GROUND WATER IN THE GREATER ATLANTA REGION, GEORGIA

by

C. W. Cressler, C. J. Thurmond, and W. G. Hester

Prepared in cooperation with the
U. S. Geological Survey

Department of Natural Resources
Environmental Protection Division
Georgia Geologic Survey

INFORMATION CIRCULAR 63

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Prepared in cooperation with the

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FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM (SI) UNITS

Multiply	By	To obtain
feet (ft)	0.3048	meters (m)
inches (in)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
square miles (mi^2)	2.590	square kilometers (km^2)
gallons per minute (gal/min)	0.06309	liters per second (L/s)
million gallons per day (Mgal/d)	0.04381	cubic meters per second (m^3/s)
	43.81	liters per second (L/s)
degree Fahrenheit (°F)	°C = 5/9(°F-32)	degree Celsius (°C)

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."

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GROUND WATER IN THE GREATER ATLANTA REGION, GEORGIA

By C. W. Cressler, C. J. Thurmond, and W. G. Hester

ABSTRACT

The Greater Atlanta Region encompasses about 6,000 square miles in the Piedmont physiographic province of west-central Georgia. Municipal and industrial water supplies in the area are derived mainly from surface water taken from rivers, streams, and impoundments. Large withdrawals now and predicted for the future are causing concern about surface-water sources being able to meet the rising demands. This study was conducted to assess the availability of ground water in the crystalline rocks of the area, and to devise methods for locating sites for high-yielding wells that could provide alternative sources of supply.

The Greater Atlanta Region is roughly divided in half by the Chattahoochee River, which follows a comparatively straight southwesterly course for nearly 110 miles across the area. Streams in the north half of the area, including the Chattahoochee River basin, mainly have rectangular and trellis drainage styles and clearly show the influence of geologic control. The topography and drainage are closely related to bedrock permeability and conventional methods for locating high-yielding well sites apply to most of the area. In contrast, the south half of the area has a superimposed dendritic drainage style in which streams developed more or less independently of the underlying geology. There, the topography and drainage are poorly related to bedrock permeability; many high-yielding wells occupy ridge crests, steep slopes, and bare-rock areas normally considered to be sites of low yield potential.

To better understand the occurrence of ground water in the area, detailed geologic studies were made of 1,051 high-yielding well sites. The results showed that large well yields are available only where aquifers have localized increases in permeability. This occurs mainly in association with certain structural and stratigraphic features, including: (1) contact zones between rocks of contrasting character and also within multilayered rock units, (2) fault zones, (3) stress relief fractures, (4) zones of fracture concentration, (5) small-scale geologic structures that localize drainage development, (6) folds that produce concentrated jointing, and (7) shear zones. Methods for selecting high-yielding well sites using these structural and stratigraphic features are outlined in the report.

Borehole geophysical techniques were used to study the nature of water-bearing openings. Sonic televiewer logs revealed that in several wells the water-bearing openings consist of horizontal or nearly horizontal fractures 1 to 8 inches in vertical dimension. The fractures were observed in granitic gneiss, biotite gneiss, gneiss interlayered with schist, and in quartz-mica schist. The writers believe the openings are stress relief fractures formed by the upward expansion of the rock column in response to erosional unloading. Core drilling at two well sites confirmed the horizontal nature of the fractures and showed no indication of lateral movement that would associate the openings with faulting.

Wells that derive water from horizontal fractures characteristically remain essentially dry during drilling until they penetrate one or two high-yielding fractures. The fractures are at or near the bottom of the wells. The high-yielding fractures are at or near the bottom of wells because: (1) the large yields were in excess of the desired quantity and, therefore, drilling ceased, or (2) in deep wells yielding 50 to 100 gal/min or more, the large volume of water from the fracture(s) "drowned out" the pneumatic hammers in the drill bits, effectively preventing deeper drilling. Twenty-five wells in the report area are known to derive water from bottom-hole

fractures, all of which are believed to be horizontal stress relief fractures. Other wells in the area are reported to derive water from bottom-hole fractures, which also are believed to be stress relief fractures. These wells occupy a variety of topographic settings, including broad valleys, ridge crests, steep slopes, and bare-rock areas, indicating that stress relief fractures are present beneath uplands and lowlands alike.

Wells deriving water from stress relief fractures have much greater average depths than wells reported from other crystalline rock areas. Many of the wells are 400 to 550 feet or more deep and derive water from a single fracture at the bottom of the hole. In one area, 62 percent of the wells that supply 50 gallons per minute or more are from 400 to more than 600 feet deep. The chance of obtaining large well yields from stress relief fractures is significantly increased by drilling to about 620 feet.

In general, moderate quantities of ground water presently are available in the report area. Most of the 1,165 high-yielding wells that were inventoried during this study supply from 40 to more than 200 gallons per minute. The distribution of these wells with respect to topography and geology indicates that most were located for the convenience of the users and that the large yields resulted mainly from chance, rather than from thoughtful site selection. By employing the site selection methods outlined in this report, it should be possible to develop large supplemental ground-water supplies in most of the area from comparatively few wells.

Coweta, Fayette, Henry, and Clayton Counties in the south part of the area that include the communities of Newnan, Shenandoah, Peachtree City, and Fayetteville are expected to grow rapidly during the next 25 years. Because of unfavorable quality conditions in the Chattahoochee River, these communities and surrounding areas are being forced to turn to small, marginal streams as water-supply sources. These streams are vulnerable to pollution from nonpoint sources and are seriously affected by prolonged drought. For these reasons, the southern Atlanta area is one that can benefit greatly from supplemental ground-water supplies. At present, all of Coweta County outside the city of Newnan uses ground water exclusively, and much of the four-county area soon may require ground water for supplemental or primary sources of supply. Large quantities of ground water are available in the four counties, as indicated by the presence of 168 wells that supply 40 to more than 200 gallons per minute.

Contrary to popular belief, many wells in the Greater Atlanta Region are highly dependable and have records of sustaining large yields for many years. Sixty-six mainly industrial and municipal wells have been in use for periods of 12 to more than 30 years without experiencing declining yields.

Well water in the area generally is of good chemical quality and is suitable for drinking and most other uses. Concentrations of dissolved constituents are fairly consistent throughout the area, and except for iron, rarely exceed drinking water standards.

INTRODUCTION

Municipal and industrial water supplies in the Greater Atlanta Region (GAR) are derived almost exclusively from surface water taken from rivers, streams, and impoundments. Large withdrawals now and predictions for future needs are causing concern about the present metropolitan area systems being able to meet the anticipated demand. Public pressure is mounting against drawing down recreation and power generation reservoirs to obtain additional water. Thus, there is a great need to assess the availability of ground water in the crystalline rocks of the GAR as a possible alternative source of supply for communities and potential industry outside the existing surface systems.

Because of generally low permeability, crystalline rocks have the reputation for furnishing only small quantities of ground water, generally 2 to 30 gal/min, suitable mainly for domestic and farm purposes. As a result, many engineering firms and consultants no longer consider ground water a practical source of supply. This has severely limited the economic development of vast areas not served by municipal or county water systems.

There are, however, a significant number of wells in the GAR that produce 100 to almost 500 gal/min. The fact that most of these wells were located without regard to topography or geology indicates that other high-yielding wells could be developed at numerous selected sites in the GAR. A study was needed that would provide methods for locating wells in the GAR that could be expected to supply large quantities of ground water for supplementing the existing surface-water sources.

This project was part of a long-range plan to appraise the ground-water resources of Georgia, with particular emphasis on high-growth areas. The data collected and used will be entered into the U.S. Geological Survey computer-stored data bank and, along with the published report, will be available to answer information requests and help municipal, industrial, and other planning agencies.

Area of Study

The GAR as used in this report includes an area of about 6,000 mi^2 in west-central Georgia (fig. 1). The study initially was limited to the area covered by the U.S. Geological Survey "Greater Atlanta Region" (1974), 1:100,000-scale topographic map, but later was expanded to include counties along the southern border of the map. As the study is concerned only with metamorphic and igneous rocks of the Piedmont physiographic province, it excludes the northwestern part of the mapped area, which is in the Valley and Ridge physiographic province. All or parts of 27 counties comprise the study area: Barrow, Bartow, Butts, Carroll, Cherokee, Clayton, Cobb, Coweta, Dawson, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Hall, Haralson, Heard, Henry, Jasper, Newton, Paulding, Pickens, Polk, Rockdale, Spalding, and Walton Counties. The 1980 population of the GAR was about 2,000,000.

Objectives and Scope

The objectives of the study were to assess the quantity and chemical quality of ground water available in the GAR, and to develop methods for locating high-yielding well sites in various geologic and topographic settings throughout the area.

In the GAR, more than 1,165 high-yielding wells (yielding a minimum of 20 gal/min) were inventoried and accurately located on topographic maps by field checking. All of the well sites were analyzed to evaluate the correlation between well yield and topographic setting.

Detailed field studies were conducted on 1,051 well sites to learn the types of geologic and topographic settings that supply large well yields. These studies assessed (1) the local geology and structure of each site to identify the wells that derive water from fault zones, contact zones, and similar features; (2) the relation between topographic setting and geology, to detect sites where the large yields result from a relation of topography to small-scale structures in the rocks; and (3) the relation of the high-yielding wells to the depth and yield of nearby wells to define and delineate the water-bearing openings that supply the large yields. These determinations were used to develop methods for selecting

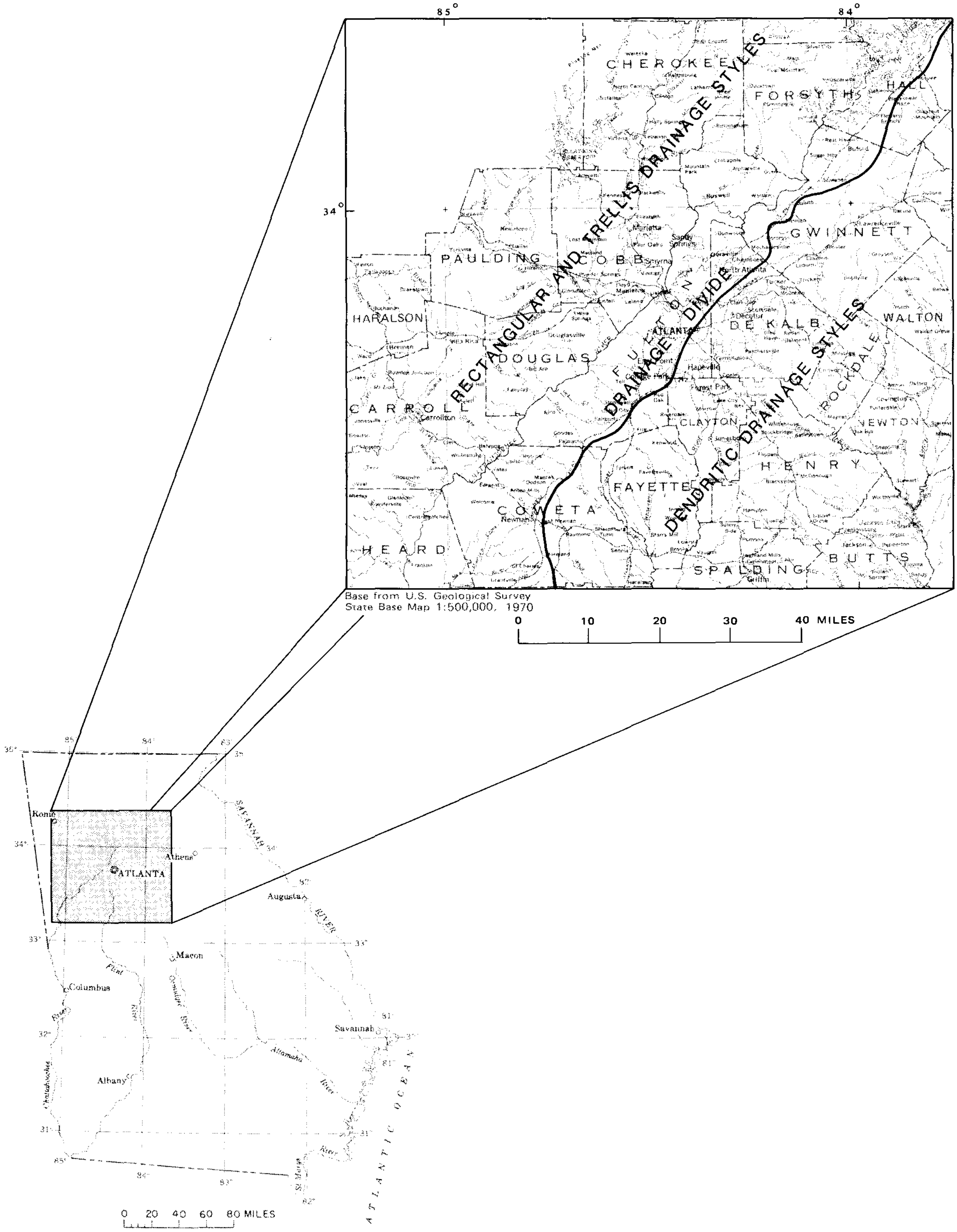


Figure 1. Location of study area.

high-yielding well sites in a variety of geologic and topographic settings throughout the GAR.

The nature and occurrence of water-bearing openings in various rock types were studied by using borehole geophysical techniques. Sonic televiewer logs of well bores were the best available means of learning the character of deep-seated fractures that supply large well yields in places of seemingly low yield potential.

Three test wells were drilled to investigate the yield potential of different geologic settings and to learn the nature of water-bearing openings. Pumping tests were run on two of the test wells to provide drawdown and recovery data needed to estimate yields. Core drilling was done beside two wells to confirm the horizontal nature of water-bearing fractures observed by borehole geophysical logs. A fourth test well was drilled to learn whether a linear feature was underlain by a zone of fracture concentration.

High-yielding well sites and water-bearing units were studied in detail in Coweta, Fayette, Clayton, and Henry Counties in an attempt to discover methods for locating sites capable of supplying large quantities of well water. Large quantities of well water soon may be needed in these counties for supplemental supply.

Physiography and Climate

Most of the report area is a broad rolling upland or plateau that, as a whole, is topographically homogeneous. Almost all of the cities and larger towns are on uplands, away from the rivers and broad valleys (LaForge and others, 1925). The plateau is inclined to the southeast, having average altitudes of 1,000 to 1,200 ft in the northwest and about 700 ft in the southeast. The maximum altitude is 2,300 ft on Pinelog Mountain in Cherokee County; the minimum altitude is 527 ft at Jackson Lake in Newton County. The average altitude of the report area is about 1,000 ft.

The northwestern part of the area is drained by the Chattahoochee and Coosa Rivers. The southeastern part is drained by the Flint and Ocmulgee Rivers.

Major cities in the area include Atlanta, Gainesville, Marietta, Decatur, Newnan, Carrollton, Conyers, Covington, Canton, Cumming, and Lawrenceville.

The area has a mild climate with slightly cooler temperatues and a little less rainfall than the State averages. In Fulton County, the average January temperature is 44°F and the average July temperature is 78°F. Average annual rainfall is 47 to 48 inches, compared to a State average of 54 inches. There are two peak-rainfall periods: late winter and midsummer.

Previous Investigations

One of the earliest reports on ground water in the GAR appeared in McCallie's "Underground Waters of Georgia" (1908). A report by Herrick and LeGrand (1949) discussed the geology and ground-water resources of the Atlanta area. Their report covered 2,055 mi^2 of the "Atlanta area" and included data on dug, bored, and drilled wells.

A 1951 report by Carter and Herrick on water resources of the Atlanta Metropolitan Area summarized ground-water data from the Herrick and LeGrand (1949) report, and also discussed availability and quality of surface water in the area. Thomson and others (1956) reported on "The Availability and Use of Water in Georgia," in which the occurrence of ground water in the Piedmont was briefly discussed. Stewart and Herrick (1963) reported on emergency water supplies for the Atlanta area. McCollum (1966) investigated the ground-water resources and geology of Rockdale County, one of the 27 counties included in the present study.

Cressler (1970) reported on the geology and ground-water resources of Floyd and Polk Counties. Cressler and others (1979) presented results of a study on geohydrology in Cherokee, Forsyth, and eastern Bartow Counties.

LaForge and others (1925) discussed the drainage systems of the Georgia Piedmont. Staheli (1976) reported on drainage styles of the area's streams that have a bearing on the distribution of ground water in the GAR.

Acknowledgments

This study was made by the U.S. Geological Survey in cooperation with the Georgia Department of Natural Resources, Geologic Survey Branch. The authors wish to acknowledge the many people who gave assistance during this study. Hundreds of property owners throughout the study area willingly supplied information about their wells and permitted access to their property. The following companies and personnel furnished construction and yield data on large-yielding wells:

- Mr. W. A. Martin and Mrs. Mary Dutton, Virginia Supply and Well Co., Atlanta
- Mr. Jim Adams and Mrs. Willie A. Massey, Adams-Massey Well Drilling Co., Carrollton
- Mr. and Mrs. Ed Livingston, Explora Contractors, Inc., Conyers
- Mr. and Mrs. Hoyt W. Waller, Waller Well Co., Griffin
- Mr. Ray Ward of Ward Drilling Co., Inc., Powder Springs
- Mr. and Mrs. H. G. Holder, Holder Well Co., Covington
- Mr. Jimmy Fowler, Fowler Well Co., Cumming
- Mr. P. T. Price, Price Well Co., Dallas
- Weisner Drilling Co., Inc., Riverdale
- Askew Water Systems, Griffin

Thomas J. Crawford of West Georgia College devoted long hours to discussing the occurrence and availability of ground water in the western part of the report area, especially Carroll County. Many of his observations and methods for selecting well sites are included in this report. He also provided construction, yield, geologic, and location data for hundreds of wells in the Carroll County area.

City clerks and water department personnel provided information on locations, histories, and use of wells in numerous towns and cities of the GAR. These included the cities of Conyers, Hampton, Clarkston, Acworth, Lawrenceville, Flowery Branch, Senoia, Milstead, Riverdale, Jonesboro, Grayson, Brooks, Peachtree City, and Turin.

Appreciation is extended to Janet K. Groseclose for assistance in preparation of this manuscript.

Well-Numbering System

The GAR is covered by 111 7.5-minute topographic quadrangles and parts of quadrangles. Wells in this report are numbered according to a system based on the 7.5-minute topographic quadrangle maps of the U.S. Geological Survey. Each 7.5-minute quadrangle in Georgia has been given a number and a letter designation according to its location. The numbers begin in the southwest corner of the State and increase numerically eastward. The letters begin in the same place, but progress alphabetically to the north, following the rule of "read right up." Because the alphabet contains fewer letters than there are quadrangles, those in the northern part of the State have double letter designations, as in 9HH. (Refer to fig. 37.)

Wells in each quadrangle are numbered consecutively, beginning with number 1, as in 8CC1. Complete well numbers, as in 5CC11, are used in well tables and most illustrations. On plate 1 the well numbers lack quadrangle designations because of space limitations. The quadrangle designations for these wells can be obtained from figure 37 and from the inset on plate 1.

In table 7, which lists chemical analyses of well water, some wells retain numbers used in previous reports.

WATER-BEARING UNITS AND THEIR HYDROLOGIC PROPERTIES

The part of the GAR included in this study lies wholly within the Piedmont physiographic province (Clark and Zisa, 1976; Fenneman, 1938). The area is underlain by a complex of metamorphic and igneous rocks that have been divided by various workers into more than 50 named formations and unnamed mappable units. Individual rock units range in thickness from less than 10 ft to possibly more than 10,000 ft.

Regional stresses have warped the rocks into complex folds and refolded folds, and the sequence has been injected by igneous plutons and dikes and broken by faults. Erosion of these folded and faulted rocks produced the complex outcrop patterns that exist today. The large number of rock types in the area and their varied outcrop patterns greatly complicate the occurrence and availability of ground water in the area. Nevertheless, many of the more than 50 named formations and unnamed mappable units in the GAR are made up of rocks that have similar physical properties and yield water of comparable quantity and chemical quality. Thus, for convenience, the rocks in the report area have been grouped into nine principal water-bearing units and assigned letter designations. The areal distribution of the water-bearing units and their lithologies are shown on plate 1. Data on wells in the water-bearing units are summarized in tables 1-3.

OCCURRENCE AND AVAILABILITY OF GROUND WATER

Ground water in the GAR occupies joints, fractures, and other secondary openings in bedrock and pore spaces in the overlying mantle of residual material. Water recharges the underground

Table 1.--Summary of well data for the Greater Atlanta Region

Water-bearing unit	Number of wells	Yield (gal/min)		Depth (ft)		Casing depth (ft)		Topography (percent of wells in each setting)						
		Range	Average	Range	Average	Range	Average	Slope	Broad lowlands	Uplands-ridge crests	Draw, hollow	Stream or lake	Saddle	Other
A Amphibolite-gneiss-schist	385	20-275	56	35-2,175	294	0-200	60	22	35	22	4	11	2	4
B Granitic gneiss	166	20-348	72	40-825	271	3-266	54	33	45	2	14	6	0	0
C Schist	185	20-150	47	67-700	195	4-144	53	19	19	27	20	11	4	0
D Biotite gneiss	70	20-351	56	82-710	270	7-140	56	20	27	36	6	11	0	0
E Mafic	32	20-471	79	67-386	191	8-116	46	17	35	28	3	17	0	0
F Granite	43	20-150	43	43-422	192	11-187	57	30	30	15	15	10	0	0
G Cataclastic	55	20-225	74	110-800	323	8-207	84	4	75	15	4	2	0	0
H Quartzite	12	20-200	72	122-500	297	30-85	58	45	9	27	18	0	0	0
J Carbonate	5	31-150	76	240-505	376	28-314	138	0	100	0	0	0	0	0

Table 2.--Summary of well data for the north half of the Greater Atlanta Region

Water-bearing unit	Number of wells	Yield (gal/min)		Depth (ft)		Casing depth (ft)		Topography (percent of wells in each setting)						
		Range	Average	Range	Average	Range	Average	Slope	Broad lowlands	Uplands-ridge crests	Draw, hollow	Stream or lake	Saddle	Other
A Amphibolite-gneiss-schist	107	20-200	53	55-675	220	12-187	52	25	28	23	9	12	2	1
B Granitic gneiss	6	20-200	81	170-337	235	31-140	68	50	0	33	0	17	0	0
C Schist	127	20-150	46	67-600	183	4-144	53	16	14	26	26	12	6	0
D Biotite gneiss	16	25-110	54	98-500	252	14-129	65	18	9	36	18	18	0	0
E Mafic	11	20-100	47	67-375	148	10-80	43	22	45	33	0	0	0	0
F Granite	17	20-75	39	43-398	152	11-72	38	20	33	7	27	13	0	0
G Cataclastic	0	--	--	--	--	--	--	--	--	--	--	--	--	--
H Quartzite	10	20-200	71	122-500	280	30-85	57	56	0	22	22	0	0	0
J Carbonate	4	31-85	58	240-505	399	28-314	164	0	100	0	0	0	0	0

Table 3.--Summary of well data for the south half of the Greater Atlanta Region

Water-bearing unit	Number of wells	Yield (gal/min)		Depth (ft)		Casing depth (ft)		Topography (percent of wells in each setting)						
		Range	Average	Range	Average	Range	Average	Slope	Broad lowlands	Uplands-ridge crests	Draw, hollow	Stream or lake	Saddle	Other
A Amphibolite-gneiss-schist	278	20-275	58	35-2,175	320	0-200	63	20	38	22	3	10	2	5
B Granitic gneiss	160	20-348	72	40-825	273	3-266	54	23	33	30	10	4	0	0
C Schist	58	20-150	48	72-700	243	19-125	56	24	32	26	8	8	6	0
D Biotite gneiss	54	20-351	56	82-710	275	7-140	53	21	32	36	2	9	0	0
E Mafic	21	25-471	116	83-386	214	8-116	47	15	30	25	5	25	0	0
F Granite	26	20-150	45	77-422	218	14-127	69	36	28	20	8	8	0	0
G Cataclastic	55	20-225	74	110-800	323	8-207	84	4	75	15	4	2	0	0
H Quartzite	2	50-100	75	240-500	370	--	62	0	50	50	0	0	0	0
J Carbonate	1	150	--	285	--	32	--	0	100	0	0	0	0	0

openings by seeping through this material or by flowing directly into openings in exposed rock. This recharge is from precipitation that falls in the area.

Unweathered and unfractured bedrock in the report area has very low porosity and permeability. Thus, the quantity of water that a rock unit can store is determined by the capacity and distribution of joints, fractures, and other types of secondary openings. The quantity of stored water that can be withdrawn by wells depends largely on the extent to which the rock openings are interconnected.

The size, spacing, and interconnection of openings differ greatly from one type of rock to another and with depth below land surface. Open joints and fractures tend to become tighter and more widely spaced with increasing depth. Joints and other openings in soft rocks such as phyllite tend to be tight and poorly connected; wells in rocks of this character generally have small yields. On the other hand, openings in more brittle rocks such as quartzite and graywacke tend to be larger and are better connected; wells in these rocks normally supply greater yields. Other rocks, including amphibolite, schist, and gneiss, are variable in the size and connection of secondary openings and generally yield small to moderate quantities of water to wells. Carbonate rocks, which include marble, can contain much larger and more extensively interconnected fracture systems. Openings in carbonate rocks commonly are enlarged by solution, and are capable of transmitting large quantities of water.

Effects of Drainage Style

The GAR is divided nearly in half by the Chattahoochee River, which follows a comparatively straight southwesterly course for nearly 110 miles across the area (fig. 1). Streams in the north half of the area, including the Chattahoochee River and its tributaries, mainly have rectangular and trellis drainage styles. In contrast, streams in the south half of the area, beginning at about the south edge of the Chattahoochee River basin, have a dendritic drainage style (Staheli, 1976).

Streams having rectangular drainage style flow in strongly angular courses that follow the rectangular pattern of the joints that break up the rocks. Areas having trellis drainage style are characterized by strongly folded and dipping rocks; the larger streams follow the outcrops of less resistant rocks and tributaries enter at right angles across the dip of the strata (Lobeck, 1939, p. 175). All of the streams in the north half of the area show the influence of geologic control, their drainage styles reflecting the varied outcrop pattern, the different lithologies present, and the geologic structure.

In the south half of the area, the dendritic drainage style is indicative of streams that developed independently of the underlying geology (LaForge and others, 1925; Staheli, 1976). According to Staheli (1976, p. 451), dendritic drainage, in which streams run in all directions like the branches of a tree, probably was established on some preexisting surface and later superimposed on the underlying crystalline rocks. Such streams are said to be superimposed when they acquire a course on nearly flat-lying material that covered the rocks beneath. Streams flowing on the veneer of material that covers the bedrock are superimposed above the concealed rocks. When rejuvenated by uplift, they become incised and develop courses without regard to the structure or lithology of the underlying rocks. Eventually, the cover material may be entirely removed and then only the physiographic pattern of the streams will suggest their having been let down from a superimposed position (Lobeck, 1939, p. 173).

According to Staheli (1976, p. 451), to explain the different drainage styles in regions underlain by similar rocks and structures, it is suggested that an earlier Coastal Plain sedimentary cover buried the Piedmont and extended inland at least to the Chattahoochee River valley. Thus, according to Staheli, drainage to the north developed originally on Piedmont rocks and so reflects their structural orientations. Staheli believes that streams south of the Chattahoochee River valley developed as consequent streams on a flat Coastal Plain cover. These streams extended headward as sea levels lowered, developed dendritic drainage, and eventually became superimposed across regional Piedmont structures. Thus, the general area of the Chattahoochee River valley might well coincide with a fossil Fall Line in Georgia (Staheli, 1976, p. 451). As Staheli points out, in areas near the Chattahoochee River, the drainage pattern suggests that higher, more resistant rocks could have existed as islands that locally controlled stream development even though the lower areas were covered by Coastal Plain sediment. For example, drainage obviously has been diverted by such prominences as Stone Mountain.

Observations made during the present study indicate that in the south half of the GAR, many of the smaller elements of the drainages, such as draws, hollows, and intermittent streams in the uppermost headwaters areas seem to have developed under geologic control. The presence of geologic control is indicated by smaller drainages that parallel prominent joint sets or that are alined with bedrock foliation. Presumably these late-forming drainages were established after removal of a preexisting cover and, therefore, developed under geologic control. The fact that the smaller drainages may reflect bedrock weaknesses, whereas the larger streams generally may not, has a profound influence on the occurrence of ground water in the south half of the GAR and on the methods that can be used successfully to locate large ground-water supplies. The relations between drainage styles and the occurrence of ground water, and the effects that drainage styles have on the methods that can be used to locate sites for high-yielding wells, are discussed in later sections of this report.

AVAILABILITY OF LARGE GROUND-WATER SUPPLIES

The quantity of ground water available in the GAR varies greatly with the location, rock type, topographic setting, drainage style, and the geologic structure. In some areas, most wells yield less than 3 gal/min, which generally is considered a minimum requirement for domestic and stock supplies. In more favorable areas, yields commonly range between 3 and 10 gal/min. It should be pointed out, however, that obtaining this quantity may require drilling in more than one site.

High-yielding wells--ones that supply 20 gal/min or more--generally can be developed only where the rocks possess localized increases in permeability. This occurs mainly in association with certain structural and stratigraphic features, including: (1) contact zones between rock units of contrasting character, (2) contact zones within multilayered rock units, (3) fault zones, (4) stress relief fractures, (5) zones of fracture concentration, (6) small-scale structures, including joints, foliation planes, and fold axes, that localize drainage development, (7) folds that produce concentrated jointing, and (8) shear zones. Other factors, such as topographic setting, drainage style, rock type, depth of weathering, thickness of soil cover, and the pervasiveness and orientation of foliation can interact to increase or decrease the availability of ground water. The nature and occurrence of structural and stratigraphic features known to increase bedrock permeability, and the relation of these features to drainage style, topography, and other factors, are discussed in the following sections.

Contact Zones

Yields of 50 to 200 gal/min may be obtained from contact zones between rock units of contrasting character. The largest yields generally are obtained where massive homogeneous rocks such as granite, which are very resistant to weathering, are in contact with foliated rocks of high feldspar content that weather rapidly and deeply. The most productive contacts generally are ones in which a resistant rock is overlain by a rapidly weathering rock (T. J. Crawford, West Georgia College, oral commun., 1979). Examples of rock types and certain physical characteristics of rocks that form productive contact zones are shown below:

1. Granite or granitic gneiss overlain by schist low in quartz content.

2. Granite overlain by hornblende, feldspar (50 percent) gneiss.

3. Granite overlain by feldspar gneiss.

4. Massive granite overlain by foliated gneiss.

5. Massive, homogeneous rocks, poorly jointed and foliated and resistant to weathering, overlain by foliated, well-jointed, deeply weathering rocks (feldspar-rich and foliated rocks weather most rapidly and deeply).

To produce the highest yields, the rocks overlying the massive homogeneous rock should be: (1) foliated, (2) have a high feldspar content, the higher the better, (3) differ mineralogically, and (4) occupy a topographic position favorable to recharge.

Contact zones occur throughout the GAR. Many potentially high-yielding contacts are shown on plate 1, and on detailed geologic maps that are available for parts of the area. (See references.)

Contact zones between rock units of contrasting character generally may be recognized in road cuts, quarries, and freshly scraped areas, and their presence also may be indicated by changes in the character of the saprolite and by changes in topography. For example, the contact between granite or granitic gneiss and a feldspathic schist may be indicated by sandy soil or saprolite containing small mica flakes derived from the granite or gneiss, that abruptly changes to a clay soil containing large mica flakes derived from the schist. Also, the area underlain by granite or gneiss may be characterized by numerous exposures of fresh rock, whereas the schist area may have no rock exposed. Contact zones between resistant and less resistant rocks also may be indicated by subtle changes in topography. The terrain over the weaker rocks may be slightly lower and flatter than that over the resistant rocks. Valleys and draws may trend parallel to the contact zone.

In the north half of the GAR, wells derive large yields from several types of contact zones. Well 12HH6 furnishes 150 gal/min to the city of Cumming, Forsyth County, from quartzite of Unit H at the contact with schist of Unit C. Well 5CC-39 in Carroll County supplies a subdivision with 100 gal/min from a contact zone between "granite" of Unit F and schist of Unit C.

In the south half of the area, comparatively few wells supply water from contact zones between rock units of contrasting character. This probably is because in an area dominated by dendritic drainage, the contacts rarely occupy topographic settings that favor increased ground-water circulation. Large yields are, however, supplied by wells that tap contact zones between mafic rocks of Unit E and various types of country rock. Well 14DD2, near Milstead in Rockdale County, supplies 100 gal/min from a contact between a diabase dike (Unit E) and granitic gneiss of Unit B. Contact zones between differing rock units are widespread in the south half of the area and may be productive where they underlie draws, stream valleys, and other low areas that favor increased ground-water circulation and provide adequate recharge.

Other potentially permeable contact zones occur between rock layers of different character within multilayered rock units such as Unit A. Areas underlain by Unit A are shown on plate 1. Although individual contact zones cannot be shown on maps of the scale used in this report, they may be located by field surveys. Contact zones of this type supply water to wells in both the north and south halves of the area. Well 12HH7 in Forsyth County derives 90 gal/min from contact zones within the multilayered rock of Unit A.

The yield potential of individual contact zones may be estimated from their topographic settings, especially their relation to local drainages. The largest yields generally can be expected from contacts that lie in and trend parallel to draws and stream valleys that are downgradient from sizable catchment areas overlain by deep soil. Contacts that cross such drainages at various angles also may be productive. Contact zones in multilayered rock units generally supply the largest yields to wells drilled on the downdip side of draws and stream valleys that parallel the contacts.

Construction of the "people mover" tunnel at Hartsfield-Atlanta International Airport provided an opportunity to observe firsthand the effects that topographic setting, catchment area size, and quantity of available recharge have on the long-term yield potential of contact zones in multilayered rocks. The tunnel site, which extended in an east-west direction for nearly a mile (fig. 2) over interlayered schist, gneiss, and amphibolite of Unit A and gneiss of Unit B, was being dewatered along the north and south sides by wells drilled at intervals of about 100 ft. The dewatering wells were 110 ft deep, gravel packed to the top of rock, and lined with slotted casing to total depth. Observation wells 60 ft or more deep and gravel packed to total depth were spaced every 200 ft along both sides of the tunnel site to permit the monitoring of water levels.

The initial yields of the dewatering wells reportedly ranged from near 0 to about 70 gal/min, averaging about 10 gal/min. Submersible pumps installed in each well discharged water at the rate of about 17 gal/min, cycling on and off as needed to prevent excessive drawdown. As the dewatering operation progressed, many pumps were off most of the time; only the highest yielding wells pumped steadily.

Because new groups of wells were intermittently completed and brought on line, and older wells were pumping less often, the most practical means of determining the total pumpage of the dewatering wells was to measure the flow in discharge ditches that collected water from wells on the north and south sides of the tunnel site. The first measurement, made February 2, 1977, showed the total pumpage to be about 100 gal/min (not accounting for evapotranspiration or seepage). With the addition of more pumping wells, the discharge increased to about 1,000 gal/min on August 1. By October 10, many wells had stopped pumping and the total discharge declined to about 500 gal/min. On January 11, 1978, the flow was reduced to about 100 gal/min and by March 31 the flow, which was too small to measure with a pigmy current meter, was estimated to be less than 50 gal/min. The flow in the discharge ditches remained too low to measure for the remainder of the dewatering operation. By June 28, 1978, most wells had stopped pumping and the highest yielding wells were cycling irregularly.

The dewatering operation proved successful for the intended purpose of lowering the water table below the bottom of the construction ditch. Ground-water levels at the beginning of the operation ranged from about 4 to 12 ft below land surface. With the start of pumping, the

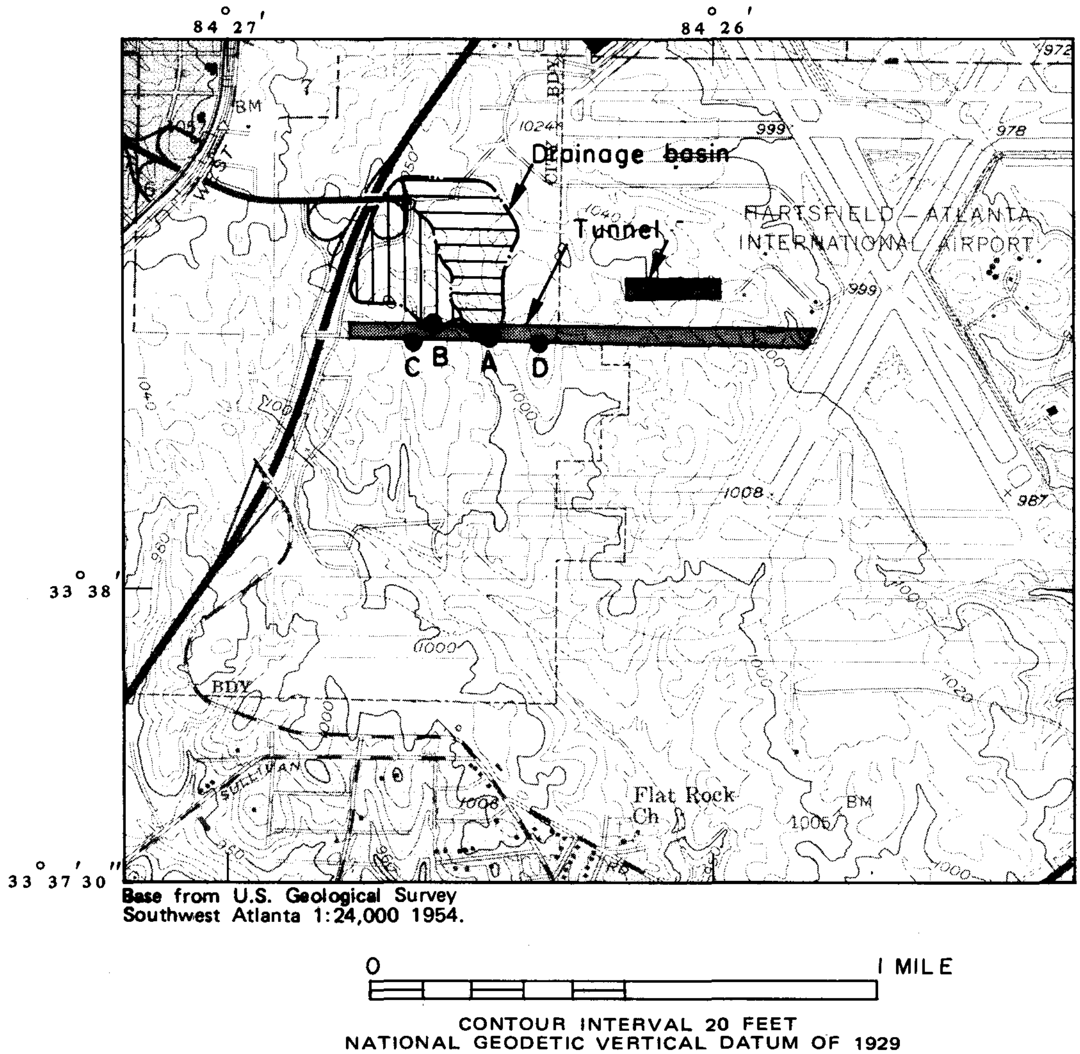


Figure 2. Well sites in the "people mover" tunnel area, Hartsfield-Atlanta International Airport. Sites A and B are downgradient from catchment areas supplying recharge; sites C and D are in interstream areas receiving little recharge.

water level in some observation wells declined more than a foot per day. Other wells responded slowly and showed little change in water level after 4 days of pumping. With continued pumping, however, the water levels in all observation wells declined, and by May 25, 1978, were drawn down to depths of 16 to 38 ft below land surface. By August 1978 the water level was generally in the range of 27 to 39 ft below land surface, well below the bottom of the construction ditch. The low water level kept the ditch free of seepage except immediately following heavy rains. This decline in water levels and the reduced yield of the few active wells, clearly indicated that ground-water storage in the saprolite largely had been depleted.

The monitoring of water levels also revealed that saprolite of layered rocks at the site (amphibolite, gneiss, and schist) has strong preferential permeability. Observation wells that had shown little response to nearby pumping wells located across the strike of the rocks immediately began drawing down with the start-up of wells along the strike. Preferential permeability in the saprolite of layered rocks (documented by Stewart, 1964) accounts for differing rates of drawdown that occurred during the dewatering operation.

The highest yielding well (70 gal/min at site A, fig. 2) penetrated interlayered schist, gneiss, and amphibolite and probably derived water from more than one interformational contact zone. Other wells in the 20-30 gal/min yield range (sites B, C, and D, fig. 2) penetrated interlayered schist, granite gneiss, and some amphibolite.

The dewatering operation demonstrated the importance of locating high-yielding wells in topographic settings that can supply recharge in quantities large enough to balance intended withdrawals. After months of pumping, only the wells in stream valleys downgradient from sizable catchment areas (sites A and B, fig. 2) continued to supply significant yields. Wells in interstream areas (sites C and D, fig. 2), on the other hand, where the quantity of recharge is limited, declined in yield and eventually were pumped dry.

The response of this well field to pumping was much the same as others in the GAR and adjacent areas of the Georgia Piedmont. Over the long term, wells tapping permeable contact zones or other types of permeable zones, no matter how large the initial yield, can supply water only at the rate it is replaced by recharge. Normally, the recharge needed to sustain high well yields for extended periods, and especially through prolonged droughts, is available only in stream valleys, drainages, and draws that receive constant recharge from large catchment areas, or in broad flat areas covered by deep saturated soil. <u>A leading cause of declining well yields in the report area is the practice of locating wells without regard to the adequacy of available recharge</u>. For this reason, successful methods for locating high-yielding well sites emphasize the importance of considering the adequacy of available recharge.

Fault Zones

Faults in the report area consist of two types: (1) large fault zones, such as the Brevard Zone (Unit G, plate 1), that have extensive rock deformation (cataclasis) and numerous small faults within the zones, and (2) faults that displace rock units without extensive deformation around the fault zone.

In large fault zones, shearing and deformation within the zone may reduce the overall permeability of some types of rock and increase the permeability of others. Limited data indicate that wells in broad lowland settings may be highly productive in the Brevard Zone. Owing to the small number of wells and to poor exposures in lowland areas, however, data are not available to indicate which lithologies within the Brevard Zone are the most productive.

Faults that displace rock units without extensive deformation may be highly permeable and supply large well yields. The largest yields generally are available from faults that involve both resistant rocks such as massive gneiss or granite (Units B and F) and less resistant rocks such as feldspathic schist (Unit C). Increases in permeability along these faults result from differential weathering of the contrasting rock types, much the same as occurs in permeable contact zones. Although fractures produced by movement on the faults typically have been healed by mineralization and no longer are fully open, the shearing and mixing of rock types contribute to increasing the permeability along the faults. A good example of a permeable fault zone is the one that extends from eastern Carrollton, Carroll County, southwestward more than 5 miles, involving schist (Unit C) and granite (Unit F). Several wells in the fault zone yield 20 to 80 gal/min.

Work in crystalline rocks in eastern Georgia by David C. Prowell (U.S. Geological Survey, oral commun., 1980) has shown that relatively recent faults are unmineralized and contain open fractures. The faults consist of one or more zones 10 to 30 ft wide in which the rock is broken by numerous vertical or nearly vertical fractures 1 to 4 inches apart. Between the individual fractures, the rock commonly is brecciated and the pieces are rotated at various angles. A 4- to 6-inch wide zone of fault gouge (rock flour) generally occurs near the middle of each fracture zone. The fractures in the fault zone are open and should be capable of storing and transmitting large volumes of ground water. Although no recent faults were recognized during the present study, they may be present in the GAR. Where they project into topographically low areas favoring increased recharge, recent faults should supply large well yields.

According to Prowell (U.S. Geological Survey, oral commun., 1980), except in fresh-rock exposures such as in deep road cuts and quarries, these recent faults are difficult to recognize. Their presence cannot be detected in the soil horizon, but relicts of breccia or variously oriented rock fragments may remain visible in saprolite. It is not known whether the faults would produce a surface trace recognizable as a topographic feature such as a lineament, but it seems likely that they might bring about noticeable changes in vegetative vigor. The likelihood of their producing lineaments probably would be greater in the north half of the area than in the south half.

Stress Relief Fractures

Water-bearing openings in crystalline rocks traditionally have been described as steeply inclined and "X"-shaped fractures and joints similar to those pictured in figure 3 (LeGrand, 1967, p. 6). These openings are reported to be most numerous and to have the largest water-bearing capacity near the surface and to become tighter and more widely spaced with increasing depth.

According to LeGrand (1967, p. 5), most of the interconnecting openings occur less than 150 ft below land surface and few extend deeper than 300 ft. Tradition also has held, as stated by LeGrand (1967, p. 1-2), that high-yielding wells are common where relatively low topographic areas and thick residual soils are combined, and low-yielding wells are common where hilltops and thin soils are combined. Accordingly, sites having the largest yield potential are assumed to be draws and valleys in or downgradient from large catchment areas having a deep soil cover. Sites having the lowest yield potential are narrow ridge tops and upland steep slopes having little, if any, soil cover.

From the beginning of this study, it was apparent that many high-yielding wells, particularly in the south half of the GAR, occupy topographic settings indicated by previous workers to have low

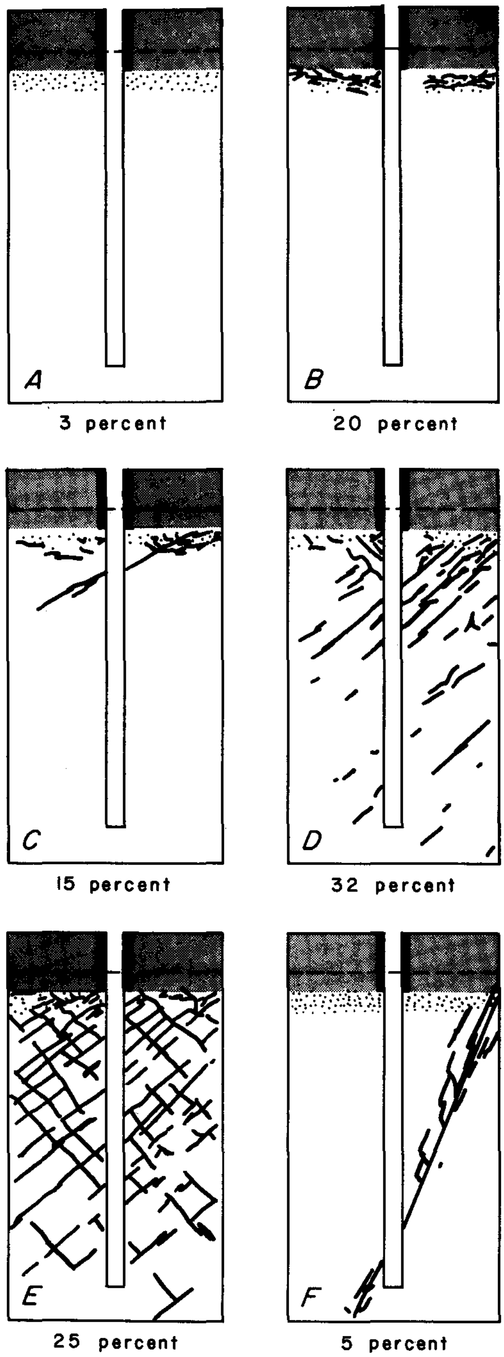


Figure 3. Six types of ground conditions showing distribution of fractures that influence the yields of wells. The stippled pattern represents soils and soft rock; the dashed line is the water table. The degree of frequency of the different types is shown in percentage. (LeGrand, 1967).

yield potential. These wells are on hilltops, ridge crests, and steep slopes, and many are in areas that have extensive rock outcrops and little or no soil cover. According to the statistical data presented by LeGrand (1967, p. 3), such sites should have only a slight chance of supplying large well yields. Moreover, about 14 percent of the high-yielding wells throughout the report area derive water from depths of 400 ft or more (table 9). Thus in the GAR, particularly in the south half of the area, a large percentage of the high-yielding wells derive water from bedrock openings more than 400 ft deep, which is a significant departure from the findings presented by LeGrand for wells in other crystalline rock areas.

Because of the inconsistancies between the occurrence of ground water in the GAR, especially in the south half of the area, and those reported from other crystalline rock areas, the authors decided to investigate the nature of water-bearing openings that supply large well yields. The intent was to identify whatever differences might exist between water-bearing openings in the GAR and those in other areas that could explain these inconsistencies.

Borehole Geophysical Logs

The most practical means available to study the nature of water-bearing openings in wells was borehole geophysical logs. A complete set of geophysical logs was run by the U.S. Geological Survey Southeast Region logger on test well 2 (8CC8) and 3 (9DD1). Logs also were run on high-yielding municipal wells in Turin, Coweta County, and Demorest in Habersham County and Blairsville in Union County northeast of the GAR. The results showed that the nature of bedrock openings could best be studied by using caliper and sonic televiewer logs. Caliper and sonic televiewer logs were run on five additional wells in different types of crystalline rocks and different topographic settings to learn more about the character of water-bearing openings.

The caliper log is a graph of well-bore diameter, and it is useful because it indicates fractures and other bedrock openings, and gives a general indication of the vertical dimension of each opening (fig. 4). By matching the caliper log with driller's records of where water entered the well, it generally is possible to identify water-bearing openings. However, the caliper log is unable to reveal details about the nature of the openings.

The sonic televiewer log makes possible the visual inspection of the entire well bore, providing detailed information about rock texture, foliation, and bedrock openings. The log is made by a geophysical probe transmitting a rotating sonic beam that reflects off the inside of the well bore and the walls of fractures and other openings. The reflected signal is electronically converted into visual images of the well bore, projected on a video screen, and photographed to provide a permanent record of the image. The photographs show variations in rock texture, layering, and foliation as shades of gray; and open fractures, deep voids, and eroded zones as areas of black (figs. 5 and 6). The images on the photographs are at a known vertical scale and are oriented with respect to north, providing a means for measuring the approximate height of openings, determining whether they are flat lying or inclined, and measuring the strike and dip of inclined features.

Televiewer logs revealed that water-bearing openings in high-yielding wells supplying 40 gal/min or more differed from what had been reported for crystalline rocks. The logs showed that in granitic gneiss and biotite gneiss and in quartz-mica schist, water-bearing openings consist of horizontal or nearly horizontal fractures 1 to 8 inches in vertical dimension and range in depth

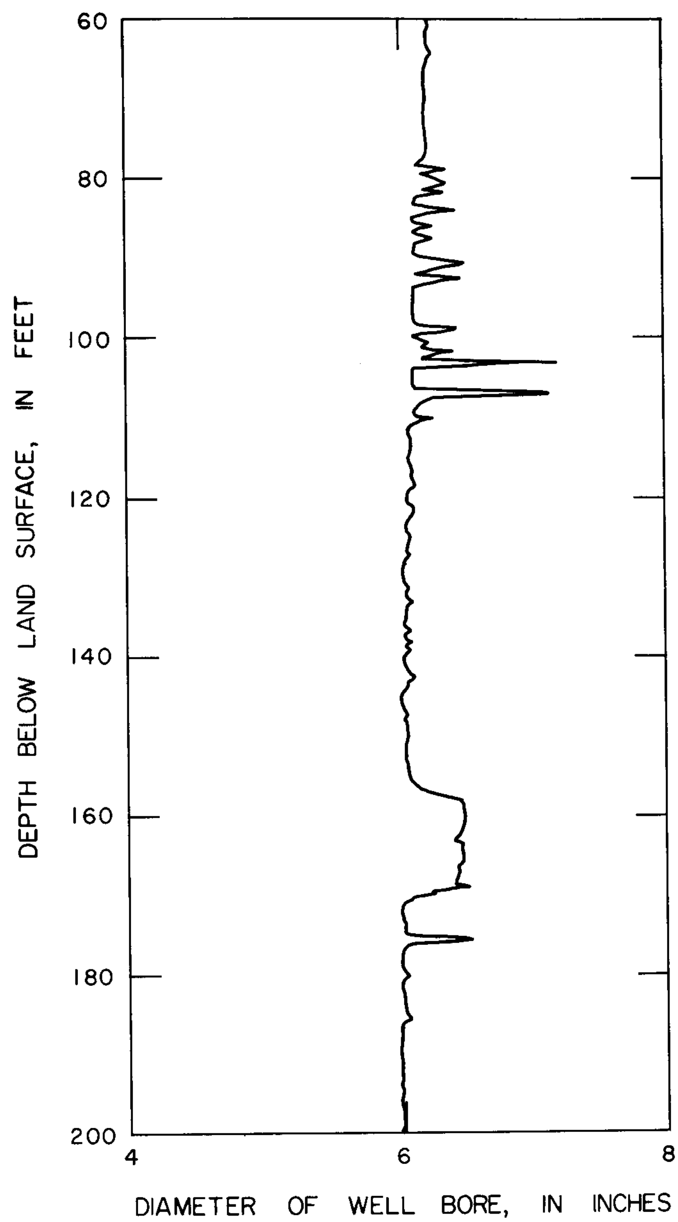


Figure 4. Caliper log of test well 2 (8CC8), Fulton County.

