Table 3.—Record of selected wells

[Aquifers: To, Ocala; Tc, Claiborne; Pw, Wilcox; Pr, Clayton; Pc-Kp, Clayton-Providence; Kp, Providence; Kr, Ripley; Kp-Kc, Providence-Cusseta; Kc, Cusseta; Kb, Blufftown. Use of water: I, industrial; P, public supply; A, agricultural; D, domestic; O, observation. F, flowing. Water level: Reported levels are given in feet; measured levels are given in feet and tenths.]

County	Well No.	Georgia Geologic Survey No.	Latitude-longitude	Name or owner	Date drilled or modified	Depth of well (ft)	Depth of casing (ft)	Diameter of well (in.)	Altitude of land surface (ft)	Aquifer(s)	Water level: Above (+) or below (-) land surface (ft)	Water level: Date of measurement	Yield (gal/min)	Specific capacity [(gal/min)/ft]	Use	Remarks
Calhoun	8E3	—	312621-0844335	Arlington	—	1,173	—	—	303	Kp	-40	1909	—	—	F	—
Clay	5L3	556	313640-0850322	Ft. Gaines	1958	375	310	8	148	Kp	+20 +35.7	4/3/58 10/80	230 125F	4.34	F	8-in. screen set at 310-320, 350-360 ft, gravel packed. Water-quality analysis made 4/3/58 & 4/17/68
Do.	5L7	—	313628-0850314	Ft. Gaines, 3	1979	550	456	24,8	232	Kp	-20 -27.1	2/1/79 8/26/81	500	4.34	P	8-in. screen set at 330-340, 355-365, 370-385, 425-445 ft.
Do.	5L4	—	313727-0850355	W.F. George Lock and Dam Plant (powerhouse)	—	372	324	—	96	Kp	F	8/3/60	1,100 600F	10.58	I	Screen set at 324-354 ft. Well flowed 8/3/60. Well located on Alabama side of Chattahoochee River, at powerhouse.
Do.	5M2	—	313731-0850341	USA C. of E. Test well 3	—	343	316	8,6	135	Kp	+33	12/55	800F	—	O	Open hole, 316-343 ft. Observation well for dewatering operations. Water-quality analysis, 8/27/57.
Do.	5L2	—	313640-0850320	Ft. Gaines	1909	264	260	—	150	Kp	+30	1909	300F	—	F	—
Dooly	14B6	3393	321209-0835422	Byromville, 2	1979	610	260	26,8	358	Tc,Kp	-46 -78.5	6/13/79 10/23/80	402	6.09	P	8-in. screen set at 260-280, 330-340, 580-600 ft.
Do.	15B6	—	320338-0834800	J. Grady Jones	—	500	—	—	365	Pc,Kp	-21.7 -31.5	2/1/51 4/2/81	—	—	D	—
Do.	14A1	—	321241-0843806	J. D. Lester	—	582	582	—	385	Kp	-100 -79.9	1/30/51 4/2/81	—	—	D	—
Dougherty	12L21	3406	313534-0841030	U.S.G.S. Test well 10	1978	843	810	14, 6,5	198	Kp	-116.9 -138.5	12/19/78 10/80	—	—	O	8-in. screen set at 810-830 ft. Continuous water-level recorder installed 12/78. Water-quality analysis, 11/21/78.
Do.	11K1	183	312654-0842101	U.S.G.S. Sealy 2	1978	1,200	1,103	—	184	Kp-Kc	-13.4 -12.2	11/6/78 4/18/79	—	—	O	Unused oil-test well drilled 1942. Original total depth, 3,500 ft.
Do.	11L13	—	313014-0841859	St. Joe - Barnett	1941	795	540	6	180	Pr,Kp	+23.1	11/28/41	270F	—	D	6-in. open hole from 540-795 ft. Well caved to 540 ft in 1978.
Do.	12L29	—	313559-0841224	Lakeside Development	1950	823	620	—	220	To, Pr,Kp	-17	2/1/50	250	—	D	Water-level measurement made during testing of lower strata. Finished well taps To, Pr, and Kp aquifers.
Do.	12L20	—	313534-0841030	U.S.G.S. Test well 6	1978	690	619	6	198	Pc	-125.4	1/18/78	—	—	O	Open hole, 619-690 ft. Water-quality analysis, 3/7/78.
