432528071021801	Marchant	--	865	--	--	--	Dr	Bedrock	--	--	D	--	
MTW- 7	432507071024301	Sargent, Roger	--	745	13.3	--	--	Dg	Till	8.07	12-10-81	D	--	
MTW- 8	432515071024001	Eldridge, William	--	775	120	6	8	Dr	Bedrock	--	--	D	14	
					New Durham									
NFW- 3	432542071095601	Swett, Fred	--	522	6.5	36	--	Dg	Sand	2.9	12-30-82	D	--	
NFW- 4	432540071095701	Swett, Fred	--	525	17.1	--	--	--	Sand	12.81	12-30-82	U	--	
NFW- 5	432539071095301	Hersam, Richard	--	522	11.4	30	--	Dg	Sand	8.05	12-30-82	D	--	
NFW- 6	432542071095101	Rollins, Doris	--	523	12.2	36	--	Dg	Sand	7.75	12-30-82	D	--	
NFW- 7	432534071095501	Hockady, Frank	--	528	30	--	--	Dn	Sand	--	--	D	--	
NFW- 8	432530071095401	Barnes, Leonard	1974	517	7.7	36	--	Dg	Sand	5.2	01-02-81	D	--	
NFW- 9	432508071084901	Horne, David	--	510	5.9	--	--	Dg	Sand	2.6	12-30-80	D	--	
NFW-10	432526071084901	Cristophore, Richard	1975	538	266	6	130	Dr	Bedrock	--	--	D	--	Suspect 130 ft DTB-maybe 13 ft
NFW-11	432535071085301	Lapanne, Norman	1977	525	8.5	36	--	Dg	Sand, gravel	3.0	01-02-81	D	--	
NFW-12	432544071085001	Atwood, Clifford	--	540	13.4	--	--	Dg	Till	10.51	12-31-80	D	--	
NFW-13	432542071084701	Burrill, L.	--	556	14.5	30	--	Dg	Till	8.1	12-31-80	U	--	
NFW-14	432551071085001	Ayers	--	565	13	30	--	Dg	Till	9.97	12-31-80	U	--	
NFW-15	432549071085601	Garland, William	1977	530	5.7	36	--	Dg	Till	1.52	12-31-80	D	--	
NFW-17	432554071090601	FISH/GAME,Farmington	1930	532	18	--	--	Dn	Sand	11.9	12-31-80	D	--	
NFW-18	432555071090801	FISH/GAME,Farmington	1979	533	12.1	26	--	Dg	Sand	--	--	D	--	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
					New Durham--Continued									
NFW-19	432527071095801	Clarke, Robert	1978	540	23.5	--	--	Dn	Sand	--	--	D	--	
NFW-20	432528071095601	Clarke, Robert	--	528	--	--	--	Dg	Sand	7.5	01-02-81	U	--	
NFW-21	432531071085501	Coleman, Sandy	1978	535	15	2	--	Dn	Sand, gravel	--	--	D	--	
NFW-22	432557071091401	Reed, Earl	--	539	15	--	--	Dn	Sand	--	--	D	--	CA
NFW-23	432557071091402	Reed, Earl	--	543	10.1	30	--	Dg	Sand	7.99	01-02-81	U	--	O
NFW-24	432558071091801	Blaisdell, Paul	1978	545	10	--	--	Dn	Sand	--	--	D	--	
NFW-25	432559071092601	Laney, Frank	1954	548	100	--	20	Dr	Bedrock	40	--	D	--	
NFW-26	432525071084801	Phillips, Donald	1975	555	250	--	--	Dr	Bedrock	--	--	D	9	CA
NFW-27	432556071094101	Gault, John	1944	545	22	--	--	Dn	Sand	--	--	D	--	
NFW-31	432601071092301	Sennott, Mark	1978	570	130	0.5	--	Dr	Bedrock	35	09-00-78	D	--	
NFW-32	432537071083801	Dion, Edna	1970	538	--	--	--	--	Bedrock	--	--	D	10	
NFW-33	432537071082801	Randall, Clayton	1976	535	128	--	8	Dr	Bedrock	--	--	D	--	
NFW-34	432537071082802	Randall, Clayton	--	535	7.3	--	--	--	Till	2.75	08-05-81	D	--	
NFW-35	432529071082401	Drew, Wilbur	1961	540	130	6	--	Dr	Bedrock	--	--	D	--	
NFW-36	432533071081601	Hayes, Warren	1961	555	16.85	36	--	Dg	Till	6.3	08-05-81	D	--	CA
NFW-37	432531071081403	Drew, William	1971	570	85	6	--	Dr	Bedrock	--	--	D	--	
NFW-38	432531071081402	Drew, William	--	570	8	30	--	Dg	Till	1.3	08-05-81	U	--	
NFW-39	432531071081401	Drew, William	--	570	12.8	--	--	Dg	Till	10.25	08-05-81	U	--	
NFW-40	432534071083401	Randall, Roswell	1970	540	148	8	18	Dr	Bedrock	--	--	D	--	
NFW-41	432534071080902	Munroe, David	--	605	11.4	--	--	Dg	Till	4.27	08-06-81	D	--	
NFW-42	432534071080901	Munroe, David	--	605	13.25	--	--	Dg	Till	6.95	08-06-81	D	--	
NFW-43	432523071073401	Pike, Mrs. Cecil	--	640	19.9	--	19.9	Dg	Till	13.7	08-06-81	U	--	
NFW-44	432530071075701	Bickford, George	--	665	100	--	--	Dr	Bedrock	--	--	D	30	
NFW-45	432435071061801	Rogers	--	642	13.6	36	--	Dg	Till	3.49	12-03-81	D	--	
NFW-46	432430071061001	Gelinas, William	--	625	133	6	0	Dr	Bedrock	--	--	D	5	
NFW-47	432430071061002	Gelinas, William	--	625	16.5	30	--	Dg	Till	6.98	12-03-81	D	--	
NFW-48	432441071062401	Ward, Earl	--	645	10.5	36	--	Dg	Till	2.92	12-10-81	U	--	O
NFW-49	432500071091101	Berry, Elmer	1979	565	120	6	100	Dr	Bedrock	--	--	D	--	
NFW-50	432500071091201	Berry, Dennis	--	570	60	8	--	Dr	Bedrock	32	00-00-68	D	--	
					Rochester									
RHW- 2	431630070594501	Pizzaro Estate	1925	230	12	36	--	Dg	Sand	9.48	10-19-53	D	--	
RHW- 3	431520070580501	Mont Calvaire Cemetery	--	190	9.8	36	--	Dg	Sand	8.10	10-20-53	I	--	
RHW- 6	431902070592203	Rochester, City of	1947	225	64	6	--	Dr	Sand, gravel	5.58	12-21-53	O	--	L,B
RHW- 8	431818070583501	People's Market	1932	235	207	8	80	Dr	Bedrock	14.98	12-21-53	I	12	
RHW- 9	431902070592001	Rochester, City of	1947	223	99	6	--	Dr	Sand, gravel	2.11	04-29-54	O	--	L, B