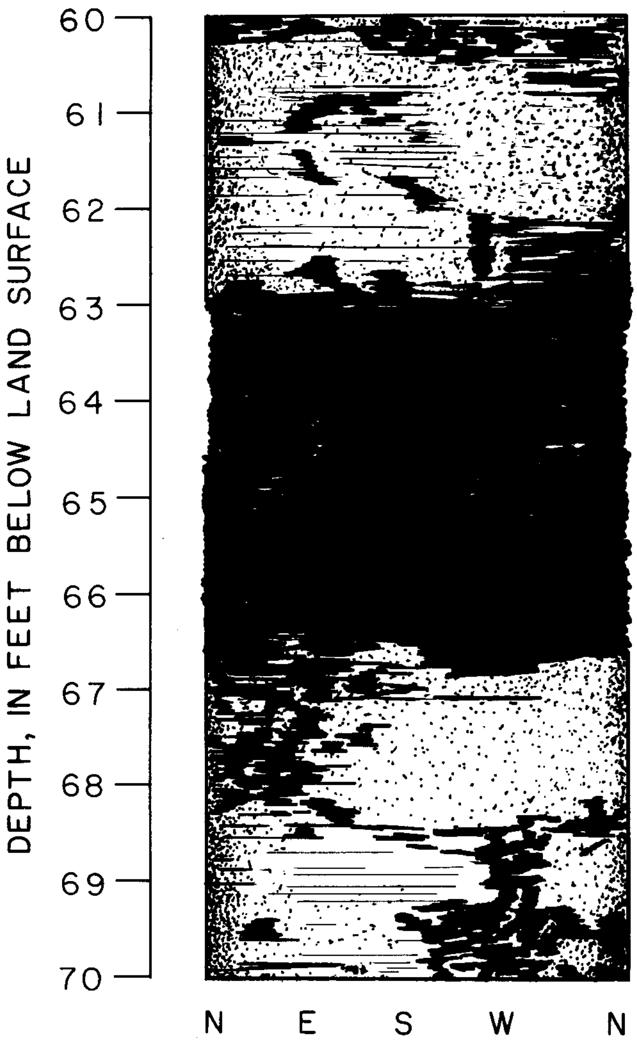


Figure 5. Televiewer image of water-bearing fracture and weathered zone eroded by drill, test well 3 (9DD1). Letters at bottom of image refer to compass quadrants.

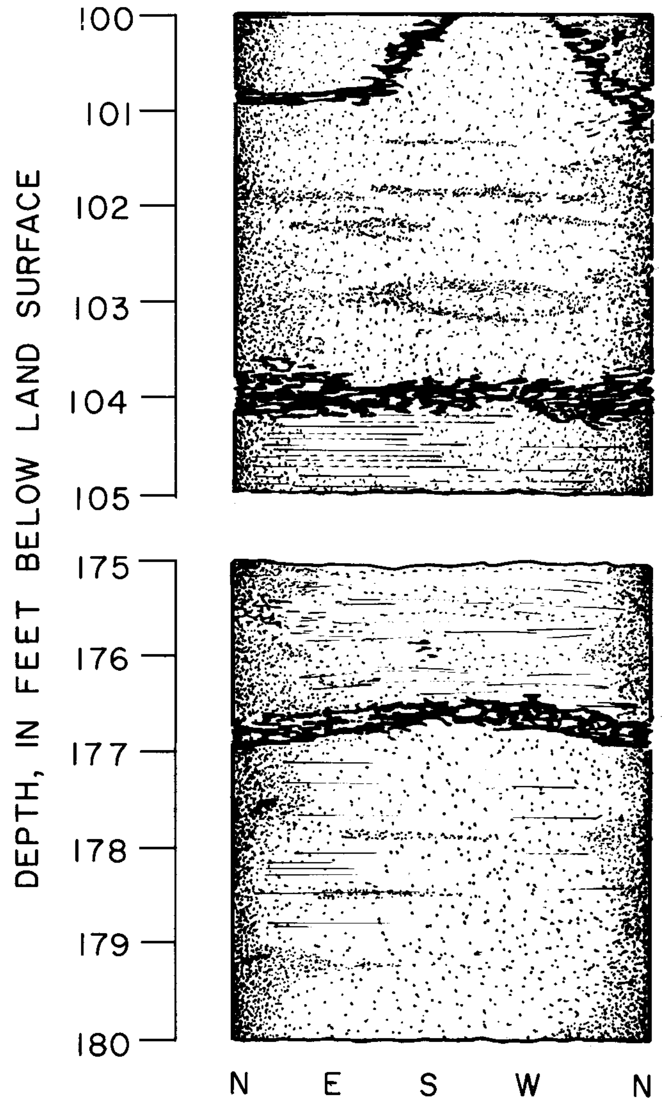


Figure 6. Televiewer image of non-water-bearing high-angle fracture at 100 feet, water-bearing horizontal fracture at 104 feet, and nearly horizontal water-bearing fracture at 176.5 feet, test well 2 (8CC8). Letters at bottom of image refer to compass quadrants.

from 28 to 440 ft. Water-bearing openings in multilayered rock units consisting of granitic and biotite gneiss interlayered with schist were shown to be horizontal fractures 1 to 3 inches in vertical dimension occurring in the gneiss layers.

Drill Cores

To verify that the televiewer logs were being correctly interpreted and to examine the surfaces of horizontal fractures for possible slickensides or other evidence of horizontal movement, the bedrock was core drilled at two well sites. The core drilling was done by the U.S. Geological Survey using a special triple tube core barrel to insure that all of the core would remain intact so that the extent of fracturing and the weathering of fracture surfaces could be properly evaluated.

During the coring process, changes in drilling rate, rotation pressure, and water pressure, which indicated the presence of openings in the rock, were precisely recorded relative to hole depth so that the exact vertical dimension of the void could be calculated. Accordingly, coring runs were exactly 10 ft in length and the amount of void space indicated by measuring the actual rock core was compared with the drilling records about the voids. These measurements of the void spaces were within 10 to 20 percent of each other.

One core, from the site of well 13DD-90, Rockdale County, penetrated granitic gneiss and confirmed that the horizontal fractures and the enlarged soft zones had been correctly identified and measured (fig. 7). The other core, from the site of test well 2 (8CC8), Fulton County, penetrated interlayered gneiss and schist and confirmed correct identification and measurements of horizontal fractures in that well. The core also revealed weathered foliation-plane openings, mostly at the contacts of schist and gneiss layers, that had not been recognized as openings in the televiewer pictures (fig. 8). No evidence of horizontal displacement was found on any surfaces of the openings.

The horizontal nature of the observed water-bearing fractures, the range of depths at which they occur, the types of topographic settings they underlie, and the rock types in which they are present, all suggest that the openings may be stress relief fractures (Wyrick and Borchers, 1981). The mechanism for forming horizontal stress relief fractures seems to be the upward expansion of the rock column in response to erosional unloading (Billings, 1955, p. 93; Wyrick and Borchers, 1981, p. 12), as shown in figure 9. The formation of stress relief fractures seems to be dependent on the volume of overburden removed relative to the area being eroded, as in a broad stream valley (fig. 28), or from the area adjacent to a ridge or upland area, as commonly occurs with divide ridges.

Stress relief fractures probably do not lie entirely along a horizontal plane, but are very low dome-shaped structures that in cross section would appear as low arches (fig. 10). The fractures probably are circular or elliptical in plan view, are slightly inclined near the outer edges, and have the maximum void space near the center. Televiewer pictures indicate that stress relief fractures an inch or so high (which could be near the outer edge of the fracture) are inclined about 5 degrees. The arching may produce vertical fractures that extend toward the surface, providing avenues of recharge. They also may serve to connect two or more stress relief fractures, thereby forming a network of interconnected fractures.

Horizontal stress relief fractures seem to occur mainly in large bodies of granitic and biotite gneiss (water-bearing Units B and D), but they also are important in units consisting of gneiss interlayered with schist (Unit A) and in schist (Unit C) and amphibolite (Unit E).

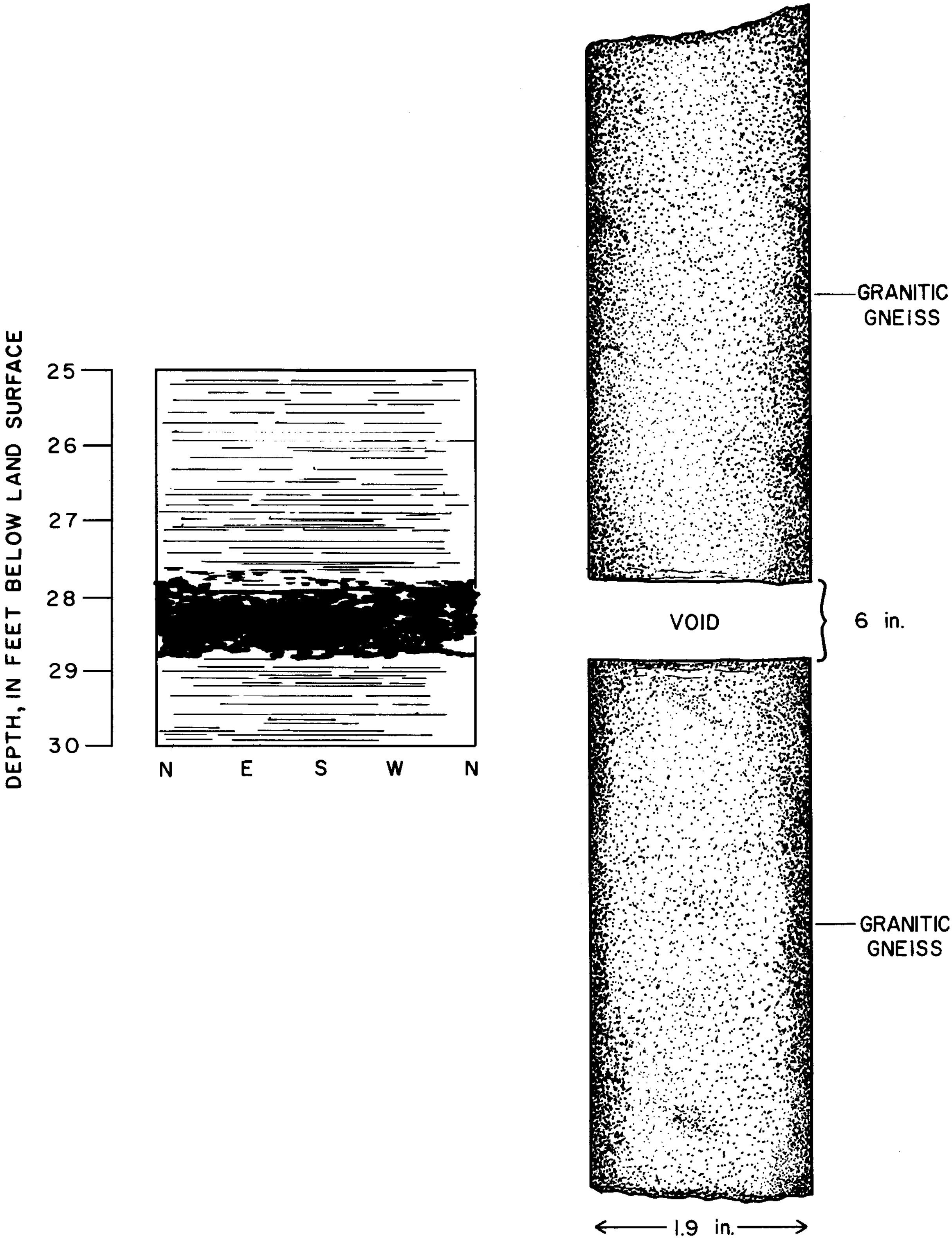


Figure 7. Comparison of televiewer image of horizontal water-bearing fracture with diagram of drill core, well 13DD90, Rockdale County.

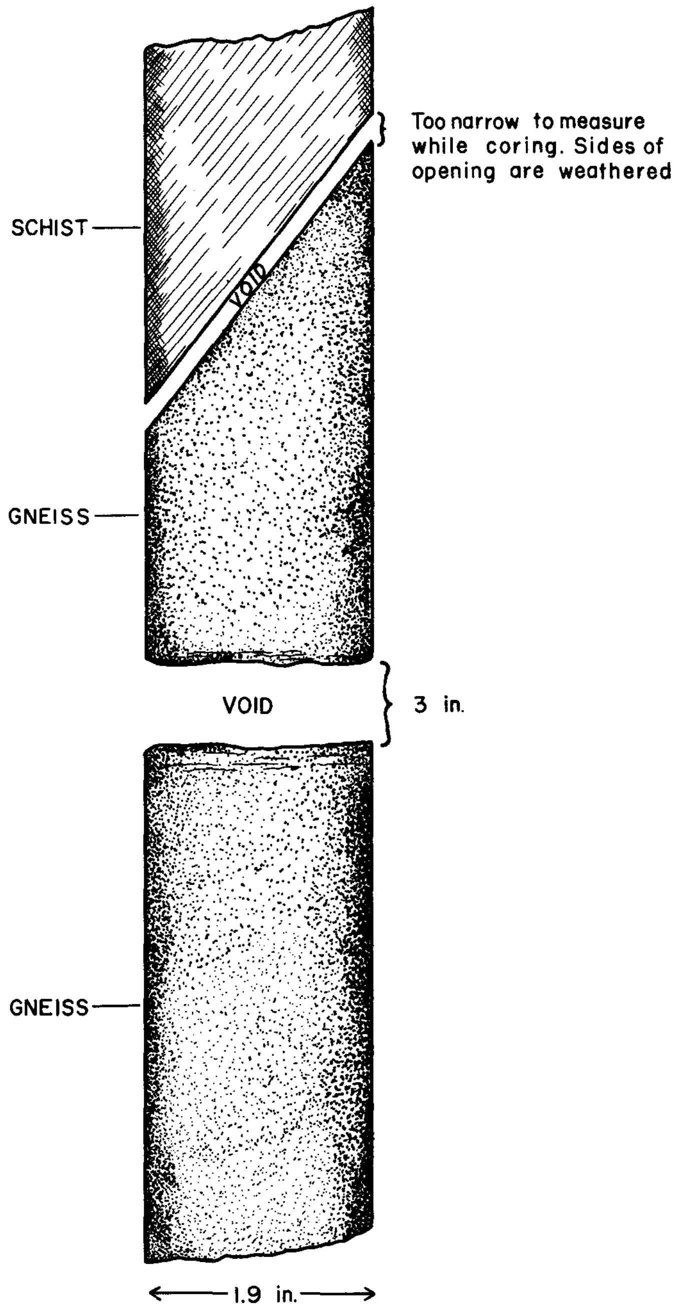


Figure 8. Diagram of drill core from test well 2 (8CC8), Fulton County, showing horizontal fracture in gneiss and opening parallel to foliation between schist and gneiss.

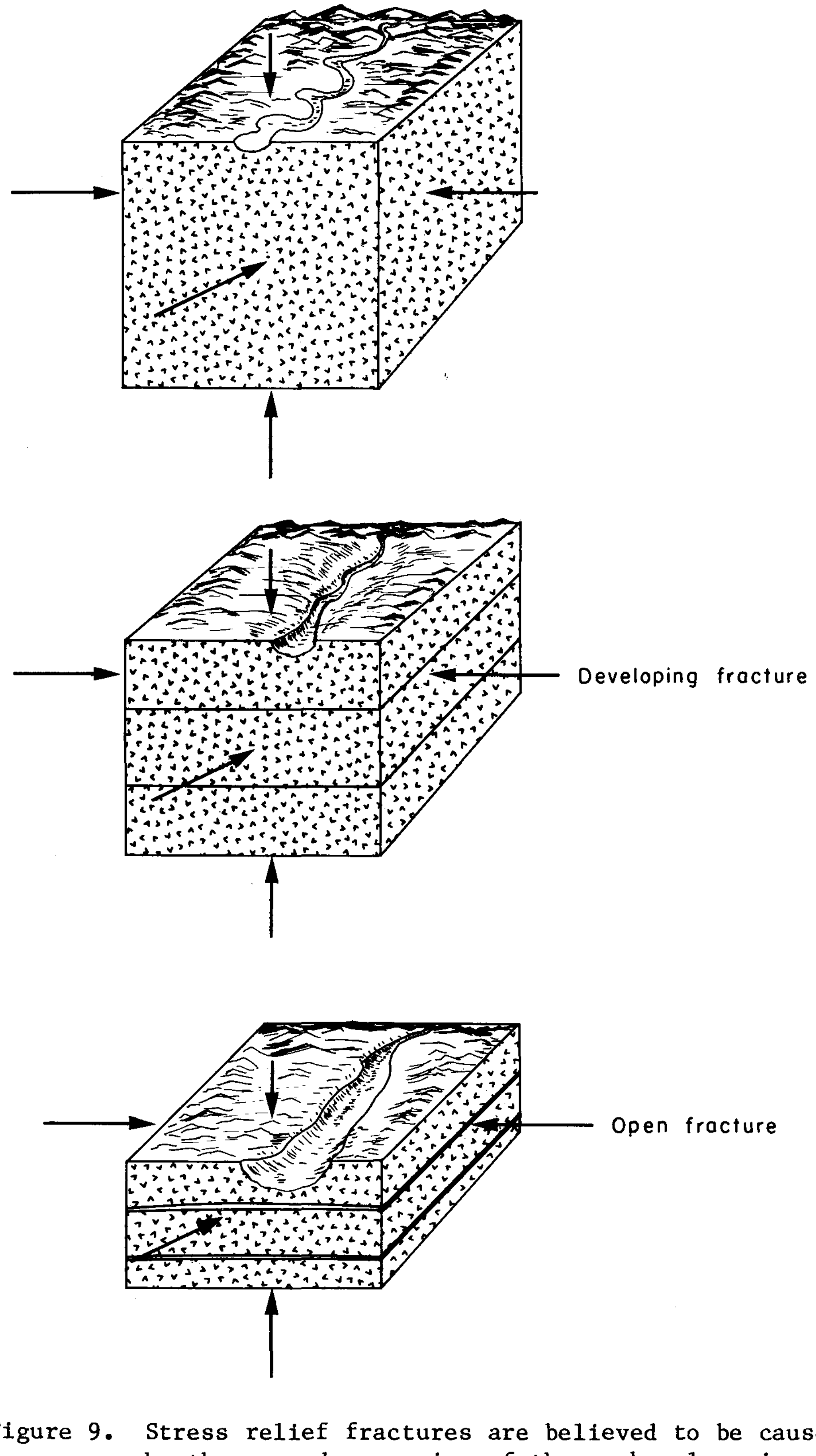


Figure 9. Stress relief fractures are believed to be caused by the upward expansion of the rock column in response to erosional unloading. Arrows represent the direction and their length represents strength of compressional stress.

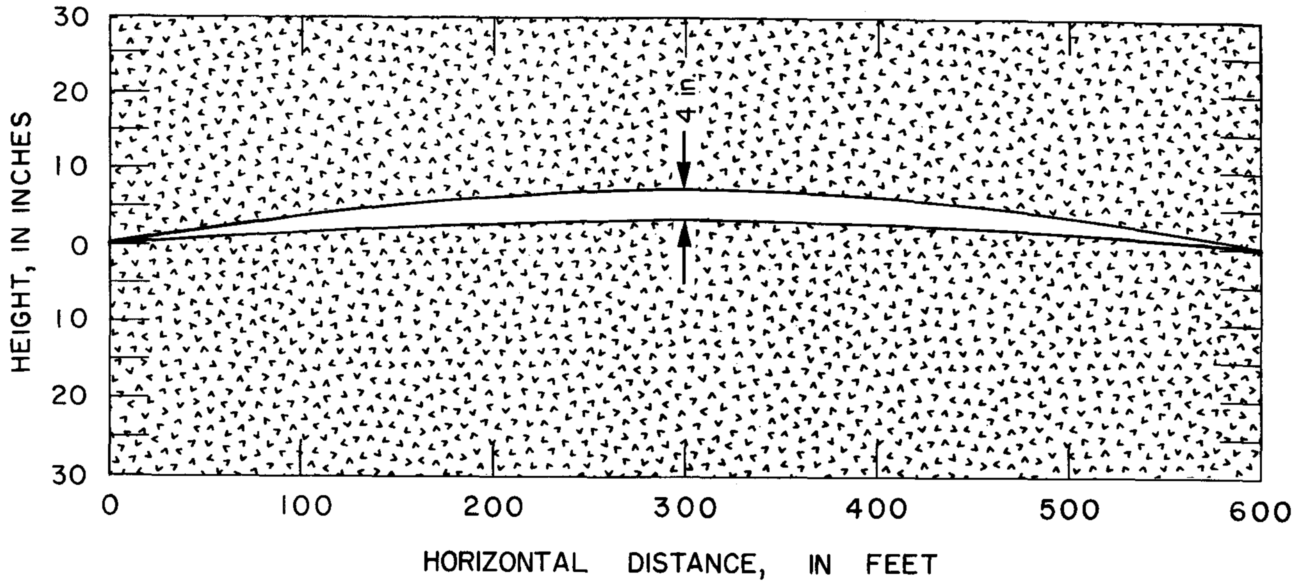


Figure 10. Hypothetical cross section of a stress relief fracture. The fractures probably are low arches that have the largest opening near the center.

Horizontal fractures probably form significant water-bearing openings in large bodies of gneiss in the south half of the area and possibly area-wide. Horizontal fractures were observed in one well (at Demorest, Habersham County, northeast of the GAR) in quartz-mica schist, and they may be a common occurrence in schist units having a high quartz content. Water-bearing stress relief fractures also may occur in granites, although none were identified during this study.

Bottom-Hole Fracture Wells

Driller's records show 25 wells in the report area that unquestionably derive large yields from openings at or near the bottom of the well. All of the wells share the characteristic of remaining dry, or essentially dry, during drilling until they penetrated one or two high-yielding fractures. The high-yielding fractures are at or near the bottom of wells because: (1) the large yields were in excess of the desired quantity and, therefore, drilling ceased, or (2) in deep wells yielding 50 to 100 gal/min or more the large volume of water from the fracture(s) "drowned out" the pneumatic hammers in the drill bits, effectively preventing deeper drilling. Four wells having identical characteristics were shown by sonic televiewer logs to derive water from horizontal fractures. Therefore, the writers believe that the bottom-hole fracture wells derive water from horizontal stress relief fractures.

Bottom-hole fracture wells are of particular interest because they include the highest-yielding wells in the study area. Construction data, topographic settings, and geology for 25 wells that derive water from bottom-hole fractures are given in table 4. The general locations of the wells are shown in figure 11.

In addition to the 25 wells listed in table 4, several other wells in the GAR share the characteristic of remaining nearly dry during drilling until they

Table 4.—Construction data, topographic setting, and water-bearing units of bottom-hole fracture wells

Well number	Water-bearing unit	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Depth of water-bearing fracture (ft)	Topography
4CC2	C	100	328	--	325	Near head of large draw on slope of divide ridge.
7BB42	D	87	330	52	330	Near head of draw on divide ridge.
8AA10	A	200	352	85	320	Divide ridge surrounded by stream heads.
9CC18	A	30	405	50	110	Point of land.
9HH5	A	200	526	12	526	Do.
10AA9	A	200	175	--	--	Point of land projecting into stream valley and shear zone.
10CC11	B	100	160	18	150	Saddle on ridge at head of two draws.
10CC12	B	50	150	30	140	Point of land.
10EE5	D	110	450	27	443	Head of draw on ridge slope.
10EE29	G	100	430	50	430	Point of land projecting into flood plain.
10HH2	A,C	150	346	92	330	Broad point of land; at head of draw on ridge slope.
11CC8	A	40	345	56	335	Head of draw on ridge slope.
12BB5	A	100	105	55	65	Crest of broad ridge.
12CC14	B	150	146	126	140	Head of draw near crest of narrow ridge.
13CC58	A	100+	340	--	335	Point of land.
13DD55	B	120	550	34	540	Crest of divide ridge surrounded by steam heads.
13DD56	B	348	410	103	400	Head of draw on divide ridge surrounded by stream heads.
13DD69	B	172	435	25	430	Crest of divide ridge surrounded by stream heads.
13DD89	B	150	230	12	220	Do.
14CC14	A	34	200	10	173	Do.
14FF3	B	100	398	46	395	Ridge crest.
14FF7	E	254	265	54	250	Draw on ridge slope.
14FF8	E	471	302	30	290	Near head of draw on slope of divide ridge.
14FF9	E	400	352	40	340	Base of ridge in stream valley.
14FF10	E	270	386	20	330	Stream valley.

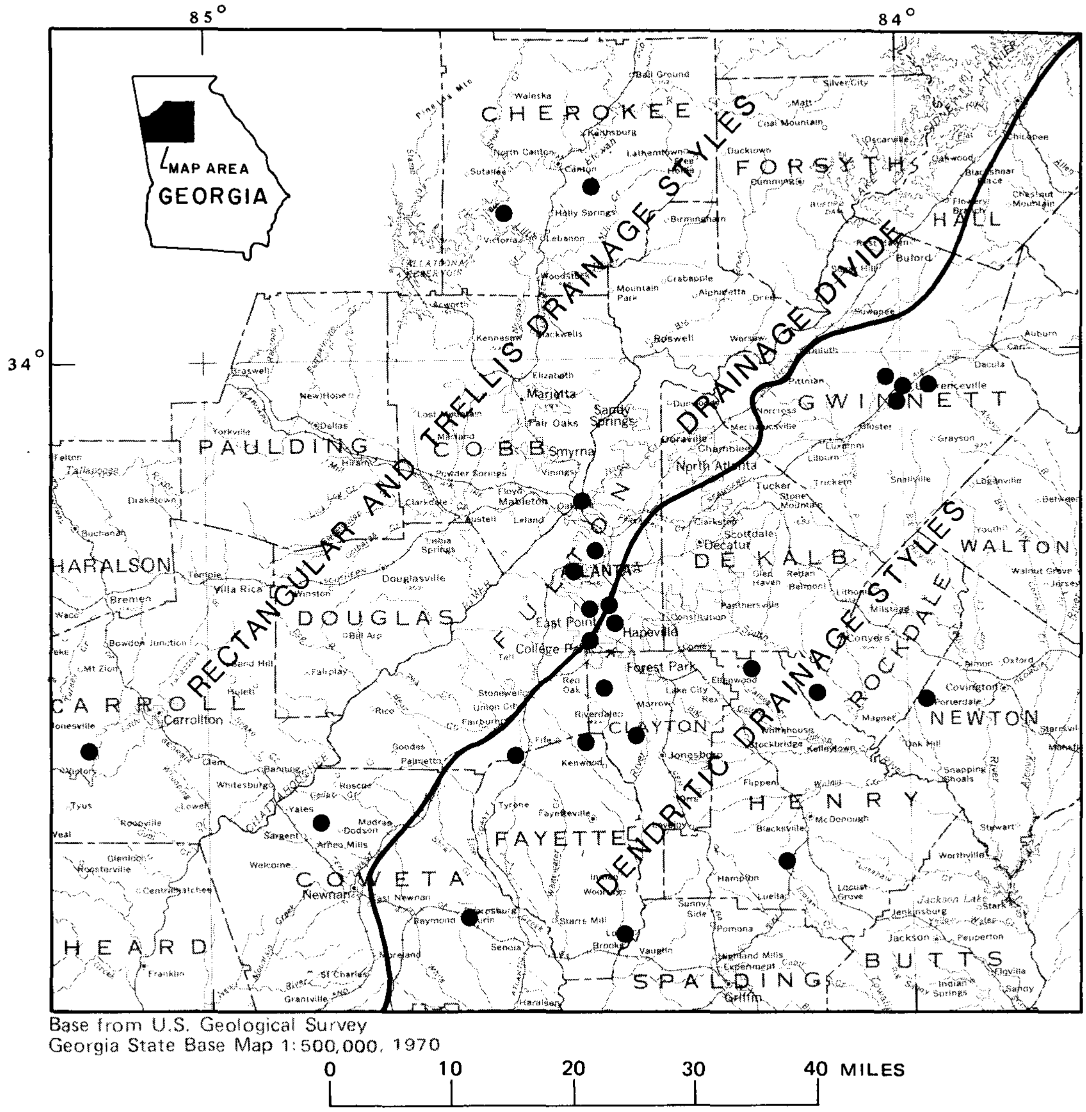


Figure 11. Locations of bottom-hole fracture wells.

obtained a large yield from one or two openings at depth. According to the memories of their owners and drillers, these wells derived their entire yields from one or two openings at or very near the bottom of the holes. The writers believe these wells also are bottom-hole fracture wells that derive water from stress relief fractures, but they were omitted from the table because no written records of the wells were available.

Areal Extent of Stress Relief Fractures

No practical means was found to measure the areal extent of stress relief fractures. Conyers well 13DD56, which is 410 ft deep and supplies 348 gal/min, is known to be connected with a 470-foot deep residential well about 400 ft to the north-northeast. The connection between the two wells was discovered when compressed air used to drill the residential well began escaping from the Conyers well.

Well 13DD90, about 2 miles southwest of Conyers, which derives water from horizontal fractures, is affected by wells 300 and 600 ft to the south, and seems to interfere with a well about 1,000 ft to the west. Conyers wells 13DD54 and 13DD55, on the other hand, are about 1,500 ft apart and tap separate horizontal fractures.

The spacing of these and other wells indicates that horizontal stress relief fractures probably range from as little as 100 ft to more than 1,000 ft across. The areal extent of individual fractures may be controlled by rock type, the size of the rock body, the geologic structure, and the amount of overburden removed relative to the area of the fracture.

Locating Horizontal Stress Relief Fractures

Because of their horizontal nature and the fact that they occur mainly at depths of 150 to more than 600 ft, stress relief fractures are not revealed by structural and stratigraphic features normally associated with increased bedrock permeability. The only clue to their presence, recognized thus far, is topographic setting. Although wells tapping horizontal fractures occupy a variety of topographic settings ranging from ridge crests to broad stream valleys, a large percentage of the wells occur in three rather distinct types of topographic settings. A knowledge of these settings may aid in selecting sites for high-yielding wells in areas having horizontal fractures.

The types of topographic settings are:

A. Points of land formed by (1) two streams converging at acute angles (fig. 12B, C), (2) two subparallel tributaries entering a large stream (fig. 12A, D), and (3) land protruding into the wide flood plains of large streams (fig. 12E). In 1 and 2, the points of land generally are less than 2,000 ft across.

B. Broad, relatively flat ridge areas, commonly on divide ridges, that are surrounded by stream heads (figs. 13 and 14). The wells are on the ridge crests and in the upper reaches of streams flowing off the ridges. Such areas are the sites of many towns and communities and, therefore, are centers of municipal and industrial pumpage.

C. Broad valleys formed by the removal of large volumes of material relative to the land on either side (fig. 28).

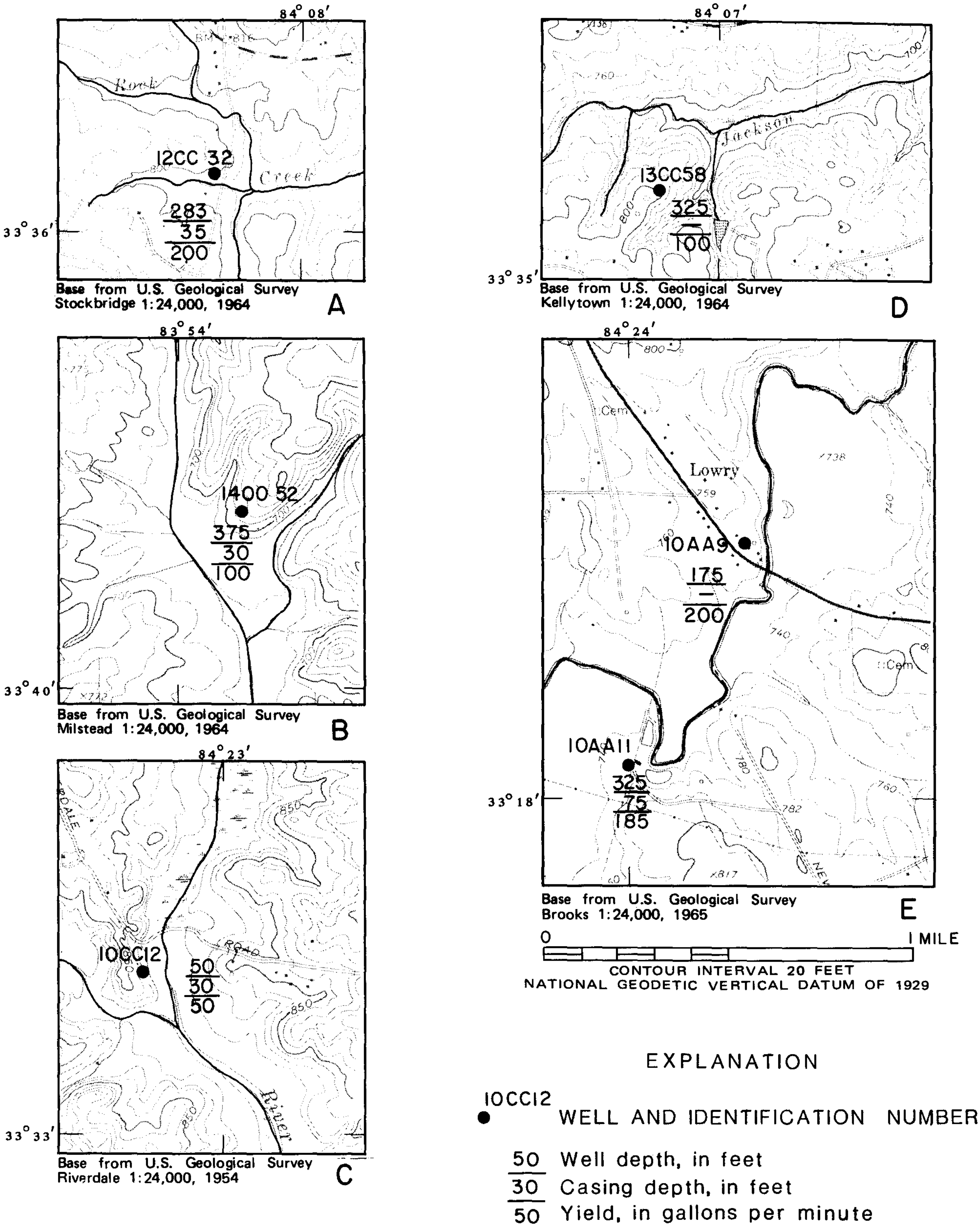
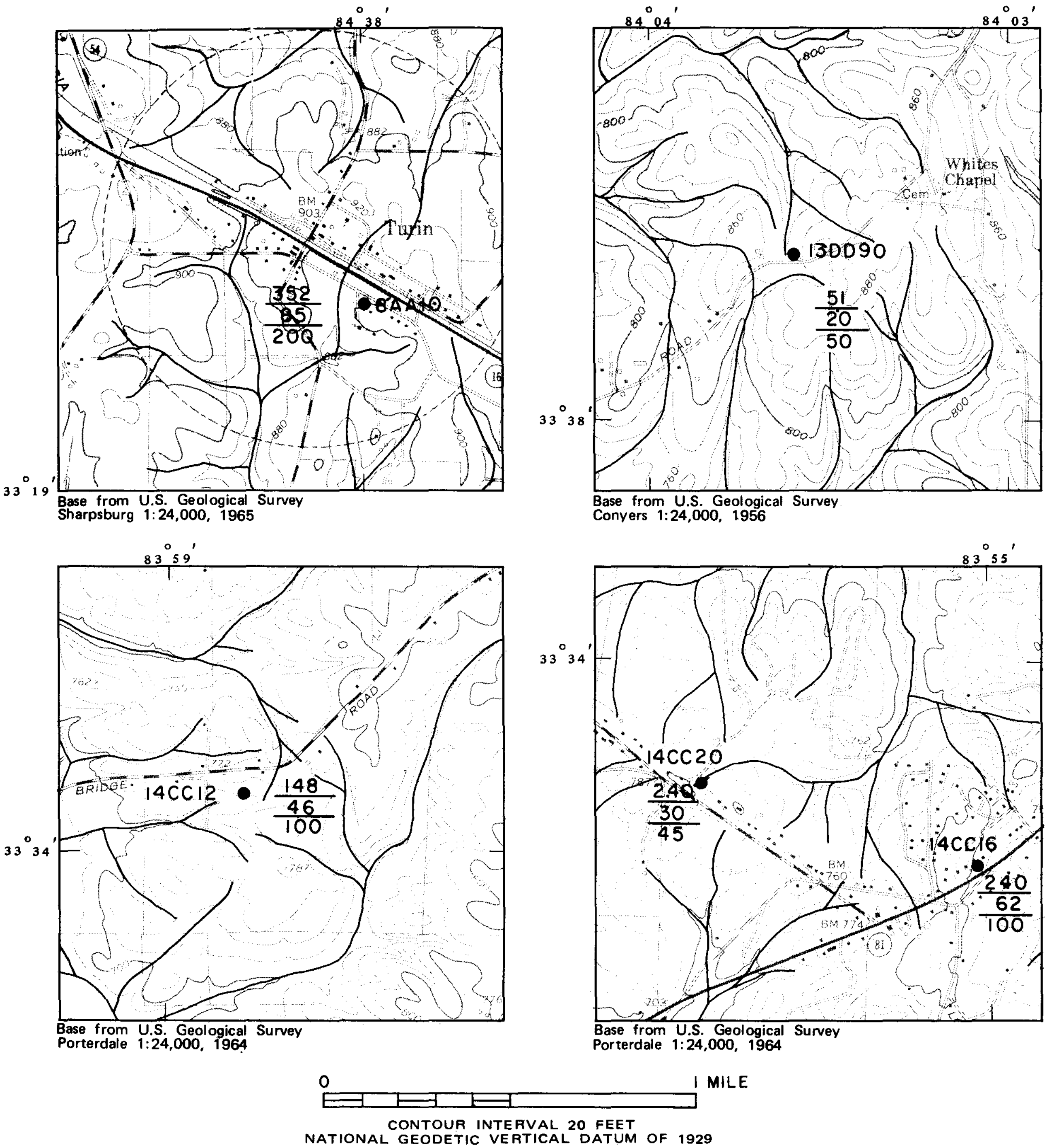


Figure 12. Wells tapping horizontal fractures commonly occupy points of land formed by confluent streams or projections of land that form constrictions in the broad flood plains of large streams.

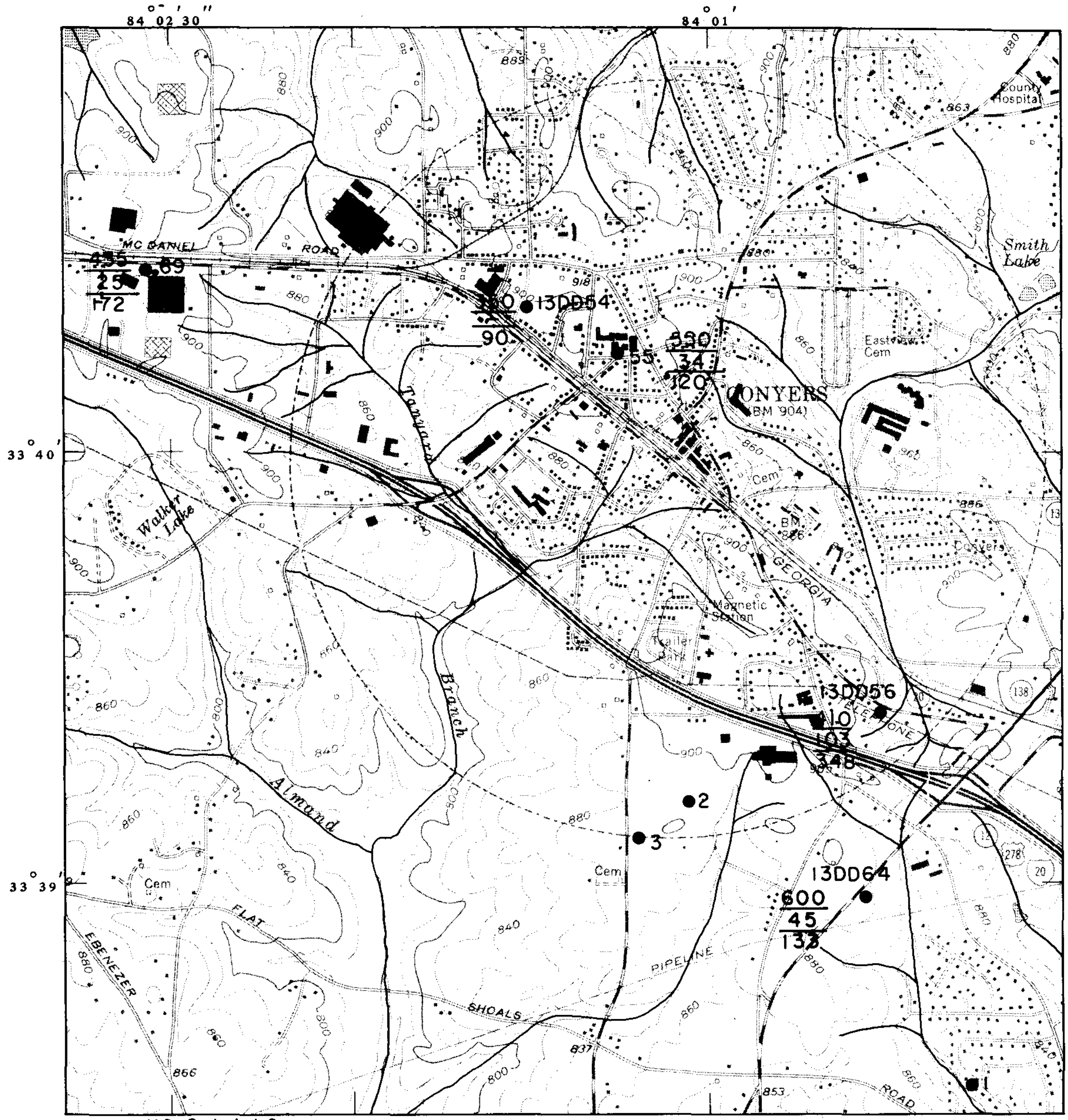


EXPLANATION

● 14CC16 WELL AND IDENTIFICATION NUMBER

240 Well depth, in feet
62 Casing depth, in feet
100 Yield, in gallons per minute

Figure 13. High-yielding wells commonly tap horizontal fractures on ridges and upland areas surrounded by stream heads.



Base from U.S. Geological Survey
Conyers 1:24,000, 1956

0 — 1 MILE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

EXPLANATION

●13DD64 WELL AND IDENTIFICATION NUMBER

600 Well depth, in feet
45 Casing depth, in feet
133 Yield, in gallons per minute

Figure 14. Wells tapping horizontal fractures commonly are on divide ridges surrounded by stream heads or in the upper reaches of streams flowing off divide ridges, as in the Conyers area, Rockdale County. Wells 1, 2, and 3, each 600 feet deep, are dry.

Zones of Fracture Concentration

Aquifers of low to moderate productivity may yield large quantities of water to wells from localized zones of increased porosity and permeability created by the concentration of fractures. These zones of fracture concentration generally are between 30 and 200 ft wide, along which the bedrock is shattered to an indefinite depth by numerous, nearly vertical, closely spaced fractures or faults of small displacement that are alined approximately parallel to the long axis of the fracture zone (fig. 15). The zones of fracture concentration extend in straight or slightly curved lines that range in length from a few hundred feet to several miles. Straight or slightly curved linear features a mile or more long, associated with these fracture zones, are visible on aerial photographs and topographic maps and are known as lineaments; shorter features are called linears.

Zones of fracture concentration tend to localize valley development. Rock weathering is greatest along these fracture zones because they transmit large quantities of moving water. The increased chemical weathering, coupled with the erosive action of surface water, localizes the valleys over these fracture zones (fig. 16). The chances of obtaining a high-yielding well are good in the floors of valleys developed over a fracture zone (Parizek, 1971, p. 28-56).

Valleys developed over fracture zones commonly possess distinctive characteristics that make them recognizable on topographic maps, aerial photographs, and satellite imagery. Among the features most easily recognized are: (1) straight stream and valley segments, (2) abrupt, angular changes in valley alinement, and (3) alinement of gullies, small depressions, or sinkholes (in marble).

In the GAR, zones of fracture concentration have localized valley development mainly in the north part of the area where topographic features developed

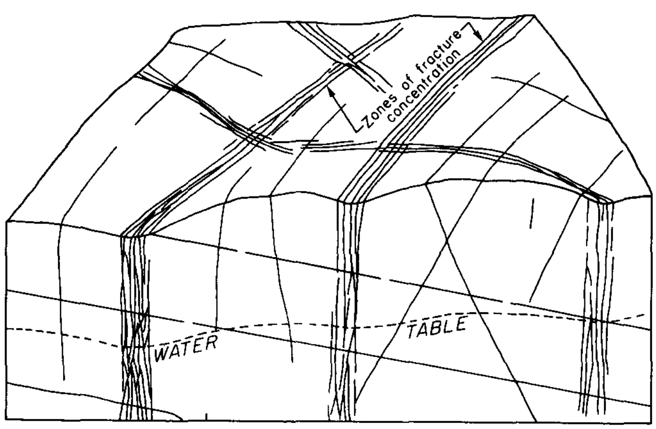


Figure 15. Zones of fracture concentration consist of nearly vertical closely spaced fractures. Modified from Parizek (1971).

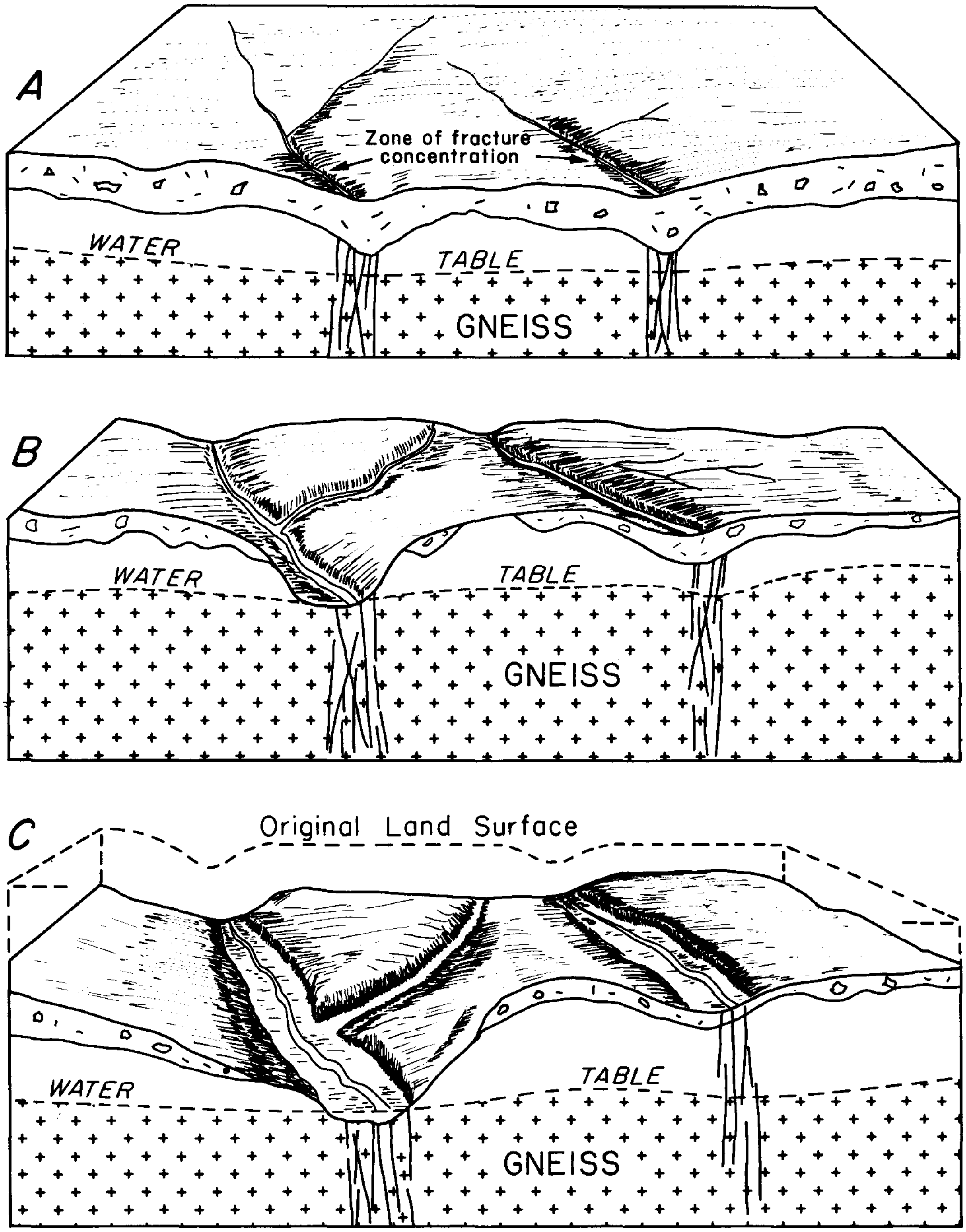


Figure 16. Valley development localized along zones of fracture concentration. Modified from Parizek (1971).

under geologic control. Several high-yielding wells in the north part of the area occupy sites on the floors of straight stream valleys that seem to have developed over fracture zones.

For example, the water supply for the Lake Arrowhead resort community, in northwest Cherokee County, was successfully developed in rugged terrain characterized by generally low-yielding wells, by drilling into zones of fracture concentration. Six production wells that penetrate zones of fracture concentration supply a combined total yield of about 560 gal/min. Driller's logs revealed that all of the wells having yields between 50 and 200 gal/min penetrated sizable fracture systems consisting of one or more large fractures or zones of closely spaced fractures. The largest yields came from zones of closely spaced fractures.

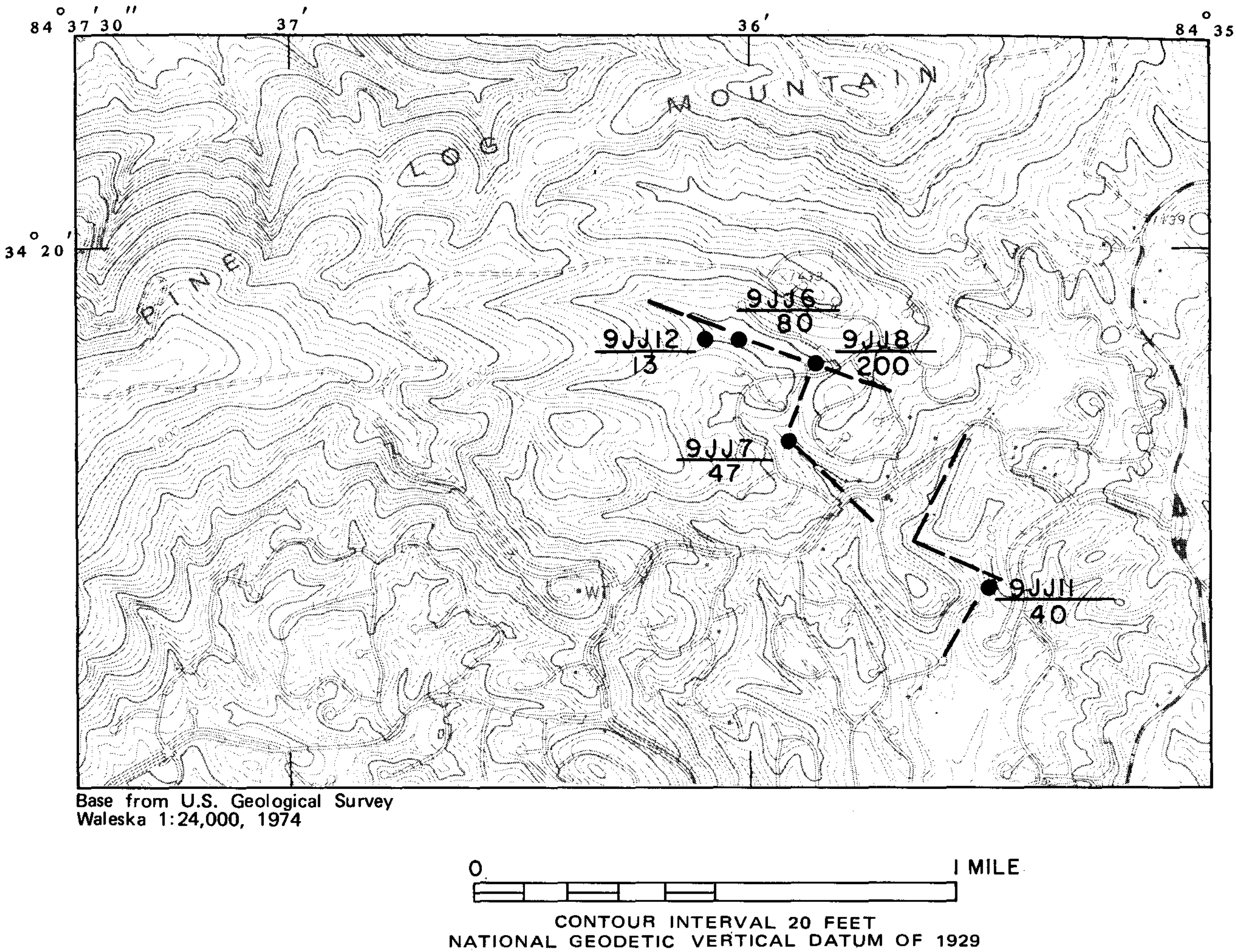
All the high-yielding wells occupy sites along straight stream segments, or where valleys make abrupt, angular changes in direction. Figure 17 is a map of part of the Lake Arrowhead area showing the locations of high-yielding and low-yielding wells, to illustrate how yields relate to topographic settings. All of the high-yielding wells are in settings that strongly suggest the presence of zones of fracture concentration.

As most zones of fracture concentration are rather narrow--30 to 200 ft wide --precision in locating wells was required to insure penetration of the water-bearing fractures. For example, wells 9JJ6 and 9JJ8 penetrated a fracture zone and yielded 80 and 200 gal/min, whereas well 9JJ12, which is situated slightly off the fracture zone, penetrated mainly solid rock and yielded only 13 gal/min.

Valleys possessing the distinctive characteristics of those developed over zones of fracture concentration--straight stream and valley segments; abrupt, angular changes in valley alinement; and alinement of gulleys, small depressions, and gaps in ridges--are common in the north part of the GAR. Many of these features overlie permeable fracture zones and may be capable of supplying large yields to wells. For example, wells 11GG11 and 11GG12 in Forsyth County each supply 200 gal/min from a fracture zone in amphibolite of water-bearing Unit E. The fracture zone, which runs at nearly right angles to the strike of the rock, underlies two straight stream segments that are alined with a gap in the intervening ridge (fig. 18). Numerous straight stream segments of similar character occur in the north part of the area and may supply large quantities of water to wells.

Field investigations showed, however, that not all linear features in the north part of the area overlie permeable fracture zones. Several straight stream and valley segments in the Sweetwater Creek area of Douglas County were found to be on rock having an average spacing of joints and fractures. None of the valleys was found to be associated with a zone of fracture concentration. Possibly, these valleys were localized over fracture zones that subsequently eroded away, leaving rock of average permeability. Depending on the depth of soil cover and the amount of rock exposed, it may not be possible to verify the presence of concentrated fractures by field examination.