Early	6E1	321	312332-0845551	Blakely, 3 (Howell Ave.)	1952	960	—	12,10	310	Pr, Kp-Kc	-40	1952	500	—	F	Well caved, 1964.
Do.	6E5	—	312246-0845600	Blakely, 1	1931	809	650	8	240	Pr,Kp	-20	5/15/46	500	—	F	Open hole, 650-809 ft. Water-quality analysis, 5/16/46.
Houston	16T4	—	322652-0833736	Pabst Brewery	1973	700	300	26, 16,12	295	Kp-Kc, Kb	-4	6/5/73	1,560	24.0	I	Screen set at 300-325, 490-510, 560-620 ft.
Do.	16T2	1094	322619-0833812	Pabst Brewery, 4	1967	640	295	26, 16,12	300	Kp-Kc, Kb	-5 -12.4	12/18/67 10/22/80	1,557	67.70	I	12-in. screen set at 295-300, 310-330, 340-360, 438-443, 510-520, 560-565, 580-585, 600-630 ft.
Do.	16T9	2160	322640-0833719	Pabst Brewery, 2	1969	625	320	26, 16,12	320	Kp-Kc, Kb	-25 -35.6	7/23/69 10/22/80	1,985	66.04	I	12-in. screen set at 320-340, 390-410, 525-545, 580-620 ft.
Do.	16T3	2139	322629-0833801	Pabst Brewery, 3	1969	710	330	26, 16,12	315	Kp-Kc, Kb	-19	5/12/69	1,543	35.88	I	12-in. screen set at 300-350, 520-550, 610-640, 680-700 ft.
Do.	16T10	—	322607-0833813	Pabst Brewery, 5	1977	640	300	26, 16,12	292	Kp-Kc, Kb	-7	6/4/77	1,655	26.27	I	12-in. screen set at 300-350, 500-520, 580-610 ft.
Do.	17D14	—	323522-0834245	Gleason's Mobile Home Park, 1	1969	95	90	4	450	Kp	-45	6/26/69	25	2.08	D	4-in. screen set at 90-95 ft.
Do.	15G1	1025	322027-0834708	Houston Co. Board of Commissioners, Henderson	1964	433	175	8	380	Tc, Kp-Kc	-132	10/64	272	2.78	P	8-in. screen set at 175-180, 315-320, 398-403, 425-430 ft.
Do.	16D6	—	323017-0833955	Mrs. C.L. Kersey	—	50	—	3	382	Kp-Kc	-40	—	—	—	D	—
Do.	16D7	—	323020-0833615	G. E. Perdue	—	65	—	2	340	Kp-Kc	-45	—	—	—	D	—
Do.	16D8	—	323036-0834008	Ethel Davis	—	116	116	2	300	Kp-Kc	+8	—	40F	—	D	—
Do.	16D9	—	323040-0834006	E. A. Merker	—	150	150	3	300	Kp-Kc	+8	—	65F	—	D	—
Do.	16D10	—	323025-0834003	J. H. Davis	—	200	200	3	300	Kp-Kc	+7	—	45F	—	D	—
Lee	12M5	—	314236-0841336	James Wingfield	1952	717	555	—	230	Pr,Kp	-7.0 -25.0	1952 7/10/79	200	—	A	Open hole from 555-717 ft.
Do.	13M2	—	314502-0820102	John Gates	—	700-800	—	—	236	Kp	+14.0	5/23/58	—	—	D	—
Macon	13E2	1061	321342-0840542	American Cyanamid Co., 1	1971	574	320	8	320	Kp, Kr,Kb	-9.2 -12.7	4/20/76 10/24/80	240	16.0	I	8-in. screen set at 320-340, 445-465, 475-485, 536-568 ft.
Do.	13E2	2161	321732-0840032	Southern Frozen Foods, 2A	1969	620	210	26, 12,10	350	Kp, Kr,Kb	-50 -53.1	7/10/69 12/1/76	1,050	19.81	I	10-in. screen set at 210-220, 440-450, 490-505, 572-582, 600-610 ft.
Do.	13E6	—	321734-0840034	Southern Frozen Foods, 1	1960	475	190	8	330	Kp,Kc	-38	3/4/60	525	6.82	I	Screen set at 190-210, 230-235, 450-465 ft.
Do.	13E9	1013	321735-0840037	Southern Frozen Foods, 2	1962	520	190	8	330	Kp,Kc	-52	8/3/62	800	14.29	I	Screen set at 190-200, 231-236, 440-450, 487-502, 510-520 ft. Water-quality analysis, 8/6/62, 1/10/69, and 4/24/74.
Do.	13B16	—	—	Joule Felton	—	348	220	4	290	Kp	+11.9	4/20/42	—	—	D	Open hole, 220-348 ft.