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
						Rochester--Continued								
RHW-11	432033071011601	Cook, Ernest	1900	265	23.5	36	--	Dg	Sand, gravel	18.58	07-12-54	D	--	B
RHW-12	431900070575201	MacLeod, R. M.	1949	250	12.5	24	--	Dg	Till	5.05	07-13-54	D	--	B
RHW-14	432022070594701	Tebbets, Mary	--	248	16.6	36	--	Dg	Sand, gravel	13.30	09-16-54	U	--	B
RHW-15	431539070564301	U.S. Geological Survey	1954	240	9.5	1	--	Dn	Sand	3.56	09-15-54	O	--	B
RHW-19	431651070581501	Flagg, Hattie	1900	210	10	36	--	Dg	Sand	6.18	09-16-54	D	--	B
RHW-20	431514070572501	Campbell, E. W.	1900	165	30	36	--	Dg	Sand,silt,clay	4.88	09-23-54	D	--	B
RHW-21	431432070580901	Wilson, Sumner	1947	200	280	8	90	Dr	Sand over Bedrock	--	--	D	10	B
RHW-22	431903070592502	Rochester, City of	1947	225	94	6	--	Dr	Sand, gravel	0.9	00-00-54	T	--	B
RHW-23	431905070592301	Rochester, City of	1947	222	90.5	6	--	Dr	Sand, gravel	10.65	00-00-47	T	--	L, B
RHW-24	431901070591601	Rochester, City of	1947	226	94	6	--	Dr	Sand, gravel	5.5	00-00-47	T	--	L, B
RHW-25	431846070592601	Rochester, City of	1947	222	60	6	--	Dr	Sand, gravel	1.3	00-00-47	T	--	L, B
RHW-26	431642070580701	NH Dept. Public Works	1956	174	84	2	--	Dn	Sand,gravel	--	--	T	--	L, B
RHW-29	431409070572401	Brown, David	--	138	196	--	27	Dr	Bedrock	--	--	--	--	
RHW-30	432008071002901	Lane, Ralph	1966	262	16.8	36	--	Dg	Sand	--	--	D	--	
RHW-31	432009071003001	Lane, Merrick	--	255	17.3	36	--	Dg	Sand	--	--	D	--	
RHW-32	432010071001401	Boudreau, John	1980	238	280	--	--	Dr	Bedrock	--	--	D	--	CA
RHW-33	432010071001402	Nickerson, George	--	238	28	--	--	Dn	Sand	--	--	D	--	CA
RHW-34	432020070595901	Turcotte, MaryJane	1979	240	12.95	--	--	--	Sand	11.38	08-10-81	D	--	
RHW-35	431411070572401	Hartwell, Stephen	--	145	14.6	30	--	Dg	Silty sand,till	7.02	08-12-81	--	--	
RHW-36	431418070572801	Brown, Irene	--	190	13.35	30	--	Dg	Silty sand,till	8.87	08-12-81	D	--	
RHW-37	431417070573101	Lucas, Ken	1973	190	405	6	18	Dr	Bedrock	18	00-00-73	--	3	
RHW-38	431509070570601	Bourgoin, Leo	--	180	9.5	--	--	Dg	Silty clay	7.23	08-12-81	D	--	
RHW-39	431519070570201	Metrick, Nicholas	1958	200	13.8	--	--	Dg	Sand	--	--	D	--	
RHW-40	431519070570202	Metrick, Nicholas	--	210	15.95	--	--	Dg	Sand	12	08-12-81	U	--	O
RHW-41	431520070565501	Polychronis, Art	1980	240	175	--	--	Dr	Bedrock	--	--	--	5	
RHW-42	431522070565401	Alley, John	1979	240	126	--	--	Dr	Bedrock	--	--	D	--	
RHW-43	431704071004301	Gilbert, Donald	--	260	32.6	48	--	Dg	Sand, gravel	29.4	08-19-81	D	--	CA
RHW-44	431709071003601	Bruce, Edward	1945	238	10	--	--	Dg	--	--	--	D	--	
RHW-45	431712071005601	Tanguay, Leo	1981	260	150	6	13	Dr	Bedrock	15	07-00-81	D	--	
RHW-46	431738070571901	Weeks	--	342	15.6	36	--	Dg	Till	--	--	U	--	
RHW-47	431736070572301	Bress	--	345	18	48	--	Dg	Till	6.73	12-14-81	U	--	CA, O
RHW-48	431645070563301	Begin, Vic	--	375	250	--	100	Dr	Bedrock	--	--	D	--	
RHW-49	431640070464701	Montminy	--	300	230	--	--	Dr	Bedrock	--	--	D	--	
RHW-50	431613070563801	Fishback, Emile	--	230	6.6	36	--	Dg	Till	1.42	12-17-81	D	--	
RHW-51	431434070575401	Turnkey Landfill	--	209	185	6	82	Dr	Bedrock	--	--	PS	--	