Zones of fracture concentration also occur in the south half of the area, but all that were identified in the field occupied hills and ridges and were not associated with valley development. The superimposed dendritic drainage in that part of the area seems to have greatly limited the localization of valleys by zones of fracture concentration. Valleys localized over fracture zones may be limited to the headwaters areas of drainages where stream courses, draws, and other depressions were formed after removal of any preexisting cover and drainages were established under geologic control. This

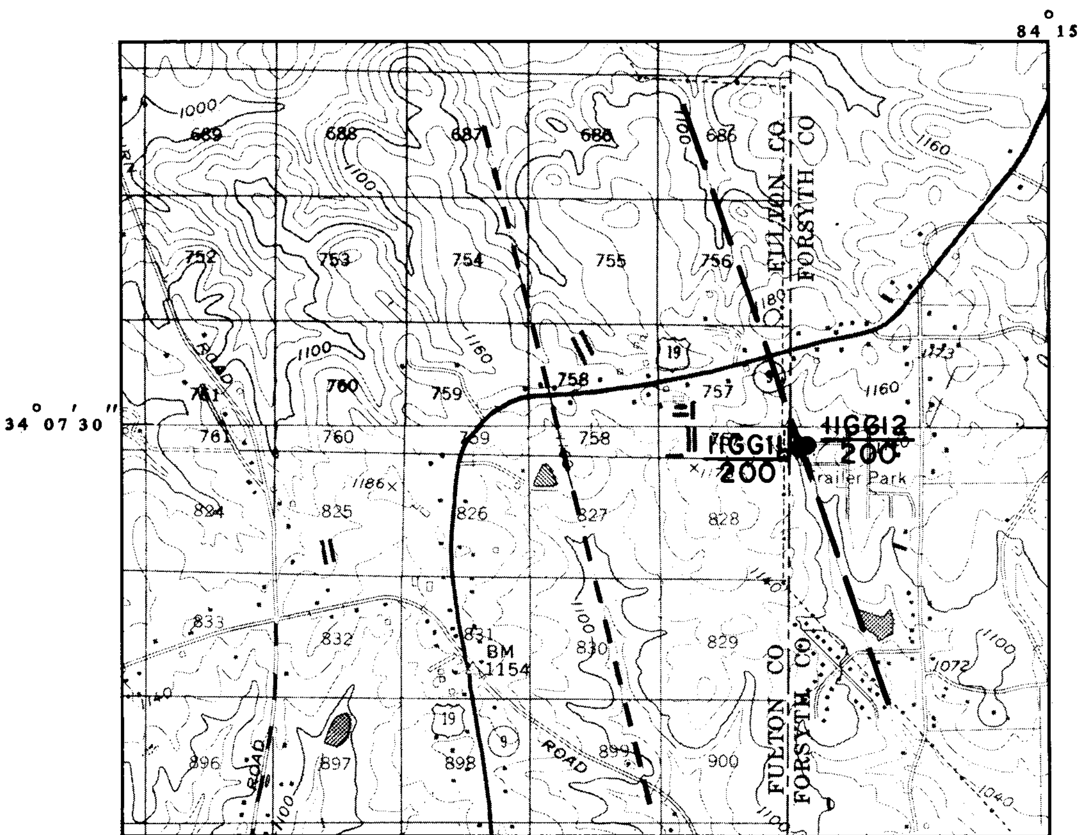


EXPLANATION

— — — ZONE OF FRACTURE CONCENTRATION

$\frac{\text{9JJ11}}{\text{40}}$ WELL-Top number is well identification. Bottom number indicates yield, in gallons per minute.

Figure 17. Relation of zones of fracture concentration to well yields, Lake Arrowhead area, Cherokee County. Modified from Cressler and others (1979).



Base from U.S. Geological Survey
Birmingham 1:24,000, 1956

0 — 1 MILE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

EXPLANATION

—— —— ZONE OF FRACTURE CONCENTRATION

— — — — PROBABLE ZONE OF FRACTURE CONCENTRATION

● 11GG11 / 200 WELL-Top number is well identification. Bottom number indicates yield, in gallons per minute.

Figure 18. Permeable zones of fracture concentration commonly lie along straight valley segments that aline with gaps in ridges.

may explain why most high-yielding wells in the south part of the area that occupy valley settings are in headwaters areas.

Early in the study the writers observed that many straight stream and valley segments in the south half of the area have a persistent strike of N. 35°-40° W. Near Milstead in Rockdale County, several linear valleys having this strike are coincident with or closely associated with diabase dikes. Southwest of Atlanta, between Forest Park and Newnan, several straight stream and valley segments also strike N. 35°-40° W., but are not associated with diabase dikes. Because of their nearly identical strike with the dikes, the writers considered the possibility that these valley segments could have developed along the same system of tension joints that was intruded by the diabase to the east and, therefore, could overlie zones of increased permeability. A test well was drilled in a linear valley formed by a segment of Camp Creek south of Riverdale, Clayton County (fig. 19), to check bedrock permeability. The well, which is 600 ft deep, penetrated nearly solid gneiss and schist (Unit A) and yielded less than 10 gal/min. The results of this test provided the first hard evidence that these linear valleys were not localized over zones of fracture concentration and that their common strike was not a product of geologic control. This raised the question: could the parallel streams in the area having a common strike be a product of dendritic drainage?

In an attempt to answer this question, topographic maps of parts of the Georgia Coastal Plain were examined to see whether in other areas of dendritic drainage, streams assume parallel courses and maintain a similar strike over large areas. The maps showed that in the Coastal Plain, streams have a common tendency to form several straight valley segments that follow essentially parallel courses. Thus, the parallelism of several straight valley segments in the south half of the GAR seems to be a normal development of dentritic drainage style and may not be related to bedrock permeability.

Small-Scale Structures that Localize Drainage Development

Small-scale structures that localize drainage development play a major role in determining the availability of ground water. The structures include joints, bedding or compositional layering, foliation, cleavage, and the axial planes of small folds. Such structures represent inhomogeneity in rocks and form planes of weakness that enhance the rapidity and depth of weathering, bringing about increases in permeability.

Rocks generally are more permeable in directions parallel to these structures than across them. Preferential permeability in weathered schists and foliated rocks has been documented by Stewart (1964) and was observed during this study. (See section on contact zones under "Availability", this report.) As rocks weather, water moves through planar openings and establishes paths of circulation that increase the rate and depth of weathering. Weathering progresses rapidly and deeply along planes of bedrock weakness, tending to localize drainage development in much the same way as discussed for zones of fracture concentration.

Where small-scale structures underlie and trend parallel to stream valleys, drainages, and draws that concentrate the flow of water, they can be avenues of greatly increased permeability. Wells drilled into drainages that flow parallel to structural features in the underlying bedrock commonly supply large yields. Relating small-scale structures to the topography and drainage is a very successful method of selecting high-yielding well sites.

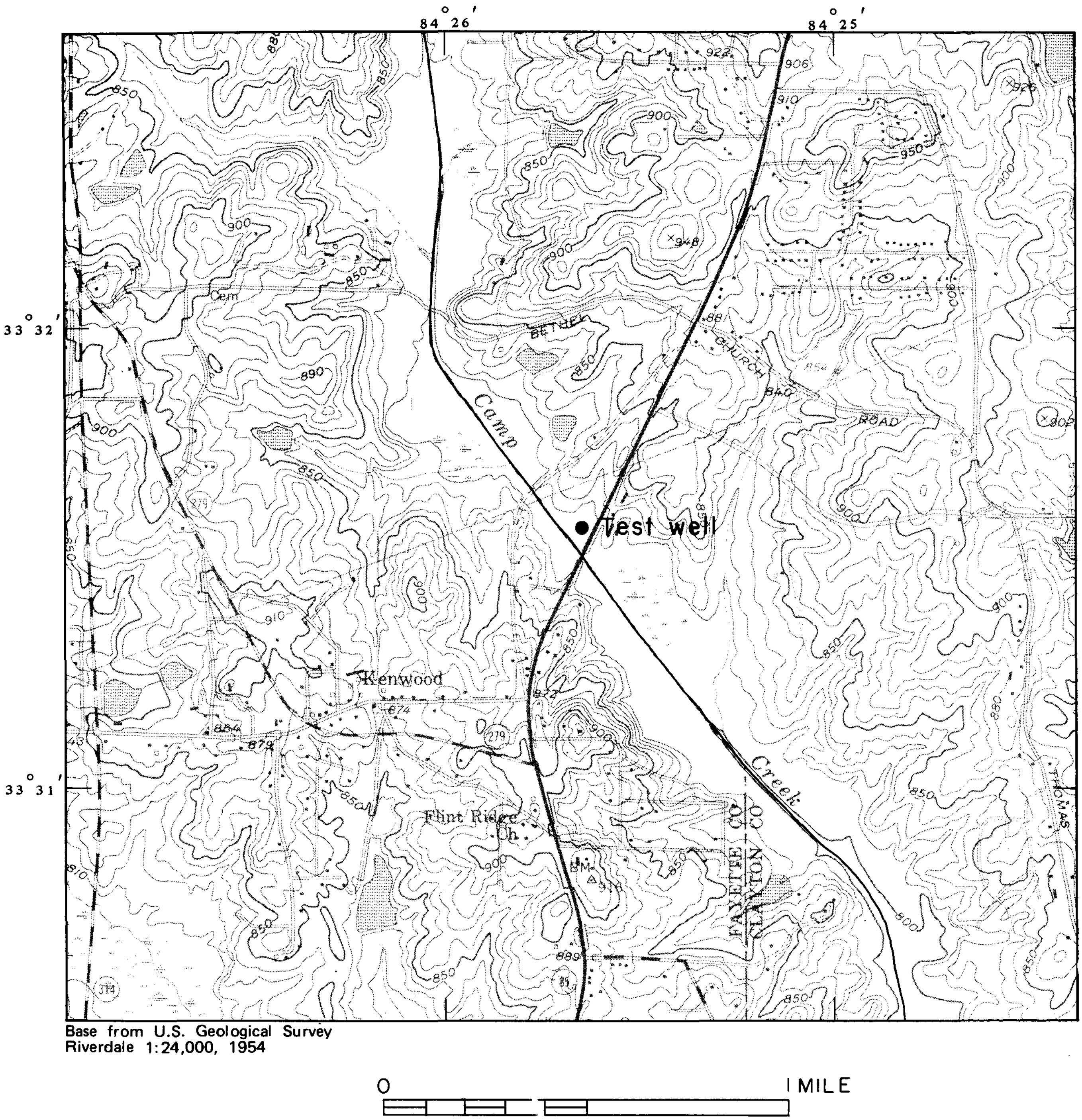


Figure 19. Topographic setting of the test well drilled in the linear valley formed by a segment of Camp Creek south of Riverdale, Clayton County.

Because small-scale structural features must localize drainage development in order to bring about significant increases in permeability, they are most useful in the north half of the report area where streams have developed under geologic control. They also may be useful in headwaters areas in the south.

In the south half of the report area, some high-yielding wells are obtained by drilling in small draws and drainages in the headwaters areas of large streams. Commonly, where wells on hilltops and ridge crests furnished insufficient yields, successful wells resulted from moving to sites in the nearest draw or headwater drainage. Because these uppermost drainages formed after removal of any preexisting cover, their locations have been influenced by the underlying bedrock structure and, therefore, they occupy relatively permeable zones.

Folds

Rocks in the GAR were too ductile during periods of major deformation to develop open joints. The latest two fold sets, however, occurred after the rocks cooled and were under less pressure, producing open joints that are concentrated along the fold axes (Michael W. Higgins, U.S. Geological Survey, oral commun., 1981). The folds, which are east-west and north-south trending open folds ranging from less than 75 to more than 600 ft across, are recognizable in road cuts and quarries (fig. 20), from where they can be projected into low areas favoring deep weathering and increased recharge. In the absence of more productive features, concentrations of joints along fold axes in the right topographic settings may be capable of supplying large well yields.

Shear Zones

The Geologic Map of Georgia (Georgia Geological Survey, 1976) shows a number of major shear zones south and southeast of Atlanta, in northern Spalding County and in Rockdale, Newton, and Walton Counties (plate 1). In relating well locations and yields to geology and structure, some of the highest yielding wells (100 gal/min to more than 200 gal/min) were found to be in these and other shear zones. Driller's logs of some of these wells report "broken rock" and "flint rock" in the wells, indicating that the wells penetrate shear zones. Other high-yielding wells are near shear zones and also penetrate permeable rock, although details about the type of rock penetrated were unavailable.

Many of the shear zones strike northeast and dip steeply to the southeast. They vary in length from less than 1 mile to about 7 miles. Although the geologic map shows shear zones to be continuous, field observations indicate that the longer shears may consist of a series of discontinuous zones that trend nearly parallel. The shear zones form prominent topographic lineaments and linears, generally consisting of low, narrow ridges flanking long, fairly straight valleys. The lineaments can be traced for miles in the field and are readily visible on topographic maps. Thicknesses of the shear zones are unknown, but the width of the associated valleys indicates that they may be as much as several hundred feet thick.

The shear zones occur in a variety of rock types, though most are in granitic gneiss (Unit B). The sheared rock consists of two types: flinty crush rock and sheared country rock.

The flinty crush rock is light-tan or buff colored, is very fine grained to cryptocrystalline, and breaks into small angular blocks. In hand samples it is easily distinguished from vein quartz. The more intensely sheared flinty crush rock weathers to small, flat, diamond-shaped pieces produced by intersecting shear planes. This is the single most consistent feature found in nearly all of the shear zones. Buff-colored flinty crush rock most commonly is associated with felsic granites and granitic

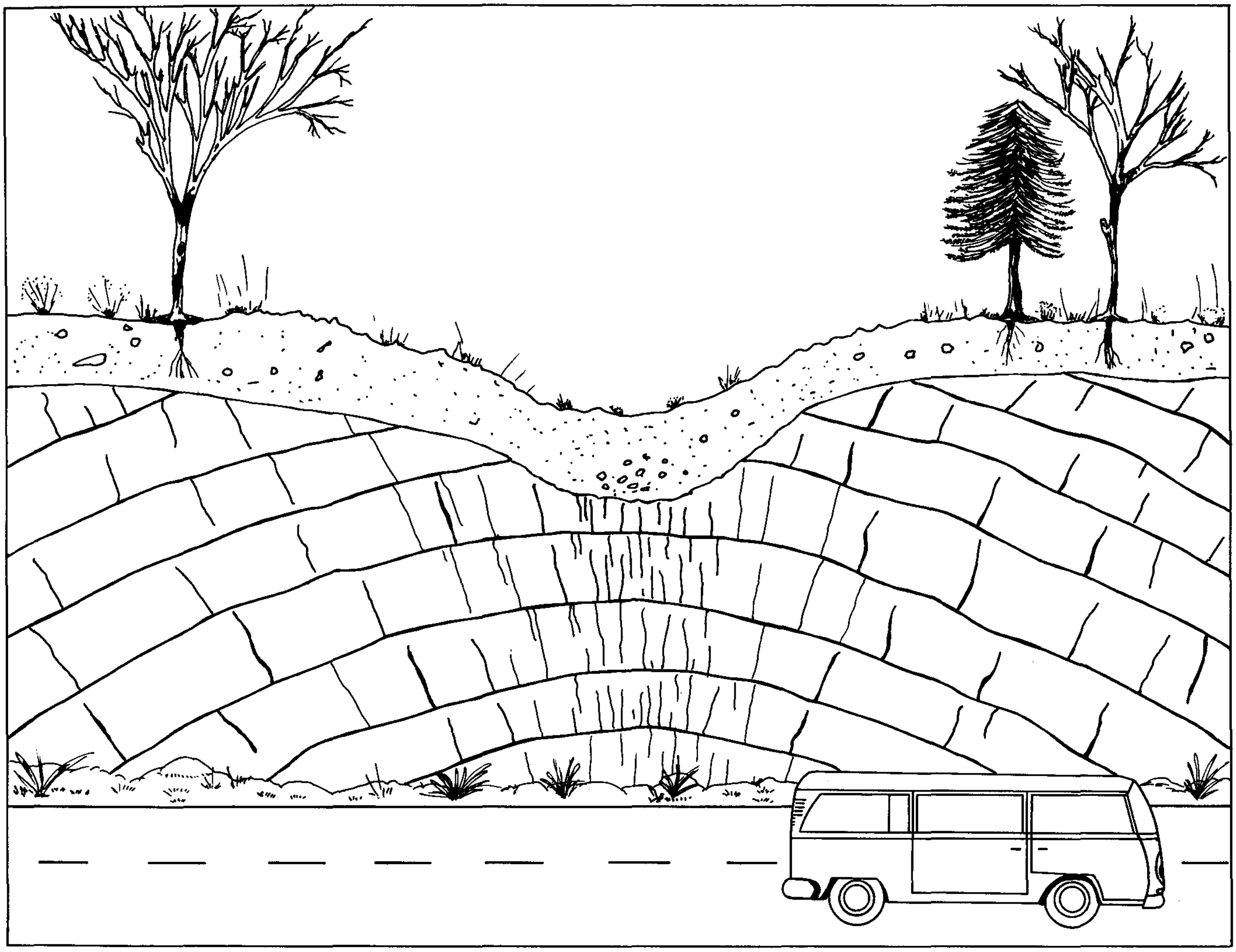


Figure 20. Concentrated jointing along the axis of a late fold.

gneisses. Dark-gray to black flinty crush rock occurs in association with more mafic rocks, such as diabase.

The sheared country rock generally shows little or no replacement mineralization. Shearing of biotite-rich gneisses commonly results in a rock having a schistose texture containing a large proportion of platy minerals (muscovite or biotite). Sheared amphibolites retain the same mineralogy but undergo abrupt textural changes that produce the previously mentioned diamond-shaped fragments. Schist that has been sheared may weather into small disk-shaped pieces and is referred to as "button schist."

HIGH-YIELDING WELLS

In this report, the term "high-yielding wells" refers to ones that supply a minimum of 20 gal/min, except in the belt extending from College Park through Atlanta, where the minimum yield is 50 gal/min. The maximum yields of the wells range from 35 to 470 gal/min, the wide range in yields resulting from differences in rock type, geologic structure, and topographic settings. The distribution of high-yielding wells in the report area is shown on plate 1.

Data on more than 1,500 high-yielding wells in the GAR were obtained from files of the U.S. Geological Survey, local drilling contractors, and ground-water hydrologists, and from previous publications. The location of each high-yielding well used in this report was confirmed by field checking and plotted on topographic maps for determination of latitude, longitude, and topographic setting. Construction and yield data were confirmed, where possible, by interviews with well owners. About 400 reportedly high-yielding wells were excluded from use in this report because the wells could not be located within the alloted time or significant questions remained about the accuracy of yield or construction data.

SELECTING SITES FOR HIGH-YIELDING WELLS

Selecting sites for high-yielding wells requires a knowledge of the character of the underlying bedrock, the structural and stratigraphic features present, and the relation of these features to the topography and drainage. This knowledge generally is obtained by a foot traverse of the area, during which structural and stratigraphic features such as fault zones, contact zones, zones of fracture concentration, the dip and strike of foliation and layering, the strike and plunge of fold axes; and other clues to localized increases in bedrock permeability are plotted on a topographic map. Locating observed features on a topographic map is a good way to understand their relation to the topography and drainage.

The appropriate method(s) to use for selecting high-yielding well sites depends on (1) the quantity of water needed, (2) the topography and the drainage style of the area, (3) the rock type, (4) the types and character of structural and stratigraphic features present in the rock, and (5) imposed constraints, such as being limited to a small area or to specific pieces of property, or the requirement that the sites be near pipelines or other facilities. Site selection methods that can be applied to most combinations of geology, topography, and drainage are presented below.

The reader also should understand that the successful siting of high-yielding wells in the GAR is not particularly good. Drilling of multiple wells to obtain required yields is common. Also, it should be recognized that some sites, for practical purposes, are virtually "barren" of ground water.

Topography and Soil Thickness

Because the yields of individual wells in the GAR vary greatly within short distances, estimating the potential yield of prospective sites can be very difficult.

Most methods for selecting well sites require a knowledge of geology and structure, which restricts their use primarily to hydrologists. A method was developed by LeGrand (1967) that utilizes only topography and soil thickness, and is suitable for use by nonhydrologists. The method provides a means for estimating, on a percentage basis, the chances of obtaining certain yields from prospective well sites in a variety of settings.

The LeGrand Method

"Although many factors determine the yield of a well, two ground conditions when used together serve as a good index for rating a well site. These conditions are topography and soil thickness. The ratings are based on the following statement: High-yielding wells are common where thick residual soils and relatively low topographic areas are combined, and low-yielding wells are common where thin soils and hilltops are combined. By comparing conditions of a site according to the topographic and soil conditions one gets a relative rating value. For example, the following topographic conditions are assigned point values:

Points	Topography
0	Steep ridge top
2	Upland steep slope
4	Pronounced rounded upland
5	Midpoint ridge slope
7	Gentle upland slope
8	Broad flat upland
9	Lower part of upland slope
12	Valley bottom or flood plain
15	Draw in narrow catchment area
18	Draw in large catchment area

"Figure 21 shows values for certain topographic conditions. Figure 22 shows rating values for soil thickness. The soil zone in this report includes the normal soils and also the relatively soft or weathered rock. The topographic and soil conditions are separately rated, and the points for each are added to get the total points which may be used in table 5 to rate a site.

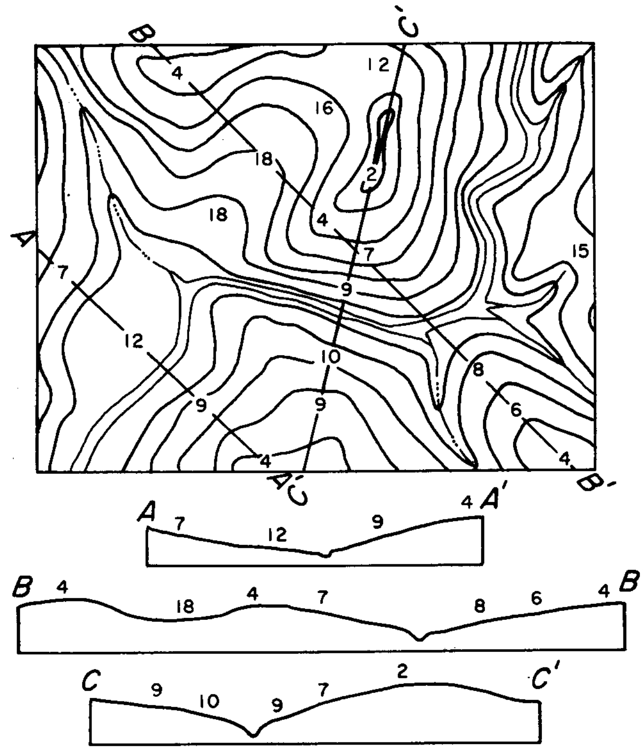
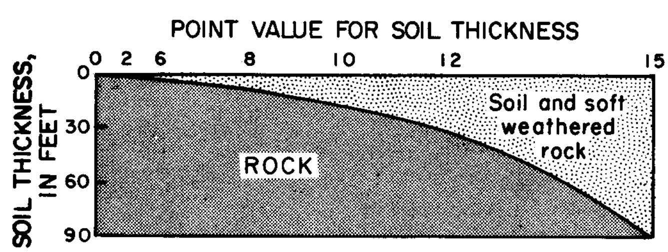


Figure 21. Topographic map and profiles of ground surface showing rating in points for various topographic positions. (LeGrand, 1967).



POINT VALUE	CHARACTER OF SOIL AND ROCK
0–2	Bare rock—almost no soil
2–6	Very thin soil—some rock outcrops
6–9	Soil thin—a few rock outcrops
9–12	Moderately thick soil—no fresh outcrops
12–15	Thick soil—no rock outcrops

Figure 22. Rating in points for various conditions of soil thickness. (LeGrand, 1967).

Table 5.--Use of numerical rating of well site to estimate the percent chance of success of a well (LeGrand, 1967)

[Data are based on maximum depth of 300 feet or maximum drawdown of water level of about 200 feet. No interference is assumed. Numberical rating is obtained by adding rating in points for topography and soil thickness; gpm, gallons per minute.]

Total points of a site	Average yield (gpm)	Chance of success, in percent, for a well to yield at least--				
		3 gpm	10 gpm	25 gpm	50 gpm	75 gpm
5	2	48	18	6	2	--
6	3	50	20	7	3	--
7	3	55	25	8	3	--
8	4	55	30	11	3	--
9	5	60	35	12	4	--
10	6	65	40	15	5	--
11	7	70	43	19	7	--
12	9	73	46	22	10	--
13	11	77	50	26	12	--
14	12	80	52	30	14	--
15	14	83	54	33	16	--
16	16	85	57	36	18	--
17	17	86	60	40	20	12
18	20	87	63	45	24	15
19	23	88	66	50	25	18
20	26	89	70	52	27	20
21	28	90	72	54	30	22
22	31	91	74	56	35	24
23	34	92	76	58	38	26
24	37	92	78	60	40	29
25	39	93	80	62	43	32
26	41	93	81	64	46	36
27	43	94	82	66	48	40
28	45	95	83	68	50	42
29	46	95	84	71	53	44
30	50	96	87	73	56	47
30+	50	97	91	75	60	50

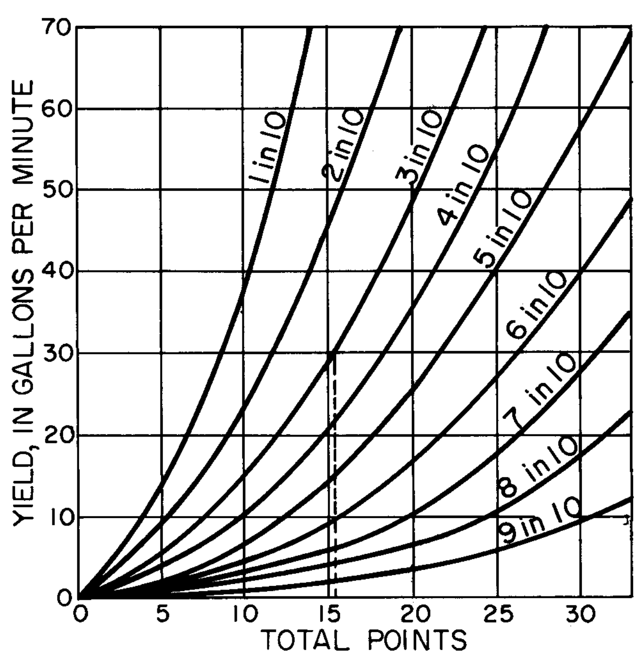
"Using two wells sites, A and B as examples, we can evaluate each as to the potential yield of a well. Site A, a pronounced rounded upland (4-point rating for topography in fig. 21) having a relatively thin soil (6-point rating for soil characteristics in fig. 22), has a total of 10 points. In table 5 the average yield for site A is 6 gal/min. This site has a 65-percent chance of yielding 3 gal/min and a 40-percent chance of yielding 10 gal/min. Site B, a draw or slight sag in topography (18-point rating) having a moderately thick soil (12-point rating), has a total of 30 points, an average yield of 50 gal/min, and a 73-percent chance of yielding 25 gal/min. Referring to figure 23, we see that the 10-point site has less than 1 chance in 10 of yielding 40 gal/min, whereas the 30-point site has better than an even chance of yielding 40 gal/min.

"Some topographic conditions of the region and a few topographic ratings are shown in figure 24. Wells located on concave slopes are commonly more productive than wells on convex slopes or straight slopes. Broad but slightly concave slopes near saddles in gently rolling upland areas are especially good sites for potentially high-yielding wells. On the other hand, steep V-shaped valleys of the gully type may not be especially good sites, and they should be avoided if surface drainage near the well is so poor that contamination is possible.

"More difficulty is likely to occur in rating character of soil and rock than in rating topography. Everyone should be able to determine by observation if the soil is thin and if the soil is fairly thick (more than 10 soil and rock points), but the intermediate ratings are difficult to make. If the observer is unsure of the soil and rock rating above the 6-point (thin-soil) value, he may choose a 10-point value for the site with assurance that he is fairly correct. White quartz or flint is not considered a true rock in this report, because it persists in the soil zone; a quartz vein, in many cases, is considered to be a slightly favorable indication of a good well site.

"The numerical rating system is not intended to be precise. One person may rate a particular site at 15 points, whereas another person may rate it at 17 points; such a small difference in rating would not be misleading. Almost everyone's rating will be within 5 points of an average rating for a site."

Limitations.--LeGrand's method is especially well suited to the north half of the report area, where the topography and geology are closely related and the topographic setting and soil thickness are indicative of bedrock permeability. It can be applied there in every type of topographic setting, from the smallest draws and drainages to the larger stream valleys. The use of LeGrand's method should bring about a substantial increase in the percentage of high-yielding wells.



EXAMPLE: A site with 16 points has 3 chances in 10 of yielding at least 30 gallons per minute and 6 chances in 10 of yielding 10 gallons per minute.

Figure 23. Probability of getting certain yield from a well at different sites having various total-point ratings. (LeGrand, 1967).

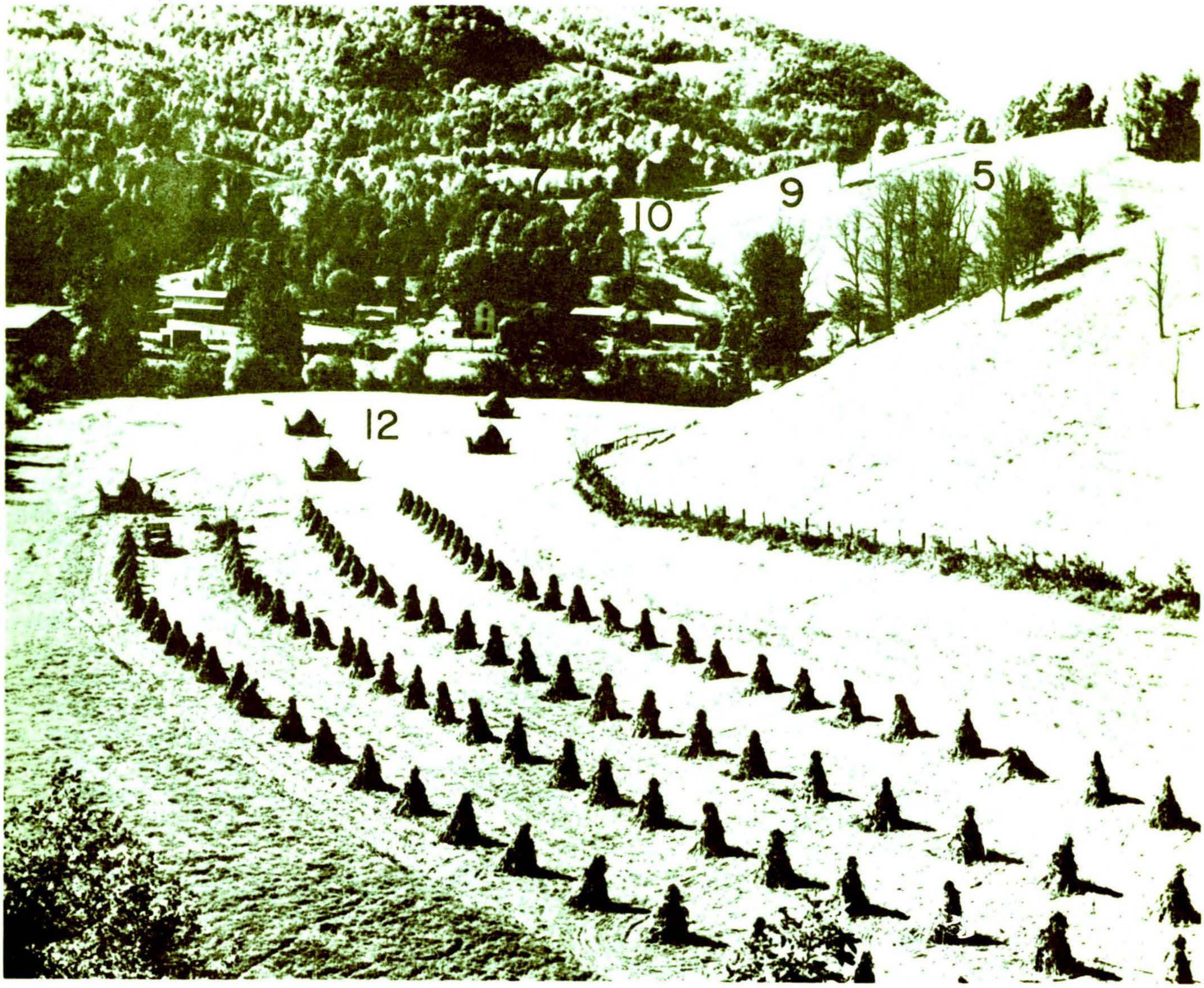


Figure 24. Countryside showing approximate ratings for topography. Numbers refer to figure 22.

In the south half of the area, the method probably will be most reliable in the uppermost headwaters areas of streams and along draws and drainages that flow down ridge slopes. In these areas, high-yielding wells commonly result when a dry hole on a hilltop or ridge crest is abandoned in favor of a site in the nearest draw or saddle, or downslope midway between the hilltop and the draw. The larger superimposed streams and drainages are not necessarily located over zones of bedrock weakness and, therefore, the method may not be applicable in those areas.

Contact Zones Between Rock Units of Contrasting Character

Potentially permeable contact zones between rock units of contrasting character occur in the GAR wherever Units B, D, and F are in contact with Units A, C, and E and in some areas with Unit G. Some contact zones between Unit C and Units E, H, and G also may be permeable. Most contacts between these units are shown on plate 1. Additional contact zones between different rock types within individual units can be found on detailed geologic maps that are available for parts of the area. (See References.) Field surveys also may reveal contact zones between individual rock layers not shown on the geologic maps.

Identifying Contact Zones

Permeable contact zones form between rock units that respond differently to weathering, such as granite and schist, gneiss and feldspathic schist, and massive homogeneous rock and highly foliated rock. The greatest permeability may occur where resistant rock (massive granite or gneiss) is overlain by rapidly and deeply weathering rock (feldspathic schist). The more resistant rock may be characterized by fresh rock exposures and thin soil and may be somewhat higher topographically. The area underlain by the less resistant rock may lack exposures, have very deep soil, and be somewhat lower. Some contact zones occupy small linear depressions or show up as slight changes in slope between the two rock units. The contacts may follow small drainages or even streams, or they may cross drainages at various angles. Other contacts, particularly in the south half of the report area, have little if any surface expression and are visible mainly in road cuts and similar exposures.

Selecting Well Sites

High-yielding well sites should be selected so that the wells will penetrate contact zones at a depth of about 100 to 150 ft. Proper placement of the wells with respect to the dip of the contact zones is essential to avoid missing the zones completely or penetrating them at too great or too shallow a depth to obtain a large yield (fig. 25).

The largest yields to wells can be expected where contact zones trend parallel to and underlie draws or drainages that are downgradient from sizable catchment areas. Contact zones crossing broad, low areas covered by deep soil also can supply large well yields. In areas of poor exposure, it may be necessary to project contact zones into suitable topographic settings in order to select high-yielding well sites.

Area of Application

This method can be applied in most of the north half of the report area where drainage development and bedrock permeability are related. In the south half of the area, the method can best be applied to headwaters areas and to drainages and draws on the slopes of divide ridges. The development of these late-forming drainages probably followed the removal of any preexisting cover and thus, contact zones are more likely to have influenced drainage development.

<u>Contact Zones in Multilayered Rock Units</u>

Permeable contact zones in multilayered rock units are most likely to occur where different rock types alternate in layers a few feet to no more than a few tens of feet thick. Rock layers of suitable type and thickness are present in most areas underlain by Unit A and in some areas of Units C, D, E, and G. However, because the individual rock layers in these units are not shown on plate 1 and generally are not shown on geologic maps, they must be located and checked for suitability by field surveys. In areas of poor exposure, it may be necessary to determine the character and thickness of the rock layers in road cuts, quarries, and similar exposures and project them along strike into favorable topographic settings.

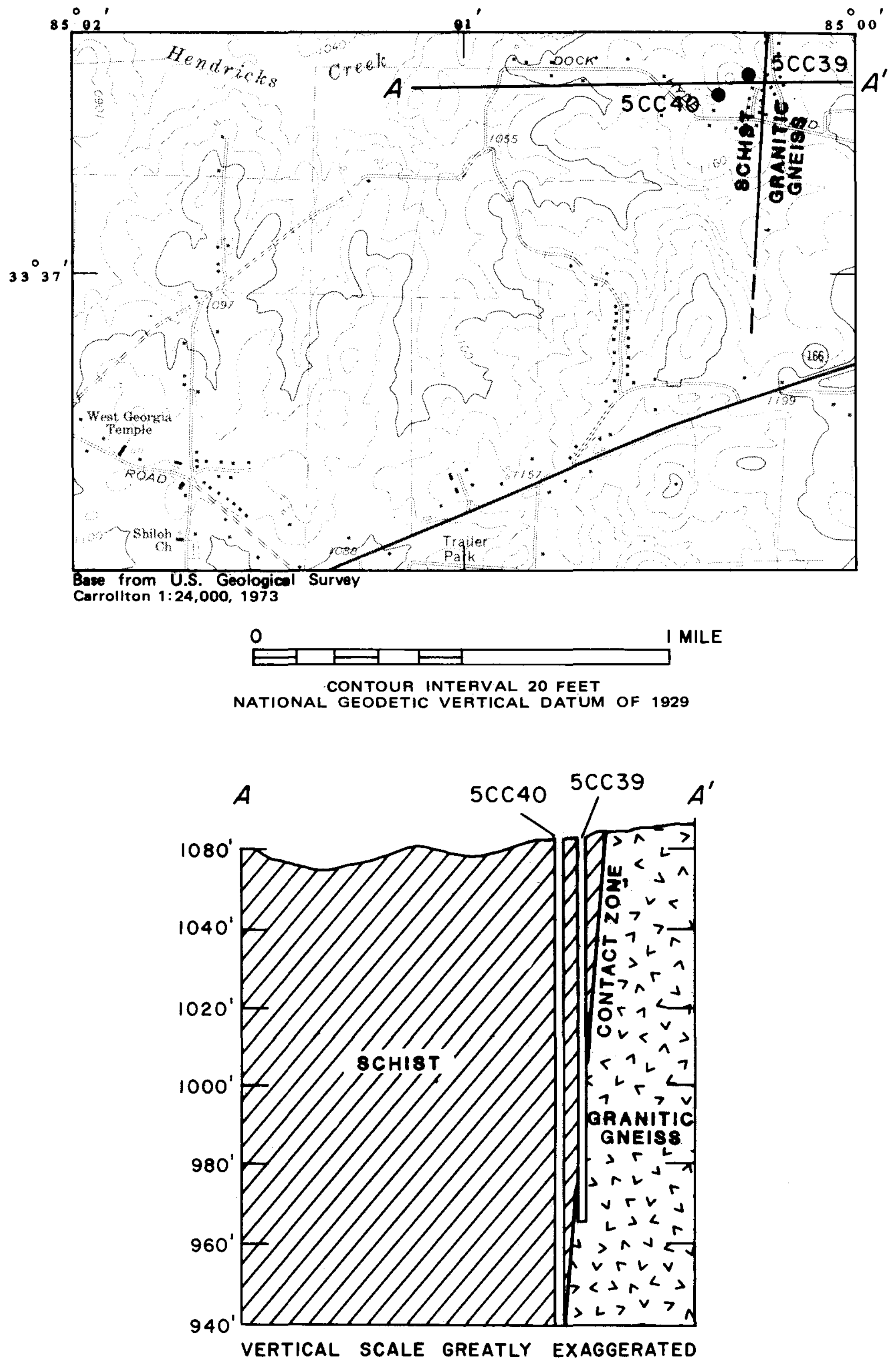


Figure 25. Well in contact zone between schist and granitic gneiss. Well 5CC39 yields 100 gallons per minute from the contact zone. Well 5CC40, which missed the contact zone, supplied about 1 gallon per minute.

Identifying Contact Zones

Contact zones capable of supplying large well yields generally form between rock layers that respond differently to weathering, such as gneiss, schist, and amphibolite (Unit A). Permeable contact zones also may form between layers of feldspathic schist and graywacke or quartzite in Unit C, between layers of schist or amphibolite and biotite gneiss in Unit D, and between different lithologies in Unit E. Increases in permeability generally are greatest in contacts that occupy topographic settings which concentrate the flow of ground water, such as in draws, drainages, and stream valleys.

Selecting Well Sites

Well sites should be located so that at a depth of 100 to 150 ft the wells will penetrate whatever contact zones project updip into the nearest streambed, draw, or area of deep soil (fig. 26). The best locations are those that increase ground-water circulation along the contact zones, as where rock layers strike parallel to local drainages. In such areas deep soil normally obscures the bedrock, requiring that the dip and strike of the rock layers be determined at nearby roadcuts or similar exposures. The largest well yields generally are obtained by drilling on the downdip side of streams or other drainages where the rock layers and drainage courses are parallel (fig. 26). It is important that well sites be placed downgradient from catchment areas large enough to supply adequate recharge.

Area of Application

This method is applicable mainly to the north half of the report area where bedrock weakness and drainage patterns are closely related. In the south half of the area, the method probably will be successful mainly in headwaters areas and in draws and drainages that flow off divide ridges, especially where the strike of the rock layers and drainage courses are parallel.

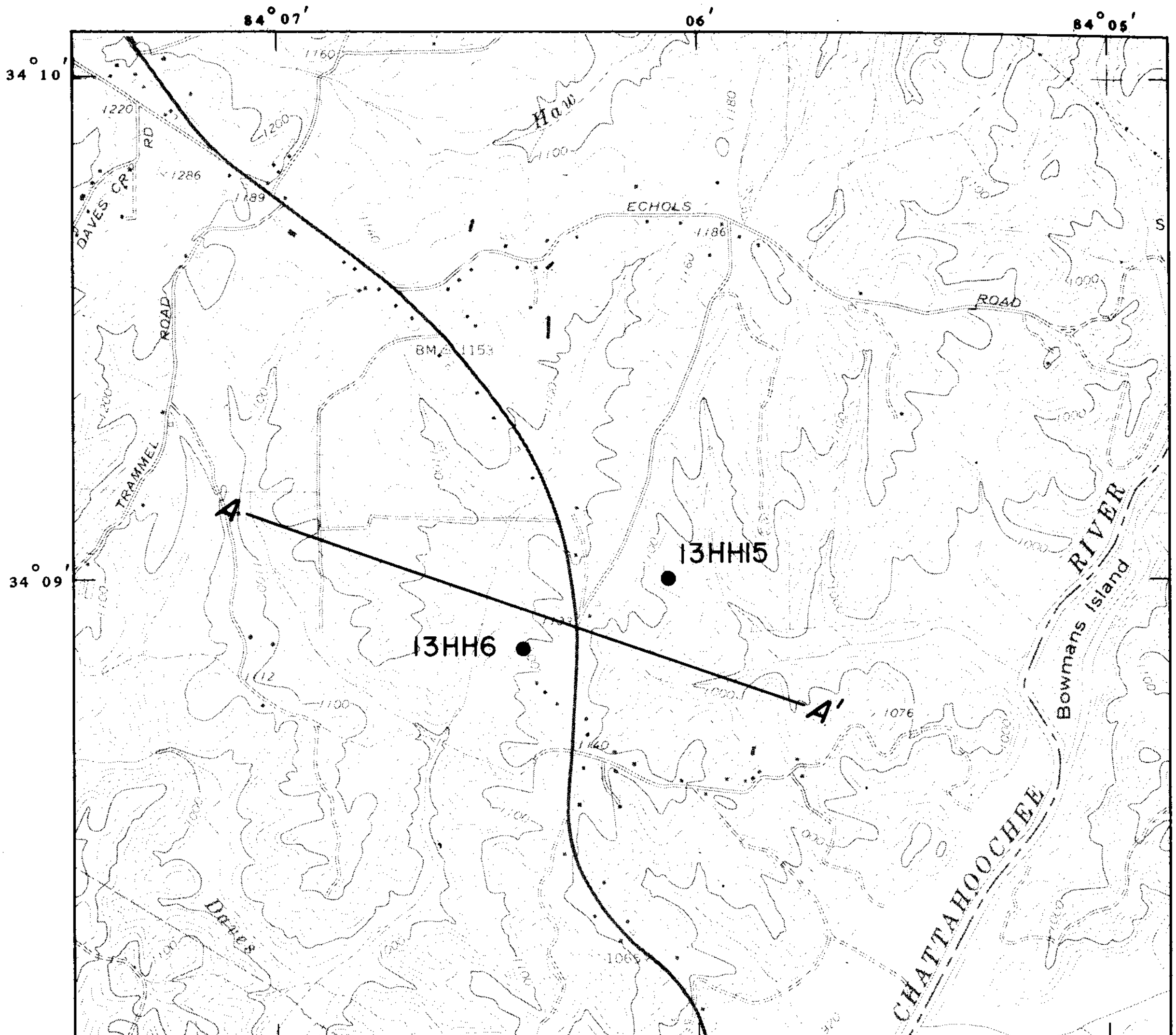
Fault Zones

Fault zones become permeable mainly where they bring into contact two or more rock types that respond differently to weathering, much the same as with contact zones. Examples would be faults that displace schist (Unit C) against granite (Unit F), amphibolite (Unit E) against schist (Unit C), or a highly foliated rock against a massive rock. Several faults are visible on detailed geologic maps available for parts of the report area. (See References.)

Identifying Fault Zones

Most fault zones possess characteristic features that aid field identification. These features include: (1) angular rock fragments in fresh exposures, or preserved as relicts in saprolite, (2) zones of intense shearing, (3) terminated rock units or layers, offset beds or layers, and abrupt changes in lithology, either parallel to or across the strike, (4) abrupt offsets of drainages or valleys and abrupt changes in linear topography, (5) haphazard mixing of two or more rock types in zones less than 10 ft to more than 100 ft wide, and (6) pegmatites and vein fillings such as quartz and halloysite (clay) concentrated in bedrock or saprolite.

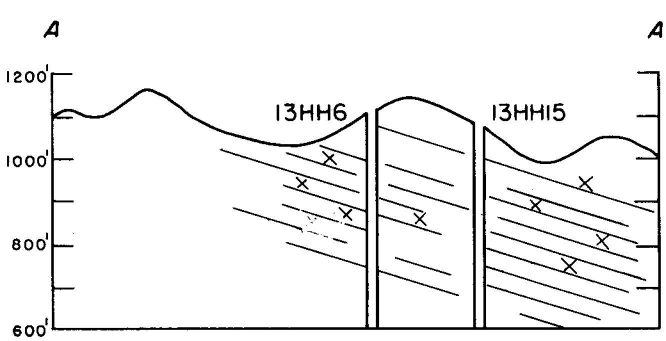
Recent faults may be recognized by the presence of vertical or near-vertical open fractures spaced 1 to 4 inches apart throughout a zone 10 ft to 30 ft wide. A 3- to 6-inch wide layer of fault gouge (rock flour or clay) may occur near the middle of the fault zone.



Base from U.S. Geological Survey
Buford Dam 1:24,000, 1964

0 1 MILE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



VERTICAL EXAGGERATION X5

Figure 26. Wells tapping contact zones within multilayered rock unit. Well 13HH6 on downdip side of stream is 401 feet deep and yields 24 gallons per minute. Well 13HH15 is 660 feet deep and yields 6 gallons per minute.

Selecting Well Sites

High-yielding well sites in fault zones are selected in much the same way as they are in contact zones. The sites should be located so the wells will penetrate inclined fault zones at a depth of about 100 to 150 ft. In broad fault zones, wells can be sited in low-lying areas within the zone, preferably in draws or drainages that parallel the fault. All well sites should be down-gradient from catchment areas large enough to provide adequate recharge.

Area of Application

The method is most effective in the north half of the report area where there is a strong correlation between drainage development and bedrock resistance. In the south half of the area, the method may be successful in headwaters areas, especially where faults underlie and parallel drainage courses.

Stress Relief Fractures

Stress relief fractures seem to occur mainly in large bodies of granitic and biotite gneiss (Units B and D), but they also are important in units consisting of gneiss interlayered with schist (Unit A), schist interlayered with amphibolite (Unit A) and amphibolite-hornblende gneiss (Unit E). Stress relief fractures have been observed in quartz-mica schist and they may be a common occurrence in schist units having a high quartz content. Stress relief fractures also may occur at depth in granites (Unit F), although none were identified during this study.

Identifying Stress Relief Fractures

Because of their horizontal nature and depth of occurrence, the presence of stress relief fractures is not indicated by structural and stratigraphic features normally associated with increased bedrock permeability. The only clue to their presence recognized thus far is topographic setting. Areas considered favorable for stress relief fractures include:

A. Points of land formed by (1) two streams converging at acute angles (fig. 12B, C), (2) two subparallel tributaries entering a large stream (fig. 12A, D), and (3) land protruding into the wide flood plains of large streams (fig. 12E). In 1 and 2, the points of land generally are less than 2,000 ft across.

B. Broad, relatively flat ridge areas, commonly on divide ridges, that are surrounded by stream heads (figs. 13 and 14). The wells are on the ridge crests and in the upper reaches of streams flowing off the ridges. Such areas are the sites of many towns and communities and, therefore, are centers of municipal and industrial pumpage.

C. Broad valleys formed by the removal of large volumes of material relative to the land on either side (fig. 28).

Selecting Well Sites

Topographic settings considered to be favorable areas for stress relief fractures can be identified on topographic maps. On broad, relatively flat ridge areas and in wide places on divide ridges, both of which are surrounded by stream heads, well sites may prove successful on the ridge crests and in the upper reaches of streams flowing off the ridges. On points of land, successful well sites generally are on the ridge crests or the lower ridge slopes from about midway along the ridge to near the end of the land point. Most high-yielding wells on points of land projecting into wide flood plains are near the flood plains. Statistics show that a well depth of about 620 ft is needed to test the yield potential of each site. Horizontal fractures also have been identified in the north part of the area beneath the broad valleys formed by the erosion of large volumes of material (fig. 28).

Area of Application

Stress relief fractures have been identified beneath broad ridge areas and on divide ridges surrounded by stream heads mainly in the south half of the area, but they also could occur in the north half. Relief fractures beneath points of land have been recognized only in the south part of the area. Horizontal fractures beneath broad valleys have been identified in the north part of the area, but whether they occur beneath such valleys in the south part is unknown.

Zones of Fracture Concentration

Zones of fracture concentration are likely to increase bedrock permeability in comparatively brittle rocks such as quartzite (Unit H), amphibolite and hornblende gneiss (Unit E), interlayered gneiss, schist, and amphibolite (Unit A), and possibly granite (Unit F). They are less likely to produce permeable zones in schist (Unit C), except where graywacke or quartzite forms a significant part of the unit.

Identifying Zones of Fracture Concentration

Zones of fracture concentration form linear features that appear as straight stream and valley segments; abrupt changes in valley alinement; the alinement of gulleys, small depressions, and gaps in ridges; abrupt changes in slope; and the alinement of areas having vigorous or stressed vegetation. In the south half of the area, many linear valleys are a product of dendritic drainage and are not necessarily associated with zones of fracture concentration.

Selecting Well Sites

Zones of fracture concentration may be less than 30 ft to about 200 ft wide. Thus, well sites must be on or as near as possible to the centerline of the fracture zone. The highest yielding wells generally are at the intersection of two fracture zones, which may be indicated by an abrupt change in valley trend or by the intersection of two valley segments (fig. 17). Sizable catchment areas upgradient from the well sites are needed to supply adequate recharge and sustain large well yields.

Area of Application

The method is applicable mainly to the north half of the report area where characteristic topographic expressions can be used to identify zones of fracture concentration. Zones of fracture concentration probably are present in the south, but they are difficult to identify because of the prevalent dendritic drainage in that part of the area. Their presence may be detectable in headwaters areas where topographic development is more likely to reflect zones of bedrock weakness.

Small-Scale Structures that Localize Drainage Development

Small-scale structures represent inhomogenities in rocks that enhance the rapidity and depth of weathering and increase permeability. Increases in permeability generally are much greater in directions parallel to the small-scale structures than across them. This directional permeability tends to localize drainage development parallel to the small-scale structures. Where small-scale structures underlie and trend parallel to stream valleys, drainages, or draws that concentrate the flow of water, they can be avenues of greatly increased permeability capable of supplying large well yields.

Identifying Small-Scale Structures

Small-scale structures associated with increased bedrock permeability include joints, bedding or compositional layering, foliation, cleavage, and the axial planes of small folds. Most small-scale structures are readily recognized on bedrock exposures and some are visible in saprolite. Structural data needed to select well sites are dip and strike of planar surfaces and the strike and plunge of fold axes. Generally, this type of data can best be obtained from field surveys of prospective sites, although detailed geologic maps provide structural data for parts of the area. (See References.) The relation of the small-scale structures to the topography can be determined by plotting the structural data on topographic maps.

Selecting Well Sites

The largest well yields can be expected from sites in stream valleys, draws, and drainages that parallel the strike of small-scale structures. Where planar structures are vertical or near vertical, as with many joint sets, the sites should be as near as practicable to the centerline of the drainage, taking into account the possibility of flooding. Where the structures are inclined, as is common with foliation and compositional layering, the most productive drilling sites may be on the downdip side of the drainages, provided the drainages are broad enough so that moving to that side does not require being on or near a steep slope or bluff, or on the nose of a ridge, no matter how small. Where possible, the sites should be downdip far enough so the well, at a depth of 100 to 150 ft, will penetrate whatever surfaces project upward into the bed of the drainage. A good combination might be a draw that parallels the strike of a well-developed set of joints, or the axial planes of minor folds, especially where the folds plunge in the downstream direction. Other good sites are in stream valleys and drainages that parallel the strike of the foliation, at points where tributary draws following cross structures such as joints enter at right angles on the downdip sides, or on both sides of the valleys. Of course, catchment areas of adequate size upgradient from the sites are needed to sustain large well yields.

Where small-scale structures and drainages are not parallel, select sites in draws or stream valleys that are as nearly parallel as possible, staying well downgradient to insure adequate recharge.