Do.	13B17	—	—	W. E. Wilburne	—	102	—	2	295	Kp	-10	2/22/42	—	—	D	—
Do.	13T2	—	—	J.A. Wardsworth	—	109.5	—	4	290	Kp	+6	4/22/42	100F	—	D	—
Do.	12B2	—	321813-0841405	Lester Souter	—	70	65	2	405	Kp	-33	—	—	—	D	—
Marion	9S3	329	321526-0843022	M. B. Wells	1963	398	—	—	645	Kp	-139 -179.7	1/14/63 10/80	—	—	D	—
Pulaski	18B3	—	321615-0832800	Old racetrack well, Hawkinsville	1959(?)	473	458	—	225	Kp-Kc	F F	1959 10/30/80	250F	—	P	Screen set at 458-470 ft.
Do.	18B11	—	321550-0832800	New racetrack well, Hawkinsville, 6	1976	552	171	—	260	To,Tc, Kp-Kc	-18	11/28/76	1,238	19.66	P	Screen set at 171-191, 220-240, 306-326, 376-386, 481-501, 535-545 ft.
Do.	18B10	—	321739-0832800	Portals Co.	1981	520	325	24,12	238	To, Kp-Kc	+1.2	4/22/81	1,080	22.43	I	12-in. screen set at 325-335, 343-355, 360-370, 400-445, 475-480, 502-510 ft.
Quitman	5F3	436	315310-0850434	Kaglar School	1955	170	116	—	348	Kp	-44.0 -53.3	1/29/75 11/9/76	25P	—	P	Original total depth, 396 ft. Well caved to depth of 170 ft.
Do.	5E1	—	314906-0850415	R. Balkcom	1966	560	473	—	414	Kp	-183	1966	—	—	D	Screen set at 473-560 ft.
Randolph	7B1	—	314609-0844743	U.S.G.S., Cuthbert observation well	—	372	250	8	455	Pc	-134.1 -146.0	1/5/65 1/5/79	—	—	O	Open hole, 250-372 ft. Unused municipal well. Water-quality analysis, 6/22/78.
Schley	11B4	73	321413-0841823	Ellaville, 1	—	624	177	8	560	Kp, Kr,Kc	-140 -134.0	3/1/37 11/14/78	245	7.0	P	8-in. screen set at 177-182, 218-223, 258-263, 303-309, 483-493, 531-537, 568-578, 618-624 ft.
Do.	11B2	174	321413-0841819	Ellaville, 2	—	583	173	8	560	Kp,Kc	-63	7/68	250	1.97	P	8-in. screen set at 175-190, 320-525, 550-560 ft.
Do.	11B3	313	321435-0841850	Crossroad Enterprises	1952	195	73	8	566	To,Kp	-53 -61.4	8/15/52 10/27/80	230	2.05	I	Screen set at 73-83, 170-175, 183-195 ft.
Do.	12B4	312	321129-0841332	T. M. Childers	1952	248	242	4	520	Kp	-155	7/6/52	9.5	.34	D	Screen set at 242-246.5 ft. Well destroyed in 1969.
Do.	11B2	—	322032-0841539	Morris Hill	—	89	85	2	500	Kp	-70	—	—	—	D	—
Do.	11B3	—	321747-0841726	J. B. Teele	—	104	—	2	480	Kp	-44	—	—	—	D	—
Do.	11B4	—	321742-0841650	Chester Davis	—	125	—	2	525	Kp	-105	—	—	—	D	—
Do.	11B5	—	321738-0841722	B. S. Teele	—	96	91	2	443	Kp	-36	—	—	—	D	—
Do.	11B6	—	321613-0841819	J. W. Collins	—	120	115	2	500	Kp	-80	—	—	—	D	—
Stewart	7Q3	—	320306-0844742	Lumpkin, 1	1963(?)	163	125	8	525	Kp	-100 -96.1	8/8/63 10/80	137	3.7	P	8-in. screen set at 125-155 ft.
Do.	7Q1	—	320320-0844717	Lumpkin, 2A	1967	156	118	8	540	Kp	-100 -102.3	4/3/67 10/80	160	3.56	P	8-in. screen set at 118-123, 133-138, 143-153 ft.
Do.	7Q2	3098	320309-0844740	Lumpkin, 3 (of 1A)	1975	191	151	4	570	Kp	-143.7 -135.3	9/75 10/80	150	—	P	Screen set at 151-191 ft. Water-quality analysis, 6/23/76.
Do.	8Q2	—	320507-0843955	Kirkland, 1	1952(?)	220	107	18,8	590	Pc-Kp	105	7/11/52	364	3.83	P	8-in. screen set at 107-112, 145-155, 170-180, 195-210 ft.