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
						Rochester--Continued								
RHW-52	431435070575301	Turnkey Landfill	--	193	175	6	72	Dr	Bedrock	--	--	T	--	
RHW-53	431441070580901	Turnkey Landfill	--	213	--	6	45	--	Bedrock	--	--	I	--	
RHW-54	431650070563501	Davis, Henry	1959	370	146	--	--	--	Bedrock	--	--	D	10	
RHW-55	431418070580301	Turnkey Landfill	1983	196	100.5	--	103	--	Sand	--	--	O	--	L
RHW-56	431434070585901	Turnkey Landfill	1983	186.6	63.5	--	64	--	Sand, gravel	--	--	O	--	L
RHW-57	431442070580301	Turnkey Landfill	1983	210	20	--	23	--	Sand, gravel	--	--	O	--	L
RHW-58	431448070574901	Turnkey Landfill	1983	178.5	65	--	--	--	Sand, gravel	--	--	O	--	L
RHW-59	431443070585501	Turnkey Landfill	1979	160	18	--	--	--	Sand, fine	5.5	10-00-79	O	--	L
RHW-60	431453070574201	Turnkey Landfill	1983	190	34	--	--	--	Silt, clay	--	--	O	--	L
RHW-61	435804070144401	Turnkey Landfill	1983	179	29.2	--	25.5	--	Sand	--	--	O	--	L
						Rollinsford								
RLW- 5	431351070503901	Cummings, H.	1900	138	40	36	--	Dg	Sand, gravel	.76	9-21-54	U	--	B
RLW- 8	431357070503201	U.S. Geological Survey	1956	118	24	4	24	Dr	Sand, gravel	--	--	T	--	L, B
RLW- 9	431348070502001	U.S. Geological Survey	1956	128	49	4	--	Dr	Sand, gravel	--	--	T	--	L, B
RLW-10	431352070502501	U.S. Geological Survey	1956	130	49	4	--	Dr	Sand, gravel	--	--	T	--	L, B
RLW-11	431325070525401	Dover, City of	1950	175	72	2.5	72	Dn	Sand, gravel	--	--	T	--	L, B
RLW-12	431325070525901	Dover, City of	1950	175	28	2.5	28	--	Sand, gravel	--	--	T	--	L, B
RLW-16	431344070503301	Tozier, Burton	1974	105	8	--	--	Dg	Clay	4.38	08-19-81	D	--	
RLW-17	431344070503401	Tozier, Burton	--	115	13	--	--	Dg	Clay	11.4	08-19-81	U	--	
RLW-18	431400070512601	Spencer	--	125	4	48	--	Dg	Silty clay	1.82	09-30-81	U	--	
RLW-19	431352070512901	Daigle, L.	1981	145	12.5	36	--	Dg	Till	6.79	09-30-81	--	--	
RLW-20	431348070513601	Watson, J.	1956	--	150	--	--	Dr	Bedrock	10	--	D	3	
RLW-21	431339070512801	Legere	--	165	140	--	75	Dr	Bedrock	--	--	--	--	
RLW-22	431338070512601	Legere	--	165	17.5	--	--	Dg	Clay	11.84	09-30-81	--	--	
RLW-23	431328070511701	Dodge	--	148	156	--	3	Dr	Bedrock	--	--	D	4.5	
RLW-24	431351070503701	Richard, George	--	135	10.6	48	--	Dg	Sand	3.32	10-02-81	U	--	CA
RLW-25	431351070503702	Richard, George	--	165	200	6	16	Dr	Bedrock	--	--	D	15	
RLW-26	431354070503101	Kirkpatrick, Phillip	--	115	11.4	36	--	Dg	Silty clay	0.88	10-02-81	--	--	
RLW-27	431349070503301	Scott, Bruce	1977	125	125	6	100	Dr	Bedrock	--	--	D	12	Suspect DTB
RLW-28	431348070503201	Scott, Bruce	--	118	265	6	200	Dr	Bedrock	--	--	U	--	Suspect DTB
						Somersworth								
SKW- 6	431405070535701	Caswell, Ralph	1950	215	125	8	28	Dr	Bedrock	18	00-00-50	D	5	L, B
SKW- 7	431417070535301	S.J. Merrill Estate	1936	220	86	10	6	Dr	Bedrock	20	00-00-36	D	4	L, B
SKW-10	431405070520401	Ellsworth, Eugene	1900	220	29	72	--	Dg	Till	10	09-21-54	--	--	B
SKW-12	431434070521501	Somersworth,City of	1952	180	33	2.5	33	Dn	Sand, clay	--	--	T	--	L, B
SKW-13	431435070520501	Somersworth,City of	1952	160	43	2.5	43	Dn	Sand	--	--	T	--	L, B

Table 6.--*Records of selected wells and test wells*--Continued

Local well number (Locations are shown on plate 1)	USGS site identification number	Owner or user	Year completed	Altitude of land surface datum (feet)	Depth (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Type of well	Water-bearing material	Water level Depth	Water level Date	Use	Yield (gal/min)	Remarks
						Somersworth								
SKW-14	431431070515201	Somersworth,City of	1952	150	6	2.5	16	Dn	Silty clay	--	--	--	--	L, B
SKW-44	431437070535901	Olson, Richard	1945	203	23.95	24	--	Dg	Sand	20.21	08-20-81	D	--	CA
SKW-45	431434070535801	Link, John	1949	205	15.75	24	--	Dg	Sand, gravel	13.6	08-20-81	D	--	
SKW-46	431445070545101	Graffert, Joseph	1931	170	12	--	--	Dg	Sand	--	--	D	--	
SKW-47	431426070514601	Riciputi	--	135	5.9	42	--	Dg	Silty clay	1.81	09-30-81	U	--	O
						Strafford								
SQW- 3	431631071080201	Brown, Roland	--	580	18.3	--	--	Dg	Till	13.16	08-18-81	U	--	
SQW- 4	431553071070201	Inglis, Harold	--	570	8.4	--	--	Dg	Till	2.74	08-18-81	D	--	O
SQW- 5	431621071074801	Labreque, Paul	1978	585	16.75	--	--	Dg	Till	1.25	08-18-81	D	--	CA
SQW- 6	431600071060101	Jacobs, Erlon	1976	298	11.81	36	--	Dg	Sand	9.34	08-19-81	D	--	
SQW- 7	431517071113801	St. Laurent, Oliver	--	518	6.4	36	--	Dg	Sand	2.49	08-23-82	U	--	CA
SQW- 8	431450071055001	Lambert, Maurice	--	255	9	36	--	Dg	Sand, gravel	--	--	D	--	