In selecting well sites, it is important to keep off any kind of crest, no matter how small or insignificant. This applies to cross ridges or ridge backs, and the noses of ridges, such as one that projects toward or into the flood plain of a stream. (This is not to be confused with much larger "points of land" described in a preceding section on Stress Relief Fractures). Where limited to a ridge top, always place the well site in a saddle or low area on the ridge top, preferably one that parallels some small-scale structure and that forms the head of a draw, no matter how slight the depression.

Also, keep in mind that in a given rock type, the more gentle the slope, the softer, more readily weathering and more permeable the rock. Beneath steeper slopes, the rock is harder, less weathered, and generally less permeable. For this reason, the more gentle the slope, the larger the well yield may be.

Area of Application

This method is applicable to all of the north half of the report area. In the south half of the area, the method probably should be limited mainly to headwaters areas and to draws and drainages that flow off divide ridges and upland areas. To be effective, there should be a clear relationship between any topographic feature and the structure of the underlying bedrock.

Folds that Produce Concentrated Jointing

Two sets of late folds in the GAR have open joints concentrated along their axes that should produce significant increases in bedrock permeability. In favorable topographic settings, these zones of concentrated jointing should supply large quantities of water to wells.

Identifying Late Folds

Late folds that produce concentrated jointing along their axes are east-west and north-south trending symmetrical anticlines about 75 to 600 ft across. The folds are most easily recognized on near-vertical bedrock exposures in road cuts and quarries, but they can be identified in natural exposures in stream valleys. They also may be recognized in cuts through saprolite.

Selecting Well Sites

Large well yields should be obtainable where zones of concentrated joints occupy topographic settings that favor increased ground-water circulation and recharge. Folds identified in road cuts and other exposures can be projected into low areas covered by deep soil, or into drainages and draws, preferably ones that parallel the fold axes. Because the greatest permeability will exist within a zone a few feet wide, wells should be centered as nearly as possible over the fold axes.

Area of Application

The method is applicable to the entire GAR.

Shear Zones

High-yielding wells are associated with major shear zones in Rockdale, Newton, Walton, and northern Spalding Counties. Smaller shear zones occur in other parts of the area and may supply large well yields.

Identifying Shear Zones

Major shear zones in Rockdale, Newton, Walton, and Spalding Counties are shown on plate 1. The shear zones, which vary from less than a mile to about 7 miles long, form prominent topographic lineaments, generally consisting of low, narrow ridges flanking long, fairly straight valleys. The lineaments can be traced in the field and are readily visible on topographic maps. The thickness of the shear zones is unknown, but the width of the associated lineaments indicates that they may be as much as several hundred feet thick. The shear zones occur in a variety of rock types, although most are in granitic gneiss (Unit B). Rocks within the shear zones consist of chert-like flinty crush rock and sheared country rock. Large permeability increases can be expected where the sheared rock has a high feldspar content.

Selecting Well Sites

The best sites for high-yielding wells should be in the linear valleys that overlie shear zones such as those shown on plate 1. Because the shear zones dip to the southeast, wells drilled near the middle or on the southeast sides of the valleys may produce the highest yields.

Area of Application

The major shear zones are in the south part of the area, but smaller shear zones occur throughout the GAR. Shearing is very common in the Brevard Fault Zone (Unit G) and may be responsible for high-yielding wells in that feature. Small shear zones were observed in the north part of the area; and, where they occupy favorable topographic settings, they may supply large well yields, especially where they are in feldspathic rocks.

RELATION OF WELL YIELDS TO WELL DEPTHS

It is estimated that there are more than 20,000 drilled wells in the GAR (W. A. Martin, Virginia Supply and Well Co., oral commun., 1978). Most of these wells were drilled for domestic or farm supplies, although a significant number were drilled for industrial supplies and to provide water for various commercial and public needs. These wells were located primarily for the convenience of the users, or were confined to readily available property or to areas near distribution lines and railroads. Most of the well sites were selected without regard to the suitability of geohydrologic conditions and thus, for the purposes of this study, are considered to be randomly located. The random selection of more than 20,000 drilled well sites in the GAR resulted in 1,165 wells, or approximately 5 percent, that are confirmed as being high yielding.

To conclude that only about 5 percent of the wells drilled in the GAR had the potential of supplying high yields probably would, however, be incorrect. This is because most of the wells were intended for domestic and farm use and were drilled no deeper than was required to obtain the minimum acceptable yield of 2 to 10 gal/min. Thus, most of the wells are relatively shallow and did not test the full potential of each site. Had all of the wells been drilled deeper, a larger percentage likely would have been high yielding. Data obtained during this study show a strong correlation between well depths and yields.

The belt extending from College Park northward through Atlanta is one area where data are available on both high-yielding and low-yielding wells. In this belt, 40 percent of the industrial, commercial, and public supply wells furnish 50 gal/min or more; about 60 percent of these wells are 400 ft to more than 600 ft deep (fig. 27). In the same area,

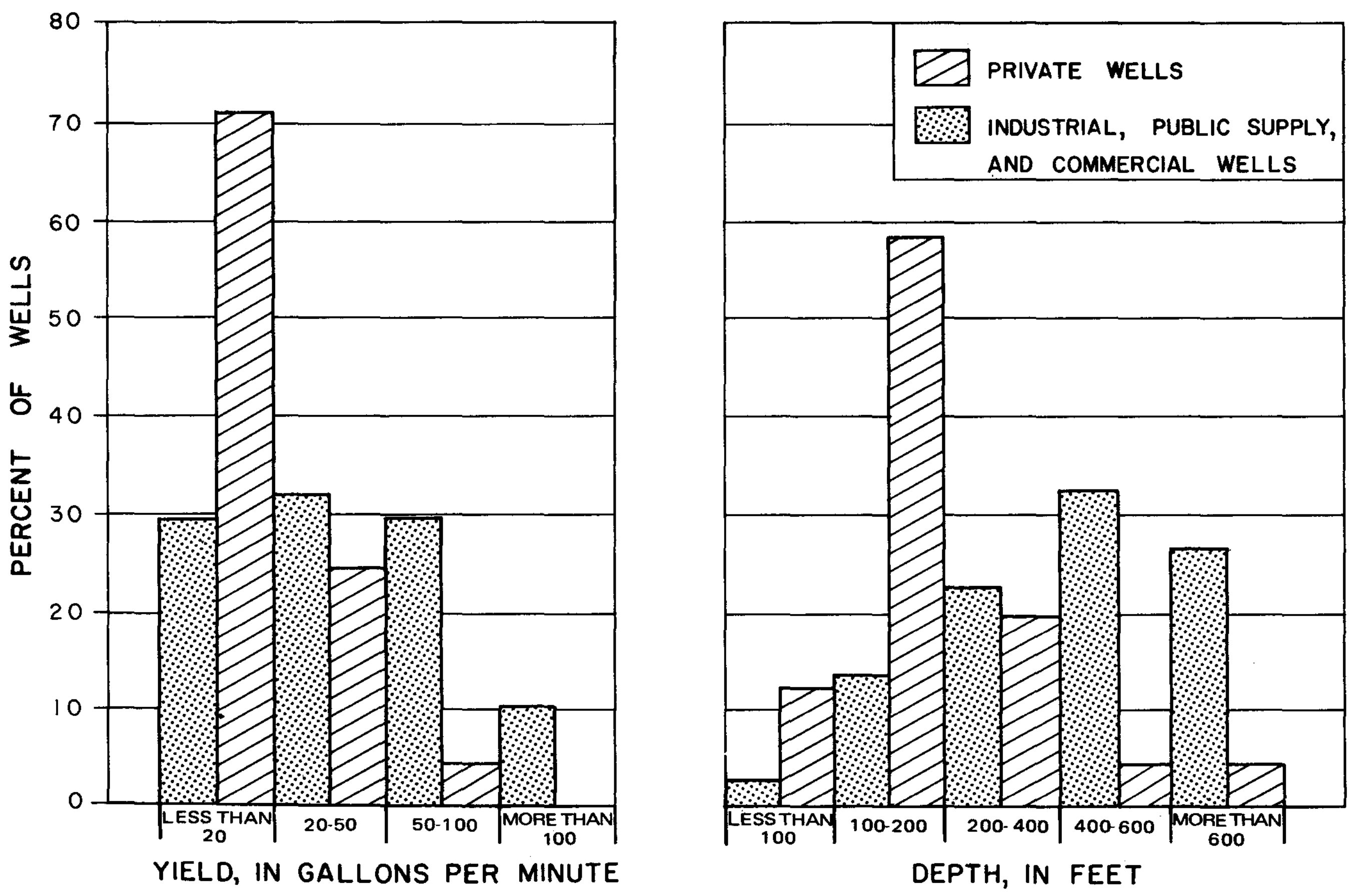


Figure 27. Relation of well yields to depths in the belt from College Park through Atlanta.

only about 6 percent of the private wells furnish 50 gal/min or more; only about 10 percent of the private wells are as deep as 400 ft. Thus, there is a strong correlation between well depths and well yields, to a depth of about 600 ft.

The data from wells in this belt indicate that the chances of obtaining a high yield from randomly located wells could be increased by consistantly drilling to depths of about 620 ft (table 9, Appendix). How this would apply to other parts of the GAR is not known, but it seems likely that deep drilling would increase the chances of obtaining large yields significantly beyond the 5-percent range. Drilling to this depth, of course, does not guarantee a high yield, as numerous wells 600 ft or more deep are reported to be dry and some wells 1,000 to 1,500 ft deep are low yielding. The well data indicate that drilling deeper than about 650 ft usually cannot be justified without supporting structural or stratigraphic evidence that indicates the presence of deeper openings.

SAFE WELL YIELDS

The safe yield of a well has been defined by Lohman (1972) as, "the amount of ground water one can withdraw without getting into trouble." In this definition, withdrawal may mean pumping a well nearly continuously, as is common with industrial and municipal supplies; seasonally, as for irrigation; or intermittently for prescribed periods each day, as to meet peak demands. Trouble may mean a number of things, including (1) running out of water, (2) declining yields, (3) muddying of the water supply during droughts, and (4) well interference.

Depending on the well, the safe yield may not remain constant, but may vary with changing conditions. For example, the safe yield may temporarily diminish during a prolonged drought. Other conditions, such as interference from nearby wells or the diversion of surface drainage and subsequent loss of available recharge, may lower the safe yield of a well. Safe yields also may vary throughout the year between wet and dry seasons. Continuous monitoring of water levels in pumping wells is a good way to determine whether safe yields are being exceeded, and it affords an opportunity to adjust pumping rates as needed to maintain optimum water levels.

Safe yield estimates on wells in the GAR generally are made from tests conducted at the time of drilling. Nearly all of the wells are drilled by the air-rotary method and the yields are estimated by blowing compressed air through the drill column and measuring the volume of water that the air expells. This method can indicate safe yields of some wells but it provides no means for measuring the drawdown and recovery during testing. Drawdown and recovery data are needed to accurately estimate safe yields, so that wells will not be equipped with pumps whose capacities are too large.

The safe yields of most wells can be estimated with reasonable accuracy from long-term pumping tests. These are tests in which the pumping rate is increased in steps or kept constant for several hours or days and the water level in the well is measured during both the pumping and the recovery phases of the tests. In general, the longer the pumping period, the more accurately safe yields can be estimated. The most accurate estimates normally are obtained from tests that run for 2 days or more, although useful estimates can be made from tests of less than 12 hours.

Long-term pumping tests have been conducted on comparatively few wells in the GAR. Most of the tests were run on industrial or privately owned wells and the results were never published. Consequently, little information is available about the drawdown and recovery characteristics of wells in different topographic and geologic settings.

Test Wells

Three test wells were drilled during this study to investigate the yield potential of different geologic settings and to learn the nature of water-bearing openings. Pumping tests were run on two of the wells to provide drawdown and recovery data needed to estimate safe yields.

The test-well sites were selected in two settings: (1) a broad valley of a perennial stream formed by the erosion of a large volume of material (fig. 28) where stress relief fractures were believed likely to occur, and (2) a narrow valley eroded by a stream flowing across the strike of resistant rocks, the stream direction probably being joint controlled (fig. 32). The second site was of particular interest because valleys of the same character are common in that area, and should they prove to be suitable sites for high-yielding wells, they could supply significant quantities of ground water.

Test Well 1

Test well 1 (8CC7) is in south Fulton County, on the flood plain of Bear Creek, a tributary of the Chattahoochee River (fig. 28). The area is underlain by moderately well-foliated biotite gneiss and minor mica schist (Unit B) that weathers very deeply. Bear Creek approximately parallels the strike of the foliation, which dips southwest at about 60°. The well site is near the Brevard Zone, but the rocks have not been sheared or mylonitized as have rocks within the zone. Well statistics are:

Depth	256 ft
Casing depth	56 ft
Diameter	6 in.
Static water level	3.85 ft below land surface
Yield (determined by compressed air test)	100 gal/min (about half of which was from the saprolite)

Casing in test well 1 was mistakenly set too shallow on a resistant rock layer in the saprolite and the well caved during development. Therefore, the well could not be tested and was used as an observation well for the pumping test done on test well 2 (8CC8).

Test Well 2

Test well 2 (8CC8), about 15 ft north of test well 1 (8CC7), is in the same geologic and topographic setting (fig. 28). Well statistics are:

Depth	243 ft
Casing depth	78 ft
Diameter	6 in.
Static water level	3.85 ft below land surface
Yield (determined by compressed air test)	45 gal/min

Most of the well water was derived from fractures at depths of 103 and 176 ft.

A step-drawdown test was conducted first to determine the approximate pumping rate that could be used in the long-term test. Pumping was done in steps of 10, 20, and 30 gal/min (fig. 29). A pumping rate of 30 gal/min for a period of 135 minutes produced a drawdown of 20 ft. Recovery of the water level after pump shutdown was rapid, being about 90 percent complete after 5 minutes and complete after 100 minutes. From these data, it was concluded that a pumping rate of 36 gal/min (the maximum capacity of the pump) would be suitable for the long-term test.

During the long-term test, a pumping rate of 36 gal/min over a period of 1,160 minutes (19.3 hours) produced a drawdown of 31 ft, to a depth of 32 ft below land surface (fig. 30). Recovery of the water level after pumping ceased was rapid; recovery was about 93 percent complete after 10 minutes and essentially complete after 300 minutes.

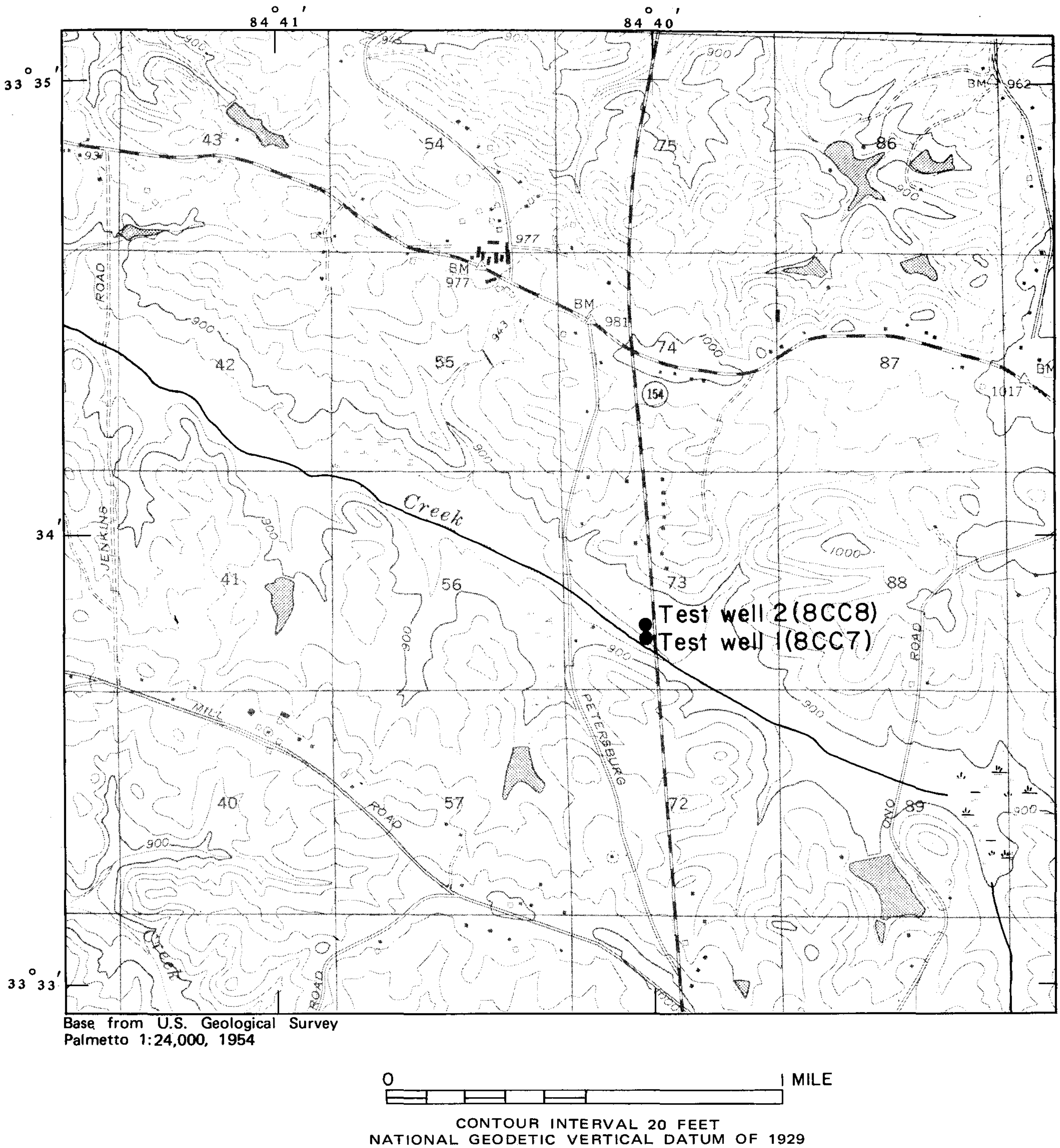


Figure 28. Topographic setting of test wells 1 (8CC7) and 2 (8CC8), Palmetto quadrangle, Fulton County.

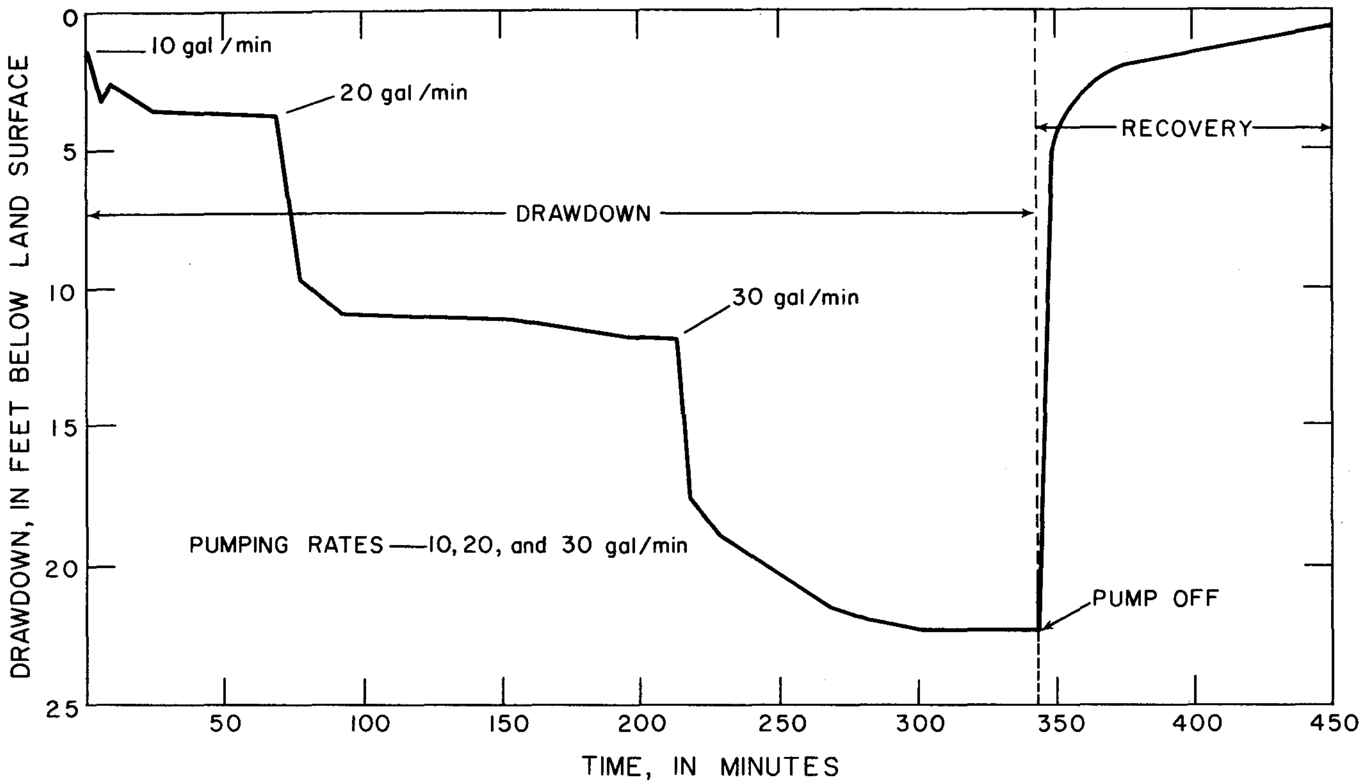


Figure 29. Drawdown and recovery curve for step drawdown test, test well 2 (8CC8).

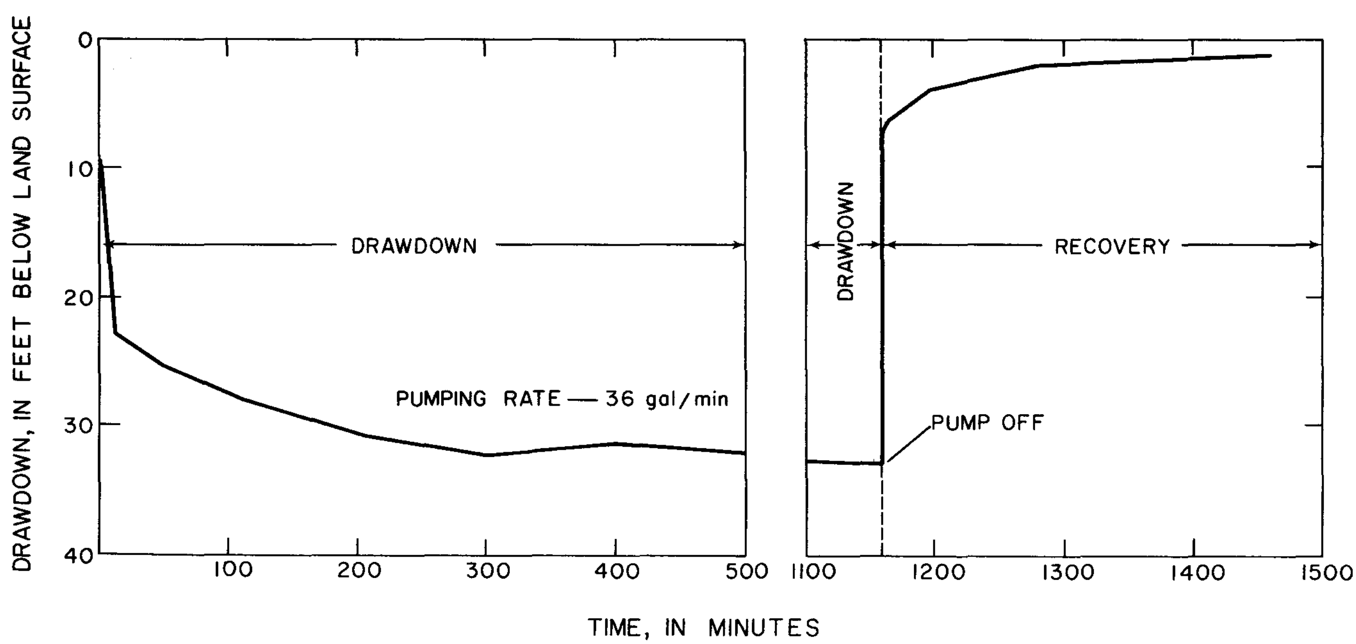


Figure 30. Drawdown and recovery curve for long-term pumping test on test well 2 (8CC8).

According to LeGrand (1967, p. 4), the increase in yield of a well in crystalline rocks is not directly proportionate to an increase in drawdown of the water level. Rather, a yield of about 80 percent of the total capacity of the well results from lowering the water level only about 40 percent of the available drawdown.[1] In test well 2 (8CC8), a pumping rate of 36 gal/min caused a decline in the water level of only about 30 percent of the available drawdown (to the top of the highest water-bearing fracture), indicating that the well was being pumped at about 60 percent of capacity (fig. 31). In light of the rapid recovery of the water level after pumping ceased, and the availability of constant recharge in the valley of a perennial stream, 36 gal/min probably is a conservative safe yield for this well. Continuous monitoring of the water level in the well during production would reveal whether that yield stresses the well and the pumping rate could be adjusted accordingly.

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1 LeGrand (1967, p. 4) referred to the available drawdown as the total depth of the well. However, in test well 2 (8CC8) the total yield is derived from only two water-bearing fractures. Thus, it would be undesirable to draw the water level down below the uppermost water-bearing fracture because doing so could lead to iron encrustation and reduced yield. In test well 3 (9DD1), discussed next, the maximum yield would be obtained by drawing the water level down to the single water-bearing fracture. Therefore, the available drawdown in these wells is considered to be the depth of the highest water-bearing fracture, thus making the percentages of relative yield somewhat conservative.

Test Well 3

Test well 3 (9DD1), in Douglas County, is on the bank of a small perennial stream that flows southeast in a narrow valley at right angles to the strike of the rocks (fig. 32). The stream is a tributary of the Chattahoochee River, which is about 0.3 mile away. The well penetrates a muscovite biotite gneiss (Unit G) containing numerous quartz veins. The well is in an area of rolling to hilly topography, which is strongly controlled by rock structure. Well statistics are:

Depth	248 ft
Casing depth	12 ft
Diameter	6 in.
Static water level	53 in. below land surface
Yield (determined by compressed air test)	40 gal/min

Nearly all of the yield was derived from a single fracture at a depth of 64 ft.

The step drawdown test conducted on this well used pumping rates of 21, 25, 30, and 40 gal/min (fig. 33). A pumping rate of 40 gal/min over a period of 340 minutes lowered the water level to a depth of 56 ft below land surface, which is about 88 percent of the distance to the water-bearing fracture that supplies the well. According to LeGrand (1967, p. 4), 40 gal/min should represent about 98 percent of the available yield of this well, indicating that it probably exceeds the safe yield. However, the rapid recovery of the water level after pumping ceased and the ready availability of recharge in the valley of a perennial stream, suggests that the well might be able to sustain this yield, at least on an intermittent schedule. Therefore a pumping rate of 40 gal/min was selected for the long-term test to see how it would affect the drawdown and to further evaluate the yield capabilities of the well.

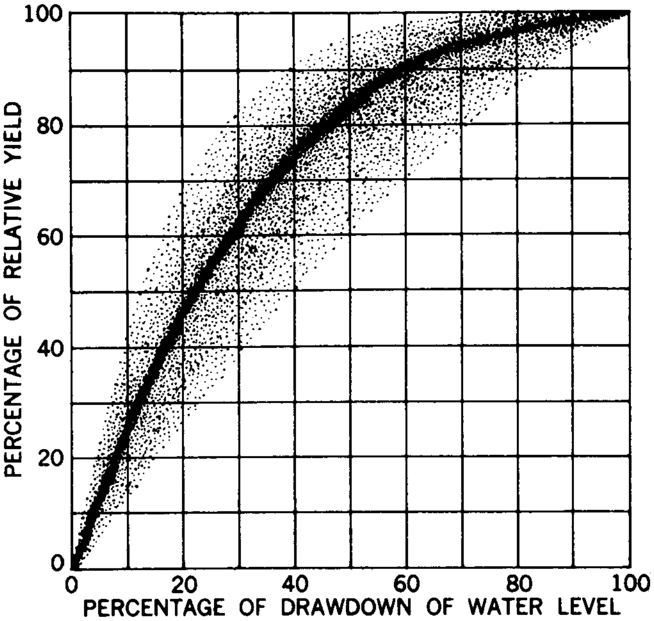

Figure 31. The curve shows that an increase in yield of a well is not directly proportionate to an increase in drawdown of the water level. A yield of nearly 80 percent of the total capacity of a well results from lowering the water level only 40 percent of the available drawdown. (LeGrand, 1967).

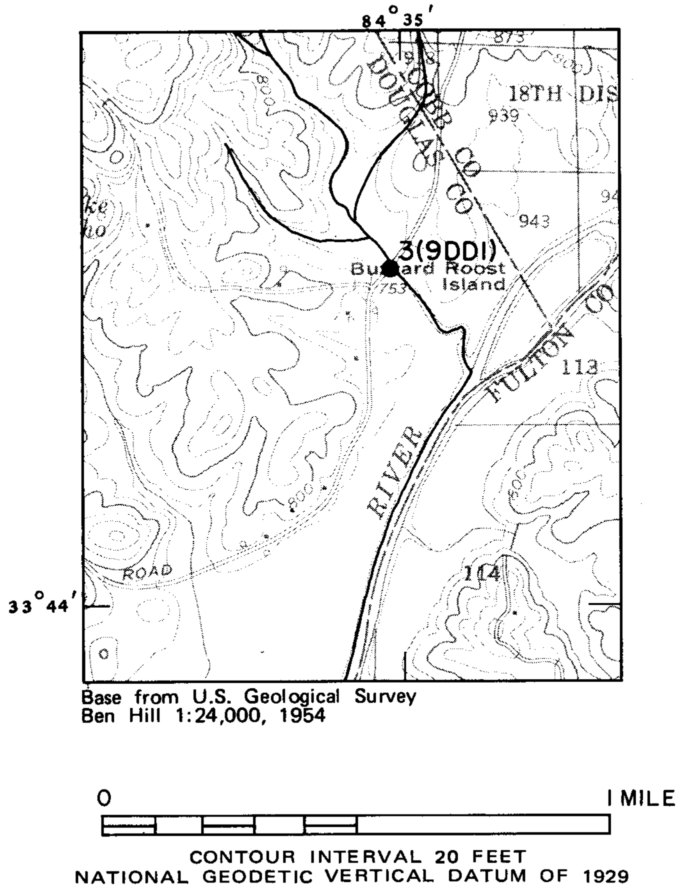

Figure 32. Topographic setting of test well 3 (9DD1), Ben Hill quadrangle, Douglas County.

Pumping at the rate of 40 gal/min for 1,140 minutes (19 hours), lowered the water level to a depth of 59.8 ft below land surface (fig. 34), which remained about 4 ft above the water-bearing fracture. After pumping stopped, recovery of the water level was fairly rapid, being 76 percent complete after 10 minutes and essentially complete after 400 minutes (6.6 hours). This means that ground water withdrawn from storage was replaced by recharge in less than 7 hours. Thus, this well may be able to sustain a pumping rate of 40 gal/min for a period of about 16 hours per day. By comparison, the safe yield for continuous pumping may be about 25 gal/min, which, during the step test, produced a drawdown of about 40 percent of the distance to the water-bearing fracture.

Because safe yields estimated in this manner are approximations and can change with time, continuous monitoring of water levels during production periods is a good way to determine whether the safe yields are being exceeded. Depending on conditions, pumping rates can be adjusted to keep water levels within safe limits.

SUSTAINED WELL YIELDS

Wells in crystalline rocks have a reputation of being unable to sustain large yields. A report by the U.S. Army Corps of Engineers (1978) on water supply possibilities for a four-county area south of Atlanta states that in the Piedmont, "ground water is scarce...and the fractured rock usually has a recharge area too small to support sustained pumping."

Data obtained during the present study show, however, that many wells in the GAR are dependable and have been pumped at high rates for many years. Table 6 (Appendix) lists 66 industrial and municipal wells currently (1980) in use that have been pumped continuously for 12 years or more. It is worth noting that the size of a well's yield is not in itself indicative of the well's ability to sustain long-term pumping.

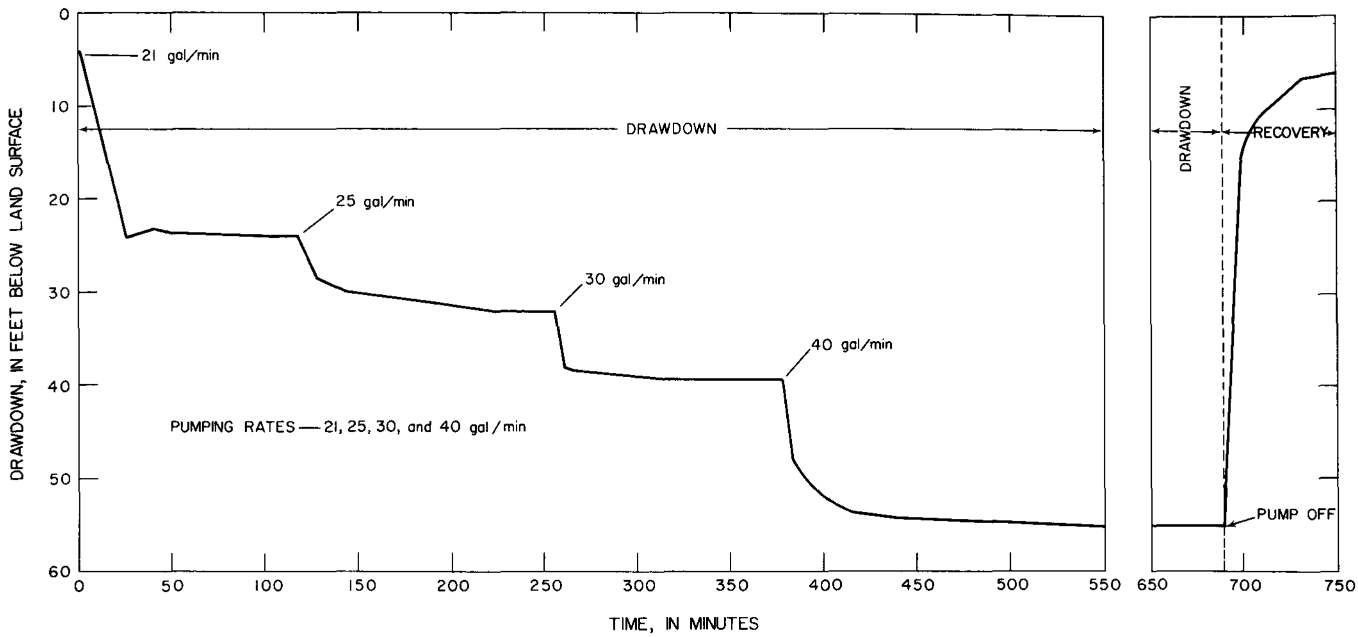

Figure 33. Drawdown and recovery curve for step drawdown test on test well 3 (9DD1).

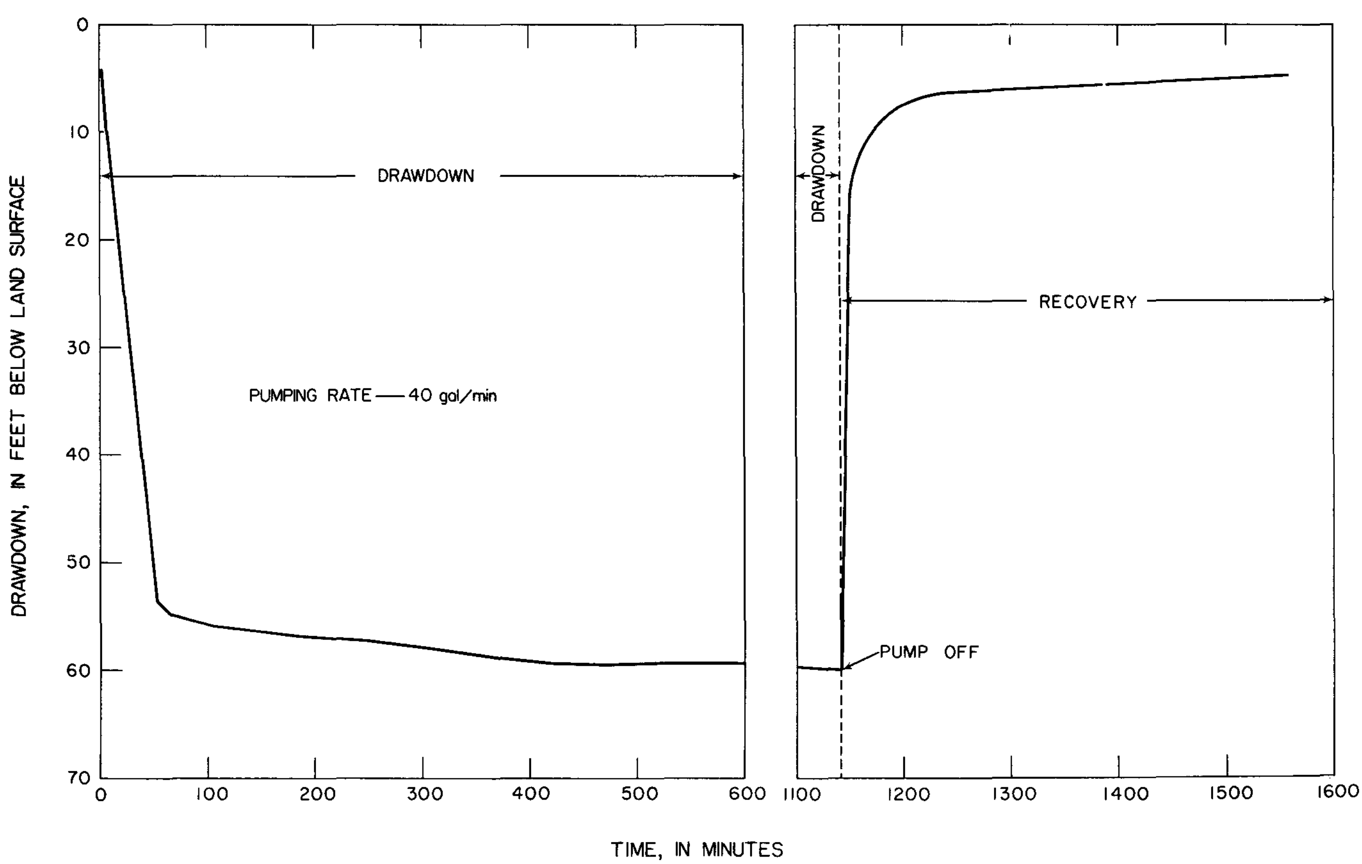

Figure 34. Drawdown and recovery curve for long-term pumping test on test well 3 (9DD1).

DECLINING WELL YIELDS

A number of municipal and county water systems in the GAR and adjacent areas use either (1) several widely spaced wells tied into a large distribution network, or (2) two or more wells clustered in a comparatively small area to form a well field. Distribution systems supplied by several widely spaced wells commonly are used by counties and cities that furnish water to broad areas. The wells generally occupy topographic settings favorable to recharge and, unless overpumped, are dependable even during droughts. Because they draw from a number of wells in a variety of settings, water systems of this type are comparatively trouble free.

Well Fields

Well fields consisting of 2 to 4 or more wells are used by some municipalities that distribute water to small areas. Typically, the wells are clustered within the corporate limits, which occupy the crest and slopes of broad ridges. As the demand for water increases, new wells are drilled on the same ridge or slightly downslope. Owing to the limited recharge capabilities of ridge areas, the aquifer systems beneath the towns gradually become dewatered and the wells no longer are able to satisfy the needs of the growing communities.

Most resulting well "failures" are the result of gradually declining yields that take place over periods of months or years and go unnoticed until the well "suddenly" fails. Declining well yields generally can be attributed to overpumping of the aquifer so that the rate of withdrawal exceeds the rate of recharge, or to the plugging of water-bearing openings. These problems generally can be traced to:

1. Inadequate testing in which the well was pumped at a high rate for a short time without monitoring the drawdown. The results of such testing can exaggerate the apparent yield potential of the well.

2. Testing wells by blowing with compressed air. The method provides no means of measuring drawdown and may give misleading yield projections.

3. Overly optimistic interpretation of results from a properly conducted pumping test.

4. The use of a high-capacity pump that produced excessive drawdowns and repeatedly exposed the well bore to air. Repeated exposure to air can foster the growth of iron-fixing bacteria and lead to the plugging of water-bearing openings by iron encrustations.

5. Conducting a pumping test during the winter or spring months when ground-water levels are high, rather than in late autumn when water levels are low. Although many wells are unaffected by seasonal changes in ground-water levels, some wells supply larger yields during wet periods than during dry.

Thus, improper testing of wells, seasonal changes in ground-water levels, locating wells in areas having limited recharge potential, and the use of pumps that produce excessive drawdown, all can lead to declining well yields and eventually to well failures.

Some types of well problems are temporary. Wells in which the water level draws down to the pump bowls for the first time during a period of extended drought may recover its former yield with the return of normal rainfall. In recognition of this, some towns decrease pumpage during dry periods to prevent excessive drawdown that could lead to permanent reductions in yield from iron encrustation.

Water-supply problems commonly lead city planners to consider alternatives, such as converting to surface water, but for many the lower costs favor the continued use of ground water. Towns such as Turin and Conyers in the GAR and Demorest, Alto, Lula, and Blairsville in areas outside the GAR, have found that additional ground-water supplies were obtainable by moving off ridges occupied by the towns into nearby stream valleys, or by drilling in more favorable sites within the town limits. Yields of 100 to 348 gal/min have been developed from wells in valley settings. Because these wells are in sites that favor recharge, the chances are good that the large yields can be sustained indefinitely.

QUALITY OF WATER

Well water in the GAR generally is of good chemical quality and is suitable for drinking and most other uses. Concentrations of dissolved constituents are fairly consistent throughout the area and, except for iron and manganese, rarely exceed drinking water standards. The few wells that contain excessively high constituent concentrations probably penetrate local mineralized zones or possibly are contaminated by surface water. Water-quality data for wells in the area are presented in table 7 (Appendix).

Large differences in constituent concentrations occur between wells deriving water from granitic (light) rocks and mafic (dark) rocks. In general, water from mafic rocks of Unit E has somewhat higher concentrations of iron, magnesium, manganese, and total dissolved solids, and a higher pH than water from granitic rocks in Units B and F. The owners of several wells in Unit E reported undesirable concentrations of iron in their water.

Anomalously high concentrations of chloride, iron, and total dissolved solids occurred in water sampled from three wells in the Austell area, Cobb County. Herrick and LeGrand (1949) suggested that these wells may penetrate mafic or ultramafic rock, but the cause of the high constituent concentrations is not known.

High concentrations of iron reported in some wells could be due to the action of iron-fixing bacteria. The presence of iron bacteria is indicated by hard iron deposits that fill pipes and coat pumps, and by slimes, scums, and filamentous bacteria that attach to well and pipe walls and fill voids in water-bearing material. The bacteria cause turbidity, discoloration, and unpleasant tastes and odors in water.

Iron bacteria may be introduced to a well bore during drilling or pump installation. For this reason, some States require sterilization of drilling tools to prevent the spreading of bacteria (Leenheer and others, 1975). Once introduced, iron bacteria are difficult to treat. A satisfactory control of the bacteria may be chlorination, though tastes and odors can persist. Also, preventing aeration of the well bore and pump by limiting drawdown of the water level can help, as iron precipitation is most active in an oxidizing environment. Continued exposure of the well bore and water-bearing openings to oxidation can result in iron encrustation and decreased well yield.

GROUND-WATER POLLUTION

Pollution of Wells

A study of the private water supplies in Bartow County (Davis, 1969, pp. 11-12) indicated that bacterial pollution of private wells is widespread. Davis found coliform bacteria in 22 percent of the 101 drilled wells sampled. Moreover, 8 percent of these drilled wells showed evidence of fecal coliform bacteria, an indicator of comparatively recent, potentially dangerous pollution.

According to Davis, improper well construction was found to be the major cause of pollution in the drilled wells. The wells surveyed by Davis ranged in depth from 47 to 328 ft. He found that 52 percent of the polluted wells had no apparent sanitary seal between the well casing and the surrounding soil, and 69 percent lacked a sanitary seal at the top of the casing. Thus, many poorly constructed wells are contaminated by surface water that leaks down between the casing and the surrounding soil.

The widespread pollution of wells results, in part, from the common practice of locating drilling sites for convenience rather than for protection of the water supply. Many wells are located as close as possible to the point of use without regard to potential sources of pollution such as septic tanks. Located in this manner, many poorly constructed wells are subject to pollution.

The well sites that are least likely to become polluted are those located, as far as practical, upgradient from sources of contamination. Sealing wells against the entry of surface water and fitting pump caps tightly to keep out insects, rodents, and other impurities, are also necessary safety measures to protect wells from contamination.

No detailed study has been made of well pollution in the remainder of the GAR, but wells there are subject to contamination in much the same way as those in Bartow County. Faulty well construction and improper site selection may result in polluted wells.

WATER-LEVEL FLUCTUATIONS

Seasonal changes in precipitation and evapotranspiration produce corresponding changes in ground-water levels. Rainfall in the area is heavy in winter and midsummer and relatively light in spring and autumn. Autumn is the driest season of the year. Ground-water levels rise rapidly with the onset of late winter rains and reduced evapotranspiration, and generally reach their highest levels for the year in March and April, as indicated by the hydrograph of well 10DD2 (fig. 35). Increases in evapotranspiration and decreases in rainfall during the spring and early summer cause ground-water levels to decline. Heavy precipitation in midsummer may cause small rises in ground-water levels, but the lack of recharge from light rainfall in the autumn results in water levels declining to the annual lows, generally in October or November (Matthews and others, 1980).

Annual water-level fluctuations in observation wells in the GAR range from 4 to 8 ft. During the past 10 years, average water levels in the wells generally have varied less than 2 ft and indicate no long-term trend (fig. 36).

EMERGENCY AND SUPPLEMENTAL WATER SUPPLIES

High-yielding wells in the GAR are numerous enough to supply large quantities of water for supplemental or emergency use. During this study, 1,165 wells were inventoried and accurately located, most of which yield 40 to more than 200 gal/min.

Because most high-yielding wells in the GAR are in use and would not quickly be made available for emergency supply, a list of wells in good condition, currently (1980) not in use is presented in table 8 (Appendix). Many of these wells probably could be made available on short notice, although most would require installation of a large-capacity pump. More accurate location data for each well are given in the well table (table 9, Appendix) and figure 37.

CONCLUSIONS

This study of the ground-water resources of the Greater Atlanta Region (GAR) has produced a series of unexpected findings. Among the most significant are:

1. The area has different drainage styles that profoundly affect the occurrence and availability of ground water. From the Chattahoochee River basin north, the area has mainly rectangular and trellis drainage styles and streams show the

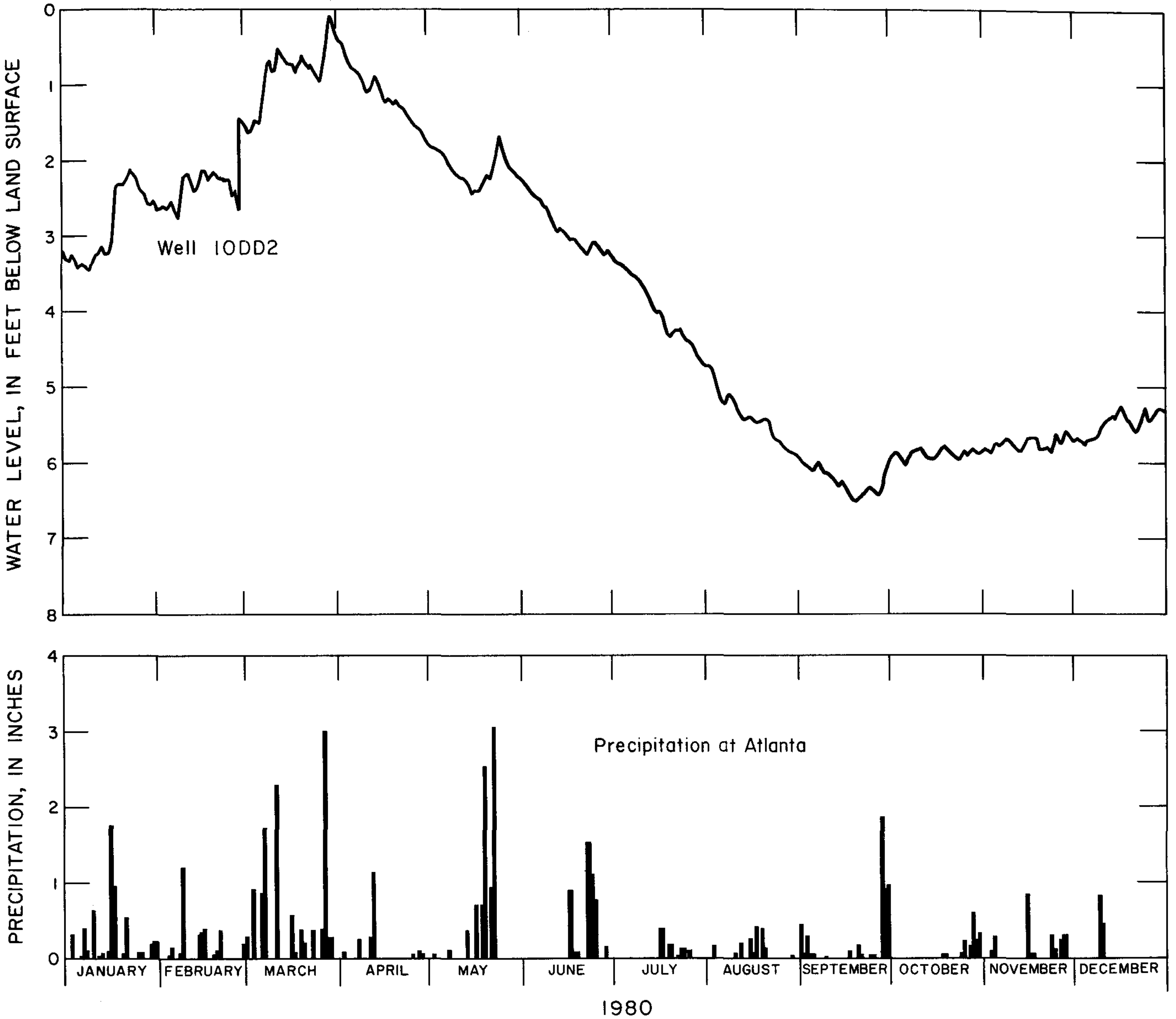

Figure 35. Water-level fluctuations in the U.S. Army, Fort McPherson observation well 10DD2, Fulton County, and precipitation at Atlanta.

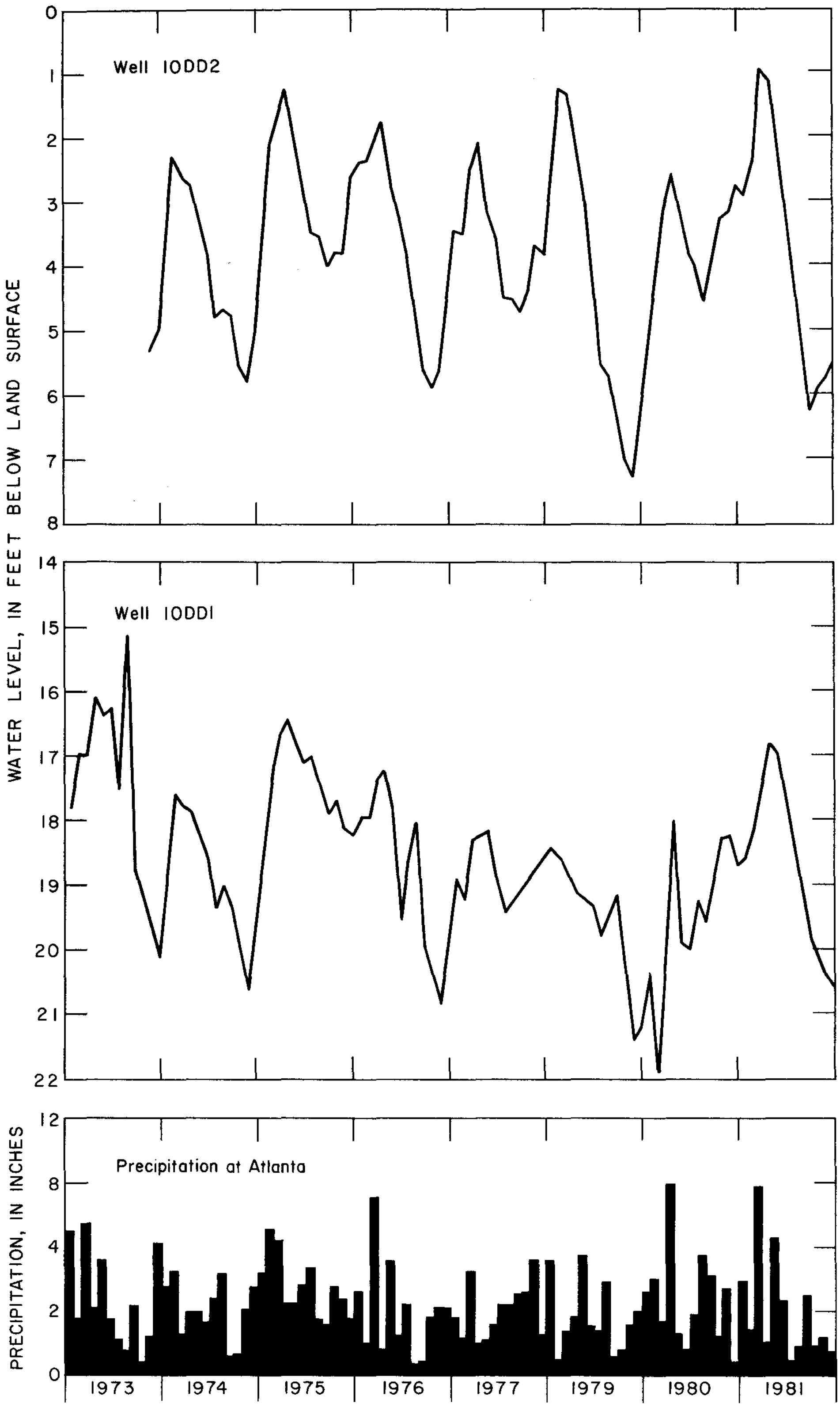

Figure 36. Water-level fluctuations in the U.S. Army, Fort McPherson observation well 10DD2 and in the O'Neil Brothers observation well 10DD1, Fulton County, and precipitation at Atlanta.