Do.	8Q3	—	320508-0843955	Kirkland, 2	1963	215	160	26,8	585	Pc-Kp	-112 -122.0	4/12/63 10/80	205	3.66	P	8-in. screen set at 160-180, 185-205 ft.
Do.	8Q1	—	320525-0843914	Kirkland, 3	1968	215	135	26,8	560	Pc-Kp	-107 -104.9	1/10/68 10/80	205	9.76	P	8-in. screen set at 135-155, 175-205 ft. Water-quality analysis, 6/20/68 and 6/27/74.
Do.	8Q4	—	320241-0843908	Singer & Jones	—	300	160	—	545	Pc-Kp	-97.8	1/29/75	700	16.59	A	—
Sumter	12Q1	2163	320702-0841141	B. Georgia Vocational Technical School, 2	1969	720	285	—	469	Kp, Kr,Kc	-152 -169.6	7/25/69 10/24/80	510	9.27	P	Screen set at 285-315, 322-332, 380-390, 435-445, 482-492, 650-660, 672-677 ft.
Do.	12Q8	213	320702-0841141	A & S Development (Old Dayton Veneer Corp.)	1948	386	313	—	470	Kp	-142 -176.7	2/5/52 10/24/80	254	—	I	Screen set at 313-333 ft.
Do.	12Q23	—	320447-0841351	Americus	1952	300	—	6	345	Kp	-40	1952	—	—	O	Continuous water-level recorder installed 1952 to 1961. Original total depth, 400 ft. Well drilled, 1896. Reworked, 1932. Caved through limestone.
Do.	12Q6	147	320345-0841330	Americus, 3 (Elm Ave.)	1947	590	260	20,10	420	Kp,Kc	-24 -210.2	8/6/47 10/24/80	800	4.12	P	10-in. screen set at 260-290, 473-485, 495-515, 570-590 ft.
Do.	12Q4	333	320332-0841355	Americus, 4 (Harold Ave.)	1947	800	203	20,10	385	Kp,Kc, Kr,Kb	-60 -150.3	2/17/53 10/24/80	935	8.82	P	10-in. screen set at 203-210, 220-225, 327-332, 342-347, 385-390, 400-405, 465-470, 600-605, 625-630, 685-690, 735-745, 765-785 ft.
Do.	12Q2	692	320321-0841212	Americus, 5 (Industrial Park)	1957	900	210	20,10	410	Pr, Kp,Kc, Kr,Kb	-60 -114.4	9/57 10/24/80	900	8.49	P	10-in. screen set at 210-220, 235-260, 275-280, 310-315, 370-375, 385-390, 428-433, 455-460, 520-525, 630-635, 668-675, 740-745, 775-780, 807-812, 885-890 ft.
Do.	12Q7	955	320336-0841409	Americus, 6 (Oak Ave.)	1964	926	194	24,10	375	Kp,Kc, Kr,Kb	-43 -116.9	4/24/64 11/14/78	1,627	18.08	P	10-in. screen set at 194-204, 216-221, 239-244, 452-457, 810-830, 692-697, 728-743, 764-784, 891-896, 906-914 ft.
Do.	11Q4	—	320240-0842237	U. of Ga. Experiment Sta.	1979	550	190	—	510	Pw,Pr, Kp,Kc	-118 -117.5	3/79 12/18/79	1,000	4.5	A	Screen set at 190-210, 230-270, 370-390, 430-470, 510-535 ft.
Terrell	10B1	213	314450-0842647	Dawson, 3	1978	575	342	20	350	Pr,Kp	-125	4/11/79	—	—	P	Backfill material removed in 1978, exposing Providence aquifer. Bottom of well plugged in 1979, sealing off Providence aquifer.
Webster	9Q1	—	320358-0843215	Preston, 1	1947	194	158	12,6	465	Kp	-86 -90.9	7/47 10/80	210	8.75	F	6-in. screen set at 158-163, 173-188 ft. Water-quality analysis, 12/14/48 and 3/31/72.
Do.	9Q2	947	320358-0843209	Preston, 2	1962	205	148	12,6	465	Kp	-94 -133.8	11/28/62 10/80	175	6.25	P	6-in. screen set at 148-158, 185-195 ft. Water-quality analysis, 12/3/62.
Do.	9Q5	—	320336-0843232	Preston, 3	1973	150	—	—	410	Kp	-48 -39.7	8/73 10/80	—	—	P	Water-quality analysis, 8/27/73.
Do.	9R3	—	321025-0843111	South River Farms	—	170	—	—	602	Kp	-130 -130.3	12/79 3/81	—	—	A	—