Table 7.--*Drillers' logs of wells and test wells*

STRAFFORD COUNTY

Dover

	Thickness (feet)	Depth (feet)
DJW-6 431305070532501		
Soil	5	0 - 5
Sand, fine	25	5 - 30
Sand, fine to coarse	20	30 - 50
Sand, coarse; gravel	35	50 - 85
Sand and clay (till)	5	85 - 90
DJW-32 431234070560801		
Soil	1	0 - 1
Clay and sand, fine	33	1 - 34
Sand, fine; gravel and clay (till)	3	34 - 37
Refusal	--	at 37
DJW-42 431315070564301		
Clay and boulders	31	0 - 31
Bedrock	--	at 31
DJW-44 431324070571301		
Sand and gravel	63	0 - 63
Hardpan	1	63 - 64
Bedrock	–	at 64
DJW-72 431323070572001		
Sand and gravel, gray; clay	16	0 - 16
Gravel, brown	17	16 - 33
Sand, gray; clay	27	33 - 60
Hardpan	1	60 - 61
Bedrock	–	at 61
DJW-80 431343070535301		
Sand and gravel	90	0 - 90
Bedrock	–	at 90
DJW-83 431321070570701		
Fill	10	0 - 10
Sand and gravel	71	10 - 81
Hardpan	10	81 - 91
Bedrock	–	at 91
DJW-115 43124070571201		
Very fine-fine sand; some clay and silt, trace trash and wood	45	0 - 45
Clay; silt; trace sand lenses	15	45 - 60
Fine-coarse sand; trace fine gravel	8	60 - 68
Refusal	–	at 68

STRAFFORD COUNTY--Continued

Dover--Continued

	Thickness (feet)	Depth (feet)
DJW-118 431257070570402		
Fine-coarse sand; trace gravel	4	0 - 4
Fine-medium sand	38	4 - 42
Clay; some silt; fine-medium sand, stratified	42	42 - 84
Sand, fine-medium; silt and clay, stratified, trace gravel	12.2	84 - 96.2
Refusal	–	at 96.2
DJW-119 431248070565301		
Sand, fine-medium; silt, trace, stratified	23	0 - 23
Silt, clay, some; sand, fine, trace layers	7	23 - 30
Sand, fine; silt, trace	9	30 - 39
Clay; some silt; fine sand	11	39 - 50
Clay	34	50 - 84
Silty sand; clay, trace, layers	12	84 - 96
Sand, fine; some silt	5.2	96 - 101.2
Refusal	–	at 101.2
DJW-121 431240070565601		
Soil	1	0 - 1
Sand, fine-medium	2	1 - 3
Sand, fine; silt	2	3 - 5
Silty clay; trace fine sand	4	5 - 9
Sand, fine-medium	14	9 - 23
Sand, fine; silt	15	23 - 38
Sand, fine; silt & clay layers	31	38 - 69
Clay	24	69 - 93
Sand, fine; silt; clay, trace	23.5	93 - 116.5
Bottom of hole		at 116.5
DJW-122 431237070570801		
Soil	1	0 - 1
Sand, fine-medium; silt, trace	4.5	1 - 5.5
Clay; silt & sand, trace	3.5	5.5 - 9
Sand, fine; silt; clay, layers, trace	26	9 - 35
Sand, fine-medium; silt & clay trace	21	35 - 56
Clay, silt & fine sand layers	5.5	56 - 61.5

Table 7.–*Drillers' logs of wells and test wells*–Continued

	Thickness (feet)	Depth (feet)
STRAFFORD COUNTY--Continued		
Dover--Continued		
DJW-123 431342070570201		
Sand, fine; brown	7	0 - 7
Sand, fine-medium; clay	28	7 - 35
Sand, fine-coarse; clay, trace	21	35 - 56
Sand, fine; clay, trace	20	56 - 76
Silt & clay	39	76 - 115
Refusal		at 115
DJW-124 431338070570601		
Sand; gravel; cobbles	15	0 - 15
Sand, fine-coarse; clay, trace	35	15 - 50
Sand, fine; gravel, fine-medium;	40	50 - 90
Trace clay	37	90 - 127
Silty sand; clay	29	127 - 156
Refusal	–	at 156
DJW-125 431333070571001		
Sand; gravel; clay	8	0 - 8
Sand; gravel, medium-coarse	49	8 - 57
Sand, fine-coarse; gravel, fine	28	57 - 85
Sand, fine; clay, trace	28.5	85 - 113.5
Refusal		at 113.5
DJW-127 431329070571401		
Soil	3	0 - 3
Clay, blue	5	3 - 8
Sand, gray; gravel, coarse	18	8 - 26
Sand, brown, medium; gravel, fine	34	26 - 60
DJW-128 431327070571401		
Sand, fine-coarse, brown	59	0 - 59
DJW-130 431325070571501		
Sand, medium, brown	50	0 - 50
Gravel, fine-coarse, brown	10	50 - 60
Sand, medium, brown	5	60 - 65
Gravel, coarse; boulders, brown	5	65 - 70
Sand, medium, brown	10	70 - 80
Gravel, coarse	10	80 - 90
Sand, fine, brown	7	90 - 97
Refusal	–	at 97
STRAFFORD COUNTY--Continued		
Dover--Continued		
DJW-131 431312070570601		
Sand, brown; small gravel	20	0 - 20
Sand, brown;	10	20 - 30
Sand, brown, silty, fine	10	30 - 40
Sand, brown, fine; small gravel; clay	15	40 - 55
Sand, brown; clay	8	55 - 63
Sand, fine, brown; gravel, small clay	12	63 - 75
Clay, brown and gray	5	75 - 80
Sand, silty, gray; clay	15	80 - 95
Clay, gray	7	95 - 102
Refusal	–	at102
DJW-132 431320070565101		
Sand, fine, brown	20	0 - 20
Sand, brown; gravel	8	20 - 28
Sand, medium, brown; gravel, small.	12	28 - 40
Sand, fine, brown; gravel, small; clay	18	40 - 58
Sand, fine; clay	16	58 - 74
Refusal	–	at 74
Farmington		
FAW-1 432237071024501		
Sand and gravel	55	0 - 55
FAW-2 432247071025601		
Sand, fine..	15	0 - 15
Bedrock		at 15
FAW-4 432128071015001		
Sand and gravel	26	0 - 26
FAW-5 432213071023601		
Sand and gravel, coarse; cobbles	40	0 - 40
Sand	25	40 - 65
Gravel, coarse	13	65 - 78
Bedrock	–	at 78
FAW-75 432323071030604		
Sand, medium-coarse; gravel	42	0 - 42