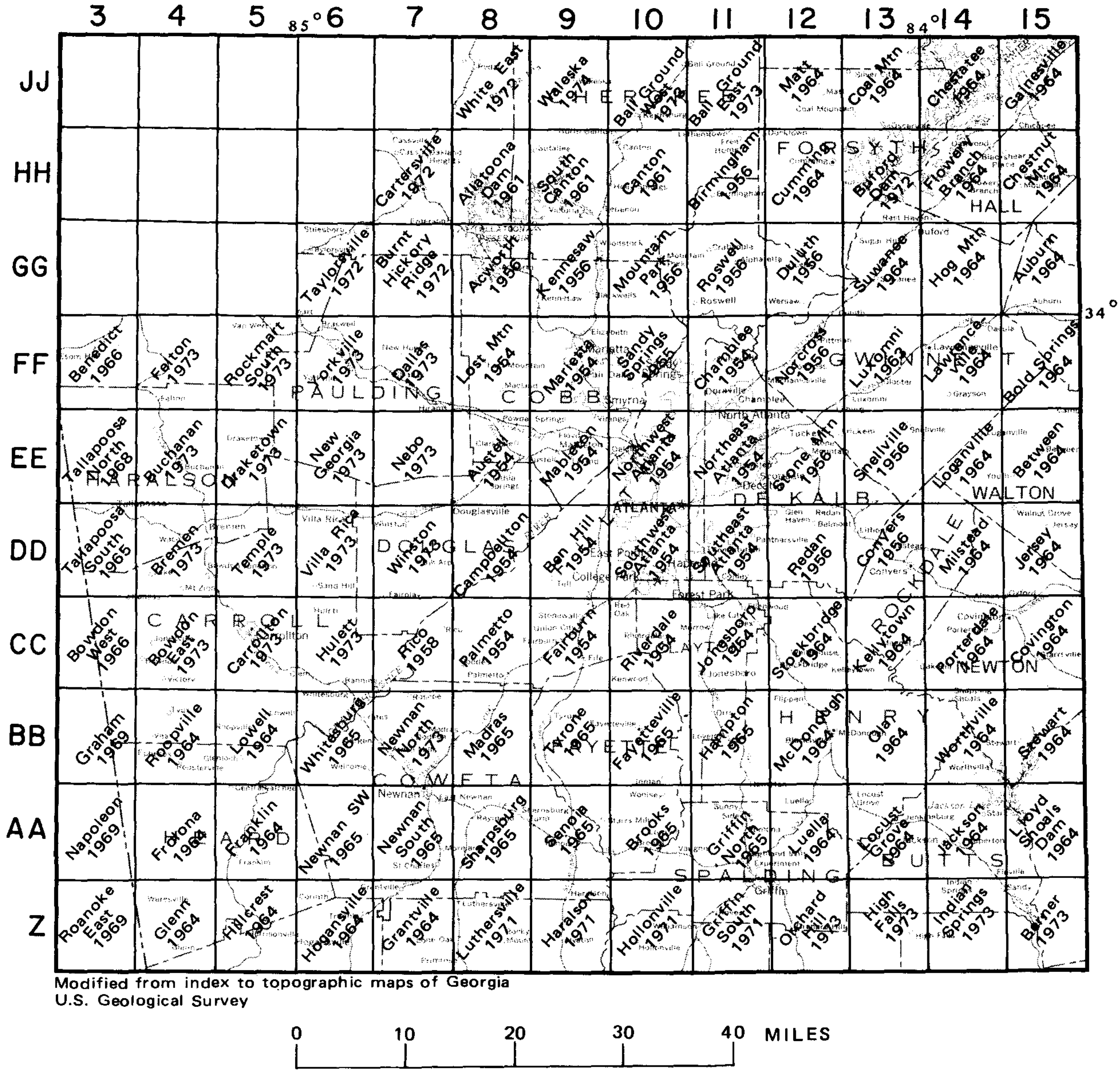

Figure 37. Number and letter designations for 7 1/2-minute quadrangles covering the Greater Atlanta Region.

influence of geologic control. The topography and drainage are closely related to bedrock permeability and therefore conventional methods for locating high-yielding well sites apply to most of the area. The south half of the area, on the other hand, has superimposed dendritic drainage style in which streams developed independently of the underlying bedrock. There, the topography and drainage are poorly related to bedrock permeability and high-yielding wells commonly occupy ridge crests, steep slopes, and bare-rock areas normally considered sites having low yield potential.

2. Geologic and topographic studies of 1,051 high-yielding well sites revealed that large well yields are available only where aquifers possess localized increases in permeability. This occurs mainly in association with specific structural and stratigraphic features: (1) contact zones between rock units of contrasting character and within multilayered rock units, (2) fault zones, (3) stress relief fractures, (4) zones of fracture concentration, (5) small-scale geologic structures that localize drainage development, (6) folds that produce concentrated jointing, and (7) shear zones. Methods were developed for selecting high-yielding well sites using these structural and stratigraph features.

3. Borehole sonic televiewer logs revealed that high-yielding water-bearing openings in granitic gneiss (Unit B), biotite gneiss (Unit D), gneiss interlayered with schist (Unit A), and quartz-mica schist (Unit C) consist mainly of horizontal or nearly horizontal fractures 1 to 8 inches in vertical dimension. The writers believe these are stress relief fractures formed by the upward expansion of the rock column in response to erosional unloading. Core drilling at two well sites confirmed the horizontal nature of the fractures and showed no indication of lateral movement that could be interpreted as faulting.

Wells that derive water from horizontal fractures characteristically remain essentially dry during drilling until they penetrate the high-yielding fracture. The high-yielding fractures are at or near the bottom of wells because: (1) the large yields were in excess of the desired quantity and, therefore, drilling ceased, or (2) in deep wells yielding 50 to 100 gal/min or more the large volume of water from the fracture(s) "drowned out" the pneumatic hammers in the drill bits, effectively preventing deeper drilling. Twenty-five wells in the report area are known to derive water from bottom-hole fractures, all of which are believed to be horizontal stress relief fractures. The wells occupy a variety of topographic settings, including broad valleys, ridge crests, steep slopes, and bare-rock areas, because horizontal fractures are present beneath uplands and lowlands alike.

Wells deriving water from stress relief fractures have much greater average depth than wells reported from other crystalline rock areas. Many of the wells are 400 to 600 feet deep and derive water from a single fracture at the bottom of the hole.

4. Contrary to popular belief, many wells in the GAR are highly dependable and have records of sustaining large yields for many years. Sixty-six mainly industrial and municipal wells have been pumped continuously for periods of 12 to more than 30 years without experiencing declining yields.

5. Large supplies of ground water presently are available in the area. Most of the 1,165 high-yielding wells inventoried during the study supply from 40 to more than 200 gal/min. The distribution of these wells with respect to topography and geology indicates that most were located for the convenience of the users and that the large yields resulted mainly from chance, rather than from thoughtful site selection. By em-

ploying the site selection methods outlined in this report, it should be possible to develop large supplemental ground-water supplies in most of the area from comparatively few wells.

6. Well water in the area generally is of good chemical quality and is suitable for drinking and most other uses. Concentrations of dissolved constituents are fairly consistent throughout the area, and except for iron and manganese, rarely exceed drinking water standards. However, in some more densely populated areas, aquifer contamination from septic tank effluent is a significant problem.

SELECTED REFERENCES

Atkins, R. L., and Higgins, M. W., 1980, Superimposed folding and its bearing on geologic history of the Atlanta, Ga., area, _in_ Excursions in Southeastern Geology, Geological Society of America, 1980 Annual Meeting Fieldtrip Guidebook, p. 19-40.

Back, William, and Barnes, Ivan, 1965, Relation of electrochemical potentials and iron content to ground-water flow patterns: U.S. Geological Survey Professional Paper 498-C, 16 p.

Barnes, Ivan, and Clarke, F. E., 1969, Chemical properties of ground water and their corrosion and encrustation effects on wells: U.S. Geological Survey Professional Paper 498-D, 58 p.

Billings, M. P., 1955, Structural geology: New York, Prentiss-Hall, 514 p.

Carter, R. W., and Herrick, S. M., 1951, Water resources of the Atlanta Metropolitan area: Georgia Geological Survey Circular 148, 19 p.

Carter, R. F., and Johnson, A. M. F., 1974, Use of water in Georgia, 1970, with projections to 1990: Georgia Geological Survey, Hydrologic Report 2, 74 p.

Clark, W. Z., and Zisa, A. C., 1976, Physiographic map of Georgia: Georgia Geological Survey, 1:200,000.

Crawford, T. J., 1969, Geologic map of Haralson-Paulding Counties, Georgia, _in_ Hurst, V. J., and Crawford, T. J., Sulfide deposits in the Coosa Valley area, Georgia, 1970: Economic Development Administration Technical Assistance Project, U.S. Department of Commerce, 190 p., pls. 1, 2.

_____1970, Geologic map of Carroll-Heard Counties, Georgia, _in_ Hurst, V. J., and Long, Sumner, Geochemical study of alluvium in the Chattahoochee-Flint area, Georgia, 1971: The University of Georgia Institute of Community and Area Development, 52 p.

_____1976, Geology of the Burnt Hickory Ridge quadrangle, Georgia: Georgia Geological Survey, open file.

_____1977, Geology of the Taylorsville quadrangle, Georgia: Georgia Geological Survey, open file.

_____1978, Geology of the Yorkville quadrangle, Georgia: Georgia Geologic Survey, open file.

_____1979, Geology of the Allatoona Dam quadrangle, Georgia: Georgia Geologic Survey, open file.

Crawford, T. J., and Medlin, J. H., 1974, The Brevard fault zone in western Georgia and eastern Alabama, _in_ Geological Society of America Guidebook 12, Southeastern Section Annual Meeting: Atlanta, Georgia, Georgia Geological Survey, p. 1-67.

Cressler, C. W., 1970, Geology and ground-water resources of Floyd and Polk Counties, Georgia: Georgia Geological Survey Information Circular 39, 95 p.

Cressler, C. W., Blanchard, H. E., Jr., and Hester, W. G., 1979, Geohydrology of Bartow, Cherokee, and Forsyth Counties, Georgia: Georgia Geologic Survey Information Circular 50, 45 p.

Davis, Barry, 1969, Water-quality survey, Bartow County, Georgia: Economic Development Administration Publication 265, 33 p.

Fenneman, N. M., 1938, Physiography of Eastern United States: New York, McGraw-Hill, 714 p.

Georgia Department of Natural Resources, 1977: Rules for safe drinking water, Chapter 391-3-5, p. 601-657.

Georgia Geological Survey, 1976: Geologic Map of Georgia, 1:500,000.

Guyod, Hubert, and Shane, L. E., 1969, Geophysical well logging, Vol. I: Hubert Guyod, Houston, Texas, p. 232-235.

Hack, J. T., 1973, Stream-profile analysis and stream-gradient index: Journal of Research, U.S. Geological Survey, v. 1, no. 4, p. 421-429.

_____1978, Rock control and tectonism--their importance in shaping the Appalachian Highlands: U.S. Geological Survey Open-File Report 78-403, 38 p.

Hem, John D., 1970, Study and interpretation of the chemical characteristics of natural water, 2nd ed.: U.S. Geological Survey Water-Supply Paper 1473, 363 p.

Herrick, S. M., and LeGrand, H. E., 1949, Geology and ground-water resources of the Atlanta area, Georgia: Georgia Geological Survey Bulletin 55, 124 p.

Higgins, M. W., 1966, The geology of the Brevard lineament near Atlanta, Georgia: Georgia Geological Survey Bulletin 77, 49 p.

_____1968, Geologic map of the Brevard fault zone near Atlanta, Georgia: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-511.

Higgins, M. W., 1971, Cataclastic rocks: U.S. Geological Survey Professional Paper 687, 97 p.

Hollyday, E. F., and Goddard, P. L., 1979, Ground-water availability in carbonate rocks of the Dandridge area, Jefferson County, Tennessee: U.S. Geological Survey Open-File Report 79-1263, 50 p.

Hurst, V. J., and Long, Sumner, 1971, Geochemical study of alluvium in the Chattahoochee-Flint area, Georgia: University of Georgia Institute of Community and Area Development, 52 p.

Joiner, T. J., Warman, J. C., Scarbrough, W. L., and Moore, D. B., 1967, Geophysical prospecting for ground water in the Piedmont area, Alabama: Geological Survey of Alabama Circular 42, 48 p.

LaForge, Laurence, Cooke, Wythe, Keith, Arthur, and Campbell, M. R., 1925, Physical geography of Georgia: Georgia Geological Survey Bulletin 42, 189 p.

Leenheer, J. A., Malcolm, R. L., and White, W. R., 1975, Investigation of the reactivity and fate of certain organic components of an industrial waste after deep well injection: Environmental Science and Technology, v. 10, no. 5, May 1975, p. 445-451.

LeGrand, H. E., 1967, Ground water of the Piedmont and Blue Ridge Provinces in the Southeastern States: U.S. Geological Survey Circular 538, 11 p.

Lobeck, A. K., 1939, Geomorphology: New York, McGraw-Hill, 731 p.

Lohman, S. W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

MacKenthum, K. M., and Ingram, W. M., 1967, Biological associated problems in freshwater environments: U.S. Department of the Interior, Federal Water Pollution Control Administration, 287 p.

McCallie, S. W., 1908, Underground waters of Georgia: Georgia Geological Survey Bulletin 15, 370 p.

McCollum, M. J., 1966, Ground-water resources and geology of Rockdale County, Georgia: Georgia Geological Survey Information Circular 33, 93 p.

Matthews, S. E., Hester, W. G., and O'Byrne, M. P., 1980, Ground-water data for Georgia, 1979: U.S. Geological Survey Open-File Report 80-50, 93 p.

Mayer, Larry, Prowell, D. C., and Reinhardt, Juergen, 1977, The subenvelope map as a tool for delineating linear features in the Georgia Piedmont and Coastal Plain: U.S. Geological Survey Open-File Report 77-695, 19 p.

Metropolitan Atlanta Water Resources Study, 1980: Drought management and water conservation: Atlanta Regional Commission, Staff Working Paper, 37 p.

Miller, L. M., 1961, Contamination by processed petroleum products, in Ground-water contamination: U.S. Department of Health, Education, and Welfare, Public Health Service, p. 117-119.

Parizek, R. R., 1971, Hydrogeologic framework of folded and faulted carbonates, in Geological Society of America Annual Fieldtrip Guidebook: Washington, D.C., November 1971, p. 9-75.

Pierce, Kenneth L., 1965, Geomorphic significance of a Cretaceous deposit in the Great Valley of southern Pennsylvania: U.S. Geological Survey Professional Paper 525-C, p. C152-C156.

Sever, C. W., 1964, Geology and ground-water resources of crystalline rocks, Dawson County, Georgia: Georgia Geological Survey Information Circular 30, 32 p.

Sonderegger, J. L., Pollard, L. D., and Cressler, C. W., 1978, Quality and availability of ground water in Georgia: Georgia Geologic Survey Information Circular 48, 25 p.

Staheli, A. C., 1976, Topographic expression of superimposed drainage on the Georgia Piedmont: Geological Society of America Bulletin, v. 87, p. 450-452.

Stewart, J. W., 1964, Infiltration and permeability of weathered crystalline rocks, Georgia Nuclear Laboratory, Dawson County, Georgia: U.S. Geological Survey Bulletin 1133-D, 59 p.

Stewart, J. W., and Herrick, S. M., 1963, Emergency water supplies for the Atlanta area in a National disaster: Georgia Geological Survey, Special Publication No. 1, 24 p.

Thomson, M. T., Herrick, S. M., Brown, Eugene, and others, 1956, The availability and use of water in Georgia: Georgia Geological Survey Bulletin 65, 329 p.

Trimble, S. W., 1970, The Alcovy River swamps--the result of culturally accelerated sedimentation: Georgia Academy of Science Bulletin 28, p. 131-141.

U.S. Army, Corps of Engineers, 1978, Water supply study of Coweta, Fayette, Henry, and Spalding Counties, Metropolitan Atlanta Area water resources management study: U.S. Army District Engineer, Savannah, Georgia, p. IV-9.

U.S. Bureau of the Census, 1971, Census of population, 1970, number of inhabitants, Georgia: U.S. Bureau of Census PC(1)-A12, Georgia, 41 p.

U.S. Department of Agriculture, Climate and man: Yearbook of Agriculture, 1941, 1248 p.

U.S. Environmental Protection Agency, 1976, National interim primary drinking water regulations, 159 p.

U.S. Geological Survey, 1978, Water-resources investigations in Georgia, 1978: 28 p.

Wyrick, G. G., and Borchers, J. W., 1981, Hydrologic effects of stress relief fracturing in an Appalachian valley: U.S. Geological Survey Water-Supply Paper 2177, 51 p.

Zurawski, Ann, 1979, Hydrogeology of the Gatlinburg area, Tennessee: U.S. Geological Survey Open-File Report 79-1167, 79 p.

APPENDIX

Table 6.--Wells in continuous use for 12 years to longer than 30 years

Well number	Water-bearing unit	Owner	Year drilled	Years in use	Depth (ft)	Yield (gal/min)
Wells pumping 12 to 20 years						
4CC4	C	Cole's Trailer Haven	1967	14	160	25
6BB14	G	Town of Whitesburg	1964	17	302	25
7AA3	A	Moreland School	1967	14	458	40
8GG9	A	Dunn's Trailer Park	1969	12	204	40
9BB9	A	City of Tyrone	1965	16	700	32
10AA2	B	City of Brooks	1966	15	555	48
10EE6	D	Seydell-Wooley	1967	14	550	351
11CC15	A	Trailer Park	1964	17	267	25
12HH6	H,C	City of Cumming	1967	14	172	150
13DD2	B	Abbott Estates	1961	20	250	50
13DD56	B	City of Conyers	before 1966	15	410	348
13DD84	B	Lakeview Estates	1962	19	627	32
13GG12	G	City of Sugar Hill	1966	15	650	50
13JJ3	C,H	North Ga. Rendering	1966	15	225	30
14DD63	B	City of Conyers	1968	13	500	125
15JJ4	G	Best Ice Co.	1962	19	192	225
15JJ5	G	do.	1965	16	528	120
15JJ8	G	do.	1965	16	602	50
15JJ11	G	Marjac Poultry	before 1966	15	287	186
15JJ12	G	do.	do.	15	225	40
15JJ13	G	do.	do.	15	300	75

Table 6.--Wells in continuous use for 12 years to longer than 30 years--Contd.

Well number	Water-bearing unit	Owner	Year drilled	Years in use	Depth (ft)	Yield (gal/min)
Wells pumping 12 to 20 years--Continued						
15JJ14	G	Marjac Poultry	before 1966	15	145	43
Wells pumping 20 to 30 years						
3CC2	A	Textile Rubber Co., 1	1957	24	337	20
Do.	A	do., 2	1957	24	283	30
Do.	A	do., 4	1957	24	265	30
5CC34	C	Plywood Case Co.	1957	24	108	30
7BB6	B	Arnall Mills	1953	28	675	69
7BB10	A	Arnco Mills	1954	27	300	33
7BB37	A	Bonnell Co. (Subdivision)	1958	23	201	75
7BB38	A	do.	1958	23	300	54
7BB39	A	do.	1958	23	350	29
7Z2	A	City of Grantville	1956	25	600	80
9AA6	A	City of Senoia	1958	23	385	50
10BB10	D	Simpson Provision Co.	1956	25	175	45
10EE16	B	Aluminum Co.	1957	24	394	21
10EE17	B	do.	1959	22	118	48
10EE25	G	Sonoco Products	1958	23	400	144
11BB9	A	City of Hampton	1951	20	340	30
11BB13	A	Lake Talmadge (Subdivision)	1953	28	286	30

Table 6.--Wells in continuous use for 12 years to longer than 30 years--Contd.

Well number	Water-bearing unit	Owner	Year drilled	Years in use	Depth (ft)	Yield (gal/min)
Wells pumping 20 to 30 years--Continued						
12EE6	A	City of Clarkston	1955	26	500	137
12GG3	G	City of Duluth	1955	26	300	58
14HH5	G	City of Flowery Branch	old	?	--	204
14HH6	G	do.	do.	--	--	108
15JJ1	G	City Ice Co.	1958	23	450	25
15JJ2	G	Gainesville Mills	1956	25	285	100
15JJ6	G	Best Ice Co.	1958	23	150	150
Wells pumping longer than 30 years						
7AA2	A	Moreland School (used by mill)	1941	41	228	55
7BB5	B	Arnall Mills	1944	37	405	53
7BB7	A	Arnco Mills	1927	54	360	40
7BB9	A	do.	1940	41	586	65
7Z8	A	Grantville Mills	1933	48	700	27
9AA4	A	City of Senoia	1946	35	500	55
9AA5	A	do.	1947	34	459	53
10DD51	A	National Biscuit Co.	1940's	--	376	77
10DD53	A	do.	do.	--	1,000	70
10EE5	D	Seydell-Wooley	1943	38	450	110
10JJ3	J	City of Ball Ground	1936	45	240	84
11BB8	A	City of Hampton	1940's	--	300	35

Table 6.--Wells in continuous use for 12 years to longer than 30 years--Contd.

Well number	Water-bearing unit	Owner	Year drilled	Years in use	Depth (ft)	Yield (gal/min)
Wells pumping longer than 30 years--Continued						
11CC6	A,E	City of Jonesboro	before 1949	32	306	21
12BB12	A	City of McDonough	1948	33	500	275
12EE7	A	City of Clarkston	1928	53	565	60
13CC47	A	Plantation Manor Childrens Home	1949	32	235	50
13DD54	B	City of Conyers	old	?	350	45
13DD55	B	do.	1930	51	550	120
14DD5	B	Town of Milstead	before 1949	32	550	60
14FF4	B	City of Grayson	1942	39	300	30

Table 7.—Chemical analyses of well water, Greater Atlanta Region

Well number	County	Water-bearing unit[1]	Name or owner	Depth of well (feet)	Date of collection	Silica (SiO_2), milligrams per liter	Micrograms per liter: Iron (Fe)	Micrograms per liter: Manganese (Mn)	Milligrams per liter: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Dissolved solids: Residue at 180°C	Dissolved solids: Sum of constituents	Hardness[2]: Calcium-magnesium	Hardness[2]: Noncarbonate	Specific conductance, micromhos at 25°C	pH
Environmental Protection Agency (1976) Drinking Water Standards							300	50						250	250	[3]1.2	10	500					
15FF1	Barrow	B	J. Adams	158	01-18-65	27	—	—	4.4	0.5	6.5	2.0	18	0.8	3.0	0.1	9.9	—	63	13	0	64	6.6
15GG1		C	City of Auburn	418	10-08-58	25	—	—	20	5.1	5.2	2.3	63	21	9.5	.1	.8	134	120	71	20	184	6.9
16FF1		A	Harrison Poultry Co.	800	08-28-62	30	—	—	8.8	1.9	6.0	2.1	49	0	.0	.2	.2	82	73	30	0	89	6.9
17FF2		A	W. Perkins & Son	256	02-15-67	28	—	—	5.8	1.5	4.1	1.3	35	.0	.8	.1	.4	59	59	20	0	62	6.6
8HH7	Bartow	B	Ga. DNR, Red Top Mountain	338	09-30-58	26	—	—	6.8	1.2	3.3	2.4	36	.4	1.0	.1	.7	65	60	22	0	65	6.4
13AA2	Butts	A	F. Childs	99	01-22-65	26	—	—	8.4	2.2	6.1	3.1	48	4.0	1.6	.1	.0	84	76	30	0	85	6.9
14AA11		A	A. C. Freeman	109	10-20-60	25	—	—	2.4	.4	4.4	1.5	16	.8	2.3	.2	1.9	62	46	8	0	37	6.3
14AA15		D	City of Flovilla	335	04-23-71	46	20	0	14	2.8	12	1.6	56	2.8	8.0	.4	13	132	128	47	1	150	7.1
3CC4	Carroll	C	L. Sherrill	102	03-02-66	33	—	—	5.6	1.8	5.3	1.1	43	.0	1.0	.0	.0	—	69	22	0	69	6.7
4CC72		F	Ga. DNR, John Tanner Prk.	135	02-22-62	37	—	—	6.0	3.2	5.9	2.0	46	7.2	1.0	.0	.1	92	85	28	0	91	6.9
5BB8		C	G. W. Hannah	91	11-19-64	7.1	—	—	2.8	.7	6.0	1.0	6	.4	6.4	.0	15	—	42	10	5	62	6.0
6BB15		G	City of Whitesburg	150	10-07-58	36	—	—	16	3.6	12	1.4	35	.8	24	.0	6.2	174	117	55	26	206	6.1
14	Cherokee[4]	C	C. Fowler Trailer Prk.	—	11-13-75	34	0	40	8.5	2.0	6.5	1.5	53	.3	1.2	.1	.01	78	81	30	0	97	6.9
30		C	J. Jordan	147	01-21-74	5.8	100	33	.4	.4	3.1	.3	2	.9	3.8	0	1.4	16	22	3	1	34	4.8
47		C	V. O. Poss	142	01-21-74	9.4	250	67	.7	.6	4.2	.4	2	3.6	4.1	0	.50	20	27	3	3	36	4.8
9JJ8		H	Lake Arrowhead, 16[5]	252	04-16-73	32	100	200	1.0	.05	.5	.95	6.3	0	1.8	.3	—	45	—	4	1	—	5.3
9JJ7		H	do., 17	309	04-27-73	4	100	10	1.2	.5	.53	.97	6.0	1	.1	.3	—	69.3	—	3.5	0	—	5.7
57		H	do., 24	288	05-29-73	5	230	90	36	10.5	2.2	3.3	136	7	.1	.3	—	144	—	142	136	—	7.2
58		H	do., 26	248	05-29-73	3.6	1,000	210	16	.21	.74	3.4	88	8.0	.1	.3	—	79	—	98	88	—	6.8
59		H	do., 27	330	05-04-73	2.4	100	50	.9	.40	.55	.53	3.6	.1	.1	.3	—	25	—	4.2	0	—	5.5
9JJ6		H	do., 31	248	05-29-73	1.5	50	10	1.4	.35	.6	1.6	3	.1	.1	.3	—	8	—	40	0	—	5.9
65		A	Gilbert Reeves	—	11-12-75	34	0	50	7.8	1.8	6.1	1	20	.5	5.2	.2	3.3	94	81	27	11	83	6.3
9GG1		D	City of Woodstock	500	11-04-63	41	—	—	22	3.9	10	2.4	86	3.2	10	.2	—	152	135	71	0	200	6.9
9HH5		A	Little River Landing, 2	525	01-21-74	22	0	17	22	9.5	2.5	3.3	164	14	3.4	.2	.01	168	180	94	0	288	7.9
9JJ12		C	E. W. Owen	—	08-20-62	24	—	—	7.2	1.3	4.6	.9	22	13	1.5	.8	—	107	104	43	0	137	7.0
11JJ2		J	City of Ball Ground	400	06-14-72	12	0	0	36	3.7	1.4	1.2	130	1.6	2.0	.2	—	124	120	110	0	225	8.0
11BB17	Clayton	A	H. J. Schneider	506	03-13-63	21	—	—	16	3.9	13	3.1	61	5.6	6.0	.1	25	136	124	56	6	170	7.1
11CC1		A	H. Smith	110	05-17-66	31	—	—	15	3.0	7.5	3.5	72	6.4	1.5	.3	.2	—	103	50	0	132	7.0
11CC6		A,E	City of Jonesboro	306	09-24-21	22	4,900	—	29	7	6.8	.66	—	15	16	—	—	—	—	—	—	—	—
11CC12		B	R. Chambers	125	03-13-63	39	—	—	22	5.1	7.7	3.6	98	9.6	3.0	.3	.1	144	138	76	0	185	7.4
8EE6	Cobb	B	City of Powder Springs	280	09-30-58	37	—	—	20	5.6	6.6	3.2	98	6.4	5.5	.3	6.5	137	139	73	0	191	7.5
8EE7		A	Louch (Austell)	80	1901	12	—	—	276	44	2,690	77	—	582	3,130	—	—	6,100	—	—	—	—	—
8EE8		A	Medlock (Austell)	65	01-22-48	19	150	—	340	58	2,320	—	136	598	3,820	.1	0	7,230	—	1,090	—	—	7.5
8EE9		A	Sulpho-Magnesium Well	750	01-22-48	19	200	—	19	60	350	133	141	48	450	0	0	610	—	77	—	—	7.2
8GG7		D	City of Acworth	500	10-01-46	18	400	—	66	17	1	—	82	5	69	—	—	480	—	253	—	—	7.0
8GG14		D	B. L. Woodall, Sr.	184	02-28-66	39	—	—	7.5	1.4	6.8	1.9	36	.4	4.2	.0	12	—	91	25	0	86	7.2
8GG15		D	City of Acworth	500	12-06-38	45	0	—	22	6.4	12	3.5	91	6.9	12	—	16	166	—	81	—	—	—
9FF8		C	Elizabeth School	382	04-22-38	27	500	—	10	3.3	5.4	2.2	40	16	1.8	0	.2	88	—	39	—	—	—
9FF9		A	City of Marietta	297	04-22-38	22	430	—	9.8	3.9	12	1.8	33	3.4	15	0	20	119	—	40	—	—	—
9FF10		A	do.	413	04-22-38	38	80	—	14	6.4	6.9	2.0	56	1.9	9.2	0	19	144	—	61	—	—	—
9FF11		A	do.	272	04-22-38	19	100	—	6	3.6	3.1	1.5	31	3	4	0	2.5	59	—	30	—	—	—
9FF12		A	do.	910	04-22-38	34	90	—	32	10	15	3.1	103	25	16	0	28	226	—	121	—	—	—
9FF13		A	do.	500	04-22-38	27	80	—	7.3	5.4	4.0	1.4	58	2.3	1.5	0	.10	74	—	40	—	—	—
9GG7		A	E. Barron	186	08-20-62	25	—	—	4.8	2.1	1.6	.1	27	.4	1.0	.1	1.7	64	50	20	0	53	7.0
6BB1	Coweta	A	A. L. Allen	132	11-20-64	36	—	—	3.2	.2	6.4	1.3	37	.0	1.4	.0	5.4	—	72	9	0	76	6.7
7BB24		E,A	Newnan Country Club	500	02-23-62	34	—	—	5.6	1.5	5.0	1.8	36	.4	1.5	.0	1.4	68	69	20	0	61	7.0
8CC4		A,F	W. H. Johnson	125	03-03-66	9.9	—	—	1.6	.6	1.5	1.2	13	.0	1.2	.0	1.6	—	24	6	0	30	6.4
9AA5		A	City of Senoia	459	10-21-58	32	—	—	24	4.4	11	2.8	44	13	25	.1	19	182	153	78	42	236	6.5
9	Dawson[4]	C	G. Harbin	—	02-09-55	1	800	—	1.8	.8	—	—	—	.2	5.4	—	—	26	—	5	—	—	6.7
11		E	L. R. Sams	—	12-11-59	21	130	—	4.4	1.7	3	1.5	28	2.4	.8	.1	.0	—	—	18	0	52	6.4
54		C	Lumpkin School	—	11-25-55	4	200	—	20	2.6	tr.	tr.	—	2.4	10.5	—	—	96	—	42	—	—	7.4
48		E	U.S. Air Force	—	10-18-56	21	310	—	10	3.6	2.7	.6	56	.2	1.3	.1	.0	66	—	40	0	90	6.8
36		C	do.	—	07-31-58	12	780	—	10	2.7	4.8	4.5	60	2	2.8	.1	.2	76	—	36	0	110	6.8

See footnotes at end of table.

Table 7.--Chemical analyses of well water, Greater Atlanta Region--Continued

							Micrograms per liter		Milligrams per liter														
																		Dissolved solids		Hardness[2]			
Well number	County	Water-bearing unit[1]	Name or owner	Depth of well (feet)	Date of collection	Silica (SiO_2), milligrams per liter	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Residue at 180°C	Sum of constituents	Calcium-magnesium	Noncarbonate	Specific conductance, micromhos at 25°C	pH
	Environmental Protection Agency (1976) Drinking Water Standards						300	50						250	250	[3]1.2	10	500					
31	Dawson[4]	C	U.S. Air Force	—	10-31-56	22	1,300	—	23	3.8	5	4.2	97	10	0.9	0.2	0.1	117	—	73	0	168	7.9
19	DeKalb[4]	E	L. L. McPherson	169	08-04-43	20	1,200	—	38	4	0.05	0.03	—	14	7	—	—	—	195	111	—	—	—
25		A	S. B. King	163	03-04-44	18	500	—	0	8	tr.	tr.	—	16	10	—	—	—	108	—	—	—	7
45		A	E. Z. Huff	110	03-04-44	14	190	—	0	8	tr.	tr.	—	18	8	—	—	—	103	—	—	—	—
60		A	U.S. Prison	605	04-08-36	—	1,000	—	15	—	—	—	—	20	7	0	—	—	—	72	—	—	—
79		A	City of Clarkston	448	04-08-36	—	150	—	21	—	—	—	69	13	4	—	—	—	—	63	—	—	—
12EE6		A	do.	500	06-07-72	26	0	60	28	5.9	9.5	5.5	100	16	8.0	.7	—	161	160	94	12	250	7.2
12EE7		A	do.	504	10-08-58	29	—	—	23	4.3	6.4	4.6	92	12	5.0	.1	6.0	143	135	75	0	199	7.1
13DD53		B	C. O. Turner	200	05-17-66	36	—	—	1.9	.4	4.8	1.2	26	.4	1.0	.1	.0	—	62	6	0	44	6.6
7CC12	Douglas	C	Fair Play School	167	02-22-62	9.8	—	—	2.4	.5	4.3	1.0	12	.6	4.0	.1	6.1	—	35	8	0	46	6.1
7EE1		A	W. A. Cox	130	02-28-66	14	—	—	.8	.8	2.0	.3	11	.4	1.2	.0	.4	—	25	6	0	22	6.6
9BB2	Fayette	B	Peachtree City	400	06-12-72	38	30	0	5.2	1.1	6.4	1.3	32	.8	1.2	.1	—	72	72	18	0	65	6.6
10AA1		A	E. A. Ballard	73	12-02-64	39	—	—	8.8	5.4	4.6	.8	57	.2	2.5	.0	4.5	—	94	44	0	112	6.8
10AA12		B	Mask & Gay, 1	135	01-18-63	14	—	—	6.8	.5	1.2	1.6	20	5.2	2.0	.2	.0	38	41	19	2	53	6.5
1	Forsyth[4]	C	E. Sherr[illegible]l	239	—	21	0	0	8.8	2.5	2.8	1.1	45	3.1	1.8	.0	.71	67	67	32	0	80	8.1
8		C,H	Habersham Marina, Drydock	545	—	21	310	29	72	1.2	78	4.4	58	310	1.7	.2	.01	573	518	180	140	727	6.5
17		A	Dixon Trailer Park	144	11-18-75	33	0	20	11	3.0	5.7	2.3	51	.5	3.6	.1	1.4	89	91	40	0	104	6.5
47		A	Chestatee School	140	11-18-75	12	10	90	50	4.2	6.7	2.6	0	.3	7.4	.1	9.9	84	83	32	32	118	5.5
11GG10		E	Shadow Park North, 3	266	11-18-75	12	14,000	1,500	7.2	1.6	3.0	1.4	30	.9	3.9	.3	.01	30	63	25	0	106	6.2
11GG11		E	do., 1	284	08-22-74	29.5	340	0	1.25	1.68	2	.8	19.5	.01	4.5	.0	.63	56	—	10	—	42	6.1
45		C,H	D. E. Nalley	175	01-23-74	19	0	14	7.5	1.6	4.6	1.7	26	2.1	4.2	.0	.01	70	64	25	4	83	6.2
40		A	C. B. & C. W. Mansell	177	11-04-63	37	—	—	5.2	1.5	5.7	1.9	32	3.6	1.5	.2	1.6	74	74	19	0	70	6.8
12JJ1		D	J. Stiner	98	03-28-66	29	—	—	3.0	.6	4.7	1.1	26	.0	.8	.1	.6	—	53	10	0	42	6.5
13JJ3		C,H	No. Ga. Rendering, 1	225	11-18-75	14	0	60	5.5	.5	1.6	1.6	20	3.5	1.2	.1	.36	39	40	16	0	52	6.5
4		C,H	do., 3	503	11-18-75	16	50	20	15	.8	3.0	1.3	5	3.6	1.1	.2	.02	66	67	41	0	93	6.5
122	Fulton	A	Sears, Roebuck & Co.	740	05-17-55	25	.00	.00	22	5.7	11	3.6	63	32	12	.0	6.8	151	149	78	27	216	6.1
10DD3		A	City of College Park	550	09-12-38	30	50	—	13	2.9	8.2	2.3	56	14	2.5	0	0	104	—	44	—	—	—
10DD12		A	City of East Point	635	09-12-38	29	2,000	—	71	20	20	5.4	66	239	4.0	.1	0	449	—	260	—	—	—
10DD13		A	do.	500	09-12-38	11	160	—	29	7.3	7.2	2.6	9.0	84	12	0	9	191	—	102	—	—	—
10DD14		A	do.	400	09-12-38	27	410	—	14	3.4	7.4	3.0	40	23	8.8	0	0	107	—	49	—	—	—
10DD29		B	City of Hapeville	600	05-02-38	34	40	—	13	5.8	7.6	5.3	80	9.3	2.5	0	.08	115	—	56	—	—	—
10DD30		B	do.	803	05-02-38	34	50	—	20	3.2	11	22	93	10	1.8	.1	0	128	—	63	—	—	—
10EE5		D	Seydel-Wooley Co.	450	03-05-48	22	500	—	31	23	tr.	tr.	112	19	7	0	0	120	—	103	—	—	—
10EE5		D	do.	450	12-18-70	32	—	—	55	11	22	8.6	136	45	50	.2	.0	326	295	180	65	499	8.4
10EE14		A	Henry Grady Hotel	710	03-05-48	20	250	—	28	5	tr.	tr.	56	26	12	0	0	160	—	90	—	—	—
10EE17		B	Aluminum Co., 2	118	11-08-60	40	—	—	52	6.0	99	4.0	80	164	60	.2	23	530	487	154	88	734	6.4
10EE36		D	Armour	500	03-05-48	21	150	—	41	24	tr.	tr.	73	47	42	0	0	320	—	200	—	—	—
12FF1		G	River Bend Gun Club	160	05-17-66	29	—	—	5.4	2.0	12	1.1	53	.8	2.5	.5	1.1	—	80	22	0	102	7.2
2	Gwinnett[4]	E	Lawrenceville Ice Co.	217	01-22-48	19	400	—	27	14	128	—	88	15	100	0	0	265	—	126	—	—	7.1
11		B	Gunters Dairy	300	01-22-48	14	250	—	tr.	tr.	0	0	51	tr.	3	—	0	33	—	21	—	—	6.8
15		B,C	Snellville Canning Plant	342	01-22-48	12	100	—	tr.	5	tr.	tr.	11	0	6	0	0	50	—	21	—	—	6.1
--		B	City of Snellville	500	02-15-67	35	50	270	18	1.7	9.6	.9	74	7.6	1.5	1.9	—	—	113	52	0	149	7.0
13FF2		E	Bethesda School	270	01-22-48	18	150	—	11	—	tr.	tr.	74	6	1.5	0	0	178	—	28	—	—	6.3
13GG14		G	City of Sugar Hill	625	08-15-72	30	40	70	16	3.0	8.0	2.0	62	13	5.0	.2	—	110	110	53	2	155	7.3
13GG15		G	do.	350	10-08-58	26	—	—	21	.9	4.2	1.1	59	11	.0	.2	.4	98	99	56	0	128	7.7
13GG16		G	City of Suwanee	600	01-08-57	21	—	—	27	5.7	16	.7	138	9.6	2.5	.5	.0	151	152	91	0	237	8.0
14FF8		E	City of Lawrenceville	302	04-29-47	14	350	—	22	8	tr.	tr.	66	21	6	0	0	128	—	88	—	—	6.4
14FF9		E	do.	352	10-17-47	22	300	—	18	3.4	—	—	—	8.8	4.8	—	0	112	—	58	—	—	6.9
14FF9		E	do.	352	08-28-62	35	—	—	25	6.7	8.1	3.2	91	18	11	.3	.0	156	152	90	16	222	7.3
14FF15		B	City of Dacula	375	01-22-48	16	500	—	7	tr.	tr.	tr.	15	tr.	6	0	0	65	—	18	—	—	6.2
14HH18	Hall	G	I. W. Jones	268	08-23-62	11	—	—	1.8	.7	2.6	1.0	6	.0	3.8	.1	4.7	40	29	8	2	35	6.3
15JJ1		G	City Ice Co.	450	03-21-66	19	—	—	49	23	2.6	3.3	140	4.4	42	.0	51	—	261	217	102	440	7.2
16KK5		A	City of Lula	404	10-02-56	27	—	—	23	5.5	6.8	3.9	71	15	22	.1	.4	155	139	80	22	224	6.5

See footnotes at end of table.

Table 7.—Chemical analyses of well water, Greater Atlanta Region—Continued

Well number	County	Water-bearing unit[1]	Name or owner	Depth of well (feet)	Date of collection	Silica (SiO_2), milligrams per liter	Micrograms per liter		Milligrams per liter													Specific conductance, micromhos at 25°C	pH
							Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (N)	Dissolved solids: Residue at 180°C	Dissolved solids: Sum of constituents	Hardness[2]: Calcium-magnesium	Hardness[2]: Noncarbonate		
Environmental Protection Agency (1976) Drinking Water Standards							300	50						250	250	[3]1.2	10	500					
4FF1	Haralson	C	W. L. Daniel	68	03-02-66	16	—	—	5.8	1.3	3.2	0.2	38	0.0	1.5	0.0	0.7	—	53	20	0	67	6.5
12BB12	Henry	A	City of McDonough	500	06-07-62	9.8	10	0	3.8	1.2	16	1.9	34	7.2	5.0	.1	—	64	62	15	0	110	7.3
6FF1	Paulding	C	Camp, 8	107	03-02-66	26	—	—	2.9	2.0	3.6	.3	28	.0	1.0	.0	.4	—	50	15	0	50	6.7
7FF1		B	City of Hiram	969	06-06-72	33	10	10	13	4.8	10	1.1	44	2.9	14	.1	—	121	120	52	16	170	6.6
7GG1		E	F. Brooks	66	11-19-64	32	—	—	12	4.4	3.1	.2	59	.4	3.0	.0	1.0	—	85	48	0	110	6.8
12CC1	Rockdale	B	H. B. Toney	353	05-18-64	46	.0	—	15	.9	12	1.5	76	3.2	1.0	.1	.0	106	117	41	0	128	7.0
13CC1		A	Joe Katz-Double T Ranch	608	08-10-63	30	100	—	10	3	—	—	46	3	5	.1	5	68	—	—	—	—	6.1
13CC2		A	M. W. Hill	150	04-28-64	34	.0	—	6.8	1.7	5.6	2.2	42	2.8	.0	.1	1.5	68	76	24	0	80	6.9
13CC16		A	Monastery of Holy Ghost	307	08-28-62	13	340	—	7.4	.9	3.6	1.6	28	16	.8	.2	.0	52	58	22	0	93	6.9
13DD2		B	Abbott Estates	250	05-20-64	17	100	—	.7	.1	2.1	1.2	8	.0	.0	.0	1.9	22	27	2	0	20	6.4
13DD7		B	Martin Hurst	—	02-11-65	24	4,000	—	18	4	—	—	98	4	4	.2	—	125	—	—	—	—	6.7
13DD18		B	Camp Westminster	209	05-20-64	29	.0	—	2.4	.5	6.1	.7	22	.3	2.2	.2	3.4	46	55	8	0	49	6.4
13DD54		B	City of Conyers	350	10-08-58	18	60	—	13	.4	3.9	1.2	31	10	5.5	.4	.5	75	68	26	8	91	7.2
13DD55		B	do.	550	03-31-48	26	tr.	—	22	10	10	—	59	11	3	0	0	123	—	—	—	—	7.5
14CC1		A	Highland Golf Club, Inc.	385	05-20-64	28	200	—	13	1.1	5	1.9	46	11	1.5	.2	.0	110	85	37	0	101	6.8
14DD2		B,E	Hi-Roc Develpmt. Corp.	130	05-07-64	20	700	—	5	1.5	—	—	32	.6	3	.1	3.8	61	—	—	—	—	6.3
14DD5		B	Callaway Mills	550	03-29-48	20	150	—	19	9	7	—	49	12	9	0	0	130	—	—	—	—	6.9
14DD7		B	Billy Farmer	137	05-18-64	28	100	—	3.6	.2	6.4	1.6	15	.4	3.5	.0	12	54	63	10	0	61	6.0
15DD10	Walton	B	R. Byrd	365	08-28-62	30	—	—	17	.6	17	1.8	85	2.0	1.0	1.2	1.1	122	114	45	0	154	7.7
16DD1		A,B	J. J. Jeffries	245	01-18-65	33	—	—	3.6	1.9	4.9	1.3	24	.4	1.2	.1	5.5	—	64	17	0	66	6.5
16EE1		A	B. F. Miller	270	02-15-67	30	70	0	17	1.4	6.2	1.9	74	1.2	1.0	.1	.1	95	96	48	0	129	6.9

1 Water sampled from water-bearing units shown on plate 1. Some wells are not shown on plate 1 because they yield less than 20 gal/min.
2 Water having a $CaCO_3$ hardness of 0 to 60 mg/L is classified, "soft"; 61 to 120 mg/L, "moderately hard"; 121 to 180 mg/L, "hard"; and more than 181 mg/L, "very hard".
3 Based on average annual air temperature.
4 Well numbers lacking quadrangle designations (such as 9JJ) are from the following sources: Cherokee and Forsyth Counties, Cressler and others (1979); Dawson County, Sever (1964); DeKalb, Fulton, and Gwinnett Counties, Herrick and LeGrand (1949).
5 Analyses of water from Lake Arrowhead wells by XEPOL ONE, Inc. Laboratory.

Table 8.—High-yielding wells in the Greater Atlanta Region that currently (1980) are unused and could provide emergency water supplies

County	Well number	Water-bearing unit	Owner	Yield (gal/min)	Year drilled	Remarks
Cherokee	8GG8	C	Harold Harriman	80	1970	Sediment in water
	9JJ2	C	Reinhardt College	32	1962	Flows
	9JJ3	C	do.	63	1962	
	10HH1	A	Hickory Flat School	50	1957	
Clayton	10DD35	B	Atlanta Terrace Motel	77	1958	
	11CC11	A	Spiveys Lake Subdivision (Jonesboro)	40	1959	
	11CC17	A	N. W. Barrenton	40	1957	
Cobb	8GG6	D	City of Acworth	60	---	
	9FF3	C	Lockheed Corp.	72	---	
	9FF4	C	do.	68	---	
	9FF5	C	do.	73	---	
Coweta	7AA8	A	City of Newnan	90	1910	Not used since 1973
	7AA9	A	do.	75	1941	Do.
	7AA10	A	do.	100	1914	Do.
	7AA11	A	do.	100	1914	Do.
	7AA14	A	Airport Spur Serv.	75	1972	
	7BB8	A	Arnco Mills	50	1932	
	7BB24	E,A	Newnan Country Club	60	1948	
	7Z5	A	City of Grantville	27	1962	
	8BB11	F	R. A. Higgins (Motel)	57	1957	

Table 8.--High-yielding wells in the Greater Atlanta Region that currently (1980) are unused and could provide emergency water supplies--Continued

County	Well number	Water-bearing unit	Owner	Yield (gal/min)	Year drilled	Remarks
DeKalb	11EE3	A	Georgia Mental Health Institute	225	1932	
	12DD8	A	Dekalb Co. Line Sch.	28	1957	
	12EE8	B	Crowe Manufacturing Company	60	1964	
Douglas	7CC6	C	Capps Ferry Training Center	20	1960	
Fayette	9CC18	A	Landmark Mobile Home Park	30	1975	High iron
Fulton	8DD10	G	Fulton Co. Sewage Treatment Plant	55	1960	
	9CC26	A	City of Union City	25	1954	
	10CC17	A,F	W. P. Burns	20	1962	High iron
	10DD2	A	Fort McPherson	20	—	
	10DD9	F,A	City of East Point	40	1928	
	10DD29	B	City of Hapeville	75	—	
	10DD30	B	do.	80	—	
	10DD31	B	do.	35	1937	
	10DD33	B	do.	55	1938	
	10DD34	B	do.	55	1914	
	10DD37	F	Motor Convoy Co.	50	1948	
	10DD39	A	Fort McPherson	32	—	
	10DD40	A	do.	35	—	
	10DD42	A	do.	21	1882	

Table 8.--High-yielding wells in the Greater Atlanta Region that currently (1980) are unused and could provide emergency water supplies--Continued

County	Well number	Water-bearing unit	Owner	Yield (gal/min)	Year drilled	Remarks
Fulton	10DD43	A	Fort McPherson	65	1885	
	10DD45	A	do.	20	--	
	10DD46	A	do.	66	--	
	10DD57	A	Johnson-Floker Co.	55	1971	
	10EE15	A	Star Photo Co.	66	1957	Flows
	10EE23	B	MacDougald-Warren, Inc.	130	1957	
	11FF7	C	Atlanta Assoc. Baptist Church	23	1956	
	11GG6	A	Northwest School, Crabapple	60	1955	
	11GG8	A	City of Alpharetta	60	1951	
Gwinnett	12FF6	B	City of Norcross	100	1945	
	12FF7	B	do.	102	--	
	12FF10	B	Interstate Mobile Home Park	30	1969	
	12GG4	G	City of Duluth	91	1951	
	14FF8	E	City of Lawrenceville	471	1945	High iron
	14FF9	E	do.	400	--	
	14FF10	E	do.	270	1912	High iron
Hall	15HH2	A,B	Candler School, Candler	40	1955	
	15HH3	A,B	H. L. Davis	30	1955	High iron
	15HH4	A,B	do.	40	1957	

Table 8.--High-yielding wells in the Greater Atlanta Region that currently (1980) are unused and could provide emergency water supplies--Continued

County	Well number	Water-bearing unit	Owner	Yield (gal/min)	Year drilled	Remarks
Hall	15JJ15	G	Cagle Poultry	125	1963	
	15JJ16	G	do.	180	1964	
	15JJ17	G	do.	180	1964	
	15JJ18	G	do.	180	1964	
	15JJ19	G	do.	180	1964	
	15JJ20	G	do.	57	1941	
	15JJ21	G	Webb-Crawford	60	1957	
Henry	12BB8	A	KOA, McDonough	50	1970	
Rockdale	13DD90	B	Jim Florence	50	1979	
	14DD3	B	Parks Printing Co.	60	1947	Was contaminated
	14DD4	B	do.	75	1950	Do.