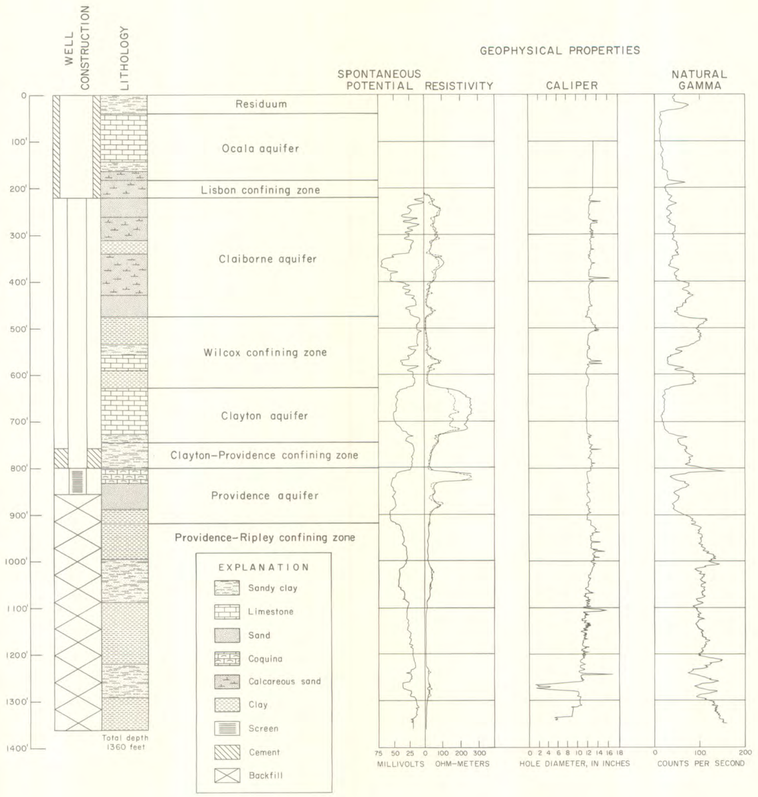

Figure 6.—Well construction and lithologic and geophysical properties of sediments at well 12L21 at Albany.

Figure 7.—Estimated discharge to streams from the Providence and other aquifers, September-October 1954.

WELL CONSTRUCTION

Wells tapping the Providence aquifer typically use multi-screen construction. The well construction and lithologic and geophysical properties of sediments at well 12L21 at Albany are shown in figure 6. Screens generally are placed opposite water-bearing zones that contain the highest percentage of coarse sand. During drilling, cuttings are collected at 10-foot intervals to determine the grain size and lithologic character of the material being penetrated. After the borehole is completed to the desired depth, a series of geophysical logs may be run to evaluate further the lithologic properties of the sediments. These logs, together with the drill cuttings, are used to determine the depth intervals of water-bearing zones. A screen line then is assembled above ground by welding alternating sections of blank casing and well screen at intervals that correspond to the depths of designated water-bearing zones. The assembled screen line is then positioned in the hole and the space between the well screen and the borehole wall is packed with coarse sand or gravel (Hicks and others, 1981, p. 19).

In some areas, the Providence aquifer supplies insufficient quantities of water and is used in combination with other aquifers. In Americus, multiaquifer wells tap combinations of the Clayton, Providence, Cusseta, and Blufftown aquifers. Albany municipal wells tap the Providence aquifer in combination with the Clayton and Claiborne aquifers. Construction information, water levels, and yields of wells tapping the Providence and other aquifers are listed in table 3.