	Thickness (feet)	Depth (feet)
STRAFFORD COUNTY--Continued		
Rochester		
RHW-6 431902070592203		
Sand, silt, clay, brown; gravel	5	0 - 5
Sand, fine-coarse, brown; silt, micaceous; gravel, fine-medium	17.3	5 - 22.3
Sand, medium-coarse, brown; silt, micaceous; gravel, fine-medium; clay	10.7	22.3 - 33.0
Sand & gravel, fine-coarse, brown	5	33 - 38
Sand, coarse, brown; gravel, fine; clay	10	38 - 48
Sand, coarse, brown; gravel, fine-coarse	11	48 - 59
Sand & gravel	6	59 - 65
RHW-9 431902070592001		
Sand, coarse, reddish brown; clay; gravel, fine-medium	5	0 - 5
Gravel, medium; sand, coarse	14	5 - 19
Sand, coarse, brown; gravel, fine-medium; boulders	7	19 - 26
Gravel, fine-medium; sand, coarse, reddish brown	14	26 - 40
Boulders and gravel; sand, coarse, brown	8	40 - 48
Sand, coarse, brown; gravel, fine-medium	12	48 - 60
Sand, fine to medium; gray; gravel, medium-coarse	16	60 - 76
Sand, coarse, brown; gravel, fine-medium.	10	76 - 86
Sand, fine-medium, quartz, gray; gravel, fine to medium; silt	4	86 - 90
Gravel, fine to medium; sand, medium-coarse, gray	9	90 - 99
Bedrock	–	at 99
RHW-23 431905070592301		
Sand, medium-coarse, brown; silt; gravel, medium	4	0 - 4
Sand, coarse, brown; gravel, fine-medium	4	4 - 8
Sand, medium-coarse, gray; gravel; silt & clay	5	8 - 13
STRAFFORD COUNTY--Continued		
Rochester--Continued		
RHW-23–Continued		
Sand, fine-medium; gray; silt	13	13 - 26
Sand, coarse, gray; gravel, fine-medium	28.5	26 - 54.5
Sand, coarse, gray; gravel; small boulders	6	54.5 - 60.5
Gravel, fine-coarse; sand, coarse, gray; silt	30.0	60.5 - 90.5
RHW-24 431901070591601		
Sand, coarse, reddish brown; gravel, fine-coarse; clay	8	0 - 8
Sand, coarse, light brown; gravel, fine-coarse; silt, micaceous	17	8 - 25
Sand, medium-coarse, gray; gravel, fine; silt, micaceous	5	25 - 30
Sand, fine-medium, gray	13	30 - 43
Silt, micaceous; clay, blue	1	43 - 44
Sand, fine-medium, gray; silt, micaceous	9	44 - 53
Sand, fine-coarse, gray; gravel, fine-medium; silt, micaceous	19	53 - 72
Gravel, fine-medium; sand, gray	17	72 - 89
Sand, coarse, gray; gravel, fine-coarse	5	89 - 94
Bedrock	–	at 94
RHW-25 431846070592601		
Sand, fine-coarse, brown; gravel, fine-medium	21.8	0 - 21.8
Sand, medium-coarse	9.7	21.8 - 31.5
Sand, medium-coarse; clay, blue	8.5	31.5 - 40
Clay, blue	20.0	40 - 60
RHW-26 431642070580701		
Sand, coarse; gravel, fine	9	0 - 9
Sand, fine; silt, clay, stratified.	29	9 - 38
Clay, soft	46	38 - 84
Sand	5	84 - 89
Clay, soft	14	89 - 103
Sand	23	103 - 126

Table 7.–*Drillers' logs of wells and test wells*–Continued

STRAFFORD COUNTY--Continued

Rochester--Continued

	Thickness (feet)	Depth (feet)
RHW-55 431418070580301		
Sand	7	0 - 7
Sand; gravel	59.5	7 - 66.5
Sand, fine-medium	25.5	66.5 - 92
Sand, fine-coarse	11	92 - 103
Granite	5.5	103 - 108.5
RHW-56 431434070585901		
Sand, fine	15.5	0 - 15.5
Silt; Sand, fine	6	15.5 - 21.5
Sand, fine-medium	26.5	21.5 - 48
Sand; gravel	5	48 - 53
Sand, fine-coarse	11	53 - 64
Granite	10.3	64 - 74.3
RHW-57 431442070580301		
Sand, fine; small silt	3	0 - 3
Sand, fine-medium; gravel, fine-medium; trace silt	20	3 - 23
Refusal	--	at 23
RHW-58 431448070574901		
Sand, medium-coarse; gravel cobbles & boulders; trace silt	15	0 - 15
Sand, very fine-fine; gravel, fine, trace	50	15 - 65
RHW-59 431443070585501		
Sand, silty, very fine-fine; gravel, trace, fine; stratified	65	0 - 65
RHW-60 431453070574201		
Sand, fine-coarse	33.5	0 - 33.5
Silt & clay, stratified	3.5	33.5 - 37
RHW-61 435804070144401		
Sand, fine	25.5	0 - 25.5
Pegmatite	11.2	25.5 - 36.7

STRAFFORD COUNTY--Continued

Rollinsford

	Thickness (feet)	Depth (feet)
RLW-8 431357070503201		
Silt & clay, gray to olive	14	0 - 14
Silt & clay, light gray-blue; gravel	9	14 - 23
Clay; silt; sand; gravel; angular	1	23 - 24
Refusal	--	at 24
RLW-9 431348070502001		
Loam, sandy, brown	1.5	0 - 1.5
Sand, medium-coarse, micaceous, brown	15.5	1.5 - 17
Sand, fine-medium, micaceous, brown	20	17 - 37
Sand, fine; silt, light gray laminated	12	37 - 49
RLW-10 431352070502501		
Fill	2.5	0 - 2.5
Sand, fine-medium, micaceous, brown	9.5	2.5 - 12
Sand, fine; silt; sand, coarse	10	12 - 22
Silt & clay, gray	27	22 - 49
RLW-11 431325070525401		
Sand, fine	40	0 - 40
Clay, sandy	32	40 - 72
Refusal	--	at 72
RLW-12 431325070525901		
Sand	20	0 - 20
Clay	8	20 - 28
Refusal	--	at 28