Table 9.—Record of wells in the Greater Atlanta Region

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller[1]	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
3CC1	Olin Downs Carrollton	A	33°32'49" 85°17'15	100	125	64	—	1958	Adams-Massey	955	—	—
3CC2	Textile Rubber Co., 1 Bowdon	A	33°31'54" 85°15'11"	20	337	—	—	1957	do.	1,080	—	—
Do.	Textile Rubber Co., 2 Bowdon	A	33°31'54" 85°15'17"	30	283	101	—	1957	do.	do.	—	—
Do.	Textile Rubber Co., 3 Bowdon	A	33°31'53" 85°15'10"	15	400	91	—	1957	do.	do.	—	—
Do.	Textile Rubber Co., 4 Bowdon	A	33°31'55" 85°15'11"	30	265	82	—	1957	do.	do.	—	—
3CC3	Frank Howard Rte. 1 Waco	C	33°37'25" 85°17'09"	30	128	28	—	1977	do.	1,190	—	—
3CC4	Alma E. Brown and Alvin H. Kuske Rte. 2, Smithfield Rd. Bowden	C	33°35'23" 85°15'31"	40	164	42	6	1978	do.	1,160	27	4
3CC6	David E. Barr Rte. 1 (Hwy. 100-N) Bowden	C	33°34'50" 85°15'12"	100	195	59	6	1979	do.	1,095	—	—
4BB1	Steve Gilland Hayes Mill Rd. Carrollton	A	33°29'43" 85°07'43"	52	292	36	—	1975	do.	1,105	—	—
4BB2	Jim Reeves Bonners Gold Mine Rd. Roopville	A	33°29'47" 85°08'30"	25	143	66	6	8/79	do.	1,125	—	—
4BB3	John D. Butler Rte. 1, Box 240 Roopville	E	33°27'59" 85°08'47"	60	178	10	6	9/79	do.	1,000	—	—
4BB4	James F. Burns Rte. 2, Box 370 Carrollton	C	33°28'58" 85°11'13"	60	173	67	6	2/79	do.	1,145	—	—
4BB5	G. Cecil Walker Tyus	C	33°27'32" 85°12'04"	75	254	103	6	5/79	do.	1,145	—	—
4BB7	Carroll Co. Fire Dept. (Hwy. 5-W) Tyus	C	33°28'21" 85°13'26"	60	203	45	6	5/79	do.	1,110	—	—
4CC1	Curtis Jeter Bowdon	C	33°33'10" 85°13'50"	25	182	79	—	1967	do.	1,060	—	—
4CC2	King David Trailer Ct. Carrollton. (Flows 12 gal/min)	C	33°33'17" 85°10'41"	100	328	—	—	1970	—	1,055	18	—
4CC3	Harold Kidd Rte. 7, Box 236 Carrollton	C	33°32'30" 85°07'53"	50	249	62	—	1975	Adams-Massey	1,010	—	—
4CC4	Cole's Trailer Haven Lovvorn Rd. Carrollton	C	33°34'58" 85°08'31"	25	160	75	—	1967	do.	1,060	20	—

1 For complete names of drillers active during the time of this study, see Acknowledgments.

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
4CC5	Coley Smith Box 112, Lovvorn Rd. Carrollton	C	33°35'03" 85°08'50"	20	129	37	—	1971	Adams-Massey	1,040	—	—
4CC6	John Tanner State Park (at Lodge) Carrollton	G	33°35'51" 85°10'01"	20	98	60	—	1974	do.	1,060	—	—
4CC7	C. E. Gibson (at Mt. Zion) Carrollton	C	33°36'49" 85°11'13"	25	157	63	—	1974	do.	1,180	—	—
4CC8	Clyde Banister Rte. 7 Carrollton	C	33°37'09" 85°11'07"	50	217	70	—	1972	do.	1,220	—	—
4CC9	Fielders Properties (Bill Fielders) Mt. Zion Rd. Carrollton	F	33°36'49" 85°09'01"	60	278	20	—	1974	do.	1,060	25	—
4CC10	Bagwell Nursing Home Rte. 4 Carrollton	F	33°37'12" 85°07'42"	30	97	72	—	1974	do.	1,055	—	—
4CC11	C. F. Fortner Rolling Hills Mobile Homes Carrollton	C	33°35'08" 85°07'49"	20	75	7.5	—	1971	do.	980	—	—
4CC12	Dr. Deal Talley Carrollton	C	33°36'22" 85°08'03"	75	142	16	6	1978	do.	985	—	—
4CC13	C. E. Gibson Mt. Zion	C	33°36'16" 85°09'13"	30	170	83	6	1979	do.	1,220	—	—
4CC14	O. A. Hightower Rte. 2, Carrollton Rd. (Hwy. 166) Bowdon	C	33°33'37" 85°13'27"	36	150	48	6	1962	Virginia	1,080	30	—
4CC15	W. W. Robinson Rte. 4, Mt. Zion Rd. Bowdon	F	33°36'39" 85°09'51"	42	233	48	6	1979	Adams-Massey	1,160	—	—
4DD3	City of Mt. Zion Mt. Zion	C	33°38'04" 85°08'54"	45	370	75	6	9/61	Virginia	1,160	—	—
4DD5	YMCA Camp Waco	C	33°40'48" 85°11'04"	25	324	40	6	4/60	do.	1,260	—	—
4DD6	R. Edward Bearden Bowdon Junction	F	33°39'32" 85°09'12	25	142	63	6	9/78	Adams-Massey	1,215	34	—
4DD7	W. Ga. Regional Air-port (by Southwire Co.) Carrollton	F	33°37'57" 85°09'21"	75	398	68	6	8/78	do.	1,130	—	—
5BB1	Homer Coker Rte. 3, Box 291 Carrollton	E	33°29'40" 85°06'20"	20	75	15	—	1974	do.	1,030	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing		Date drilled	Driller	Elevation (ft)	Water level below land surface	
						depth (ft)	diam. (in.)				Static head (ft)	Pumping head (ft)
Carroll County												
5BB2	Harry K. Eidson Rte. 3 Carrollton	C	33°29'06" 85°03'48"	20	262	90	--	1974	Adams- Massey	1,120	--	--
5BB3	R. H. Prichard Brady Phillips Carrollton	C	33°27'24" 85°02'15"	40	230	46	--	1972	do.	1,030	--	--
5BB4	Jimmy Delvalle P. O. Box 712 Carrollton	C	33°29'16" 85°01'49"	25	97	19	--	1972	do.	900	--	--
5BB5	L. M. Smith Rte. 6, Box 273 Carrollton (Clem- Lowell Rd., Roopville)	C	33°29'17" 85°01'46"	50	128	31	--	1973	do.	900	40	--
5BB6	L. M. Smith Rte. 6, Box 273 Carrollton	C	33°29'18" 85°01'44"	20	128	12	--	1972	do.	900	--	--
5BB7	Harold Phillips Lowell Community	C	33°29'31" 85°01'29"	75	144	23	--	1972	do.	840	--	--
5BB8	Mount Lowell Baptist Church, Lowell Rd. Lowell	C	33°28'31" 85°02'56"	100	213	38	6	1/79	do.	1,060	--	--
5BB10	Lamar Blackwelder Rte. 1 Roopville	C	33°28'20" 85°06'30"	50	82	50	--	12/78	do.	1,130	45	--
5BB11	J. Harvey Smith Clem-Lowell Rd. Carrollton	C	33°29'51" 85°01'38"	40	293	40	--	12/78	do.	985	--	--
5CC1	Alfred & Mildred Mapp Hayes Mill Rd. Carrollton	A	33°30'50" 85°07'27"	20	95	58	--	1972	do.	980	--	--
5CC2	J. D. Maxwell Carrollton	A	33°31'35" 85°07'21"	25	200	70	--	1964	do.	990	--	--
5CC3	Vernon Phillips Old Roopville Rd. Carrollton	E	33°30'41" 85°05'37"	30	100	34	--	1968	do.	1,060	--	--
5CC4	Dix Rest Home Rte. 3 Carrollton	E	33°30'56" 85°05'18"	80	172	32	--	1963	do.	1,080	50	--
5CC5	R. A. Hollingsworth & Felton Denney Rte. 3 (Willie Waters) Carrollton	A,C	33°30'55" 85°04'56"	30	110	37	--	1968	do.	1,110	--	--
5CC6	Furichos Jones Rte. 3 Carrollton	E	33°31'54" 85°06'09"	75	67	42	--	1962	do.	1,020	--	--
5CC7	Carl Smith Don Rich Dr. Carrollton	E,A	33°32'06" 85°04'48"	75	119	27	--	1970	do.	1,040	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
5CC8	Carl L. Smith Don Rich Dr. Carrollton	A	33°32'07" 85°04'43"	25	55	44	—	1969	Adams-Massey	1,045	—	—
5CC9	Marty Lamb Don Rich Rd. Carrollton	A	33°32'04" 85°04'43"	30	66	39	—	1966	do.	1,040	—	—
5CC10	Carl Smith Don Rich Rd. Carrollton	A	33°32'07" 85°04'37"	30	68	50	—	1968	do.	1,040	—	—
5CC11	W. Rayford Denney Mrs. H. M. Denney Carrollton	F	33°32'03" 85°03'41"	30	81	22	—	1973	do.	1,090	—	—
5CC12	World Wide Sales, Inc. Tyrus Rd. Carrollton (Mr. Palmer, Superv.)	A	33°33'01" 85°07'08"	55	253	53	—	1968	do.	1,020	—	—
5CC13	Herman F. Brown Greenhouse, Hwy. 27 S. Carrollton	E,C	33°33'06" 85°04'41"	25	200	40	—	1975	do.	1,035	—	—
5CC14	Chapel Heights Carrollton	A	33°33'00" 85°04'08"	75	115	23	—	1968	do.	1,050	—	—
5CC16	Mr. Driver Mrs. McGukin, 3	A	33°32'41" 85°04'14"	27.5	70	46	—	1958	do.	1,070	—	—
5CC18	Doc Huddleston Rte. 6 Carrollton	C	33°33'00" 85°03'20"	25	155	79	—	1966	do.	1,180	—	—
5CC19	A. B. Harwell (Pastor) First Baptist Church Carrollton	F	33°32'26" 85°02'01"	75	127	30	—	1976	do.	1,160	—	—
5CC20	H. E. Smith (Southwire) 114 Canterbury Dr. Carrollton	C	33°32'19" 85°01'56"	25	202	28	—	1975	do.	1,095	—	—
5CC21	J. W. Wood, Jr. Rte. 6 Carrollton	C	33°32'46" 85°01'27"	35	90	70	—	1963	do.	1,145	—	—
5CC22	Jerry Wood (Builders) Newnan Rd. (Jones Estates) Carrollton	C	33°31'59" 85°01'05"	60	261	37	—	1973	do.	1,180	—	—
5CC23	Claude Bates Newnan Rd. Carrollton	C	33°32'10" 85°00'46"	60	90	37	—	1968	do.	1,150	—	—
5CC24	Fielders Properties Rte. 4 Carrollton (Clem)	C	33°30'34" 85°01'49"	30	100	75	—	1975	do.	1,080	70	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
5CC25	Grady Prescott (now Mr. H. M. Rooks) Clem	C	33°30'38" 85°00'49"	100	186	22	--	1960	Adams-Massey	980	--	--
5CC26	Loyd Madden Rte. 2 Carrollton	C	33°33'47" 85°07'25"	30	300	5.5	--	1966	do.	1,050	--	--
5CC27	Larry & Roy Denney Mt. Zion Rd. Carrollton	C	33°35'13" 85°07'20"	100	255	35	--	1971	do.	1,060	--	--
5CC28	Bill Fielder & Peoples Bank Carrollton	C	33°34'59" 85°06'53"	43	202	21	--	1975	do.	980	--	--
5CC29	Duffey Sausage Co., 2	A	33°34'09" 85°04'13"	40	400	47.5	--	1968	do.	1,060	75	--
5CC30	Duffey Sausage Co., 1	A	33°34'09" 85°04'08"	49	500	50	--	1968	do.	1,060	--	--
5CC31	Bill Carter Carrollton (next to Bagwell Nursing Home)	F	33°37'26" 85°07'18"	20	98	63	--	1974	do.	1,070	--	--
5CC32	Bagnwell Nursing Home Carrollton	F	33°37'16" 85°07'17"	20	80	46.5	--	1969	do.	1,050	--	--
5CC33	Jerrell W. Nixon Carrollton	F	33°37'01" 85°07'09"	25	142	55	--	1974	do.	1,040	--	--
5CC34	Plywood Case Co. Carrollton (Mr. J. B. Hammrick)	C	33°36'42" 85°05'13"	30	108	38	--	1957	do.	1,015	80	--
5CC35	Howard Reid Temple Rd. Carrollton	A	33°37'04" 85°04'33"	120	115	--	--	1961	do.	1,045	81	--
5CC36	Hope Gibson Temple Road Carrollton	A	33°36'49" 85°04'29"	65	98	43	--	1961	do.	1,020	--	--
5CC37	Steve Warren Leisure Heights Shady Grove Rd. Carrollton	A	33°36'43" 85°03'30"	40	96	32	--	1971	do.	1,020	--	--
5CC38	G. M. Thomas 530 N. Lakeshore Dr. Carrollton	C	33°35'53" 85°03'20"	25	127	50	--	1961	do.	1,020	--	--
5CC39	H. W. Richards Lumber Co. Ole Hickory Subdiv., 2 Carrollton	C,F	33°37'24" 85°00'14"	100	81	41	--	1970	do.	1,060	85	--
5CC41	Dixie Hill Enterprises Carrollton (county farm road)	A	33°35'44" 85°00'55"	75	158	63	--	1974	do.	1,090	--	--

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
5CC42	E.M. (Pee Wee) Johnson Mt. Zion Rd. (Hwy. 16) Carrollton (for Stephen G.-grandson)	C	33°35'18" 85°06'58"	35	98	70	6	11/78	Adams-Massey	1,040	--	--
5CC43	Horace Griffith Tyus Rd. Carrollton (and J. C. Palmer)	C	33°33'27" 85°07'03"	48	249	20	6	11/65	Virginia	1,080	--	--
5CC44	do.	C	33°33'28" 85°07'03"	32	269	57	6	4/64	do.	1,080	90	--
5CC45	Emery Flinn, Jr. Newnan Rd. Carrollton (Hwys. 16 & 27)	C	33°33'03" 85°06'05"	40	300	96	6	7/63	do.	1,240	--	--
5CC46	Charles Ray Smith Oak Grove Rd. Carrollton	E	33°31'11" 85°06'41"	54	161	22	--	7/56	do.	1,060	--	--
5DD1	Charles W. Williams Carrollton	A	33°37'34" 85°03'57"	40	142	21	--	1973	Adams-Massey	1,020	--	--
5DD2	Stanley Parkman Carrollton	A	33°37'39" 85°03'54"	20	157	52	--	1973	do.	1,020	--	--
5DD3	David Caldwell P. O. Box 244 Carrollton	A	33°38'06" 85°03'22"	25	307	55	--	1974	do.	1,050	95	--
5DD4	Kelley S. Thompson Temple	A	33°38'13" 85°03'17"	50	90	26	--	1974	do.	1,020	--	--
5DD5	Mrs. S. W. Driver Temple Rd. (next to Kelley Thompson) Carrollton	A	33°38'14" 85°03'16"	40	81	23	--	1967	do.	1,020	--	--
5DD6	Billy Brock Rte. 1, Shady Grove Rd. Carrollton	C	33°37'49" 85°02'06"	20	142	60	--	1976	do.	1,060	--	--
5DD7	Julian Alexander Rte. 1 Carrollton	A	33°38'24" 85°00'34"	36	294	105	--	1976	do.	1,120	99	--
5DD8	Carl Lambert Rte. 5 Carrollton	A	33°39'05" 85°02'51"	75	98	34	--	1971	do.	1,040	--	--
5DD9	Ralph Baxter Temple	A	33°40'15" 85°01'58"	50	127	51	--	1977	do.	1,070	--	--
5DD10	Grady Robert Terrell Rte. 4, Temple Rd. Carrollton	C	33°40'00" 85°03'04"	150	193	37	--	1961	do.	1,120	102	--
5DD11	J. G. McCalmon (now G. R. Wester) Carrollton	C	33°40'28" 85°03'16"	40	131	54	--	1963	do.	1,120	103	--

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
5DD12	Ronald E. Lee Rte. 5 Carrollton	C	33°40'33" 85°03'16"	20	127	23	--	1972	Adams-Massey	1,120	--	--
5DD13	J.V. Hamrick (now Drayer) Carrollton (ASC well, Center Point Community)	C	33°40'49" 85°03'17"	25	132	37	--	1964	do.	1,160	105	--
5DD14	J. B. Dewberry Southeastern Hatchery Carrollton	C	33°41'34" 85°02'42"	30	236	31	--	1960	do.	1,100	--	--
5DD15	J. B. Dewberry Carrollton	C	33°41'35" 85°02'37"	25	200	21	--	1966	do.	1,130	--	--
5DD17	Bethel Baptist Church Temple	A	33°42'24" 85°01'15"	30	110	25	--	1968	do.	1,080	--	--
5DD18	James Hacker Rte. 1 Temple	A	33°42'34" 85°00'36"	25	202	30	--	1974	do.	1,100	--	--
5DD19	Matthews & McKibben Sage St. Temple	A	33°42'48" 85°00'30"	20	247	63	--	1975	do.	1,100	110	--
5DD20	Bert Ethridge P. O. Box 52 Temple	A	33°42'50" 85°00'00"	75	98	25	--	1977	do.	1,040	--	--
5DD23	Julian Cook Rte. 1, Shady Grove Rd. Carrollton	A	33°38'22" 85°00'30"	36	155	73	6	5/63	Virginia	1,120	--	--
5DD24	Woodland Christian Camp Temple	C	33°41'39" 85°02'01"	42	272	40	6	5/68	do.	1,170	115	--
5DD26	J. Michael Allgood Rt. 1, Andrea Lane Temple	A	33°41'42" 85°01'27"	42	248	38	6	8/78	Adams-Massey	1,080	--	--
5DD27	Gary M. Bulloch McKenzie Bridge Rd. Carrollton	A,C	33°37'35" 85°02'37"	100	165	11	6	8/78	do.	1,090	--	--
5DD28	Diane Robinson McKenzie Bridge Rd. Carrollton	A	33°37'35" 85°02'39"	40	113	38	6	8/78	do.	1,080	--	--
5DD29	Cathy Hudson Temple Rd. Carrollton	A	33°41'13" 85°01'05"	100	187	51	--	5/78	do.	1,155	119	--
5DD30	Daniel Martin Hogliver Rd. Carrollton	C	33°39'00" 85°05'39"	25	172	67	6	4/78	do.	1,200	120	--
5EE2	Eli & Dora Luke Rte. 2 Temple	H	33°45'23" 85°01'59"	50	100	61	--	1969	do.	1,135	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
6BB12	Lamar Hembree Carrollwood, Rte. 3 Happy Hill Church Rd. Carrollton	C	33°29'38" 84°58'42"	37	112	27	—	1976	Adams- Massey	980	—	—
6BB13	Robert J. Morek Box 25 Whitesburg	B,G	33°27'41" 84°56'29"	30	337	37	—	1973	do.	840	—	—
6BB14	Town of Whitesburg Whitesburg	G	33°29'43" 84°54'44"	25	302	51	—	1964	do.	830	—	—
6CC2	J. T. Miles Rte. 8 Carrollton	C	33°31'53" 84°59'33"	150	125	28	—	1974	do.	1,080	—	—
6CC3	J. T. Miles Newnan Rd. Carrollton	C	33°32'16" 84°59'23"	20	155	28	—	1972	do.	1,000	—	—
6CC4	A. R. McGukin Banning (Banning Mill Resturant)	C	33°31'39" 84°55'08"	30	67	4	—	1974	do.	900	—	—
6CC5	W. H. Horsley Rte. 6 Carrollton	C	33°35'01" 84°58'33"	75	100	45	—	1962	do.	1,100	—	—
6CC6	Charles H. Frost, Jr. Carrollton	C	33°35'42" 84°58'32"	20	157	21	—	1973	do.	1,120	130	—
6CC7	H. L. Lumsden Rte. 1 Carrollton	F	33°37'16" 84°59'09"	25	98	25	—	1975	do.	1,200	—	—
6CC8	David Sales Rte. 8, Box 113 Carrollton	F	33°37'21" 84°58'14"	30	202	14	—	1977	do.	1,140	—	—
6CC9	Aaron & Marie Matthews Hulett	F	33°37'15" 84°57'04"	25	84	16	6	5/78	do.	1,180	—	—
6DD1	Ray Medlock Carrollton (near Sand Hill)	F	33°37'52" 84°59'10"	75	50	35	—	1968	do.	1,200	135	—
6DD2	W. L. Morrow Rte. 1 Carrollton, 2	F	33°37'56" 84°59"04"	30	210	27	—	1972	do.	1,200	136	—
6DD3	Charles S. Bennett Carrollton (near Defnel Store)	A,C	33°38'26" 84°59'53"	20	262	49	—	1976	do.	1,160	137	—
6DD4	E. C. Bagley Carrollton (toward Hickory Level	A	33°40'07" 84°59'52"	50	100	57	—	1968	do.	1,085	—	—
6DD5	Treasure Lake of Ga. Carrollton (Marina)	C	33°38'30" 84°54'50"	20	202	50	—	1975	do.	1,100	—	—
6DD6	J. Aubrey Allen	A	33°42'16" 84°59'43"	30	43	37	—	1968	do.	1,030	140	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Carroll County												
6DD7	New Brooklyn Bapt. Ch. Temple	C	33°44'58" 84°59'54"	20	80	31	—	1968	Adams- Massey	1,125	—	—
6DD8	Lee Wynn Rte. 1 Villa Rica, 2	B	33°43'30" 84°57'00"	30	152	11	—	1974	do.	1,100	—	—
6DD10	Clyde Jones (Jones Funeral Home) Villa Rica	C,A	33°42'36" 84°57'00"	25	112	57	—	1973	do.	1,190	—	—
6EE1	McDowell Enterprises Rollin View Estates Villa Rica	A	33°45'06" 84°56'34"	50	248	52	—	1975	do.	1,180	145	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Cherokee County												
8GG8	Harold Harrison 5471 Priest Rd. Acworth	C	34°05'14" 84°38'24"	80	106	47	6	1970	Ward	890	—	—
8GG9	Ralph Dunn Dunn's Trailer Prk. Highway 92 Acworth	A	34°06'36" 84°39'01"	40	204	52	6	1969	do.	890	—	—
9GG2	Howard E. Fowler Old Alabama Rd. Woodstock	D	34°05'12" 84°32'23"	30	155	—	6	1977	do.	950	—	—
9GG6	Woodstock School Woodstock	D	34°18'34" 84°31'28"	26	90	70	6	1940	—	1,005	—	—
9HH1	YMCA Atlanta Lake Allatoona Canton	D	34°07'39" 84°36'32"	97	155	98	6	5/54	Virginia	870	—	—
9HH2	T. Jared Irwin 126 Cedar Dr. Woodstock	D,A	34°08'01" 84°36'40"	32	207	129	6	12/65	do.	880	—	—
9HH3	C & S Bank Club Lake Allatoona P. O. Box 4899 Atlanta	A	34°09'03" 84°34'45"	40	435	176	6	5/60	do.	945	—	—
9HH4	do.	A	34°09'09" 84°34'37"	26	446	187	6	12/53	do.	915	—	—
9HH5	Little River Landing Rte. 4, Highway 205 Canton	A	34°09'49" 84°34'48"	200	526	12	6	1970	Ward	855	—	—
9HH6	Joe Hefner Ridge Rd. Canton	C	34°10'15" 84°33'38"	30	165	21	—	9/77	Fowler	1,000	—	—
9HH7	Wayne Hillhouse Lebanon Rd. Canton	C	34°10'18" 84°33'02"	25	105	67	—	9/73	do.	1,000	—	—
9HH8	Canton Concrete Highway 5 (South) Canton	C	34°11'28" 84°30'15"	30	675	17	—	3/78	do.	1,020	—	—
9JJ2	Reinhardt College Waleska	C	34°19'13" 84°32'53"	32	300	104	—	9/62	Virginia	1,060	—	—
9JJ3	do.	C	34°19'17" 84°32'55"	63	346	20	6	10/62	do.	1,060	—	—
9JJ4	Leonard Foote Rte. 3, Waleska Hwy. Canton	C	34°19'43" 84°31'10"	65	105	22	6	1975	Ward	1,200	—	—
9JJ5	Lake Arrowhead, 27 Pine Log Mountain Waleska	H	34°17'12" 84°37'22"	100	330	35	6	1973	—	1,620	Flows	96
9JJ6	do., 31	H	34°19'50" 84°36'03"	80	248	64	6	1973	—	1,380	—	96
9JJ7	do., 17	H	34°19'21" 84°35'56"	47	309	30	6	1973	—	1,280	Flows	64
9JJ8	do., 16	H	34°19'49" 84°35'53"	200	252	32	6	1973	—	1,300	—	55

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing		Date drilled	Driller	Elevation (ft)	Water level below land surface	
						depth (ft)	diam. (in.)				Static head (ft)	Pumping head (ft)
Cherokee County												
9JJ10	J. Jordan	C,H	34°20'16" 84°34'39"	20	122	85	6	1966	--	1,120	--	--
10GG6	Leon H. Stells Rte. 1, Trickum Rd. Woodstock	A	34°05'05" 84°29'12"	40	130	68	6	1975	Ward	1,090	--	--
10GG7	Bob Hagan Cherokee Lane Woodstock	A	34°04'42" 84°28'30"	50	126	50	6	1971	do.	1,060	--	--
10GG8	A. S. Gowen Highway 92 Woodstock	A	34°05'08" 84°28'04"	32	192	110	6	8/64	Virginia	980	--	--
10GG9	Fulton Co. Sewage Treatment Plant Cox Rd. (off) Mountain Park	A	34°06'09" 84°25'47"	75	400	69	6	4/76	do.	880	--	--
10HH1	Hickory Flat School Hickory Flat (Canton)	A	34°10'13" 84°25'26"	50	298	105	6	3/57	do.	1,060	--	--
10HH2	O. L. Whitmire Box 394A, Indian Knoll Community Canton	A,C	34°12'37" 84°26'26"	150	346	92	6	1973	Ward	1,180	--	--
10JJ1	Claude Crane Crane Rd. Clayton Community	C	34°20'30" 84°28'53"	20+	105	61	--	5/78	Fowler	1,270	--	--
10JJ2	City of Ballground Ballground	J	34°20'12" 84°22'31"	85	400	314	8	1936	--	1,095	100	--
10JJ3	do.	J	34°20'11" 84°22'31"	84	240	238	8	1936	--	1,095	Flows	--
11HH1	F. J. Russell, Jr. Rte. 1, Box 266A Arbor Hill Rd. (Rolling Meadows Farm) Canton	A	34°13'23" 84°19'28"	20	205	76	6	3/77	Virginia	1,220	--	--
11HH2	Free Home School Highway 20 Free Home (Canton)	A	34°14'22" 84°17'24"	48	285	79	6	11/55	do.	1,260	--	--
11HH5	Dean Ledbetter Rte. 2, Canton Rd. (Highway 20) Cumming	A	34°14'00" 84°16'01"	36	305	28	6	2/68	do.	1,200	--	--
11JJ3	Harold Leverett Conns Creek Rd. Ballground	C	34°19'50" 84°20'17"	100+	245	40	6	1977	Fowler	1,070	--	--
11JJ4	F. E. Blackwell	C	34°18'16" 84°19'44"	32	62	33	6	1973	--	1,100	25	--
11KK27	City of Nelson	J	34°22'49" 84°21'57"	31	505	28	10	1947	--	1,385	--	--
11KK28	do.	J	34°22'35 84°22'01"	32	450	77	8	1962	--	1,320	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Clayton County												
10CC11	R. L. Carr 5555 Riverdale Rd. College Park	B	33°36'08 84°26'03"	100	160	18	6	7/69	Weisner	980	--	--
10CC12	W. A. Hanson, Jr. 94 Valley Rd. Riverdale	B	33°33'23" 84°23'14"	50	150	30	6	9/58	Virginia	830	32	45
10CC13	Alma H. Orr Arrowhead Shopping Center Riverdale	B	33°34'37" 84°22'44"	30	232	88	6	6/60	do.	850	25	125
10CC14	Geo. H. Findley 5914 Old Dixie Hwy. (Hwy. 19-41) Forest Park	B	33°35'37" 84°22'30"	72	302	51	6	6/59	do.	905	--	--
10DD35	Atlanta Terrace Motel, 1-75 South	B	33°38'37" 84°23'51"	77	400	38	6	8/58	do.	955	--	--
10DD36	Clorox Company 17 Lake Mirror Rd. Forest Park	B	33°37'42" 84°23'12"	42	440	82	6	8/78	do.	970	38	250
11BB1	Fortson Youth Cntr. (Camp Fortson) Hampton	A	33°22'36" 84°21'22"	35	121	80	--	12/63	Weisner	825	--	--
11BB2	Camp Calvin Lovejoy-Woolsey Rd. Hampton	A	33°22'58" 84°21'45"	25	370	141	8	7/64	Virginia	860	--	--
11BB3	do.	A	33°23'06" 84°21'58"	31	401	23	8	10/58	do.	910	10	200
11BB4	Charlie C. Walker Wilkins Rd. Hampton	A	33°24'06" 84°21'40"	35	240	156	6	8/55	do.	885	--	--
11BB14	Talmadge Dev. Corp. Twelve Oaks Lake Panhandle Rd. Lovejoy	A	33°25'10" 84°19'09"	76	432	49	6	2/55	do.	840	--	--
11BB16	Donald Hastings McDonough Rd. (off) Jonesboro	D,A	33°26'56" 84°19'15"	20	100	--	--	10/72	Waller	960	--	--
11BB18	Camp Orr - BSA (now Clayton Co. Pollution Control Project)	D	33°27'58" 84°18'43"	28	300	--	--	5/61	Virginia	870	50	260
11BB19	Prince W. Feagin 1919 Freeman Rd. Jonesboro	B	33°28'28" 84°19'44"	50	133	58	6	8/62	do.	880	--	--
11BB20	M. C. Steele 10316 S. Expwy. Jonesboro	B	33°28'25" 84°20'09"	36	137	103	6	11/61	do.	900	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Clayton County												
11CC3	City of Jonesboro Jonesboro	A	33°31'37" 84°21'26"	52	300	200	6	1927	Hamilton & Sullivan	870	8	—
11CC6	do.	A,E	33°31'21" 84°20'59"	21	306	50	6	Before 1949	Kennedy	850	—	—
11CC8	Royal Fauscett 1510 Stockbridge Rd. Jonesboro	A	33°31'43" 84°20'27"	40	345	56	6	1/65	Virginia	850	100	345
11CC9	A. E. Hill 1716 Stockbridge Rd. Jonesboro	A	33°31'52" 84°19'45"	30	185	99	6	1/69	do.	850	—	—
11CC10	G. D. Hatcher, Jr. 2693 Stockbridge Rd. Jonesboro	A	33°32'35" 84°18'32"	36	132	38	6	7/54	do.	870	10	—
11CC11	Spivey's Lake Subdiv. Lake Jodeco Rd. Jonesboro	A	33°30'39" 84°17'35"	40	330	54	6	3/59	do.	810	30	290
11CC13	Dr. Fred M. Bell 6640 Barton Rd. Morrow	A	33°34'24" 84°20'28"	22	540	43	6	5/54	do.	945	—	—
11CC14	Clarence K. Bartlett 4948 Jonesboro Rd. Forest Park	A	33°37'10" 84°21'04"	50	163	35	6	12/66	do.	970	—	—
11CC15	Poole's Trailer Haven 7411 S. 42 Highway Rex	A	33°34'22" 84°16'26"	25	267	38	6	12/64	do.	865	—	—
11CC17	H. W. Barrenton Bethel Church Rd. Jonesboro	A	33°31'03" 84°22'09"	40	200	74	6	5/57	do.	860	—	—
11DD4	Alterman Transport Lines Thurmond Rd. Forest Park	E	33°38'50" 84°20'58"	35	210	116	6	9/72	do.	940	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Cobb County												
8EE3	V. H. Allen 4907 Mosley Rd. Austell	A	33°50'03" 84°38'52"	125	150	55	6	3/67	Virginia	920	—	—
8EE4	C. P. Chem. Corp. (Kerr McGee orig.) 4080 Indus. Rd. Powder Springs	A	33°51'10" 84°38'58"	55	395	—	—	10/64	do.	910	15	210
8EE5	Ga. Metals, Inc. 1400 Indus. Rd. Powder Springs	A	33°51'16" 84°38'59"	40	500	81	6	4/66	do.	920	25	200
8EE6	City of Powder Springs Powder Springs	B	33°51'31" 84°40'48"	200	170	—	—	1935	Helms	970	25	—
8FF1	Durr Hatchery Roy M. Durr Moon Rd. Powder Springs	A	33°53'12" 84°42'29"	34	225	115	6	1/56	Virginia	990	—	—
8FF2	Jerry Hood Wright Rd. Powder Springs	B	33°54'48" 84°43'07"	50	185	53	6	9/76	do.	970	—	—
8FF3	Harold R. Adams Owens Ave. Marietta	A	33°53'17" 84°37'45"	40	126	64	6	1971	Ward	940	—	—
8FF4	Ray Ward 1331 Lost Mountain Rd. Marietta	A	33°55'17" 84°41'34"	60	155	60	6	1957	do.	1,060	—	—
8FF5	Robert L. Peck 540 Holland Rd., NW Powder Springs	A	33°56'30" 84°42'56"	60	110	15	6	1972	do.	1,090	—	—
8FF6	H. J. Lavender Antioch Rd. Powder Springs	E,B	33°57'47" 84°43'28"	36	210	80	6	8/58	Virginia	1,075	—	—
8FF7	C. P. Bull, III Burnt Hickory Rd. Kennesaw	B	33°59'28" 84°41'44"	150	306	31	6	1972	Ward	900	—	—
8FF8	Harold C. Greenway 2125 Midway Rd. Marietta	A	33°57'15" 84°40'45"	200	164	46	6	11964	do.	1,120	—	—
8FF9	Frank Denney, Jr. Rte. 4, Trail Rd. Marietta	A	33°51'14" 84°41'05"	60	305	22	6	1971	do.	1,190	—	—
8FF10	Richard R. Anderson 1837 Schilling Rd. Kennesaw	A	33°59'58" 84°38'16"	45	146	95	6	1973	do.	1,160	—	—
8GG1	Paul Finger Rte. 2, County Line Rd. Acworth	E	34°01'16" 84°42'39"	100	375	80	6	11966	do.	900	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Cobb County												
8GG2	Johnny R. Davidson 6216 Cedar Crest Rd. Acworth	D	34°03'35" 84°43'54"	100	185	141	6	7/72	Virginia	900	--	--
8GG3	Fairway Mobile Home Park 4715 Cobb Prkway, N. Acworth	D	34°34'00" 84°43'34"	110	374	65	6	1973	Ward	910	--	--
8GG5	W. L. Singletary Ellis Rd. Kennesaw	A	34°00'47" 84°38'12"	30	106	52	6	1970	do.	1,120	--	--
8GG6	City of Acworth Seminole Dr. Acworth	D	34°03'44" 84°40'45"	60	500	70	8	--	Virginia	870	--	--
8GG7	do.	D	34°03'55" 84°40'45"	49	500	--	8	--	do.	900	33	134
9EE2	John R. Boggs 571 Boggs Rd. Mableton	C	33°48'13" 84°34'15"	32	222	89	6	6/63	do.	1,025	15	209
9FF1	City of Smyrna Spring St. Smyrna	C	33°52'59" 84°30'40"	110	131	--	8	Before 1949	do.	1,045	--	--
9FF2	Cobb County Airport Dobbins AFB Marietta	C	33°54'55" 84°30'06"	75	235	80	8	Before 1949	do.	1,000	--	--
9FF3	Lockheed Corp. Marietta	C	33°55'11" 84°30'49"	72	131	44	--	1951	do.	980	--	--
9FF4	do.	C	33°55'20" 84°31'01"	68	513	21	--	1951	do.	980	--	--
9FF5	do.	C	33°55'23" 84°31'14"	73	550	49	--	1951	do.	1,010	--	--
9FF6	Town & County Investmt. Co. 1106 Mossy Rock Rd.,NW Kennesaw	A	33°58'51" 84°35'55"	43	155	42	6	1977	Ward	930	--	--
9FF7	David B. Field 1389 Bells Ferry Rd. Marietta	C	33°59'06" 84°33'31"	30	180	40	6	1976	do.	1,170	--	--
9GG1	Charles Hutson Rte. 6, Ebenezer Rd. Marietta	A	34°02'03" 84°30'09"	35	104	22	6	1969	do.	1,065	--	--
10FF1	Richard Ardell 15601 Old Canton Rd.,NE Marietta	C	33°59'18" 84°27'54"	35	205	54	6	5/74	Virginia	1,000	--	--
10FF2	Riverbend Apts. 6640 Akers Mill Rd.,NW Atlanta	C,H	33°53'48" 84°26'42"	42	95	70	6	12/67	do.	780	16	84

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Cobb County												
10FF3	J. B. Smith (2 mi east of Hwy. 3, near Chattahoochee R.)	C	33°53'28" 84°26'44"	50	90	—	6	1947	J.A.Wood	950	15	—
10FF4	Rust Cheese Co. Highway 41 Smyrna	C,H	33°52'48" 84°27'50"	50	117	—	6	—	O.V.Helms	1,020	38	—
10GG1	J. P. Wolbert 3660 Oak Lane, NE Marietta	C	34°00'10" 84°26'36"	60	327	99	6	4/71	Virginia	1,020	—	—
10GG2	Karl A. Kandell 2535 Johnson Ferry Rd. Marietta	C	34°00'45" 84°26'02"	33	600	86	6	4/77	do.	1,070	—	—
10GG3	W. Brad Denman 4195 Indian Twn.Rd.,NE Marietta	A	34°03'09" 84°28'04"	75	70	50	6	1977	Ward	1,035	—	—
10GG5	Harold R. Ingle 2665 Jamerson Rd.,NE Marietta	A	34°03'59" 84°28'20"	30	403	—	6	1973	do.	1,040	—	—

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
6AA1	T. S. Powers Powers Crossroads	B	33°20'18" 84°58'47"	45	161	64	6	11/57	Virginia	840	20	30
6AA2	Sue Rickenbacker Rte. 2 (for C. T. Helton) Newnan	B	33°19'44" 84°55'12"	100	90	23	6	1977	Adams-Massey	780	—	—
6BB1	H. R. Meadows Rte. 1, Box 1825 Coggin Rd. Newnan	B	33°24'09" 84°56'28"	30	105	35	6	3/69	Virginia	860	5	20
6BB2	N. J. Wallace, Sr. Rte. 1, Box 2270 Welcome Rd. Newnan	B	33°23'08" 84°53'33"	50	145	69	6	10/75	Virginia	840	30	145
6BB3	Western High School Welcome Community Welcome	A	33°23'23" 84°53'20"	18	231	116	6	3/50	do.	870	40	100
6BB5	Jay Aver Rte. 1, Box 1995 Mt. Carmel Rd. Handy	A	33°24'38" 84°53'28"	50	120	40	6	12/77	do.	840	8	120
6BB6	M. C. Barber Murphy Rd. Newnan	B,A	33°25'21" 84°54'19"	25	205	—	—	9/77	Waller	780	—	—
6BB7	Mabel Stovall Welcome-Sargent Rd. Newnan	A	33°24'43" 84°53'19"	30	205	—	—	1/64	Virginia	770	15	140
6BB8	Georgia Power Co. Yates Plant Newnan	G	33°27'57" 84°54'24"	50+	378	34	—	5/71	Weisner	780	—	—
6BB9	do.	G	33°27'43" 84°53'59"	115	307	43	—	9/65	Virginia	740	—	—
6BB10	do.	B,G	33°27'40" 84°53'41"	100	146	42	—	5/71	do.	760	—	—
7AA1	Erle W. Fanning Rte. 4, Box 65 Beavers Rd. Newnan	A	33°16'52" 84°50'53"	60	490	50	6	9/67	Weisner	860	—	—
7AA2	Moreland School Moreland	A	33°17'00" 84°46'06"	55	228	83	—	10/41	Virginia	940	—	—
7AA3	do.	A	33°17'03" 84°46'06"	40	458	66	6	6/67	do.	940	40	210
7AA4	Westside School Newnan	A	33°22'27" 84°49'48"	65	302	113	6	11/54	do.	860	30	80
7AA5	Roy E. Knox Belt Rd. Newnan	A	33°22'12" 84°49'37"	50	136	19	6	6/58	do.	880	—	—
7AA7	Unity Baptist Church LaGrange St. Ext. Newnan	A	33°21'34" 84°49'34"	25	155	46	6	1963	do.	900	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
7AA8	City of Newnan Newnan Waterworks Newnan	A	33°21'16" 84°48'52"	90	400	—	—	1910	Hughes Spec.Well Drlg.Co.	810	—	—
7AA9	do.	A	33°21'16" 84°48'48"	75	500	—	—	1941	Hughes	810	—	—
7AA10	do.	A	33°21'09" 84°48'47"	100	350	—	—	1914	do.	850	—	—
7AA11	do.	A	33°21'08" 84°48'43"	100	350	—	—	1914	do.	880	—	—
7AA12	Dr. J. B. Peniston 128 Woodbine Cir. Newnan	A	33°21'43" 84°48'12"	50	450	98	6	6/57	Virginia	950	10	30
7AA13	Coweta County Airport Newnan	A	33°18'46" 84°46'24"	35	205	77	6	1/66	do.	940	40	185
7AA14	Airport Spur Service I-85 & U.S. 29 Newnan	A	33°19'07" 84°46'39"	75	370	94	6	7/72	do.	960	—	—
7AA15	Standard Oil Station I-85 & U.S. 29 Newnan	A	33°19'33" 84°46'44"	50	248	69	6	2/72	do.	980	30	248
7AA16	Holiday Inn I-85 & U.S. 29 Newnan	A	33°19'41" 84°46'48"	100+	223	68	6	12/68	Weisner	970	—	—
7AA17	William Banks Banks Haven, Hwy. 29 Newnan	A	33°20'36" 84°47'03"	50	435	95	6	7/69	Virginia	930	22	210
7AA18	E. Newnan Water Co. Newnan	A	33°21'08" 84°46'53"	24	510	78	6	9/73	do.	960	—	—
7AA19	E. Newnan School Newnan	A	33°21'17" 84°46'40"	21	401	78	6	10/54	do.	920	35	160
7AA20	Harley Hanson & David Parrott 31 Sunrise Dr. Newnan	A	33°21'26" 84°46'04"	75	140	30	6	6/74	do.	950	—	—
7AA21	McDowell Brothers Pinehill Estates, 2 Newnan	A	33°21'47" 84°50'19"	60	217	65	—	1975	Adams-Massey	820	—	—
7AA22	do., 1	A	33°21'52" 84°50'10"	20	247	78	—	1974	do.	800	—	—
7BB1	Mike Edwards Rte. 1, Box 2660 Highway 34, South Newnan	A	33°22'42" 84°52'14"	40	120	27	6	1/78	Virginia	810	—	—
7BB2	Fred L. Schronder 16 Beech St. Newnan	A	33°23'17" 84°49'45"	150	255	65	6	12/73	do.	940	—	—
7BB3	J. W. Hughie 11 Beech St. Newnan	A	33°23'19" 84°49'41"	50	320	70	6	6/77	do.	890	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
7BB5	Arnall Mills Sargent	B	33°25'12" 84°51'21"	53	405	82	—	6/44	Virginia	820	—	—
7BB6	do.	B	33°25'01" 84°51'17"	69	675	—	—	1953	do.	840	—	—
7BB7	Arnco Mills Highway 27, North Newnan	A	33°26'02" 84°52'08"	40	360	—	—	1927	do.	760	—	—
7BB8	do.	A	33°26'03" 84°52'07"	50	400	—	—	1932	do.	760	—	—
7BB9	do.	A	33°26'02" 84°52'03"	65	586	—	—	1940	do.	755	—	—
7BB10	do.	A	33°25'53" 84°52'05"	33	300	107	6	12/54	do.	760	40	146
7BB11	G. C. Watkins Box 185D, Brown Place Newnan	A	33°24'58" 84°48'54"	100	212	30	6	5/74	do.	830	—	—
7BB12	Windsor Estates (Lindsey Realty) Laurel Dr. Newnan	A	33°25'44" 84°49'07"	40	323	—	—	11/77	Waller	915	—	—
7BB13	Jerry Windom Country Club Rd. Newnan	A	33°25'44" 84°48'54"	75	390	—	—	9/77	do.	900	—	—
7BB14	Northside School Country Club Rd. Newnan	A	33°25'23" 84°47'47"	36	288	44	—	9/51	Virginia	920	55	73
7BB15	BPOE Club (Elks) Atlanta Hwy. (Hwy. 29) Newnan	A	33°23'51" 84°47'49"	124	265	72	6	6/59	do.	920	30	200
7BB16	Newnan House Motel & Resturant Highway 29 Newnan	A	33°24'08" 84°47'30"	80	270	71	6	11/75	do.	900	50	210
7BB17	City of Newnan Wahoo Creek Sewage Treatment Plant Highway 29 Newnan	A	33°24'11" 84°47'04"	63	371	28	6	12/74	do.	840	70	162
7BB18	V. J. Bruner 4 Redbud Trail Newnan	A	33°24'28" 84°46'51"	50	225	78	6	11/74	do.	880	—	—
7BB19	Thomas W. Parker 6 Redbud Trail Newnan	A	33°24'25" 84°46'51"	30	205	64	6	3/76	do.	860	—	—
7BB20	J. W. (Bill) Ozmore Lakehills Subdiv. 1 Dogwood Dr. Newnan	A	33°24'33" 84°46'42"	30	265	69	6	11/72	do.	880	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing		Date drilled	Driller	Elevation (ft)	Water level below land surface	
						depth (ft)	diam. (in.)				Static head (ft)	Pumping head (ft)
Coweta County												
7BB21	J. W. (Bill) Ozmore Lakehills Subdiv. 1 Dogwood Dr. Newnan (for G. E. Myers)	A	33°24'34" 84°46'40"	20	220	96	6	3/63	Virginia	875	—	—
7BB22	do. (for W. P. Warren)	E,A	33°24'37" 84°46'45"	20	220	53	6	4/63	do.	910	—	—
7BB24	Newnan County Club Highway 29 Newnan	E,A	33°25'09" 84°46'36"	60	500	124	6	10/48	do.	850	—	—
7BB25	J. W. Rainwater Rainwater Antiques Highway 29 Newnan	B	33°25'37" 84°45'38"	33	206	101	6	12/69	do.	940	—	—
7BB26	Kenneth Denney Rte. 2, Walt Carmichael Rd. Newnan	A	33°28'38" 84°50'23"	32	304	6	6	10/65	do.	770	—	—
7BB27	Roscoe Coalson Box 44, Roscoe Rd. Sargent	A	33°27'16" 84°49'19"	37	192	44	6	5/58	do.	900	57	109
7BB30	F. L. Smith, Sr. Rte. 2, Happy Valley Rd. Newnan (at residence of Tim Cole)	A	33°27'52" 84°45'24"	51	200	56	6	6/58	do.	900	—	—
7BB31	Madras School Highway 29, North Madras	A	33°26'07" 84°45'02"	34	295	75	6	10/65	do.	1,000	20	205
7BB32	Heritage Hills Subdiv. Highway 29, North Newnan	A	33°25'10" 84°46'26"	50	391	78	6	11/72	do.	960	90	391
7BB33	Howard Holcombe 11 Thomas Way Newnan	A	33°23'04" 84°29'56"	50	152	97	—	1974	Adams- Massey	880	—	—
7BB34	Dixie Hill Enterprises McDowell Brothers Wedgewood Subdiv., 2 Newnan	A	33°23'16" 84°49'58"	50	—	—	—	1977	do.	960	—	—
7BB35	do., 1	A	33°23'17" 84°50'10"	150	187	31	—	1977	do.	840	—	—
7BB36	Garnett H. Shirley 132 Temple Ave. Newnan	A	33°23'17" 84°49'46"	100	230	71	—	1972	do.	920	—	—
7BB37	William L. Bonnell Co. Subdivision, 4 Newnan	A	33°22'58" 84°49'08"	75	201	30	—	1958	do.	920	—	—
7BB38	William L. Bonnell Co. Newnan, 5	A	33°23'00" 84°49'07"	54	300	58.5	—	1958	do.	920	—	—
7BB39	William L. Bonnell Newnan	A	33°23'43" 84°48'02"	29	350	83.5	—	1958	do.	960	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
7BB40	Layton Brozell Construction Co. Skating Rink Newnan	A	33°24'01" 84°47'35"	25	260	65	—	1926	Adams-Massey	900	—	—
7BB42	Hickory Hollow Subdiv. (McDowell Bros.), 2	D	33°26'14" 84°50'15"	87	330	52	—	1976	—	900	—	—
7CC2	Mrs. T. L. Lang Rte. 2, Box 162 Starr Rd. Roscoe	B	33°30'07" 84°48'13"	35	159	57	6	10/77	Virginia	850	35	159
7Z1	City of Grantville Grantville	A	33°14'06" 84°50'12"	50	500	—	8	—	—	860	—	—
7Z2	do.	A	33°14'02" 84°50'13"	80	600	57	8	7/56	Virginia	850	—	—
7Z3	do.	A	33°13'59" 84°50'23"	50	550	—	—	—	—	880	—	—
7Z4	do.	A	33°14'16" 84°50'00"	85	500	—	8	—	—	880	—	—
7Z5	do.	A	33°14'09" 84°49'55"	27	650	47	8	7/62	Virginia	880	—	—
7Z8	Grantville Mills Grantville	A	33°14'18" 84°49'54"	27	700	—	—	1933	—	840	—	—
8AA1	Carl Sanders Hwy. 54 & Haynie Rd. Moreland	A	33°16'19" 84°42'49"	120	127	87	6	9/71	Weisner	880	—	—
8AA2	Larry Fulton Elders Mill Rd. Blackjack	A	33°15'49" 84°38'09"	80	200	33	6	1978	Askew-Morris	875	—	—
8AA3	Floyd Eppinette Elders Mill Rd. Senoia	A	33°15'29" 84°37'39"	42	501	22	6	2/56	Virginia	860	—	—
8AA4	William Milam Hinds Rd. Newnan	A	33°18'17" 84°42'45"	20	105	—	6	1/75	Waller	840	—	—
8AA5	F. D. Mann Moore Rd. Raymond	A	33°19'16" 84°42'48"	60	357	56	6	9/76	Virginia	845	20	350
8AA6	J. R. Schlicker Scoggin Rd. Raymond	A	33°19'19" 84°42'53"	50	138	—	6	—	Hale	835	—	—
8AA7	M. M. Benefield Rte. 3, Box 83C Raymond Highway Newnan	A	33°20'08" 84°44'28"	48	100	53	6	1/66	Virginia	880	40	50
8AA8	Felton Tidwell Rte. 3, Box 135 Highway 16 Newnan	A	33°20'12" 84°44'17"	30	140	41	6	4/65	do.	880	27	100

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
8AA9	City of Turin Turin	A	33°19'51" 84°38'41"	20	484	80	--	3/72	Waller	920	35	--
8AA10	Town of Turin P. O. Box 35 Turin	A	33°19'26" 84°38'00"	200	352	85	--	1976	Adams- Massey	900	--	--
8AA11	Paul Hope Hope Ranch, Odum Rd. Turin	H	33°19'48" 84°37'41"	50	305	--	--	9/77	Waller	900	--	--
8BB1	D. C. Spriggs Lower Fayetteville Rd. Newnan	B	33°22'38" 84°43'50"	20	123	45	6	10/76	Weisner	845	--	--
8BB2	Robert E. Lee Rte. 4, Box 273 Posey Rd. Newnan	B	33°25'51" 84°42'13"	60	190	87	6	5/74	Virginia	910	--	--
8BB3	Wm. M. Vineyard Lower Fayetteville Rd. Newnan	B	33°22'50" 84°40'15"	36	270	20	6	5/59	do.	920	25	50
8BB4	H. L. Willis Lassetter Rd. Sharpsburg	A	33°23'37" 84°39'31"	60	125	88	6	10/72	do.	885	--	--
8BB5	Harry Rivers Rte. 1, Shoal Creek Rd. Sharpsburg	A	33°24'01" 84°38'37"	40	144	--	--	11/73	Waller	840	--	--
8BB6	Marshall W. McGraw Rte. 1, Box 34 Sharpsburg (now Sarvich)	A	33°24'02" 84°37'57"	50	165	58	6	6/77	Virginia	810	--	--
8BB7	Steve Walsh Highway 54 Sharpsburg	B	33°23'00" 84°37'30"	150+	370	8	6	5/78	do.	800	--	--
8BB8	Joe Tanner Highway 54 Sharpsburg	B	33°22'59" 84°37'31"	25	85	31	6	8/75	do.	870	--	--
8BB10	R. A. Higgins Riggins Rd. (Hidley Rd.) Palmetto	F	33°29'51" 84°40'47"	50	77	38	6	11/54	do.	1,040	--	--
8BB11	R. A. Higgins Motel on Hwy. 295 Palmetto	F	33°29'38" 84°40'30"	57	340	52	6	4/57	do.	1,040	--	--
8BB12	Hank Bruns Palmetto-Fisher Rd. Palmetto	F	33°28'09" 84°39'54"	35	170	65	6	5/56	do.	980	--	--
8BB13	Cannon Gate Golf Course Palmetto	F	33°28'15" 84°39'32"	33	422	53	--	9/65	Weisner	960	--	--
8BB14	E. G. Brent, Jr. Rte. 2, Box 296 Fisher Rd. Major	F	33°27'35" 84°39'36"	25	245	49	--	1978	Askew- Morris	960	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
8BB15	Canon Gate Community Rte. 1 Sharpsburg	F	33°27'06" 84°38'52"	80	198	60	--	10/70	Weisner	930	--	--
8BB16	Staton Constr. Co. 169 N. Woods Rd. Woods Crossing Sharpsburg	A,B	33°27'02" 84°37'50"	30	285	43	--	6/78	Askew- Morris	900	--	--
8CC4	W. H. Johsnon Box P Palmetto	A,F	33°30'09" 84°40'10"	150	125	33	6	8/65	Virginia	1,020	--	--
8CC5	E. K. Platt R.F.D. 2, Johnson Cir. Palmetto	A,F	33°30'12" 84°40'09"	30	226	14	6	3/73	do.	1,030	--	--
8CC9	David Miller Mobile Home Ranch I-85 at Palmetto Exit	F	33°30'20" 84°38'11"	23	406	92	6	4/71	do.	900	--	--
9Z1	Earl E. Messer Highway 85, South Haralson	F	33°11'57" 84°34'44"	32	200	78	6	6/60	do.	770	10	80
9Z2	R. E. McKinney Highway 85, South Haralson	F	33°12'19" 84°34'52"	36	191	106	6	2/56	do.	780	--	--
9Z3	Charlie Miller Dun Rovin Acres Highway 85, South Haralson	F	33°12'27" 84°34'58"	30	180	85	6	8/77	do.	780	--	--
9Z4	William J. Estes Esco Gas Co. Haralson	A	33°13'33" 84°34'13"	50	208	132	6	12/55	do.	820	--	--
9Z5	do.	A	33°13'35" 84°34'23"	74	257	134	6	9/60	do.	820	--	--
9Z6	J. W. Hutchinson Dreweyville Rd. Haralson	A	33°13'33" 84°34'07"	48	199	135	6	4/66	do.	820	--	--
9Z7	Haralson School Haralson	A	33°13'38" 84°33'58"	38	203	109	--	--	--	830	20	75
9Z9	W. J. Estes Dreweyville Rd. Haralson	A	33°13'19" 84°32'05"	47	400+	--	--	1960's	--	800	--	--
9Z10	H. F. Stripling (for Hubbard) Haralson	F	33°11'10" 84°16'57"	50	313	187	6	5/61	Virginia	810	--	--
9AA1	Eastside Elem. School Old Highway 85 Senoia	C	33°15'58" 84°34'48"	26	326	81	--	10/54	do.	900	20	166
9AA2	East Coweta School Peeks Crossing Sharpsburg	A	33°18'14" 84°35'56"	48	152	--	--	12/50	do.	940	--	125