RECHARGE

The Providence aquifer is recharged by precipitation along a 600-square mile outcrop belt that extends from the Chattahoochee River valley in Clay and Quitman Counties northeastward to the Flint River valley in Macon and Peach Counties (fig. 7). Additional recharge by precipitation is received between the Flint and Ocmulgee Rivers where the aquifer is near land surface and is overlain by permeable sand units. The aquifer also may receive recharge south of the outcrop area through leakage from underlying units. Declining water levels in the Providence aquifer have increased naturally occurring hydraulic head differentials, and therefore the potential for upward leakage of poor-quality water from underlying units has been increased.

DISCHARGE

The Providence aquifer discharges significant quantities of water to surface streams both in the outcrop area and downdip through overlying units. Much of this discharge probably represents rejected aquifer recharge due to low transmissivity (fig. 5). Estimated discharges of ground water to streams in the outcrop area during September-October 1954 (fig. 7) indicate that even during a period of extreme drought, water was available to recharge the aquifer. During this period, discharges exceeding 0.8 (ft3/s)/mi2 were observed in parts of Macon, Taylor, Schley, and Marion Counties (Thomson and Carter, 1954).

South of the outcrop area, discharge may occur where water from the Providence aquifer, under greater hydraulic pressure than water in the overlying Clayton aquifer, leaks upward through the Clayton-Providence confining zone into the Clayton aquifer. Declining water levels in the Clayton aquifer since the early 1900's have increased this naturally occurring head differential, thereby increasing the potential for upward leakage from the Providence aquifer. Water-quality analyses from the Clayton aquifer indicate that water may be leaking from the Providence aquifer into the Clayton aquifer in the Albany area (Hicks and others, 1981, p. 16).

DISCHARGE THROUGH IDLE MULTIAQUIFER WELLS

Idle multiaquifer wells in Albany and Dawson also provide conduits for the discharge of water from the Providence aquifer into the Clayton aquifer. Tests made in an idle Albany city well in 1979 showed that the Providence aquifer was discharging water through the well into the Clayton aquifer at a rate of 12 gal/min (Hicks and others, 1981, p. 20). A similar test conducted in an idle Dawson city well in 1981 showed that the Providence aquifer was discharging water through the well into the Clayton aquifer at a rate of 178 gal/min (D. W. Hicks, U.S. Geological Survey, oral commun., 1982). The higher discharge rate at Dawson probably is due to a greater head difference between the Providence and Clayton aquifers in that area. This head difference may be due to greater water-level declines in the Clayton aquifer than in the Providence aquifer.

SEASONAL WATER-LEVEL FLUCTUATIONS

Water-level fluctuations in the Providence aquifer are related to seasonal changes in precipitation, evapotranspiration, and rates of pumping. Owing to low transmissivity (fig. 5), most of the water-level fluctuations in the aquifer south of the outcrop area are caused by changes in pumping rates. The water level in observation well 12Q23 about 10 miles south of the outcrop area in Americus, fluctuated 13.8 ft between the lowest observed level in November 1958 and the highest level in January 1959. This fluctuation was due primarily to heavy seasonal pumping from nearby city wells (Owen, 1963, p. 42).

The water level in test well 12L21 about 40 miles south of the outcrop area at Albany, fluctuated 23.8 ft during 1980. A comparison of the water-level records for this well with the estimated pumping from the Providence aquifer by the city of Albany, shows the seasonal variation in rates of pumping and their effect on water levels (fig. 8).

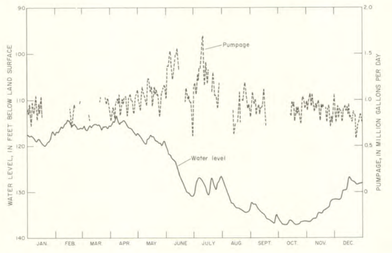

Figure 8.—Estimated mean daily pumpage from the Providence aquifer by the city of Albany and mean daily water levels in the Providence aquifer at well 12L21 at Albany, 1980.

Cartography by Willis G. Hester

HYDROGEOLOGY OF THE PROVIDENCE AQUIFER OF SOUTHWEST GEORGIA.

By
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1983