Somersworth

	Thickness (feet)	Depth (feet)
SKW-12 431434070521501		
Sand, very fine, white	10	0 - 10
Sand, very fine, white; sand, very fine, white & clay, gray, 2" thick stratified layers	10	10 - 20
Sand, very fine, gray; clay; silt	10	20 - 30
Clay, hard, gray	3	30 - 33
Refusal	--	at 33

	Thickness (feet)	Depth (feet)
STRAFFORD COUNTY--Continued		
Somersworth--Continued		
SKW-13 431435070520501		
Soil	1	0 - 1
Gravel, fine; sand, coarse	1.5	1 - 2.5
Clay; sand, fine	17.5	2.5 - 20
Clay, hard, blue-gray; silt	13	20 - 33
Sand, coarse, hard, black; clay; silt	7	33 - 40
Sand, coarse, hard, black	3	40 - 43
Bedrock	–	at 43
SKW-14 431431070515201		
Soil	1	0 - 1
Clay, gray	9	1 - 10
Clay; sand	5	10 - 15
Gravel, black; sand, fine	1	15 - 16
Bedrock	–	at 16

Table 8.--*Records of selected borings*

[L = logs in table 9]

Boring	USGS site identification number	Year	Owner	Altitude of land surface datum (feet)	Depth below land surface (feet)	Water-bearing material	Remarks
			Barrington				
BBB- 1	431446071001701	1954	N.H. Dept. of Transportation	160	12.2	Till, sandy	L, Refusal
			Dover				
DJA- 11	431354070565101	1976	City of Dover	120	85	Silty sand	L, Bedrock 85 ft
DJA- 12	431343070565701	1976	City of Dover	120	63	Silt; sand; clay	L
DJA- 13	431304070562801	--	County Farm, Dover	170	53	Gravel; clay	L
DJA- 33	431228070560901	1952	Corp of Engineers	130	91	Till	91 ft to Bedrock
DJA- 43	431319070565801	1952	Corp of Engineers	156	142.5	Sand; clay	142.5 ft to Bedrock
DJB- 3	431142070522401	--	N.H. Dept. of Transportation	23	83.5	Till	L
DJB- 4	431400070544601	1955	......do..................	158.1	34.5	Sand; gravel	L
DJB- 5	431305070534101	1955	......do..................	167.6	89	Sand	L
DJB- 6	431245070533401	1955	......do..................	180.7	83	Gravel	L
DJB- 7	431233070534301	1955	......do..................	101.3	48	Sand, fine	L
DJB- 8	431224070535001	1955	......do..................	57.1	16	Sand, silty; gravel	L
DJB- 9	431159070535001	1955	......do..................	93.9	19	Gravel	L
DJB- 10	431126070533101	1955	......do..................	83.9	52.9	Till	L
			Farmington				
FAA- 1	432330071030601	1981	Town of Farmington	270	21	Gravel; boulders	
FAA- 2	432336071042601	1981	......do..................	340	16	Gravel; boulders	
FAA- 3	432335071050401	1981	......do..................	330	13	Boulders	
FAA- 4	432245071031701	1980	......do..................	270	12	Boulders	
FAA- 8	432222071033401	1983	Davidson Rubber Division	370	22.5	Sand; silt; gravel	L
			Rochester				
RHA- 1	431457070571801	1984	U.S. Geological Survey	140	70.5	Clay, silty	L
RHA- 2	431451070572801	1984	......do..................	120	33	Sand	L, Refusal at 33 ft
RHA- 3	431423070572201	1984	......do..................	120	54	Sand; clay	L, Refusal at 54 ft
RHA- 4	431350070571601	1984	......do..................	160	83	Sand	L
RHA- 5	431340070571701	1984	......do..................	150	82	Sand; gravel	L
RHA- 8	431450070572901	1984	......do..................	130	53	Sand; gravel	L, Refusal at 53 ft
RHA- 9	431954070595101	1984	......do..................	240	80	Sand	L,
RHA- 10	432011070593101	1984	......do..................	230	35	Sand	L, Refusal at 35 ft
RHA- 11	431950070592201	1984	......do..................	240	16	Sand	L, Bedrock at 16 ft
RHA- 12	431848070585101	1984	......do..................	230	19.5	Sand; gravel	L, Bedrock at 19.5 ft

Table 8.--*Records of selected borings*--Continued

Boring	USGS site identification number	Year	Owner	Altitude of land surface datum (feet)	Depth below land surface (feet)	Water-bearing material	Remarks
			Rochester--Continued				
RHA- 13	431436070581101	--	Turnkey Landfill	190	36	Sand; gravel	L, Refusal at 36 ft
RHA- 15	431358070571401	1976	City of Dover	125	110.7	Sand, silty sand	L
RHA- 16	431359070570901	1976	City of Dover	115	111.2	Silty sand	L
RHA- 18	431438070580501	1983	Turnkey Landfill	200	48.7	Sand	Bedrock at 40 ft
RHB- 2	431902071021801	1970	N.H. Dept. of Transportation	376.7	14	Till, sandy	L
RHB- 3	431453070585701	1950	......do..................	163.7	39	Sand; gravel	L
RHB- 4	431847070594801	1956	......do..................	229.6	56	Gravel; sand	L
RHB- 5	431818070594401	1956	......do..................	239.3	14.3	Gravel	L
RHB- 6	431746070593901	1956	......do..................	231.0	27	Till	L
RHB- 7	431726070592101	1956	......do..................	209.9	23	Gravel, sandy	L
RHB- 8	431658070584901	1956	......do..................	203.9	29.3	Sand	L
RHB- 9	431655070584201	1956	......do..................	178.8	90.5	Sand	L
RHB- 10	431607070572701	1956	......do..................	208.9	22.5	Sand, silty; gravel	L
RHB- 11	431948070583301	1956	......do..................	222.9	33.2	Sand; gravel	L
RHB- 12	431947070583601	1956	......do..................	239.4	12.5	Sand	L
RHB- 13	431518070562801	1955	......do..................	206.3	15	Gravel, silty	L
RHB- 14	431915070593401	1956	......do..................	223.6	80	Sand	L
			Strafford				
SQB- 1	431606071060701	1951	N.H. Dept. of Transportation	225	21	Sand	L
SQB- 2	431508071052801	1972	......do..................	297.4	10	Till	L