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Coweta County												
9AA3	Paul McKnight McKnight Grain Elevs. Senoia	A	33°17'57" 84°33'49"	30	204	—	—	3/74	Virginia	840	—	—
9AA4	City of Senoia Senoia	A	33°17'49" 84°33'39"	55	500	40	—	2/46	Sou.-Stevens	840	—	—
9AA5	do.	A	33°17'30" 84°33'22"	53	459	107	—	4/47	Virginia	820	—	—
9AA6	do.	A	33°18'06" 84°32'57"	50	385	—	—	10/58	Adams-Massey	850	—	—
9AA7	do.	A	33°18'22" 84°33'14"	50	500	—	—	—	—	850	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Dawson County												
11KK2	Cousins Properties, Inc. Big Canoe Resort Marblehill	--	34°28'28" 84°17'39"	22	600	92	6	6/72	Virginia	1,820	158	250
11KK3	do.	--	34°28'18" 84°17'54"	103	335	52	6	7/72	do.	1,700	93	127
11KK9	do.	--	34°28'35" 84°18'39"	23	500	25	6	5/73	do.	1,870	10	315
11KK11	do.	--	34°28'11" 84°17'09"	28	500	71	6	7/73	do.	1,660	80	235
11KK12	do.	--	34°28'20" 84°17'15"	60	500	72	6	7/73	do.	1,640	60	255
11KK13	do.	--	34°28'12" 84°17'40"	40	500	38	6	7/73	do.	1,720	50	265
11KK14	do.	--	34°28'04" 84°17'07"	43	500	64	6	8/73	do.	1,650	—	150
11KK16	do.	--	34°28'22" 84°19'09"	53	500	81	6	8/73	do.	1,840	135	180
11KK24	do.	--	34°28'02" 84°15'23"	43	166	58	6	12/72	do.	1,840	31	116

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
DeKalb County												
11DD1	Jake Patterson (Dairy) 2193 Tilson Rd. Atlanta	A	33°43'54" 84°15'14"	70	197	—	8	--	—	910	—	—
11DD2	J. L. Porter (Dairy) McAfee at Porter Rd. Atlanta	A	33°43'54" 84°16'12"	60	103	—	6	--	—	940	33	—
11DD3	Harry R. Dunivin 2505 Columbia Dr. Decatur	A	33°42'54" 84°15'14"	25	500	31	6	3/56	Virginia	950	—	—
11EE1	Central Paving, Inc. 1239 North Ave., NW Atlanta	A	33°46'18" 84°20,51"	26	470	8	—	1/61	do.	970	6	150
11EE2	Ga. Mental Health Inst. (Asa Candler estate) 1313 Briarcliff Rd. Decatur	A	33°46'55" 84°20'45"	79	680	40	6	2/35	Hamilton & Sullivan	1,000	630	--
11EE3	do.	A	33°46'57" 84°20'37"	225	980	40	10	1932	do.	1,000	843	--
11EE5	D. L. Stokes (now Lewis F. Nickel) 32 Berkeley Rd. Avondale Estates	A	33°46'22" 84°15'57"	50	183	41	6	4/46	Virginia	1,060	62	100
11EE6	Commercial Properties Century Center 3051 Clairmont Rd. Atlanta	B	33°50'43" 84°18'50"	100	260	28	6	1970	Ward	850	—	—
11EE7	WSB Radio Clarkston	B	33°50'40" 84°15'06"	70	250	—	---	—	--	1,050	20	—
11EE8	Richard F. Sams (now Dietz) 1200 Montreal Rd. Clarkston	A	33°49'10" 84°15'12"	225	350	27	6	7/55	Virginia	1,000	10	200
11FF1	Morrison's Flower Farm 3086 Osborne Rd. (Atl.) Briarwood	D	33°52'45" 84°20'36"	37	225	38	6	7/77	do.	1,010	--	--
11FF2	John D. Arndt 1448 Harts Mill Rd.,NE Atlanta	D	33°54'13" 84°19'46"	25	125	30	6	7/70	do.	880	30	125
11FF3	Lymburner Nursery (Zayers here now) 4570 Buford Highway Chamblee	B	33°53'20" 84°17'14"	165	375	53	6	5/54	do.	995	—	--
12DD8	DeKalb Co. Line School Linecrest Rd. Ellenwood	A	33°39'27" 84°14'41"	28	300	40	6	3/57	do.	860	—	--
12DD9	C. H. Shumate (his daughter) 4990 Covington Hwy. Decatur	B	33°44'02" 84°12'36"	42	144	44	6	11/56	do.	940	—	--
12DD10	John M. Jackson, Jr. 6533 Rock Springs Rd. Lithonia	B	33°41'20" 84°08'15"	54	211	55	6	8/65	do.	820	30	40

Table 9.—Record of wells in the Greater Atlanta Region—Continued

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DeKalb County												
12DD11	H. M. Nash 6508 Rock Springs Rd. Lithonia	B	33°41'07" 84°08'10"	45	151	73	6	5/63	Virginia	840	20	69
12EE1	Roy L. Bowman 489 Martins Rd. Stone Mountain	D	33°47'04" 84°10'43"	22	140	45	6	7/60	do.	960	70	140
12EE2	C. D. Cavander 6193 Patillo Way Lithonia	A	33°46'04" 84°09'18"	35	155	40	6	9/64	do.	1,000	58	60
12EE4	Richard F. Sams (now Dietz) 1200 Montreal Rd. Clarkston	A	33°49,10" 84°14'58"	30	179	40	6	9/60	do.	1,050	—	—
12EE5	Mrs. Katherine Sewell 1140 Montreal Rd. Clarkston	A	33°49'05" 84°14'50"	36	155	44	8	4/66	do.	1,000	—	—
12EE6	City of Clarkston Market & College Sts. Clarkston	A	33°48'18" 84°14'22"	137	500	45	6	1/55	do.	1,040	31	220
12EE7	do.	A	33°48'18" 84°14'12"	60	565	38	6	1928	do.	1,000	—	—
12EE8	Perma-Pipe Corp. (now Crowe Mfg. Corp.) 1609 Stoneridge Dr. Tucker	B	33°49'42" 84°11'19"	60	225	18	6	5/64	do.	1,070	30	225
12EE9	N. B. Griffin 1730 Juliette Dr. Stone Mountain	B	33°49'55" 84°10'34"	32	205	38	6	7/68	do.	980	—	—
13DD60	Carl Kitchens 3329 Old Klondike Rd. Conyers	C,B	33°39'09" 84°05'47"	50	465	—	—	12/77	Waller	850	—	—
13DD82	Joe R. Bailey	B	33°44'49" 84°02'42"	25	230	60	—	12/77	Virginia	860	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Douglas County												
6DD11	J. R. Hembree Flat Rock Rd. Ephesus Church, Box 252 Villa Rica	F	33°40'24" 84°54'10"	32	170	48	6	2/61	Virginia	1,085	40	70
6DD12	J. C. Gordon Conners Rd. Villa Rica	A	33°43'54" 84°53'46"	35	159	56	6	10/66	do.	1,140	—	—
7CC4	Dalton Fountain Rte. 1, Winston (Gary Gaston, now 8760 Fountain Dr.)	C	33°37'22" 84°51'45"	60	200	40	6	2/63	do.	1,170	10	20
7CC5	T. W. Fridell 8142 Highway 166 Douglasville	C	33°36'58" 84°50'28"	57	150	64	6	8/56	do.	1,060	—	—
7CC6	Roy C. Camp Capps Ferry Training Center	C	33°36'44" 84°49'38"	20	120	49	6	2/60	do.	1,080	30	120
7CC7	C. L. Cheatham 7382 Highway 166 Douglasville	C	33°37'03" 84°49'00"	48	158	—	—	6/66	do.	1,000	19	30
7CC8	Doug Daniels (his daughter) 5781 S. River Rd. Douglas	G,C	33°37'28" 84°45'45"	40	205	—	—	1978	P.T.Price	780	—	—
7DD1	Dr. John Anagnostakis Highway 5 Douglasville	C	33°38'32" 84°50'03"	50	—	—	—	12/78	Adams-Massey	980	—	—
7DD2	Roy Hamrick (now B. E. Turner) 4020 Union Hill Rd. Douglasville	C	33°41'42" 84°51'14"	54	115	53	6	6/57	Virginia	1,140	—	—
7DD3	Frank H. King, Jr. 4704 Post Rd. Winston	C	33°40'42" 84°51'45"	30	200	83	6	10/64	do.	1,140	—	—
7DD4	Grady F. Duren 3925 Kings Way Douglasville	C	33°41'42" 84°46'28"	36	200	75	6	1/59	do.	1,190	—	—
8DD1	Jim Thomas Adams 2030 Arlis Lane Douglasville	C,H	33°39'14" 84°44'17"	20	225	—	—	1978	Price	960	—	—
8DD2	Vernon C. Camp 4014 Chapel Hill Rd. Douglasville	D,C	33°41'44" 84°42'57"	20	202	101	6	8/58	Virginia	1,020	—	—
8DD3	Jay Camp Rte. 4, Chapel Hill Rd. (fire sta. now) Douglasville	F,C	33°41'54" 84°43'02"	36	143	99	6	7/56	do.	1,030	45	100
8DD4	F. E. Clark Highway 166 Douglasville	C	33°41'23" 84°39'48"	50	205	45	6	8/72	do.	950	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

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Douglas County												
8DD5	H. E. Brown 3199 Fairburn Rd. Douglasville	C	33°43'06" 84°39'41"	36	190	20	6	12/57	Virginia	1,060	—	—
8DD6	Lawrence Hennesy 3044 Fairburn Rd. (well at 3014 Lake Monroe Rd.) Douglasville	C	33°43'21" 84°40'26"	41	100	42	6	6/56	do.	1,000	49	49
8EE1	Eastwood Mobile Home Park 5621 Fairburn Rd. Douglasville	F	33°45'18" 84°43'07"	30	300	—	—	1978	P.T.Price	1,084	—	—
8EE2	James D. Ward 4268 Old Douglas-ville Rd. Lithia Springs	F	33°48'15" 84°40'43"	43	112	50	6	10/58	Virginia	985	—	—
9DD1	USGS Test well 3	G	33°44'35" 84°35'02"	40	248	12	6	1978	Adams-Massey	850	4.5	60
9EE1	Standard Oil Co. I-20 & Ga. Hwy. 6 Austell	C	33°46'40" 84°36'24"	30	430	73	6	8/67	Virginia	920	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fayette County												
9AA10	Falcon Field Airport Peachtree City	A	33°21'34" 84°34'10"	25	264	—	—	11/71	Waller	810	—	—
9BB1	Joel Cowan, Devlpr. 309 Dividend Dr. Peachtree City	A	33°23'07" 84°34'58"	39	126	—	—	9/59	Virginia	840	—	—
9BB2	Peachtree City	B	33°24'03" 84°34'54"	90	400	117	8	8/60	do.	800	—	—
9BB3	Gould E. Bernard 109 Meadowlark Tr. Peachtree City	A	33°23'00" 84°32'07"	30	225	113	6	2/77	do.	820	—	—
9BB4	Larry S. Mosely 104 Robinson Bend Tr. Peachtree City	A	33°23'02" 84°32'01"	75	185	100	6	7/78	do.	800	—	—
9BB5	Harry G. Labar Ebenezer Rd. Peachtree City	A	33°24'52" 84°32'14"	40	125	60	6	4/76	do.	930	—	—
9BB6	Harold D. Sowell Ebenezer Rd. Peachtree City	A	33°26'04" 84°32'41"	150	210	62	6	11/72	do.	960	—	—
9BB7	W. R. Weinmeister Willow Pond Farm Fayetteville	A	33°25'05" 84°30'13"	45	210	47	6	3/70	do.	820	35	100
9BB8	Andrew F. Gonczi Crabapple Lane Peachtree City	A	33°26'53" 84°34'41"	70	290	73	6	6/74	Weisner	890	—	—
9BB9	City of Tyrone (Adm. by Fayette Co.) Tyrone	A	33°28'18" 84°35'55"	32 (42 pmpd)	700	64	—	10/65	Virginia	990	—	—
9BB10	Larry McClanahan Triple Creek Farm P.O. Box 574, Dogwood Tr., now C.B.Starnes) Fayetteville	A	33°27'13" 84°33'18"	75	86	29	6	5/71	do.	940	—	—
9BB13	R. H. Arnall Old Tyrone Rd. Fayetteville	A	33°27'03" 84°33'11"	70	100	—	—	1965	Weisner	910	—	—
9BB14	Raymond Conn Rte. 2, Linden Dr. Fayetteville	A	33°27'22" 84°32'25"	20+	173	19	6	2/66	do.	940	—	—
9BB15	Marnell Mobile Home Park, Hwy. 54 Fayetteville	A	33°36'34" 84°31'38"	125	400	87	6	8/77	Virginia	930	40	170
9BB16	Charles B. Pyke Sandy Creek Rd. Fayetteville	A	33°29'44" 84°32'52"	120	148	52	6	10/73	Weisner	960	—	—
9BB17	W. B. Elder Sandy Creek Rd. Fayetteville	A	33°29'43" 84°32'44"	30	100	42	6	7/58	Virginia	950	—	—

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Fayette County												
9BB18	Hershel A. Bennefield Hood Rd. Fayetteville	A	33°27'46" 84°30'03"	30	283	21	6	11/70	Virginia	860	80	122
9BB23	Carl J. Moore 3754 Sandy Ridge Tr. Fayetteville	B	33°29'59" 84°33'51"	40	220	37	6	5/77	do.	950	—	—
9CC1	Joel Ogletree, Contr. Universal Builders 3699 Sandy Ridge Tr. Fayetteville (for Robt. H. Philmon)	B	33°30'12" 84°33'57"	80	255	29	6	4/77	do.	945	30	250
9CC2	Joel Ogletree, Contr. Universal Builders Sandy Ridge Tr. Fayetteville	B	33°30'08" 84°33'59"	18	225	—	—	—	—	960	—	—
9CC14	do.	B	33°30'08" 84°33'53"	40	225	—	—	—	—	950	—	—
9CC16	Landmark Mobile Home Park Milam Rd. Fayetteville	A	33°31'36" 84°33'48"	60	505	78	6	11/76	Virginia	940	50	250
9CC17	do.	A	33°31'23" 84°33'50"	88	325	82	6	9/75	do.	930	30	180
9CC18	do.	A	33°31'28" 84°33'48"	30	405	50	6	8/75	do.	930	—	—
9CC19	Bill Babb Highway 92 Fairburn	A	33°31'47" 84°30'46"	25	72	36	6	5/62	Weisner	990	—	—
9CC20	A. E. Coleman Rte. 1 Fayetteville Rd. Fairburn	A	33°31'32" 84°30'10"	25	143	46	6	2/66	Virginia	1,000	—	—
10AA2	City of Brooks Brooks	B	33°17'22" 84°27'35"	48	555	30	6	10/66	do.	860	—	—
10AA3	Vernon Woods Lowry Rd. Brooks	B	33°17'43" 84°27'25"	30	85	72	6	12/65	Weisner	830	—	—
10AA4	Robert Fisher Rte. 1, Grant Rd. Brooks	A	33°17'24" 84°25'53"	25	230	—	—	8/74	Waller	760	—	—
10AA5	E. Neal Gray Highway 85 Conn. Brooks	B	33°18'59" 84°28'35"	120	145	45	6	14/72	Weisner	800	—	—
10AA8	Antioch Baptist Ch. Brooks-Woolsy Rd. Fayetteville	B	33°20'50" 84°25'34"	30	265	—	—	5/72	Virginia	825	—	—
10AA9	John Crews Highway 92, East Fayetteville	A	33°18'37" 84°23'40"	200	175	—	—	6/76	Waller	750	—	—

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Fayette County												
10AA10	Robert V. Morris Lynn Dr. Brooks	E	33°21'07" 84°26'53"	30	204	—	—	10/72	Waller	900	—	—
10AA13	Eugene Weatherup Brooks	A	33°15'29" 84°27'56"	60	222	85	6	3/66	Virginia	835	—	—
10BB1	Warren Young, Jr. Harp Rd. Fayetteville	D,B	33°23'30" 84°28'49"	40	429	89	6	4/77	Weisner	840	—	—
10BB2	H. F. Modelevsky Willow Pond Rd. Fayetteville	A	33°24'34" 84°29'29"	25	171	114	6	7/72	do.	820	—	—
10BB3	Rolling Meadows Sub-division, Redwine Rd. (on Horseshoe Creek) Fayetteville	A	33°24'41" 84°29'17"	75	148	102	—	2/73	do.	840	—	—
10BB4	Charles E. Watkins Chanticleer Subdiv. Highway 92 Fayetteville	A	33°25'15" 84°26'27"	30	455	—	—	9/77	Waller	885	20	—
10BB5	Webb W. Mask, Jr. Rte. 3, Highway 92 Fayetteville	A	33°23'22" 84°25'29"	36	200	95	6	4/62	Virginia	890	16	145
10BB6	Ralph Wofford Rte. 1, Goza Rd. Inman (Fayetteville)	A	33°22'33" 84°25'07"	20	245	120	6	10/73	do.	880	—	—
10BB7	A. C. Eubanks, Jr. Inman Rd. Fayetteville	A	33°24'13" 84°24'35"	40	205	—	6	1/67	do.	800	15	60
10BB8	G. C. Gable Hampton Rd. Fayetteville	B	33°25'52" 84°25'22"	35	197	140	6	10/69	Weisner	840	—	—
10BB9	Barbara Scott Hampton Rd. Fayetteville	D	33°26'18" 84°26'26"	60	172	23	6	1/67	do.	940	—	—
10BB10	Simpson Provs. Co. Highway 85 Fayetteville	D	33°27'04" 84°27'20"	45	175	113	6	8/56	Virginia	920	—	—
10BB11	C. C. Rogers Constr. Co. (Hwy. 92, West) 589 Forrest Ave. Fayetteville	A	33°28'08" 84°28'11"	100	85	60	6	8/66	do.	860	20	85
10BB12	Phillips Concrete Block Co. Rte. 3, Highway 314 Fayetteville	E	33°29'50" 84°27'00"	40	140	41	6	9/67	do.	820	4	—
10BB14	Charles Phillips W. Lake Dr. Fayetteville	A,E	33°29'47" 84°27'10"	23	390	47	6	4/74	do.	840	—	—

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Fayette County												
10BB15	John M. Ellis, Jr. Highway 85 Fayetteville	A	33°27'34" 84°26'16"	55	227	78	6	4/61	Virginia	900	28	55
10BB16	G. L. Cannon Holly Hill Rd. Fayetteville	A	33°27'51" 84°25'55"	53	194	101	6	7/64	do.	880	32	46
10BB17	Charles W. Cook Briarwood Subdiv. off Callaway Rd. Fayetteville	B	33°26'23" 84°25'10"	25	205	60	6	6/78	Askew	830	--	--
10BB18	A. O. Bailey Shelby Lane Fayetteville	B	33°26'15" 84°25'00"	35	155	--	--	9/76	Waller	850	--	--
10BB19	Landis Walker Walker Water System Cedar Tr. Fayetteville	A	33°29'08" 84°24'44"	65	400	33	6	4/74	Virginia	820	10	150
10BB20	H. D. Thames, Jr. Rte. 3, McDonough-Fayetteville Rd. Fayetteville	B	33°27'39" 84°23'22"	75	200	116	6	5/72	do.	800	30	100
10BB21	Bob Anderson Busbin Rd. Fayetteville	A,B	33°22'34" 84°29'40"	30	180	--	--	4/77	Waller	845	--	--
10CC1	Walter T. Turner Rte. 2, Hwy. 92, North Fayetteville	B	33°30'48" 84°29'47"	150	85	42	6	6/66	Virginia	915	--	--
10CC2	Charles Reagan New Hope Rd. Fayetteville	B	33°30'38" 84°29'21"	25	355	--	--	3/78	Waller	970	--	--
10CC3	J & S Water Co. Westbridge Subdiv. Westbridge Rd. Fayetteville	E,B	33°30'40" 84°28'36"	100+	122	22	--	8/73	Weisner	900	--	--
10CC4	do.	E	33°30'37" 84°28'32"	25	147	22	--	8/73	do.	900	--	--
10CC5	do.	E	33°30'41" 84°28'31"	60	172	45	--	4/78	do.	895	--	--
10CC6	Allgood Constr. Co. off Kenwood Rd. Riverdale	E	33°30'36" 84°27'04"	100+	123	93	6	5/78	do.	815	--	--
10CC7	Dr. T. J. Busey Rte. 4, Helmer Rd. Riverdale	A	33°31'38" 84°26'17"	150	96	58	6	11/71	do.	860	--	--
10CC8	Dix Leon Corp. (Subdiv.), Hwy. 279 Riverdale	B	33°32'34" 84°27'24"	110	96	49	--	5/74	do.	900	--	--
10CC9	Joe Potts 1872 Woodland Rd. Riverdale	E	33°32'08" 84°27'04"	60	83	64	--	10/71	do.	905	--	--
10CC10	H. L. Newton Newton Plantation Highway 279 Riverdale	E,B	33°32'27" 84°26'20"	50	273	8	--	6/68	do.	845	--	--

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Forsyth County												
11GG10	Shadow Park North, 3	E	34°07'27" 84°15'21"	50	266	33	6	1972	--	1,135	--	--
11GG11	do., 1	E	34°07'28" 84°15'31"	200	284	31	6	1969	--	1,095	--	--
11GG12	do., 2	E	34°07'28" 84°15'31"	200	200	37	6	1970	--	1,095	--	--
12HH1	O. W. Adams Hyde Rd. Cumming	A	34°14'28" 84°13'16"	35	175	89	6	11/63	Virginia	1,200	--	--
12HH2	Globe Oil Co. 602 Atlanta Rd. Cumming	A	34°11'14" 84°08'32"	50	150	72	6	4/67	do.	1,260	--	--
12HH5	John C. Bellamy Kelley Mill Rd. Cumming	H	34°12'22" 84°11'13"	30	68	40	6	1962	--	1,100	6	--
12HH6	City of Cumming Cumming	H,C	34°13'54" 84°09'14"	150	172	36	8	1967	--	1,350	12	--
12HH7	H. Evans Cumming	A	34°13'37" 84°08'39"	90	153	22	6	1968	--	1,250	50	--
12JJ1	John Stiner Hightower Rd. Cumming	D	34°18'16" 84°13'25"	25	98	57	6	1959	--	1,050	22	--
13HH1	Herbert Hansard Rte. 5, Roanoke Rd. Cumming	A	34°10'43" 84°05'12"	40	303	64	6	5/57	Virginia	1,190	--	--
13HH2	The Troutman Co. Wms. Shore Rd. (off) (Subdivision well) Cumming	H	34°12'28" 84°05'24"	60	--	--	--	4/74	do.	1,120	22	28
13HH3	Thomas Bridges Rte. 7, Box 320 Pilgrim Mill Rd. Cumming	A	34°12'20" 84°03'36"	23	305	61	6	9/70	do.	1,080	--	--
13HH4	Deer Creek Shores (D.C. Hartfield res.) 22 Lanier Dr. Cumming	A	34°12'00" 84°03'20"	75	205	40	--	7/66	do.	1,100	--	--
13HH5	Tom Bagwell Highway 369 Cumming	A	34°14'46" 84°01'36"	25	200	84	6	1/72	do.	1,070	--	--
13HH6	Cullen Construction Co., 1 Cumming	A	34°08'51" 84°06'22"	24	401	51	6	1975	do.	1,130	--	--
13HH8	Woodrow Beck, Jr. Sinclair Shores Rd. Cumming	A	34°12'27" 84°05'38"	40	225	43	6	1972	--	1,140	--	--
13HH9	Galloway Holland Dr. Cumming	A,H	34°13'54" 84°03'35"	30	195	45	6	--	--	1,110	--	--

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Forsyth County												
13HH10	Bench Mark Cumming	A	34°12'00" 84°04'20"	60	195	42	6	—	—	1,150	—	—
13JJ1	Wm. T. Barnes (for Danny Pendley) Rte. 2, Box 219 Cumming	E	34°16'47" 84°07'11"	30	300	74	6	8/72	Virginia	1,230	—	—
13JJ2	G. L. Tallant Highway 93 Cumming	A	34°17'21" 84°05'14"	33	173	33	6	2/72	do.	1,200	—	—
13JJ3	N. Ga. Rendering Plant, 1 Rendering Plant Rd. Cumming	C,H	34°16'55" 84°03'28"	30	225	20	6	5/66	do.	1,340	—	—
13JJ6	Elroy Warbington Rte. 1 Little Mill Rd. Cumming	H	34°16'30" 84°01'33"	25	158	47	6	9/72	do.	1,190	12	158
14JJ1	Elmo Fortenberry Waldrip Rd. Cumming	H	34°16'30" 84°58'27"	30	575	23	6	8/78	do.	1,100	—	—
14JJ2	C. Martin Jot Em Down Rd. Cumming	H	34°15'53" 84°59'55"	40	250	60	6	—	—	1,210	—	—
14JJ3	Creek Point Cove Cumming	A	34°15'49" 84°59'40"	20	248	60	6	—	—	1,180	38	—
14JJ4	T. P. Wright Waldrip Rd. Cumming	C,H	34°16'12" 84°58'58"	45	500	51	6	—	—	1,180	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
7CC3	B. L. Cannon Rte. 1, Box 342 Hutcheson Ferry Rd. Palmetto	B	33°31'25" 84°46'54"	30	126	48	6	12/70	Virginia	760	17	120
7CC9	Carl B. Crouch Garretts Ferry Rd. (Rico Community) Palmetto	G	33°34'50" 84°47'59"	30	190	32	6	9/65	do.	780	30	80
7CC10	Julian V. Jones Rte. 1, Garretts Ferry Rd. Palmetto	G	33°34'51" 84°47'54"	50	110	8	6	8/73	do.	760	--	--
8CC1	Harold Whitley Hearn Rd. Palmetto	F	33°31'50" 84°42'59"	40	120	68	6	11/58	do.	885	--	--
8CC2	Harold Ellman Hutcheson Ferry Rd. Palmetto	F	33°32'13" 84°43'11"	35	150	67	6	3/57	do.	900	20	20
8CC3	L. W. Osborne 7401 Old Rico Rd. Palmetto	F	33°33'11" 84°44'02"	75	150	101	6	11/72	do.	940	--	--
8CC6	D. Harold Bomar Rte. 1, Williams Rd. Palmetto	A	33°31'58" 84°37'32"	27	225	98	6	5/58	do.	1,020	20	70
8CC7	U.S.G.S. test well 1	B	33°33'46" 84°40'01"	100+	256	56	6	5/78	Adams-Massey	882	3.8	--
8CC8	U.S.G.S. test well 2	B	33°33'46" 84°40'01"	45	243	78	6	1978	do.	882	3.8	32
8CC11	Robert Johnson Woodruff Rd. Palmetto	F	33°35'59" 84°43'36"	20	180	60	6	1977	do.	800	--	--
8DD8	Brown (Brown's Lake) Brown's Rd. Campbelltown	G	33°38'22" 84°42'05"	35	300	--	--	--	AAA	820	--	--
8DD9	do.	G	33°38'22" 84°42'00"	100	175	--	--	--	Virginia	820	10	--
8DD10	Fulton Co. Sewage Treatment Plant 7520 Cochran Rd. Atlanta	G	33°40'36" 84°38'01"	55	250	40	6	3/60	do.	750	10	85
8DD11	John Helms Cochran Rd., SW Atlanta	G	33°40'56" 84°38'09"	20	96	--	--	--	AAA	800	--	--
9CC21	Paul E. Hindman Bishop Rd. Fairburn (Rita Dyer now)	A	33°32'54" 84°37'20"	40	158	44	6	6/55	Virginia	1,000	31	48
9CC22	Whitewater Creek Sewage Trmt. Plant Spence Rd. Fairburn	A	33°32'03" 84°31'23"	42	300	52	10	6/72	do.	900	--	--

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
9CC23	James T. Bullard Lee's Mill Rd. Fairburn	F	33°32'11" 84°32'45"	20	130	37	6	2/61	Virginia	960	23	23
9CC24	Nelville McClure 286 Southwood Rd. Fairburn	D	33°36'38" 84°36'37"	47	208	32	6	9/59	do.	920	—	--
9CC25	do.	D	33°37'30" 84°36'14"	32	202	70	6	4/60	do.	820	—	--
9CC26	City of Union City (on Goodson St.) Union City	A	33°34'46" 84°33'02"	25	350	68	—	10/54	do.	1,020	—	--
9DD2	Fulton Co. Brd. of Ed., Utoy School Cascade Rd. Atlanta	F	33°43'35" 84°31'07"	40	250	46	6	1/53	do.	830	15	155
9DD3	Barton Brands Ltd. 650 Fairburn Rd., SW Atlanta	F	33°44'14" 84°30'29"	59	500	84	6	6/77	Ga. Well Drilling	820	—	--
9DD4	Sou. Natural Gas Co. Ben Hill	B	33°44'14" 84°33'29"	144	96	70	8	1947	Virginia	800	—	--
9EE3	Anaconda Aluminum Fulton Indus. Blvd. Atlanta	G	33°45'34" 84°32'55"	90	500	133	6	1/76	do.	800	40	250
9EE4	do.	G	33°45'33" 84°32'54"	49	—	—	—	12/78	do.	800	—	--
10CC17	W. P. Burns 5205 Schofield Rd. College Park	A,F	33°36'48" 84°27'50"	20	120	65	6	8/62	do.	1,015	20	40
10CC18	L. F. Hagan Old Bill Cook Rd. Red Oak	F	33°35'49" 84°29'18"	40	100	51	6	10/55	do.	900	--	--
10CC19	West Lumber Co. 2050 Roosevelt Hwy. Red Oak	A	33°37'18" 84°29'24"	64	225	27	6	6/61	do.	1,020	20	20
10DD1	Oneil Brothers East Point	A	33°40'43" 85°26'20"	—	298	49	10	—	—	910	25	—
10DD2	U.S. Government Fort McPherson	A	33°42'07" 84°25'48"	20	338	—	12	—	L. C. Dew	1,000	8	108
10DD3	City of College Park (Francis St.)	A	Not located	50	550	—	10	(Old)	Ga. Well Drilling	—	—	—
10DD4	do. (Cambridge St.)	A	Not located	75	500	—	—	Before 1930	do.	—	—	--
10DD5	do. (Wiley St.)	A	Not located	100	305	37	12	10/39	do.	1,000	12	—
10DD9	City of East Point (Center St.) East Point	F,A	33°40'17" 84°27'04"	40	552	15	10	1928	Hamilton & Sullivan	930	0	140

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
10DD10	City of East Point (Spring St.) East Point	A	Not located	36	600	—	—	—	Hamilton & Sullivan	—	13	—
10DD11	do. (St. Michael St.)	A	Not located	20	50	12	10	—	do.	—	—	—
10DD12	do. (Cleveland Ave.)	A	Not located	45	635	—	10	1926	do.	—	0	150
10DD13	do. (Jefferson Ave.)	A	Not located	40	500	—	10	—	do.	—	—	—
10DD14	do. (Wadley Ave.)	A	Not located	90	400	—	8	1926	do.	—	44	122
10DD15	do. (Harris St.)	A	Not located	35	490	—	10	1926	—	—	0	—
10DD16	do. (Chambers Park, Cleveland Ave.)	A	33°41'58" 84°26'09"	75	402	—	10	1940	Pat Murphy Eqpmt. Co.	980	15	—
10DD17	do. (at water tank)	A	Not located	70	530	—	—	—	Hamilton & Sullivan	—	54	—
10DD18	do. (Roosevelt Highway)	A	Not located	40	—	—	10	—	do.	—	—	93
10DD19	do. (Taylor Ave.)	A	Not located	61	500	—	10	—	L. C. Dew	—	60	—
10DD20	do. (Plant St.)	A	Not located	20	250	—	10	1909	Hamilton & Sullivan	—	58	—
10DD21	do. (100 yds east of 10DD20)	A	Not located	175	500	106	8	1911	L. C. Dew	—	65	77
10DD23	do. (Plant St.)	A	Not located	40	684	95	8	1928	do.	—	60	—
10DD24	City of College Park (Marion Harper Mill)	A	Not located	20	377	—	6	—	—	—	49	—
10DD28	do. (Conley Park)	A	33°41'03" 84°27'05"	20	600	—	10	3/40	Virginia	980	12.6	—
10DD29	City of Hapeville (Jonesboro Rd.) Hapeville	B	33°40'02" 84°24'10"	75	600	—	10	—	—	930	60	—
10DD30	do. (Atlanta Ave. at Georgia Ave.)	B	33°39'03" 84°24'46"	80	603	—	10	—	—	980	60	—
10DD31	do. (Oakdale Rd.)	B	33°39'37" 84°24'46"	35	616	—	10	1937	—	1,050	70	—
10DD32	do. (Sims St.)	B	Not located	75	600	—	10	—	—	—	57	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
10DD33	City of Hapeville (Clay Place at Virginia Ave.)	B	33°39'27" 84°25'00"	55	825	—	10	1938	--	980	66	—
10DD34	do. (by City Hall)	B	33°39'34" 84°24'30"	55	600	—	—	1914	—	980	--	—
10DD37	Motor Convoy Co. 25 Poole Creek Rd. Hapeville	F	Not located	50	84	62	6	1/48	Virginia	—	6	—
10DD38	West View Corp. West View Cemetery Gordon Rd. Atlanta	B	33°44'54" 84°26'48"	58	600	61	8	—	--	980	—	200
10DD39	U.S. Government Ft. McPherson	A	33°42'39" 84°26'04"	32	450	—	10	—	L. C. Dew	970	32	—
10DD40	do.	A	33°42'40" 84°26'07"	35	500	--	8	—	do.	1,000	22	—
10DD42	do.	A	33°42'47" 84°26'17"	21	250	—	8	1882	do.	1,010	50	—
10DD43	do	A	33°42'45" 84°26'15"	65	500	—	10	1885	do.	990	50	—
10DD45	do.	A	33°42'19" 84°25'43"	20	689	113	12	--	do.	1,050	30	—
10DD46	do.	A	33°42'07" 84°25'52"	66	300	—	12	—	do.	1,010	12	112
10DD47	City of College Park (Harvard Ave.)	A	Not located	100	600	—	12	1928	Virginia	--	--	--
10DD48	do.	A	33°42'06" 84°25'46"	136	651	—	12	--	do.	1,040	17	—
10DD50	Central of Ga. RR Lee St. at Lakewood Ave. Atlanta	A	33°41'51" 84°25'43"	100	308	9	10	--	do.	1,040	1.5	110
10DD51	National Biscuit Co. 1000 Arden Ave. Atlanta	A	33°42'54" 84°25'13"	77	376	—	6	--	Pat Murphy Eqpmt. Co.	1,020	—	--
10DD53	do.	A	33°42'53" 84°25'17"	70	1,000	--	--	--	Virginia	1,030	—	--
10DD54	Mrs. R. Lombard 2275 Rhinehill Rd. Atlanta	B	33°41'29" 84°22'47"	100	200	38	6	3/78	do.	820	—	--
10DD55	Brown Transport 352 University Ave. Atlanta	A	33°43'08" 84°23'59"	45	325	40	6	10/77	do.	940	31	252
10DD56	U.S. Plating & Bumper Service, Inc. 78 Milton Ave., SE Atlanta	A	33°43'28" 84°23'05"	45	325	44	6	11/62	do.	980	—	--

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
10DD57	Johnson-Floker Co. 570 Glenn St., SW Atlanta	A	33°44'16" 84°24'22"	55	580	56	6	8/71	Virginia	1,000	55	326
10DD58	State of Georgia Building Authority Atlanta	A	33°44'57" 84°23'20"	80+	507	86	—	1978	Holder	970	—	—
10DD59	Gate City Cottom Mill Spring St. East Point	A	Not located	60	717	42	8	11/41	Virginia	—	28	60
10DD60	do.	A	Not located	100	900	—	6	1910	do.	—	60	—
10DD61	Tennessee Corp. Central Ave. East Point	B	Not located	75	550	266	6	1920	—	—	—	—
10DD62	Piedmont Cotton Mill Central Ave. East Point	B	Not located	100	465	—	6	1908	Hamilton & Sullivan	—	60	70
10DD63	National Fruit Product Co., Inc. 725 Humphries St., SW Atlanta	A	Not located	52	750	—	10	—	Virginia	—	20	—
10DD64	M. W. Harmon 536 Manford Rd., SW Atlanta	A	Not located	51	170	40	8	1944	do.	—	15	120
10DD65	Central of Ga. RR Lee St. near Lakewood Ave. Atlanta	A	33°41'54" 84°25'42"	183	151	—	—	—	—	1,040	—	—
10DD66	Atlanta Woolen Mills 598 Wells St. Atlanta	A	Not located	50	606	—	8	1926	—	—	—	—
10EE5	Seydel-Wooley & Co. (Div. of AZS) 763 Marietta Blvd. Atlanta	D	33°46'32" 84°25'39"	110	450	27	8	1943	Virginia	890	38	104
10EE6	do.	D	33°46'30" 84°25'38"	351	550	12	8	8/67	do.	890	21	220
10EE10	Atlantic Steel Co. 1365 McCaslin St. Atlanta	D	Not located	110	350	—	8	—	—	—	30	—
10EE11	do.	D	Not located	130	508	0	10	1940	Economy Well Drls.	—	58	95
10EE12	do.	D	Not located	70	450	—	12	1930	—	—	35	—
10EE13	do.	D	Not located	115	495	—	12	1940	—	—	35	—
10EE14	Henry Grady Hotel 210 Peachtree St. Atlanta	A	33°45'24" 84°22'12"	90	710	—	10	—	—	1,060	39	130

Table 9.—Record of wells in the Greater Atlanta Region—Continued

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Fulton County												
10EE15	Star Photo Lab. 300 Ponce de Leon Ave. Atlanta	A	33°46'25" 84°22'39"	66	477	37	6	3/57	Virginia	960	3	200
10EE16	Aluminum Finishing Co. Atlanta	B	Not located	21	394	—	—	10/57	do.	—	—	—
10EE17	do.	B	33°47'56" 84°25'23"	48	118	38	6	11/59	do.	905	25	100
10EE21	do.	B	Not located	20	200	64	6	10/70	do.	900	—	—
10EE22	Bob Knight 1790 Springer Rd. Atlanta	B	33°48'11" 84°25'04"	150	166	127	6	1973	Ward	910	—	—
10EE23	MacDougald-Warren, Inc., Bill Pop & Cobb Dr., NW Atlanta	B	33°47'56" 84°24'20"	130	395	44	6	5/57	Virginia	830	—	—
10EE25	Sonoco Products 2490 Old Marietta Blvd., NW Atlanta	G	33°49'30" 84°27'42"	144	400	33	10	1/58	do.	900	30	250
10EE26	do.	G	33°49'33" 84°27'45"	30	500	23	8	3/66	do.	900	—	—
10EE27	do.	G	33°49'26" 84°27'45"	32	500	23	—	4/66	do.	900	—	—
10EE28	do.	G	33°49'28" 84°27'39"	110	—	—	—	1957	do.	900	—	—
10EE29	Richard L. Aeck 2200 W. Wesley Rd. Atlanta	G	33°50'28" 84°27'34"	100	430	50	6	11/72	do.	850	—	—
10EE30	W. R. Cox 3190 Nancy Crk.Rd.,NW Atlanta	G	33°50'30" 84°26'35"	25	480	74	6	1/68	do.	800	—	—
10EE31	William L. Gunter 544 Valley Rd., NW Atlanta	D	33°51'20" 84°24'18"	37	285	18	6	3/65	do.	850	—	—
10EE32	Exposition Cotton Co. 794 Marietta St., NW Atlanta	D	Not located	50	515	—	6	1920	—	—	40	—
10EE33	do.	D	Not located	80	500	—	8	Before 1937	—	—	18	—
10EE35	White Provision Co. Howell Mill Rd. & 14th Street, NW Atlanta	D	Not located	60	432	—	—	—	—	—	35	100
10EE36	Armour & Company 14 Brady Ave., NW Atlanta	D	Not located	75	500	—	8	1937	—	—	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
10EE37	Atlanta Gas Light Co. Foundry St. near Southern RR Atlanta	A	Not located	150	278	--	8	1895	--	--	80	--
10EE38	Ga. RR & Elec. Co. Davis St. near Jones Ave. Atlanta	A	Not located	52	350	--	14	1899	--	--	12	--
10EE39	do.	A	Not located	56	638	--	14	1900	--	--	12	--
10EE40	Ansley Hotel 98 Forsyth St. Atlanta	A	33°45'20" 84°23'18"	69	750	42	10	5/46	Virginia	1,050	44	180
10EE41	City of Atlanta Five Points Atlanta	A	33°45'16" 84°23'23"	33	2,175	--	--	1885	--	1,040	--	--
10EE42	Atlantic Ice & Coal Co. 106 Washington St. Atlanta	A	33°45'09" 84°23'13"	60	300	--	6	1906	--	1,030	--	--
10FF5	U. V. Aagsen 1005 Mt. Vernon Rd. Sandy Springs	G,H	33°54'13" 84°25'12"	50	180	61	6	1/71	Virginia	1,060	35	100
10FF6	Joe Dickson 5895 Mitchell Rd. Atlanta	H	33°54'58" 84°23'24"	35	150	45	6	1/55	do.	1,100	--	--
10FF7	Sands Apartments 346 Carpenter Dr. Sandy Springs	G	33°54'46" 84°22'42"	35	--	--	--	--	Banks	970	--	--
10FF8	Ed Dodd 6955 Brandon Mill Rd. Sandy Springs	A	33°56'47" 84°23'14"	40	120	58	6	12/53	Virginia	880	--	--
10FF9	J. J. Cochran Sandy Springs	A	33°56'04" 84°22'14"	50	138	70	--	Old	J.A. Wood	970	--	--
10GG10	Harmon R. Cales 895 Woodstock Rd. Roswell	C	33°03'40" 84°23'12"	30	125	42	6	8/70	Virginia	1,160	--	--
10GG11	George M. Couch 890 Woodstock Rd. Roswell	C	33°03'34" 84°23'11"	35	186	52	6	4/64	do.	1,160	18	45
11DD5	State of Georgia State Nursery 1058 Constitution Atlanta	A	33°41'37" 84°21'21"	100+	300	--	--	1976	Holder	835	Flows	--
11EE8	ITT Grinnell Corp. 645 Northside Dr. Atlanta	A	33°45'42" 84°21'33"	40	320	--	--	4/65	Virginia	980	20	200
11EE9	Ga. Baptist Hospital 300 Boulevard, NE Atlanta	A	33°45'47" 84°22'22"	69	700	50	10	5/46	do.	1,030	42	180

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
11EE10	T. Wayne Blanchard 564 Wimbledon Rd. Atlanta	D	33°48'26" 84°22'07"	38	350	20	6	—	Virginia	900	40	200
11FF4	Landmark Apartments I-285 at 5775 Glenridge Rd. Atlanta	G	33°54'45" 84°21'35"	30	173	63	6	11/72	do.	950	10	173
11FF5	N. A. Williams 24 Laurel Dr., NE Atlanta	H,C	33°55'46" 84°21'28"	25	318	79	6	7/60	do.	1,110	62	160
11FF6	Foxcroft Apartments 6851 Roswell Rd. Atlanta	A	33°56'31" 84°22'19"	60	106	45	6	1973	Ward	940	—	—
11FF7	Atlanta Assoc. of Baptist Churches 1900 Northridge Dunwoody	C	33°59'14" 84°19'32"	23	450	39	6	6/56	Virginia	920	60	180
11FF8	E. A. Isakson 1275 Riverside Rd. Roswell	C	33°59'25" 84°19'21"	50	201	19	6	5/66	do.	870	—	—
11FF9	Dr. Robert Smith, III 1750 Brandon Hall Dunwoody	A	33°59'04" 84°18'09"	40	205	70	6	12/76	do.	880	—	—
11FF10	Bill Weaver 3450 Spalding Dr. Atlanta	H	33°57'57" 84°17'36"	30	185	—	6	8/67	do.	990	30	100
11FF11	V. A. Pinnell 3400 Spalding Dr. Atlanta	C,H	33°57'55" 84°17'38"	75	—	—	—	1962	J.A. Wood	990	—	—
11FF12	Joe A. Seibold 8099 Jett Ferry Dunwoody	A	33°58'13" 84°17'15"	30	150	27	6	5/55	Virginia	900	0	100
11FF14	Sidney Wooten 7700 Jett Ferry Dunwoody	H,A	33°57'53" 84°18'09"	100	153	51	6	8/79	--	1,100	—	—
11GG1	J. S. Robinson 400 Grimes Bridge Roswell	C,A	34°00'55" 84°20'15"	24	323	38	6	11/68	Virginia	1,080	—	—
11GG2	A. C. Morris, Jr. 350 Hollyberry Dr. Roswell	C	34°03'25" 84°21'00"	25	306	28	6	4/71	do.	1,100	—	—
11GG3	Jerry Bowden Tote Water Farms 12405 Etris Rd. Roswell	C	34°05'05" 84°22'06"	23	173	61	6	1/71	do.	1,060	—	173
11GG4	Thomas Archer 335 Ranchette Rd. Alpharetta	C,A	34°06'04" 84°22'17"	50	126	46	6	9/71	Ward	1,080	—	—
11GG5	Roger Hopper 185 Dorris Rd. Alpharetta	C	34°06'26" 84°21'24"	30	240	35	6	4/78	Virginia	1,020	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Fulton County												
11GG6	Fulton Co. Board of Education Northwestern School Crabapple	A	34°05'36 84°20'30"	60	200	22	6	1/55	Virginia	1,100	10	136
11GG7	F. J. Russell, Jr. Haygood Rd. Alpharetta	A	34°07'11" 84°18'18"	24	234	26	6	12/65	do.	1,020	--	--
11GG8	City of Alpharetta Alpharetta	A	34°04'33" 84°17'38"	60	250	66	8	8/51	do.	1,130	--	120
11GG9	do.	E,A	34°04'12" 84°17'36"	75	300	--	10	--	--	1,090	--	--
11HH6	Robert E. Wildman Rte. 3, Red Rd. Alpharetta	E	34°07'46" 84°18'58"	30	--	--	--	--	Virginia	1,070	--	--
12FF1	Riverbend Gun Club Highway 141 Norcross	G	3°59'24" 84°10'12"	55	160	71	6	9/66	do.	880	--	--
12GG5	Neal Embry 10505 Embry Farms Duluth	G	34°02'17" 84°07'35"	37	245	67	6	19/74	do.	930	20	245

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Gwinnett County												
12FF6	City of Norcross Norcross	B	33°56'44" 84°12'54"	100	342	—	8	1945	Virginia	1,040	80	—
12FF7	do.	B	33°56'43" 84°12'54"	102	385	—	8	—	do.	1,030	79	—
12FF8	Michael Sellers 4115 Frank Neely Rd. Norcross	G	33°58'21" 84°14'56"	40	105	—	6	1974	Ward	970	—	—
12FF9	L. E. Mansfield Spalding Dr. Norcross	G	33°57'55" 84°13'37"	50	195	98	6	5/64	Virginia	980	—	—
12FF10	Interstate Mobile Home Park Hillcrest Rd. Norcross	B	33°55'42" 84°10'10"	30	222	14	6	10/69	do.	900	—	—
12FF11	Erwin Westbrook 2632 Pleasant Hill Rd. Duluth	E	33°58'14" 84°08'42"	50	144	—	6	1965	Ward	1,040	—	—
12GG1	Vantress Farms Irwindale Rd. Duluth	G	34°01'09" 84°09'51"	42	505	207	6	9/56	Virginia	930	—	—
12GG2	do.	G	34°00'46" 84°09'50"	25	543	92	6	7/57	do.	960	—	—
12GG3	City of Duluth Duluth	G	34°00'25" 84°09'12"	58	300	96	—	9/55	do.	1,060	40	170
12GG4	do.	G	34°00'09" 84°08'38"	91	252	78	8	1/51	do.	1,100	20	170
13EE1	Tom Hewett 1558 Joe Hewett Rd. Snellville	D	33°51'56" 84°03'18"	54	152	64	6	9/69	do.	960	—	—
13EE2	do.	D	33°51'57" 84°03'18"	32	145	69	6	1/65	do.	970	—	—
13EE3	C. E. Shell Rosedale Rd. Snellville	B,H	33°50'24" 84°02'06"	50	150	44	6	8/61	do.	980	20	60
13EE4	L. E. Shell 2376 Old Rosedale Rd. Snellville	H	33°50'23" 84°02'12"	35	165	17	6	6/76	do.	990	—	—
13EE5	Charles R. Hager Lenora Church Rd. Snellville	B	33°50'11" 84°00'58"	60	203	24	6	8/68	do.	910	—	—
13EE6	Mike King Bermuda Rd. Stone Mountain	F	33°48'19" 84°06'26"	25	225	133	6	3/75	do.	940	50	225
13FF1	Ralph A. Tillman 248 Lester Rd., SW Lawrenceville	D	33°53'43" 84°05'35"	75	145	35	6	8/72	do.	870	—	—
13FF2	Bethesda School Bethesda School Rd. Lawrenceville	E	33°55'30" 84°05'07"	50	270	50	6	2/46	do.	960	35	100

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Gwinnett County												
13FF3	James R. Bowers 2707 Hutchins Rd. Lilburn	E	33°54'05" 84°03'31"	30	240	—	—	3/78	Virginia	970	—	270
13FF4	Mt. Zion Church Scenic Highway Lawrenceville	C,H	33°53'18" 84°00'40	30	240	48	6	1/60	do.	1,065	—	—
13FF5	David Brannon 970 Five Forks- Trickum Rd. Lawrenceville	D	33°55'35" 84°00'11"	30	325	30	6	10/77	do.	1,040	—	—
13FF6	James A. Dailey 936 Tab Roberts Rd. Lawrenceville	E	33°59'38" 84°02'48"	45	234	43	6	4/63	do.	1,040	—	—
13FF7	Elmore F. Stuart 379 Russell Rd. Lawrenceville	C	33°59'33" 84°01'31"	40	128	89	6	10/68	do.	1,000	10	80
13FF8	E. A. Barton "Villa Luyet" 109 Johnson Rd. Lawrenceville	E	33°56'03" 84°01'13"	60	143	11	6	8/76	do.	940	—	—
13GG1	Col.Walter A.Smith,Jr. Sheltonville Rd. Suwanee	G	34°02'58" 84°05'48"	42	156	85	6	6/61	do.	950	—	—
13GG2	E. D. Lilley "Wildcat Acres" Russell Rd. Lawrenceville	B	34°00'08" 84°00'22"	25	357	22	6	3/61	do.	990	—	—
13GG4	Yerkes Field Station (Emory University) Taylor Rd. Lawrenceville	C	34°01'07" 84°01'41"	22	452	22	6	2/64	do.	1,020	—	—
13GG9	Georgia Highway Dept. Hwy. 85 N, Rest Stop Suwanee	C,E	34°02'11" 84°02'23"	19	400	—	6	9/68	do.	1,105	—	—
13GG11	do.	C	34°02'55" 84°01'33"	23	277	—	6	6/68	do.	990	—	—
13GG12	City of Sugar Hill Sugar Hill	C	34°06'17" 84°01'42"	50	650	68	6	4/66	do.	1,140	8	120
13GG14	do.	G	34°06'24" 84°01'35"	72	625	74	6	10/65	do.	1,160	40	160
14EE2	William D. Isaacs 2839 Lenora Rd. Snellville	D	33°48'22" 83°59'56"	60	105	94	6	11/76	do.	940	—	—
14EE3	Claude A. Bentley Bentley Trail (off Cannon Rd.) Loganville	B	33°48'22" 83°58'38"	75	210	29	6	2/72	do.	960	—	—
14EE4	Everett J. Ritchey 3434 Pate Dr. Snellville	B	33°49'38" 83°59'50"	150	155	76	6	7/75	do.	915	40	155

Table 9.--Record of wells in the Greater Atlanta Region--Continued

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Gwinnett County												
14EE5	W. L. Atha 954 Midway Rd. Loganville	B	33°51'09" 83°57'00	50	165	56	6	12/70	Virginia	960	20	50
14EE7	Rupert H. Rollins Temple Johnson Rd. Loganville	B	33°50'21" 83°58'37"	150	360	3	6	1/71	do.	950	—	—
14EE8	C. O. Edwards, Jr. Lake Carlton Loganville	B	33°50'52" 83°56'21"	50	150	70	6	4/58	do.	940	—	—
14FF1	Francis Babb Lakeview Dr. Grayson	B	33°53'05" 83°59'25"	20	340	29	6	12/73	do.	970	—	—
14FF2	A. W. Lunceford 1389 Lakeview Rd., SW Grayson	B	33°53'04" 83°59'21"	30	350	11	6	1/74	do.	950	Flows	—
14FF3	Chadwick Constr. Co. (Jackson job) Highway 84 (LL 59) Grayson	B	33°53'02" 83°58'04"	100	398	46	6	4/73	do.	1,060	—	—
14FF4	Gwinnett County City of Grayson Grayson	B	33°53'33" 83°57'27"	30	300	85	6	1942	Ragan	1,080	22	—
14FF5	David Manchester 1055 Johnson Rd. Lawrenceville	D	33°55'01" 83°59'55"	50	105	39	6	4/77	Virginia	940	—	—
14FF7	Piedmont Metal Prods. Maltbie St. Lawrenceville	E	33°57'50" 83°59'55"	254	265	54	6	8/72	do.	1,080	50	200
14FF8	City of Lawrenceville Gordon St. Lawrenceville	E	33°57'39" 83°59'40"	471	302	30	10	1945	do.	1,020	93	110
14FF9	do. (Rich Martin St.)	E	33°57'22" 83°59'43"	400	352	—	8	—	do.	1,030	14	—
14FF10	do. (Water Works Rd.)	E	33°57'35" 83°58'45"	270	386	20	8	1912	do.	1,000	20	—
14FF11	Gerald Hanson 895 McCart Rd. Lawrenceville	D	33°56'39" 83°57'16"	23	170	27	6	11/77	do.	1,040	—	—
14FF12	Dr. Charles Brand McCart Rd. Lawrenceville	D	33°56'43" 83°57'14"	100	265	49	6	4/71	do.	1,020	—	—
14FF13	Oscar M. Dunnagan Rte.2,362 Sweetgum Rd. Lawrenceville	D	33°57'35" 83°56'35"	25	200	25	6	6/60	do.	1,070	30	90
14FF14	James Banner 1694 Alcovy Rd. Lawrenceville	B	33°57'51" 83°54'46"	20	295	52	6	9/75	do.	1,020	—	—
14GG1	Hal Cook Rte. 1, Thompson Mill Rd., Buford	B	33°06'13" 83°54'23"	100	206	39	6	1971	Ward	980	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