Table 9.--*Drillers' logs of selected borings*

[Thickness is given in feet; depth is given in feet below land surface]

Boring	Thickness	Depth
STRAFFORD COUNTY		
Barrington		
BBB-1 431446071001701		
Sand, boulders	3	0 - 3
Hard pan (till), sandy, silty	9.2	3 - 12.2
Refusal	--	at 12.2
Dover		
DJA-11 431354070565101		
Sand, brown	6	0 - 6
Clay, gray	28	6 - 34
Silt & clay, gray	7	34 - 41
Silt, gray; clay, brown & gray	14	41 - 55
Sand, silty, gray; mica, gravel, fine; clay	30	55 - 85
Refusal	--	at 85
DJA-12 431343070565701		
Sand, fine, brown	13	0 - 13
Sand, brown & gray; clay	22	13 - 35
Sand, gray; clay	11	35 - 46
Sand, silty, brown; clay	17	46 - 63
DJA-13 431304070562801		
Clay	26	0 - 26
Gravel, sharp; clay	13	26 - 39
Sand, fine; gravel, sharp; clay	10	39 - 49
Hardpan (Till)	4	49 - 53
DJB-3 431142070522401		
Paving and space	11	0 - 11
Granite blocks & concrete	17.5	11 - 28.5
Till, silty, sandy	26.5	28.5 - 55
Till, stoney	28.5	55 - 83.5
Refusal	--	at 83.5
DJB-4 431400070544601		
Silt, hard; clay	13	0 - 13
Clay, soft	11	13 - 24
Sand; gravel	10.5	24 - 34.5
Refusal	--	at 34.5
STRAFFORD COUNTY		
Dover--Continued		
DJB-5 431305070534101		
Soil	1	0 - 1
Sand, fine; stones, few	9	1 - 10
Sand, fine; silt; clay	31	10 - 41
Sand, fine-medium, stratified	48	41 - 89
Refusal	--	at 89
DJB-6 431245070533401		
Sand; gravel	5	0 - 5
Gravel	25	5 - 30
Silt	2	30 - 32
Gravel; boulders	16	32 - 48
Boulders	9	48 - 57
Sand	7	57 - 64
Sand; stones; boulders	19	64 - 83
Refusal	--	at 83
DJB-7 431233070534301		
Sand; gravel	10	0 - 10
Sand, fine; silt	10	10 - 20
Sand, fine; silt; clay	24	20 - 44
Gravel	4	44 - 48
Refusal	--	at 48
DJB-8 431224070535001		
Sand, fine, organic	3	0 - 3
Sand, fine; silt	10	3 - 13
Gravel, silty	3	13 - 16
Refusal	--	at 16
DJB-9 431159070535001		
Loam	1	0 - 1
Silt	6	1 - 7
Gravel	12	7 - 19
DJB-10 431126070533101		
Silt, soft; clay	18	0 - 18
Hardpan	34.9	18 - 52.9
Refusal	--	at 52.9

Table 9.--*Drillers' logs of selected borings*--Continued

Boring	Thickness	Depth
STRAFFORD COUNTY		
Farmington		
FAA-8 432222071033401		
Sand, fine-coarse; gravel, fine-medium	2.5	0.5 - 3
Sand, fine; silt; gravel, fine; stratified	6	3 - 9
Sand, fine-coarse; gravel, fine	12	9 - 21.0
Boulders	1.5	21 - 22.5
Bedrock, cored 2.1'	--	22.5 - 24.6
Rochester		
RHA-1 431457070571801		
Fill, clay, silty	2	0 - 2
Clay, silty, brown	3	2 - 5
Clay, silty, gray brown	10	5 - 15
Clay, silty, brown gray	5	15 - 20
(No reliable return)	48	20 - 68
Till	2.5	68 - 70.5
RHA-2 431451070572801		
Fill, sandy	8	0 - 8
Silt, clayey, gray	7	8 - 15
Sand	6	15 - 21
Sand, split spoon, very fine-medium, predominantly fine, brownish gray	2	21 - 23
Sand	8	23 - 31
Sand, split spoon, fine-very coarse, predominantly coarse-very coarse; gravel, granules, scattered pebbles, brownish gray	2	31 - 33
Refusal	--	at 33
RHA-3 431423070572201		
Fill, sandy	2	0 - 2
Silt, brown	3	2 - 5
Silt; sand, very fine-medium, predominantly very fine-fine, brown to grayish brown at 10 feet	13	5 - 18
Clay, silty, blueish gray	10	18 - 28
Clay, silty, gray, split spoon	1.5	28 - 29.5
Sand, very fine-fine, brownish gray	24.5	29.5 - 54
Refusal	--	at 54
STRAFFORD COUNTY		
Rochester--Continued		
RHA-4 431350070571601		
Sand, fine-medium, orange brown	5	0 - 5
Sand, fine-very coarse, predominantly medium-coarse; gravel to 1.5"	40	5 - 45
Sand, very fine-very coarse predominantly medium-very coarse, grayish brown split spoon 81-83	38	45 - 83
RHA-5 431340070571701		
Sand, fine-very coarse, predominantly coarse, orange brown; gravel	15	0 - 15
Sand, fine-medium, brown; small gravel	5	15 - 20
Sand, fine-very coarse, orange-brown; small gravel to 2"	10	20 - 30
Sand, fine-very coarse, brown, predominantly medium & coarse	10	30 - 40
(No reliable return)	6	40 - 46
Sand, fine-very coarse, brown-orange; small gravel	36	46 - 82
RHA-8 431450070572901		
Sand, fine-coarse; small gravel, reddish brown	5	0 - 5
Gravel & sand	25	5 - 30
Sand, fine-coarse; small gravel	18	30 - 48
Till (?)	5	48 - 53
Refusal	--	at 53
RHA-9 431954070595101		
Sand, fine-coarse; gravel, reddish brown	5	0 - 5
Sand, medium-coarse, light brown	5	5 - 10
Sand, fine-coarse, predominantly medium, brownish gray	5	10 - 15
Sand, coarse-very coarse, grayish brown	5	15 - 20
Sand, fine-coarse, predominantly medium, brown	10	20 - 30
Sand, fine-very coarse, predominantly medium-very coarse, brown	5	30 - 35
no return on split spoon; probably gravel & sand with till near end	45	35 - 80