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Hall County												
14HH1	T. C. Holmes Yatch Club Rd. Flowery Branch	A	34°10'33" 83°59'03"	25	235	79	6	8/57	Virginia	1,080	56	165
14HH3	Gilbert Orr Rte. 1, Gaines Ferry Rd. Flowery Branch	G	34°10'24" 83°58'00"	27	225	72	6	5/67	do.	1,190	—	--
14HH4	Homer P. Reeves Paradise Point Rd. Flowery Branch	G	34°10'41" 83°56'53"	40	265	45	6	5/67	do.	1,200	—	--
14HH5	City of Flowery Branch Flowery Branch	G	34°11'03" 83°55'48"	204	—	—	--	—	do.	1,130	13	86
14HH6	do.	G	34°11'04" 83°55'37"	108	—	—	--	—	do.	1,140	63	273
14HH7	J. D. Cash Rte. 3, Atlanta Hwy. Flowery Branch	B,G	34°12'11" 83°53'17"	40	201	66	6	6/54	do.	1,240	20	60
14HH8	do.	B,G	34°12'25" 83°53'11"	35	169	43	6	12/57	do.	1,260	—	--
14HH11	L. B. Carter 995 Gainesville Hwy. Flowery Branch	G	34°09'18" 83°57'19"	25	116	35	6	9/56	do.	1,140	—	--
14HH14	do.	G	34°09'06" 83°56'30"	25	225	70	6	11/58	do.	1,230	—	—
14HH15	do.	C	34°09'01" 83°56'31"	22	345	73	6	12/58	do.	1,230	—	—
15HH1	G. W. Allen Hopewell Lane Gainesville	A,H	34°12'55" 83°47'20"	30	250	23	6	5/53	do.	1,200	85	85
15HH2	Hall County Board of Education Candler School Candler	A,B	34°12'58" 83°47'06"	40	300	42	6	2/55	do.	1,160	—	--
15HH3	H. L. Davis Rte. 3, Candler Rd. (Highway 60, South) Gainesville	A,B	34°12'20" 83°46'51"	30	205	—	--	12/55	do.	1,120	20	140
15HH4	do.	A,B	34°12'19" 83°46'51"	40	284	21	6	4/57	do.	1,120	—	--
15JJ1	City Ice Company Main St. Gainesville	G	34°17'01" 83°49'42"	25	450	110	6	2/58	do.	1,200	35	210
15JJ2	Gainesville Mills Georgia Ave., SW Gainesville	G	34°16'55" 83°49'48"	100	285	142	—	1956	do.	1,180	—	--
15JJ4	Best Ice Company 1125 Purina Dr., SE Gainesville	G	34°16'53" 83°49'52"	225	192	90	—	1962	do.	1,180	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

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Hall County												
15JJ5	Best Ice Company 1125 Purina Dr., SE Gainesville	G	34°16'54" 83°49'52"	120	528	116	—	1965	Virginia	1,180	—	—
15JJ6	do.	G	34°16'51" 83°49'52"	150	150	80	—	1958	do.	1,180	—	—
15JJ8	do.	G	34°16'51" 83°49'52"	50	602	92	8	1965	do.	1,180	—	—
15JJ10	Lanier Hatchery Gainesville	G	34°16'54" 83°49'54"	60	250	—	6	—	do.	1,180	—	—
15JJ11	MarJac Poultry Aviation Blvd. Gainesville	G	34°16'48" 83°49'45"	186	287	85	—	Before 1966	do.	1,180	—	—
15JJ12	do.	G	34°16'46" 83°49'45"	40	225	120	—	Before 1966	do.	1,190	—	—
15JJ13	do.	G	34°16'46" 83°49'48"	75	300	120	—	1966	do.	1,190	—	—
15JJ14	do.	G	34°16'47" 83°49'39"	43	145	60	6	1/66	do.	1,210	—	—
15JJ15	J. D. Jewell Poultry (now Cagle's) Aviation Rd. Gainesville	G	34°16'43" 83°49'53"	125	300	—	—	1963	do.	1,200	90	100
15JJ16	do.	G	34°16'42" 83°49'55"	180	316	106	—	1964	do.	1,200	90	110
15JJ17	do.	G	34°16'40" 83°49'58"	180	160	101	—	1964	do.	1,200	90	100
15JJ18	do.	G	34°16'38" 83°49'59"	180	200	101	—	1964	do.	1,210	91	100
15JJ19	do.	G	34°16'37" 83°50'01"	180	315	140	—	1964	—	1,210	93	100
15JJ20	do.	G	34°16'34" 83°50'02"	57	600	—	—	1941	Virginia	1,210	—	—
15JJ21	Seven-Up Bottling Co. (new Webb-Crawford Foods) (Indus. Blvd.) Gainesville	G	34°16'50" 84°49'50"	60	390	93	6	10/57		1,180	—	—
15JJ22	Gainesville Mills Georgia Ave., SW Gainesville	G	34°17'02" 83°49'22"	55	—	—	—	—	—	1,200	—	—
15JJ23	Pepsi-Cola Btlng. Co. Gainesville	G	Not located	220	400	110	—	12/57	—	—	—	—
15JJ25	William Smallwood Griffen Dr. Gainesville	G	34°21'55" 83°48'05"	100	303	57	6	9/69	Virginia	1,180	—	—
15JJ26	Larry Christopherson Hall Dr. Gainesville	G	34°21'42" 83°46'25"	20	355	48	6	7/74	do.	1,180	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

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Hall County												
15JJ27	White Sulphur School (now Air Line School) White Sulphur	G	34°21'10" 83°45'41"	37	401	33	6	10/55	Virginia	1,020	—	—
15KK1	James B. Stewart Rte. 9, Highland Cir. Gainesville	C	34°23'43" 83°49'40"	30	265	98	6	2/75	do.	1,280	—	—
15KK2	Frank Hogan Highland Rd. Gainesville	C	34°24'06" 83°49'42"	60	160	47	6	10/75	do.	1,280	—	—
15KK3	Claude Wofford Cleveland Rd. (Highway 129) Gainesville	C	34°24'25" 83°48'19"	30	190	124	6	10/66	do.	1,200	—	—
15KK4	Clyde Autry, Jr. Honeysuckle Rd. Gainesville	C	34°23'41" 83°47'20"	20	200	125	6	5/56	do.	1,240	—	—
16HH1	Clark & Clark 1864 Thompson Rd. Gainesville	B	34°14'17" 83°42'45"	30	190	84	6	2/57	do.	900	—	190
16JJ1	Albert Winters Rte. 6, Broom Rd. (chicken houses) Gainesville	A	34°18'00" 83°44'48"	30	320	51	6	7/59	do.	1,000	—	—
16JJ2	R. J. Cromley Rte. 10, Box 271 E. Hall Rd. Gainesville	A	34°19'18" 83°44'37"	50	263	37	6	10/69	do.	1,080	—	—
16JJ3	Harrison Elrod, Jr. Rte.10, Miller Cave Rd. Gainesville	A	34°19'52" 83°44'52"	75	400	28	6	8/71	do.	1,095	114	400

Table 9.—Record of wells in the Greater Atlanta Region—Continued

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Haralson County												
3DD1	Hoover-Hanes Corp. Tallapoosa	C	33°43'49" 85°16'28"	100	325	110	—	1971	Adams-Massey	1,160	—	—
3DD2	H. A. Jailett Tallapoosa	C	33°44'01" 85°15'43"	25	126	46	—	1966	do.	1,160	—	—
3DD3	Philip S. Robinson Rte. 1, County Rd. Waco	C	33°39'51" 85°15'27"	75	255	88	6	5/79	do.	1,240	—	—
3EE1	Charles M. Williams Rte. 2 (Steadham Farm) Tallapoosa	C	33°50'14" 85°26'06"	80	203	24	—	1973	do.	1,180	—	—
3EE2	Maurice J. Henry 303 Plant St. Groton, Conn. (Tallapoosa)	C	33°47'56" 85°17'50"	30	100	69	—	1960	do.	1,050	—	—
3EE3	Mercer Brown (for Michael Brown) Rte. 2 Buchanan	C	33°47'46" 85°17'15"	55	144	144	—	1975	do.	1,020	—	—
3EE4	Durward Mize Rte. 1, Mize Brdg. Rd. Tallapoosa	C	33°48'35" 85°16'59"	30	127	58	—	1974	do.	1,060	—	—
3EE5	Herbert Manning Rte.2,Jacksonville Rd. Tallapoosa	C	33°47'10" 85°18'49"	32	222	110	6	6/64	Virginia	1,030	—	—
4DD1	Forsyth Concrete Co. (Clay Jones) P. O. Box 976 Cumming	C	33°41'22" 85°11'23"	20	292	101	—	1974	Adams-Massey	1,280	—	—
4DD2	Aaron Denny Constr.Co. Rte. 2 Bremen	C	33°44'38" 85°10'11"	40	200	60	—	1976	do.	1,260	—	—
4DD4	John Ferrell League Highway 100, South Tallapoosa	C	33°40'09" 85°14'49"	32	200	30	6	2/66	Virginia	1,260	—	—
4EE1	J. W. Brannon Jimmy Cush P. O. Box 187 Buchanan	E	33°47'22" 85°12'13"	30	127	73	—	1973	Adams-Massey	1,110	—	—
4EE2	N. E. Heatherington Rte. 1, Buchanan Rd. Tallapoosa	C	33°45'49" 85°14'02"	32	159	53	6	5/64	Virginia	1,020	—	—
4EE3	Robert Turner Devils Kitchen P. O. Box 123 Bremen	C	33°45'56" 85°11'03"	30	82	50	6	2/79	Adams-Massey	1,340	—	—
5DD16	H. J. Hurst, Sr. Rte. 1 Bremen	C	Not located	75	285	68	6	1963	do.	1,340	—	—
5DD25	Charles A. Easterwood Littlevine Rd. Bremen	C	33°44'22" 85°06'29"	40	234	119	6	9/69	Virginia	1,340	—	—
5EE1	Jon M. Mitcham P. O. Box 338 Temple	B	33°46'44" 85°04'50"	20	202	140	—	1975	Adams-Massey	1,220	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Henry County												
11AA1	John C. Walters, III 33 Woodlawn Ave. Hampton	A	33°22'30" 84°17'05"	54	210	77	6	9/62	Virginia	820	—	—
11BB5	Atlanta Intnl. Raceway Highway 20, West Hampton	A	33°23'03" 84°19'02"	50	500	124	8	10/59	do.	825	7	195
11BB7	City of Hampton, 2 Hampton	A	33°23'08" 84°17'09"	35	300	—	8	1940's	—	865	—	—
11BB8	do., 3	A	33°23'10" 84°17'18"	35	300	—	8	1940's	—	860	—	—
11BB9	do., 4	A	33°23'18" 84°16'50"	30	340	30	8	2/51	Virginia	850	4	150
11BB10	do., 5	A	33°22'42" 84°18'16"	60	160	93	6	6/60	do.	820	145	—
11BB11	do., 6	A	33°22'41" 84°18'16"	60	400	70	6	12/70	do.	830	40	60
11BB12	do., 7	A	33°23'21" 83°16'32"	27	700	138	6	5/73	do.	820	20	315
11BB13	Talmadge Dvlpmt. Corp. Circle Dr. Lake Talmadge Lovejoy	A	33°25'58" 84°21'19"	30	286	23	—	10/53	do.	840	—	—
11BB15	Frank Ritchie Carl Parker Rd. Hampton	A	33°26'06" 84°17'44"	200	415	14	6	1978	Askew-Morris	970	—	—
11BB21	Walter B. Spivey Noah's Ark Rd. Jonesboro	B	33°29'36" 84°17"24"	43	185	40	6	3/73	Virginia	828	—	—
11BB22	Wilbur E. Adams 3386 Noah's Ark Rd. Jonesboro	B	33°29'44" 84°17'29"	25	145	—	—	12/70	do.	835	27	145
11CC16	Louis P. Filoso 4042 Cumberland Dr. Rex	A	33°34'54" 84°15'47"	40	110	12	6	12/60	do.	800	—	—
12AA1	Rocking A Farm Hampton Rd. Locust Grove	A	33°21'38" 84°09'54"	30	214	70	6	9/56	do.	840	40	140
12BB1	Ted Fausel Box 346, Highway 20 Hampton	A	33°23'49" 84°14'37"	20	165	21	6	3/57	do	810	—	—
12BB2	do.	A	33°23'45" 84°14'27"	25	265	42	6	2/60	do.	840	—	—
12BB3	do.	A	33°24'21" 84°14'09"	41	300	88	6	8/68	do.	870	—	—
12BB4	Pete Beshear Box 356-B, Nail Cir. McDonough	A	33°25'05" 84°12'10"	20	255	—	—	3/73	Askew-Morris	860	—	—
12BB5	Selman's Dairy Rte. 3, Hwy. 155 McDonough	A	33°24'11" 84°10'27"	100	105	55	6	10/67	Virginia	880	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Henry County												
12BB6	H. C. Allen Macon Rd. (Highway 23, South) McDonough	A	33°24'17" 84°08'28"	30	204	—	—	11/54	Virginia	890	25	85
12BB7	George Meikel Mt. Olive Rd. McDonough	A	33°28'02" 84°13'22"	75	105	—	—	11/73	Waller	780	—	--
12BB8	KOA Campground Flippen Rd. (Hwy. 351) at I-285 McDonough	A	33°29'03" 84°13'58"	50	425	42	6	4/70	Virginia	880	—	--
12BB9	Trav-L Park (Holiday Inn) I-75 & State Rte. 351 Flippen	A	33°28'43" 84°13'06"	34	66	46	6	3/71	do.	860	10	63
12BB10	Paul H. Smith Campground Rd. McDonough	C	33°29'33" 84°09'09"	25	280	—	—	8/73	Waller	860	—	--
12BB11	George Sorrow Rte. 1, Salem Rd. McDonough	C	33°29'59" 84°09'02"	20	305	—	—	7/78	do.	840	—	—
12BB12	City of McDonough McDonough	A	33°27'14" 84°09'06"	275	500	73	—	1948	Virginia	790	—	--
12CC8	Mrs. Wade C. Hinton Rte. 1, Flat Rock Rd. Stockbridge	B	33°32'57" 84°10'59"	24	386	36	6	12/62	do.	740	--	—
12CC9	R. S. Swanson Highway 138 Stockbridge	C,B	33°32'49" 84°11'13"	40	194	—	—	8/64	Waller	740	—	--
12CC10	W. F. Jones, Jr. Hemphill Rd. Stockbridge	A	33°33'27" 84°10'07"	60	143	28	6	9/68	Virginia	800	—	--
12CC11	Walter D. Cook Cotton Cir. (off Flat Rock Rd.) Stockbridge	B	33°34'40" 84°12'40"	36	305	53	6	10/67	do.	810	70	305
12CC12	Clarence Sheppard Old Ivey Rd. Stockbridge	D	33°34'33" 84°11'38"	20	205	—	--	12/73	Waller	750	—	--
12CC13	E. F. Babb Swan Lake Rd. Stockbridge	D	33°35'58" 84°11'21"	30	82	33	6	11/64	Weisner	850	—	--
12CC14	Hugo Kirk Rte. 1, Austin Rd. Ellenwood	B	33°37'24" 84°12'01"	150	146	126	6	1972	Ward	815	—	—
12CC15	Gerald Culbreth Austin Rd. Stockbridge	D	33°36'49" 84°11'21"	20	130	7	6	7/73	Virginia	800	—	--
12CC16	Rev. John W. Moody Austin Rd. Stockbridge	D	33°37'11" 84°11'08"	40	185	—	—	7/78	Waller	765	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Henry County												
12CC17	Howard W. Stephens Box 341, Fairview Rd. Stockbridge	B,D	33°36'35" 84°10'13"	48	144	26	6	12/60	Virginia	900	—	—
12CC18	H. L. Luther Mays Rd. Stockbridge	B	33°35'29" 84°09'30"	50	145	—	—	5/74	Waller	865	—	—
12CC19	Leonard Harding 3091 Mays Rd. McDonough	B,D	33°35'37" 84°09'46"	25	130	43	6	16/78	Holder	820	—	—
12CC20	Morgan Auto Parts Highway 138, East Stockbridge	B,C	33°32'39" 84°11'23"	100	220	59	6	—	Virginia	820	—	—
12CC21	Ozias Primitive Baptist Church Box 403, Mosely Rd. & Highway 155 McDonough	A	33°32'33" 84°08'19"	60	167	35	6	4/67	do.	790	—	—
12CC22	Leroy Berry, Jr. Selfridge Rd. McDonough	A	33°31'57" 84°08'02"	20	305	—	6	4/75	Waller	700	—	—
12CC23	Harry Cook Highway 155 Stockbridge (or McDonough)	A	33°31'25" 84°08'26"	25	205	—	—	3/73	do.	710	—	—
12CC24	J. B. Gleaton Rte. 2, Box 62 Brannan Rd. McDonough	A	33°30'50" 84°10'02"	100	146	17	6	9/70	Virginia	740	40	140
12CC26	Valley Forge Corp. Safari Motor Inn I-75 & Hudson Brdg.Rd. Stockbridge	D	33°30'21" 84°14'09"	100	300	38	6	7/72	do.	860	—	—
12DD1	Frank Stokes Rte. 1, Hearn Rd. Ellenwood	B	33°37'57" 84°12'11"	200	368	38	6	1972	Holder	785	—	—
12DD2	L. W. Baity Rte. 1, Panola Rd. Ellenwood	A	33°38'31" 84°12'14"	60	86	45	6	1972	Ward	800	—	—
12DD3	William Wehunt 155 Ward Dr. Ellenwood	D	33°38'10" 84°11'14"	30	225	84	6	1/78	Askew-Morris	790	—	—
12DD4	Norman Barnes Cloud-9 Kennels Ward Dr. Ellenwood	D,B	33°38'21" 84°11'11"	20	260	90	6	3/64	Virginia	785	18	64
12DD6	M. W. Buttrill, Inc. Little Mountain Village Ellenwood	D,B	33°38'23" 84°10'59"	30	370	76	6	7/73	do.	770	—	—
13AA1	Six Star Mobile Home Village Rte. 1, Indian Crk.Rd. Locust Grove	A	33°20'06" 84°07'06"	100	258	102	6	10/71	do.	780	37	154

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Henry County												
13AA2	S. H. Gardner, Jr. Highway 23 Locust Grove	A	33°21'43" 84°07'18"	40	126	73	6	5/59	Virginia	860	18	40
13AA3	do.	A	33°22'04" 84°07'12"	50	170	43	6	5/66	do.	870	21	21
13AA4	S. Royce Cox Peeksville Rd. Locust Grove	C	33°21'10" 84°03'13"	30	167	60	6	8/66	do.	700	25	80
13BB1	W. R. Price Keys Ferry Rd. (Highway 81, South) McDonough	A	33°26'17" 84°07'15"	30	325	71	6	5/67	do.	830	—	--
13BB2	Peggy Patrick (old O. W. Price place) Keys Ferry Rd. McDonough	A	33°26'16" 84°07'09"	36	221	49	6	12/68	do.	840	—	--
13BB3	Zack B. Hinton McGarity Rd. McDonough	A	33°27'11" 84°07'13"	32	185	70	6	7/68	do.	790	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Newton County												
14CC12	Jones Rte. 7, Box 262-C Roberts Rd. Covington	A	33°34'08" 83°58'41"	100	148	46	6	1975	Holder	770	—	—
14CC13	W. Charles Bell Salem Rd. Conyers	A	33°35'48" 83°58"15"	36	154	77	6	12/53	Virginia	860	30	90
14CC14	W. C. Bell (daughter) Salem Rd. Conyers	A	33°35'46" 83°58'14"	34	200	10	6	2/55	do.	860	40	146
14CC15	Grady Bloodworth, Sr. Rte. 5, Salem Rd. Covington	A	33°34'07" 83°57'06"	25	180	107	6	12/55	do.	810	—	—
14CC16	Benny J. Dooley McDonough Highway Covington	H,A	33°33'31" 83°55'04"	100	240	62	6	1975	Holder	810	—	—
14CC17	Otis Spillers Spillers Dr. Covington	B	33°35'13" 83°53'30"	65	158	95	6	1974	do.	640	—	—
14CC18	James L. Hayes Salem Rd. Covington	A	33°34'59" 83°57'58"	40	250	148	6	8/70	Virginia	850	—	—
14CC19	H. L. "Roy" Moore Rte. 2, Salem Rd. Covington	A	33°34'56" 83°57'58"	35	208	116	6	9/57	do.	850	—	—
14CC20	Mrs. W. Russell Braden Salem Rd. Covington	A	33°33'42" 83°55'50"	45	240	30	6	8/55	do.	790	60	75
14CC21	Claude I. Madden Atlanta Highway (old Highway 12) Covington	A	33°37'06" 83°53'52"	50	150	50	6	3/75	do.	740	—	—
14DD50	Marion Jakes Towers Rd. Conyers	E	33°42'53" 83°54'57"	100	98	36	6	1976	Holder	690	—	—
14DD51	C. T. Ellington Box 76, Hightower Trl. Oxford	E	33°42'21" 83°54'11"	50	205	—	—	8/77	Virginia	770	—	—
14DD52	Alcovy Realty for Spring Valley Subdiv. Dial Mill Rd. Oxford	B	33°40'26" 83°53'50"	100	375	30	6	1976	Holder	730	—	—
15BB1	Frank Christian (for Benny Rodgers Highway 212 Stewart	A,B	33°26"01" 83°51'18"	200	188	24	6	1974	do.	650	—	—
15CC1	R. H. Gazaway RFD, Steele Rd. Covington	H	33°31'41" 83°51'01"	50	500	—	—	2/75	Waller	770	—	—
15CC2	Bryant Steel (Contractors) Steele Rd. Covington	A	33°31'35" 83°50'37"	20	354	—	—	11/73	do.	705	—	—

Table 9.—Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Newton County												
15CC3	D. L. Knox Big Woods Rd. (at Dixie Rd.) Starrsville	B	33°31'32" 83°48'52"	60	158	37	6	1975	Holder	730	—	--
15CC4	A. J. Robinson Bo Jones Rd. Starrsville	B	33°32'51" 83°48"01"	60	173	75	6	1975	do.	715	—	--
15CC5	Sam B. Hay, Jr. Dearing Rd. Covington	A	33°31'57" 83°50'08"	100	250	45	6	1975	do.	750	—	--
15CC6	Guy V. Evans Highway 142, South Covington	A	33°34'42" 83°46'54"	100	143	50	6	1977	do.	740	—	—
15CC7	Guy McGiboney Highway 142, South Covington	B	33°34'56" 83°46'44"	75	200	118	6	1976	do.	710	—	--
15CC8	Dr. Johnny Capes Highway 142, South Covington	B	33°34'58" 83°46'35"	60	173	96	6	1974	do.	715	—	--
15CC9	Warren Jones Newton Ridge Subdiv. Highway 142, South Covington	A	33°35'19" 83°46'34"	150	395	50	6	1974	do.	745	—	—
15CC10	John Fairburn Skyline Dr. Skyline Subdiv. Covington	B	33°35'35" 83°45'26"	100	124	94	6	1975	do.	815	—	--
15CC11	Clybel Farms Highway 142 Pony Express	B	33°33'51" 83°45'05"	150	335	50	6	1977	do.	800	—	—
15DD1	Covington Recre- ation Department City Pond Rd. Covington	B	33°37'39" 83°50'45"	200	220	95	6	1975	do.	790	—	--
15DD2	R. L. Stewart City Pond Rd. Covington	B	33°38'12" 83°50'30"	150	415	44	6	1975	do.	815	—	—
15DD3	Ray Dial Highway 81 (at Dial Mill Rd.) Oxford	A	33°38'52" 83°51'45"	100	128	80	6	1975	do.	810	—	--
15DD4	Bobby Evans (now Donald Bryant) Macedonia Church Rd. Oxford	B	33°40"32" 83°52'07"	150	158	80	6	1974	do.	763	—	--
15DD5	William White Rogers Hill Rd. Oxford	A	33°40'37" 83°50'15"	60	143	84	6	1976	do.	770	—	—
15DD6	W. Henry Crews Alcovy Rd. Covington	B	33°39'39" 83°47'49"	100	120	42	6	11/74	Virginia	760	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Newton County												
15DD7	Thomas Reed Hazelbrand Rd. Covington	B,A	33°38'33" 83°47'31"	100	113	35	6	1975	Holder	720	--	--
15DD8	Gilbert Gober Hamby Lane Covington	A	33°38'36" 83°46'42"	150	323	30	6	1975	do.	655	--	--
16CC2	Ralph Hale Highway 142 Pony Express	A	33°33'04" 83°44'23"	100+	83	60	6	1975	do.	720	--	--
16CC3	Arnold Cherry Highway 11 Pony Express	B	33°33'03" 83°44'23"	100+	203	43	6	1975	do.	760	--	--
16CC4	Tommy Breedlove Hwy. 142 at Hwy. 11 Pony Express	A	33°33'11" 83°44'22"	200+	285	40	6	1975	do.	780	--	--
16CC5	H. G. Holder Highway 278 Hub Hollow Covington	B	33°36'09" 83°44'09"	150	333	91	6	1975	do.	780	--	--

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Pickens County												
11KK1	Cousins Proprts., Inc. Big Canoe Resort Marblehill	--	34°27'58" 84°18'39"	80	275	31	6	6/72	Virginia	1,620	--	--
11KK5	do.	--	34°26'41" 84°16'45"	21	300	33	6	11/72	do.	1,420	45	207
11KK6	do.	--	34°26'17" 84°17'13"	50	330	25	6	3/73	do.	1,380	6	246
11KK17	do.	--	34°27'32" 84°17'30"	28	225	65	6	8/73	do.	1,790	--	168
11KK18	do.	--	34°27'22" 84°17'21"	60	500	65	6	8/73	do.	1,500	10	242
11KK20	do.	--	34°26'27" 84°16'39"	21	306	38	6	10/73	Ward	1,400	3	145
11KK22	do.	--	34°25'50" 84°16'29"	102	286	46	6	6/73	do.	1,560	22	41
11KK23	do.	--	34°26'52" 84°16'01"	129	146	75	6	12/71	do.	1,540	27	86
11KK26	A. J. Padgett Rte. 1, Box 337 Ball Ground	--	34°24'18" 84°18'11"	100	305	21	6	1974	Ward	1,440	--	--

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Rockdale County												
12CC28	John L. Davenport 4390 Bowen Rd. Conyers	A	33°34'23" 84°08'01"	85	160	50	—	1978	Holder	740	—	—
12CC29	J. Lamar Martin 3979 Union Church Rd. Conyers	A	33°34'31" 84°07"33"	60	128	51	—	1973	do.	760	—	—
12CC30	Walter Krygier 3800 Union Ch. Rd., SW Stockbridge	A	33°35'19" 84°08'06"	50	143	42	—	3/73	Virginia	820	—	—
12CC31	William D. Manley 4356 Hwy. 138, East Stockbridge	A	33°35'34" 84°07'39"	40	165	45	—	5/67	do.	820	30	165
12CC32	James N. Moore 3307 Union Church Rd. Conyers	B	33°36'06" 84°08'16"	200	283	35	—	1970's	Holder	795	—	—
12CC33	Harold Cox 3241 Union Church Rd. Stockbridge	B	33°36'22" 84°08'16"	25	345	85	—	4/70	Virginia	810	15	175
12CC34	William Bell 5320 Alexander Lake Rd. Stockbridge	B	33°37'17" 84°09'38"	75	158	77	—	1978	Holder	820	—	—
12DD5	M. W. Buttrill, Inc. Little Mountain Village Ellenwood	F	33°38'32" 84°10'59"	32	300	—	—	1963	Virginia	790	—	—
12DD7	Floyd E. Stephens	D,F	33°37'41" 84°08'27"	30	200	15	6	1965	do.	780	—	—
13CC47	Plantation Manor Children's Home 2394 Morrison Rd. Conyers	A	33°35'04" 84°04'01"	50	235	—	—	1949	do.	710	25	—
13CC50	J. B. Langston 3450 Hwy. 138, SW Conyers	A	33°36'00" 84°05'56"	100	429	—	—	6/76	do.	700	—	—
13CC51	Ralph Almand 2499 Hwy. 212, SW Conyers	B	33°37'24" 84°04'55"	75	345	63	—	6/78	—	820	—	—
13CC53	Donald M. Spencer 2245 Goode Rd. Conyers	A	33°36'21" 84°03'36"	75	285	37	—	8/78	Virginia	750	—	—
13CC54	Head Realty, #5 Fairoaks Subdivision Ebenezer Rd. Conyers	A	33°36"16" 84°02'30"	46	300	74	—	9/77	do.	730	2	210
13CC56	Julia Kennedy 2333 Hwy. 138, SW Conyers	A	33°37'19" 84°03'26"	50	205	21	—	2/78	Ward	815	—	—
13CC57	Ed Wilson Deere Rd.,off Hwy.138 Conyers	A	33°37'16" 84°03'35"	100	75	36	—	—	Holder	820	—	—

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Rockdale County												
13CC58	Terry Snider Boulder Dr. Stockbridge	A	33°35'04" 84°04'03"	100+	340	—	—	4/79	Explora	770	—	—
13DD2	Ernest Abbott Abbott Estates (Sargent owns) Conyers	B	32°40'48" 84°04'32"	50	250	18	—	11/61	Virginia	860	10	150
13DD3	James E. Abbott, Jr. 2588 Abbott Rd. Conyers	B	33°41'02" 84°04'20"	20	135	—	—	9/62	do.	890	38	55
13DD9	J. J. Mitchell (now Carmichael) McDaniels Mill Rd. Conyers	B	33°39'44" 84°04'28"	200	372	28	—	1962	Weisner	865	—	—
13DD18	Westminster Presby- terian Church Camp Westminster Lake Rockaway Rd. Lithonia	B	33°42'36" 84°02'46"	25	209	47	—	2/64	Virginia	840	40	98
13DD53	Joseph A. Stanton 814 Hwy. 138, SW Conyers	B	33°38'12" 84°01'13"	35	205	33	—	10/55	do.	880	42	70
13DD54	City of Conyers Conyers	B	33°40'24" 84°01'39"	45	350	—	—	—	do.	890	—	—
13DD55	do.	B	33°40'14" 84°01'17"	120	550	34	—	1930	do.	910	—	—
13DD56	do.	B	33°39'54" 84°00'33"	348	410	103	—	Before 1966	do.	880	60	—
13DD58	Woody Parker 2171 Hwy. 212, SW Conyers	B	33°37'48" 84°05'29"	40	55	14	—	7/59	do.	850	—	—
13DD59	Philip J. Rodgers 1019 Meadow Lane (2365 Hwy. 212) Conyers	B	33°37'37" 84°05'15"	70	245	46	—	9/67	do.	860	—	—
13DD61	John M. Frazier 3230 Old Klondike Rd. Conyers	C	33°39'18" 84°05'26"	100+	310	38	—	—	Holder	780	—	—
13DD62	J. K. Kilgore 1950 Smyrna Rd. Conyers	B	33°38'14" 84°03'38"	30	155	33	—	8/62	Virginia	850	—	—
13DD63	R. Darden Archer & L. B. Still, Jr. 1801 Flat Shoals Rd. Conyers	B	33°39"03" 84°02'48"	45	235	86	—	12/55	do.	880	45	45
13DD65	J. Tom Grenade 2102 Flat Shoals Rd. Conyers	B	33°39'08" 84°03'24"	36+	250	137	—	7/56	do.	860	—	—
13DD66	Bobby Hudgins Flat Shoals Rd. Conyers	B	33°39'10" 84°03'15"	40	101	23	—	6/55	do.	865	10	25
13DD67	C. R. Vaughn 2150 Millers Chapel Rd. Conyers	B	33°38'13" 84°01'02"	36	223	58	—	4/57	do.	850	15	36

Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Rockdale County												
13DD69	City of Conyers Conyers	B	33°40'24" 84°02'32"	172	435	25	—	7/74	Virginia	920	25	160
13DD74	Lewis G. Abbott 163 Abbott Rd. Conyers	B	33°41'15" 84°04'23"	100	258	32	—	1/65	do.	860	—	—
13DD76	Joseph A. Abbott 186 Abbott Rd., SW Conyers	B	33°41'08" 84°04'14"	30	250	—	—	3/67	do.	890	30	120
13DD77	James Paul Whitley,Jr. 2332 Old Covington Hwy. Conyers	B	33°41'13" 84°03'54"	35	133	44	—	5/61	do.	920	15	50
13DD78	Standard Oil Co. Sigman Rd. at I-20 Conyers	B	33°41'00" 84°03'48"	30	198	22	—	9/65	do.	940	—	—
13DD81	Westminster Presby-terian Church, 3 Camp Westminster Lake Rockaway Rd. Lithonia	B	33°42'48" 84°02'32"	20	250	72	—	4/67	do.	770	50	150
13DD83	Reginald Dunston 1060 Bethel Rd. Lithonia	B	33°44'40" 84°01'19"	30	470	—	—	8/77	Waller	865	—	—
13DD84	Lakeview Estates, 1 Lake Rockaway Rd. Conyers	B	33°42'22" 84°02'02"	32	627	20	—	10/62	Virginia	740	—	—
13DD85	do., 2	B	33°42'39" 84°02'08"	46	400	37	—	5/65	do.	720	15	200
13DD86	do., 3	B	33°42'48" 84°02'26"	45	225	155	—	3/67	do.	750	—	—
13DD87	do., 4	B	33°42'52" 84°02'28"	42	385	84	—	10/68	do.	740	20	105
13DD88	do., 5	B	33°42'51" 84°02'20"	43	305	40	—	7/70	do.	715	30	273
13DD89	Eugene Humphries 3322 Irvin Bridge Rd. Conyers	B	33°43'58" 84°01'07"	150	230	12	—	1971	Ward	900	—	—
13DD90	Jim Florence Smyrna Rd. Conyers	B	33°38'23" 84°03'35"	50	40	20	6	1979	Explora	860	—	—
14CC10	Little Hope Ranch 1464 Christian Cir.,SE Conyers	A	33°34'49" 83°59"55"	60	146	42	—	3/71	Virginia	770	—	—
14CC11	Mack H. Barnes, Jr. 2880 Old Salem Rd. Conyers	A	33°37'08" 83°59'33"	100	550	76	—	9/72	do.	800	—	—
14DD2	Hi-Roc Devlpmnt. Corp. Conyers	B,E	33°42'15" 83°58'52"	100	130	107	—	4/64	do.	680	—	—
14DD3	Parks Printing Co. (out of business) Milstead	B	33°41'32" 83°59'51"	60	550	—	—	1947	do.	690	25	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Rockdale County												
14DD4	Parks Printing Co. (out of business) Milstead	B	33°41'29" 83°59'55"	75	237	30	—	1950	Virginia	700	—	—
14DD5	Gray Realty Co. (Town of Milstead) Old Callaway Mills Rd. Milstead	B	33°41'00" 83°59'29"	60	550	—	—	—	do.	800	25	—
14DD20	H & H Construction Co. (Sid Herring) Gees Mill Rd. Conyers	A	33°39'09" 83°58'00"	25	203	55	—	4/60	do.	805	—	—
14DD21	H. R. Payne, #12 2840 Gees Mill Rd. Conyers	B	33°39'36" 83°57'11"	100	263	8	—	3/62	Holder	785	—	—
14DD26	John Steincher 3131 Dennard Rd. Conyers	B	33°40'56" 83°56'37"	60	108	70	—	1963	Weisner	760	—	—
14DD45	A T & T Building 4A 2315 Salem Rd. Conyers	A	33°37'44" 83°58'45"	28	700	105	—	3/58	Virginia	860	34	200
14DD46	do.	A	33°37'32" 83°58'16"	32	700	106	—	3/58	do.	860	—	—
14DD47	Violet M. Edwards c/o Moonlight Drive-In Theatre (at drive-in) Conyers	A	33°37'50" 83°58'28"	30	400	79	—	7/55	do.	860	—	—
14DD53	do. (Golf Course)	A	33°37'32" 83°58'15"	120	329	126	—	11/64	do.	840	—	—
14DD57	John Deere Plant 2001 Deere Rd. Conyers	A	33°37'53" 83°57'28"	44	35	1	—	8/74	do.	800	—	—
14DD58	do.	A	33°37'50" 83°57'30"	43	35	35	—	8/74	do.	800	10	20
14DD60	Johnny Arnold 2775 Gees Mill Rd. Conyers	B	33°39'29" 83°57'15"	30	106	51	—	2/78	Ward	825	—	—
14DD61	H. R. Payne, #11 2840 Gees Mill Rd. Conyers	B	33°39'35" 83°57'14"	36	130	20	—	3/62	Virginia	790	17	60
14DD63	City of Conyers Conyers	B	33°40'28" 83°59'47"	125	500	25	—	6/68	do.	770	25	210
14DD70	Hi-Roc Devlpmnt. Corp. Conyers	E,B	33°42'44" 83°58'14"	100	180	98	—	1/71	do.	720	—	—
14DD71	J. Wayne Moulton 3280 White Rd., NE Conyers	B,E	33°43'28" 83°57'58"	30	280	40	—	1978	Holder	805	—	—
14EE20	Mrs. Gwinnett Cox 4760 Highway 20 Loganville	C	33°46'21" 83°59'11"	60	125	8	—	1955	do.	880	—	—

Table 9.—Record of wells in the Greater Atlanta Region—Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Spalding County												
10AA11	T & A Enterprises (now Atlanta Processing) off New Salem Rd. Griffin	A	33°18'05" 84°23'57"	185	325	75	—	4/75	Virginia	755	—	—
11AA10	Jones-Susong, Inc. Harbor House Sunnyside, 1 Hampton	C	Not located	22	450	54	—	11/73	do.	—	—	—
11AA11	do., 2	C	Not located	91	494	45	—	12/73	do.	—	—	—
11Z1	W. D. (Bill) Landrum Carver Rd. Griffin	A,J	33°12'16" 84°18'02"	150	285	32	—	12/65	Virginia	881	—	—

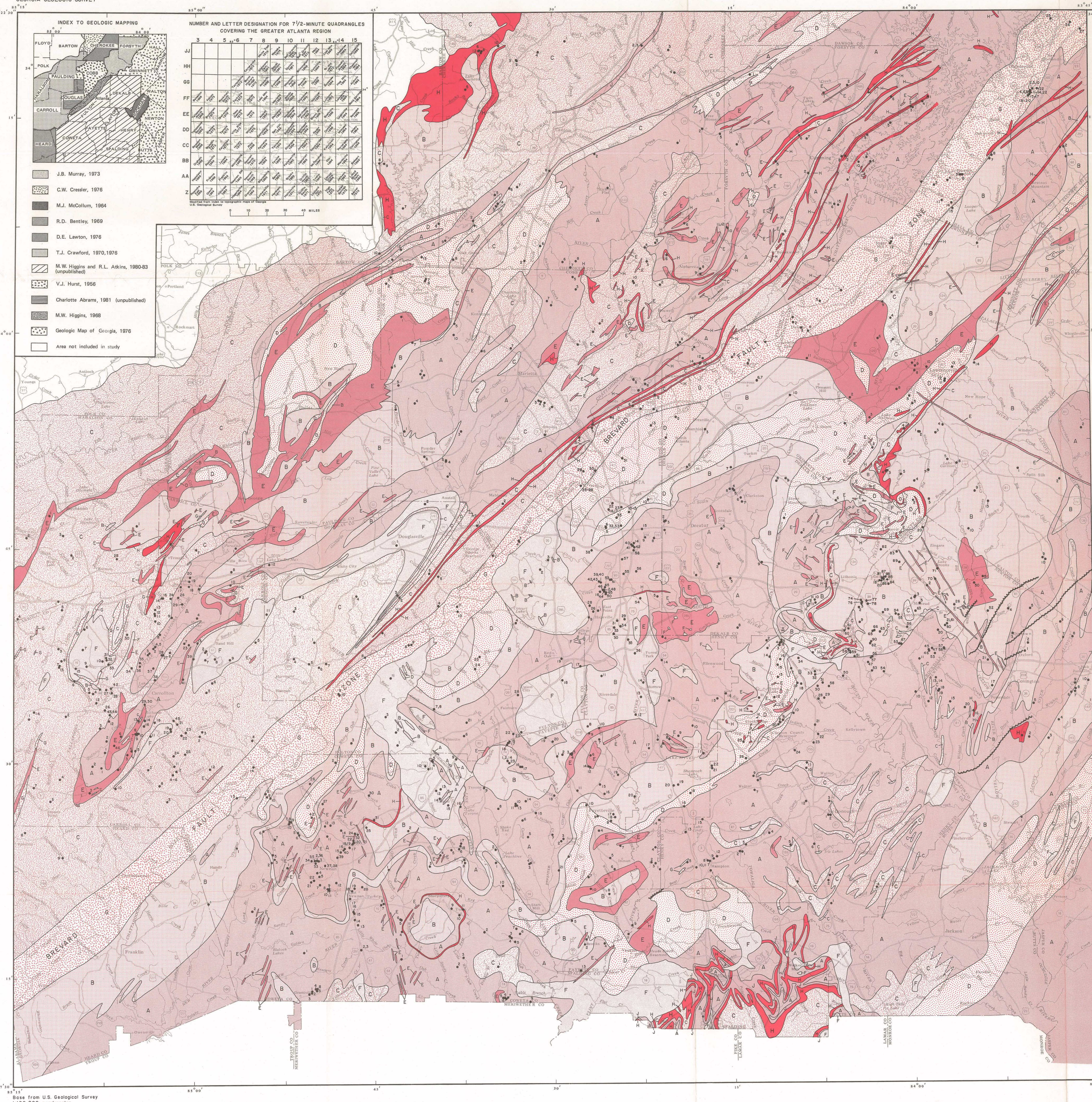
Table 9.--Record of wells in the Greater Atlanta Region--Continued

Well No.	Owner	Water-bearing unit	Latitude and longitude	Yield (gal/min)	Depth (ft)	Casing depth (ft)	Casing diam. (in.)	Date drilled	Driller	Elevation (ft)	Water level below land surface: Static head (ft)	Water level below land surface: Pumping head (ft)
Walton County												
14EE9	Ralph Chandler Box 101 Jersey	B	33°48'49" 83°54'49"	50	397	48	6	5/74	Virginia	907	50	397
14EE10	J. W. Henderson Sharon Road Loganville	B	33°46'17" 83°55'22"	100	70	40	6	8/78	Holder	900	--	--
14EE13	J. C. White Green St. Loganville	B	33°48'12" 83°53'43"	30	205	77	6	7/77	Virginia	820	--	--
15DD9	Vincent Goransky Rte. 3, Box 431 (Cornish Creek Rd.) Covington	B	33°44'12" 83°49,12"	60	250	160	6	7/74	do.	770	--	--
15DD10	Paul Smith Rte. 3 Cornish Creek Rd. Covington	B	33°44'05" 83°48'57"	30	265	70	6	6/77	do.	740	--	--
15EE1	Robert A. Escoe Bay Creek Rd. Loganville	B	33°50'30" 83°51'13"	50	157	66	6	12/64	do.	920	--	--
15EE2	E. E. Berryman Smith Rd. Between	B	33°49'43" 83°47'42"	60	400	31	6	1976	Holder	900	--	--
15FF2	Daniel H. Warren off Carl Davis Rd. Monroe	A	33°53'16" 83°45'49"	50	285	26	6	8/77	Virginia	840	--	--
16EE2	Russell Dillard Jersey Rd. Monroe	--	33°45'27" 83°44'54"	40	240	87	6	5/77	do.	780	--	--
16EE3	Rolling Hills Mobile Home Park Genes Bell Rd. Monroe	--	33°47'34" 83°39'49"	30	500	170	6	6/73	do.	820	22	230
16EE4	Transcontinental Gas Co. Winder Rd. Monroe	--	33°49'49" 83°41'33"	120	436	89	6	6/57	do.	860	--	--
17EE1	Harris Lowe High Shoals Rd. Good Hope	--	33°47'13" 83°36'18"	100	120	28	6	10/70	do.	800	--	--
17EE2	Thomas Chandler Highway 83 Good Hope	--	33°45'40" 83°34'13"	60	203	100	6	1977	Holder	780	--	--


PAULDING
HARALSON
DOUGL
CARROLL
COWE
HEARD
Braswell
New Hope
Dallas
Yorkville
Hiram
Felton
Draketown
Buchanan
Temple
Villa Rica
Winston
Bremen
Waco
Bill Arp
Bowdon Junction
Jake
Mt Zion
Sand Hill
Fairplay
Hulett
Rico
Carrollton
Jonesville
Bowdon
Clem
Banning
Victory
Whitesburg
Roscoe
Tyus
Lowell
Yates
Roopville
Madras
Dodson
Veal
Sargent
Arnco Mills
Ephesus
Glenloch
Roosterville
Welcome
Centralhatchee
Newnan
East N
Franklin
St Charles
Tallapoosa
River
Lick Log Cr
Sweetwater
Gothards
Pumpkinvine Cr
Raccoon
Snake
Whooping
Little
Turkey Cr
Dog R
Cedar Cr
CHATTAHOOCHEE
Creek
Mountain
New
SEABOARD
SOUTHERN
CENTRAL
GEORGIA

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

Prepared in cooperation with the
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



EXPLANATION

Principal Water-Bearing Units

A

YIELD--Well yields range from 20 to 275 gal/min, averaging 56 gal/min.
DEPTH--Wells range in depth from 35 to 2,175 ft, averaging 294 ft. Casing depths range from 0 to 200 ft, averaging 60 ft.
TOPOGRAPHIC SETTINGS--Twenty-two percent of the wells occupy slopes, 35 percent are in broad lowlands, 22 percent are on uplands-ridge crests, and 4 percent are in draws and hollows.
METHODS--Effective methods for selecting high-yielding well sites are (1) contact zones within multilayered rock units, (2) small-scale structures that localize drainage development, (3) zones of fracture concentration, (4) topography and soil thickness, and (5) stress relief fractures in settings similar to the one shown in figure 28. In the area of dendritic drainage, the methods are effective mainly in headwaters areas, especially where the strike of the rock layers and drainage courses are parallel.
ROCK TYPE--Unit A is a complex aquifer consisting of interlayered amphibolite, gneiss, and schist in varying proportions and thicknesses. In some areas the unit is predominantly amphibolite containing thin layers of gneiss. In others, the dominant rock type is gneiss interlayered with amphibolite or schist, or both. Also common are areas of gneiss interlayered with schist and schist interlayered with gneiss. Interlayering of two different lithologies, and commonly three, is highly significant because the contact zones between the contrasting layers have the potential for developing increased permeability. Wells in the unit may penetrate several permeable contact zones that contribute to the total yield.

B

YIELD--Well yields in Unit B range from 20 to 348 gal/min, averaging 72 gal/min.
DEPTH--Wells range in depth from 40 to 825 ft, averaging 271 ft. Casing depths range from 3 to 266 ft, averaging 54 ft.
TOPOGRAPHIC SETTINGS--Thirty-three percent of the wells occupy slopes, 45 percent are in broad lowlands, 2 percent are on uplands-ridge crests, and 14 percent are in draws and hollows.
METHODS--Effective methods for well site selection are (1) stress relief fractures in topographic settings similar to those shown in figures 12-14 and 28, (2) shear zones, (3) contact zones with Units A, C, E, and possibly G, (4) small-scale structures that localize drainage development, and (5) fault zones. In the area of dendritic drainage, the last three methods are effective mainly in headwaters areas.
ROCK TYPE--Unit B consists of granitic gneiss containing biotite, muscovite, quartz, and feldspar in order of increasing abundance. In some areas the unit includes layers of amphibolite and other rocks.

C

YIELD--Well yields range from 20 to 150 gal/min, averaging 47 gal/min.
DEPTH--Wells range in depth from 67 to 700 ft, averaging 195 ft. Casing depths range from 4 to 144 ft, averaging 53 ft.
TOPOGRAPHIC SETTINGS--Nineteen percent of the wells occupy slopes, 19 percent are in broad lowlands, 27 percent are on uplands-ridge crests, and 20 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) small-scale structures that localize drainage development, (2) contact zones with Units B, D, E, F, H, and in some areas G, and (3) contact zones between schists and graywacke and quartzite layers within the unit. In the area of dendritic drainage, the methods will be effective mainly in headwaters areas.
ROCK TYPE--The unit consists of muscovite, feldspar, sillimanite, and quartz schists locally interlayered with thin to thick beds of graywacke, quartzite, and other rocks. Garnet, graphite, and biotite are common accessary minerals. In places, the schists are interlayered with hornblendic units.

D

YIELD--Well yields range from 20 to 351 gal/min, averaging 56 gal/min.
DEPTH--Wells range in depth from 82 to 710 ft, averaging 270 ft. Casing depths range from 7 to 140 ft, averaging 56 ft.
TOPOGRAPHIC SETTINGS--Twenty percent of the wells occupy slopes, 27 percent are in broad lowlands, 36 percent are on uplands-ridge crests, and 6 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) small-scale structures that localize drainage development, (2) contact zones between rocks of contrasting character, both with Units A, C, E, and G at the edge of the unit and with dissimilar rock layers within the unit, (3) topography and soil thickness, (4) fault zones, and (5) stress relief fractures. In the area of dendritic drainage, the first four methods are effective mainly in headwaters areas. Stress relief fractures may be present beneath topographic settings similar to those shown in figures 12-14 and 28.
ROCK TYPE--The principal rock type in the unit is biotite gneiss. In some areas, lenses of amphibolite and layers of schist and other rocks also occur. Deep weathering and a thick red soil characterize the unit.

E

YIELD--Well yields range from 20 to 471 gal/min, averaging 79 gal/min.
DEPTH--Wells range in depth from 67 to 386 ft, averaging 191 ft. Casing depths range from 8 to 116 ft, averaging 46 ft.
TOPOGRAPHIC SETTINGS--Seventeen percent of the wells occupy slopes, 35 percent are in broad lowlands, 28 percent are on uplands-ridge crests, and 3 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) contact zones with Units B, C, D, F, and G, (2) small-scale structures that localize drainage development, (3) zones of fracture concentration that parallel drainages, and (4) stress relief fractures. In the area of dendritic drainage, the first three methods are effective mainly in headwaters areas.
ROCK TYPE--The unit consists of metamorphosed mafic rocks, including amphibolite, hornblende gneiss, metagabbro, metavolcanics, and metamorphosed ultramafic rocks (mafic rocks without feldspar). Locally the rocks are chloritized. Diabase, a dark intrusive rock that forms dikes, also is part of this unit. Interlayers of biotite and granitic gneiss and schist also occur.

F

YIELD--Well yields range from 20 to 150 gal/min, averaging 43 gal/min.
DEPTH--Wells range in depth from 43 to 422 ft, averaging 192 ft. Casing depths range from 11 to 187 ft, averaging 57 ft.
TOPOGRAPHIC SETTINGS--Thirty percent of the wells occupy slopes, 30 percent are in broad lowlands, 15 percent are on uplands-ridge crests, and 15 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) contact zones with Units A, C, E, G, and possibly Unit D depending on the degree of foliation, and with inclusions of contrasting character, (2) small-scale structures that localize drainage development, (3) topography and soil thickness where low bedrock permeability requires the use of bored wells, (4) zones of fracture concentration, and (5) fault zones. The methods should be most useful in headwaters areas, except for (3) which can be applied in most areas having a suitable combination of topographic setting and saprolite thickness.
ROCK TYPE--The unit consists primarily of muscovite and biotite granite. Inclusions of schist, gneiss, amphibolite, and other rocks may occur locally.

G

YIELD--Well yields range from 20 to 225 gal/min, averaging 74 gal/min.
DEPTH--Wells range in depth from 110 to 800 ft, averaging 323 ft. Casing depths range from 8 to 207 ft, averaging 84 ft.
TOPOGRAPHIC SETTINGS--Four percent of the wells occupy slopes, 75 percent are in broad lowlands, 15 percent are on uplands-ridge crests, and 4 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) small-scale structures that localize drainage development, including the dip and strike of foliation and layering, (2) contact zones between rock layers of contrasting character where exposures are adequate to reveal rock types in low-lying areas, and (3) topography and soil thickness.
ROCK TYPE--The unit includes a variety of cataclastic rocks formed by the crushing and fracturing of preexisting rocks as a result of mechanical forces, as well as unaltered rocks from other units. Some of the most common cataclastic rocks are mylonite, phyllonite, and button schist, all classified according to texture rather than mineralogy.

H

YIELD--Well yields range from 20 to 200 gal/min, averaging 72 gal/min.
DEPTH--Wells range in depth from 122 to 500 ft, averaging 297 ft. Casing depths range from 30 to 85 ft, averaging 58 ft.
TOPOGRAPHIC SETTINGS--Forty-five percent of the wells occupy slopes, 9 percent are in broad lowlands, 27 percent are on uplands-ridge crests, and 18 percent are in draws and hollows.
METHODS--Effective methods for selecting well sites are (1) small-scale structures that localize drainage development, especially the dip and strike of layering and jointing, (2) contact zones, mainly with Units A and C, and (3) zones of fracture concentration in favorable topographic settings. In the area of dendritic drainage, the methods are mainly effective in headwaters areas.
ROCK TYPE--The unit consists mainly of muscovite-bearing quartzite that in the south part of the area commonly contains garnet and sillimanite. In some areas the quartzite is interlayered with phyllite or schist.

J

YIELD--Well yields in Unit J range from 31-150 gal/min, averaging 76 gal/min.
DEPTH--Wells range in depth from 240 to 505 ft, averaging 376 ft. Casing depths range from 28 to 314 ft, averaging 138 ft.
TOPOGRAPHIC SETTINGS--One hundred percent of the wells are in broad lowlands.
METHODS--Effective methods for well site selection are (1) small-scale structures that localize drainage development, (2) topography and soil thickness, and (3) zones of fracture concentration, taking into account surface indications of bedrock permeability such as lines of sinkholes and depressions, and straight stream and valley segments. In the area of dendritic drainage, the methods may be effective mainly in headwaters areas.
ROCK TYPE--In the north half of the area, Unit J consists of micaceous marble and calcareous mica schist. Being highly soluble, much of the unit accumulates a thick soil cover and is poorly exposed. Outcrop widths indicate that the unit probably is several hundred feet thick. In the south part of the area, the unit consists of 50 to 200 ft of thinly layered calcareous metatuff containing lenses and layers of calcite marble.

CONTACT--Approximately located; dashed where less accurate; dotted where concealed

SHEAR ZONE

WELL AND IDENTIFICATION NUMBER

Cartography by Willis G. Hester and Ellie S. Black