Table 9.--*Drillers' logs of selected borings*--Continued

Boring	Thickness	Depth
STRAFFORD COUNTY		
Rochester--Continued		
RHA-10 432011070593101		
Sand, fine-coarse, predominantly medium, orange-brown (water at 4')	5	0 - 5
Sand, fine-very coarse, predominantly medium & coarse, light brown	5	5 - 10
Sand, fine-very coarse, predominantly coarse, light brown	10	10 - 20
Sand, fine-very coarse; small granules & pebbles; (ss 30-32) sand, fine-very coarse, gravel to 1"	15	20 - 35
Refusal	--	at 35
RHA-11 431950070592201		
Sand, fine-very coarse, predominantly medium & coarse, brownish-orange brown; granules & pebbles (ss 15-17)	16	0 - 16
Bedrock (phyllite)	--	at 16
RHA-12 431848070585101		
Sand, fine-very coarse, predominantly medium & coarse, orange brown; gravel to 1"	5	0 - 5
Sand, fine-very coarse, predominantly coarse, brownish-orange; gravel to 2"	4	5 - 9
Gravel (no ss return)	10	9 - 19
Clay, silty	0.5	19 - 19.5
Bedrock (phyllite)	--	at 19.5
RHA-13 431436070581101		
Sand, fine, small silt, trace gravel, fine	15	0 - 15
Gravel, coarse; cobbles; boulders, trace silt	21	15 - 36
Refusal	--	at 36
STRAFFORD COUNTY		
Rochester--Continued		
RHA-15 431358070571401		
Loam	6	0 - 6
Clay	15	6 - 21
Sand, silty; clay	45	21 - 66
Sand, fine-medium; clay	11	66 - 77
Sand, silty, fine; small clay	14	77 - 91
Sand, fine-medium	14	91 - 105
Sand, fine	5.7	105 - 110.7
Refusal	--	at 110.7
RHA-16 431359070570901		
Loam	3	0 - 3
Clay	4	3 - 7
Sand, fine; clay	21	7 - 28
Clay	50	28 - 78
Silt; trace clay	6	78 - 84
Sand, silty	27	84 - 111
Refusal	--	at 111
RHA-18 431438070580501		
Sand, fine-coarse	7.5	0 - 7.5
Sand, fine	26.0	7.5 - 33.5
Sand, fine-coarse	6.5	33.5 - 40
Granite	6.7	40 - 46.7
RHB-2 431902071021801		
Fill	1	0 - 1
Till, sandy; boulders	13	1 - 14
Refusal	--	at 14
RHB-3 431453070585701		
Sand, fine; silt	17	0 - 17
Sand; loam	3	17 - 20
Sand; wood	7	20 - 27
Sand; gravel	12	27 - 39
RHB-4 431847070594801		
Gravel; fill	5	0 - 5
Sand, fine, organic, silty	4	5 - 9
Sand, sharp, medium, uniform	21	9 - 30
Gravel	26	30 - 56
Refusal	--	at 56

Table 9.--*Drillers' logs of selected borings*--Continued

Boring	Thickness	Depth
STRAFFORD COUNTY		
Rochester		
RHB-5 431818070594401		
Soil; loam	1	0 - 1
Sand, fine	2	1 - 3
Gravel	11.3	3 - 14.3
Refusal	--	at 14.3
RHB-6 431746070593901		
Soil	1	0 - 1
Sand, fine-medium	10	1 - 11
Till	16	11 - 27
Refusal	--	at 27
RHB-7 431726070592101		
Muck; sand	3	0 - 3
Clay, soft; silt; sand	5	3 - 8
Gravel, sandy	15	8 - 23
Refusal	--	at 23
RHB-8 431658070584901		
Soil	1	0 - 1
Sand, medium, organic	8	1 - 9
Clay	20.3	9 - 29.3
Refusal	--	at 29.3
RHB-9 431655070584201		
Soil	1	0 - 1
Sand, fine-medium	10.5	1 - 11.5
Clay, soft	22	11.5 - 33.5
Sand, fine-medium	57	33.5 - 90.5
Refusal	--	at 90.5
RHB-10 431607070572701		
Soil	1	0 - 1
Sand, fine	12	1 - 13
Sand, silty; gravel	9.5	13 - 22.5
Refusal	--	at 22.5
STRAFFORD COUNTY		
Rochester--Continued		
RHB-11 431948070583301		
Soil	1	0 - 1
Sand; gravel	6	1 - 7
Sand; silt; stones	26.2	7 - 33.2
Refusal		-- at 33.2
RHB-12 431947070583601		
Soil	1	0 - 1
Sand, medium, sharp	6	1 - 7
Hardpan, sandy	5.5	7 - 12.5
Refusal	--	at 12.5
RHB-13 431518070562801		
Sand; muck	1.5	0 - 1.5
Sand, fine-medium, sharp	5.0	1.5 - 6.5
Gravel, silty	8.5	6.5 - 15
Refusal	--	at 15
RHB-14 431915070593401		
Soil	1	0 - 1
Sand	8	1 - 9
Sand, coarse	10	9 - 19
Sand, coarse; gravel, fine	13	19 - 32
Sand, medium, sharp	13	32 - 45
Silt; sand, fine	5	45 - 50
Sand, medium, sharp	21	50 - 71
Sand, coarse; boulders	9	71 - 80
Refusal	--	at 80
Strafford		
SQB-1 431606071060701		
Gravel, medium-coarse	3	0 - 3
Sand, fine-medium, clean, sharp	18	3 - 21
SQB-2 431508071052801		
Sand; stones; boulders	5	0 - 5
Till, sandy; boulders	5	5 - 10
Refusal	--	at 10